INEQUITY ON THE ROADS:

THE INTERPLAY OF GLOBAL, REGIONAL AND NATIONAL FORCES AND TRAFFIC FATALITIES, INJURIES AND ACCIDENT SEVERITY

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DISSERTATION ABSTRACT

In 2010, 1.24 million deaths worldwide were due to road traffic crashes. Traffic mortality disproportionately affects developing countries. Indeed, although developing countries account for only 48% of motorized vehicles worldwide, 91% of global road deaths occur in these countries. While we know that economic development is an important factor, we do not know to what extent the interplay between global, regional and national forces can explain different traffic fatality and injury outcomes across the world. This dissertation begins by building and using a unique cross-national time series data set to assess the global diffusion of three road safety measures across 170 countries: 1) national road safety agencies; 2) child restraint laws; and 3) mandatory use of daytime running lights. With respect to these three measures, the results show that road safety agencies diffused regionally (as opposed to nationally and globally), child restraints laws are disseminated globally, and daytime running lights were diffused primarily in Europe. Then, using cross-national time series data from 126 countries, the dissertation examines the effects of the diffusion of road safety agencies and national health systems on traffic fatalities, injuries, and accident severity. Findings suggest that the global diffusion of road safety agencies is associated with a long-term decrease in traffic injuries in developed countries. A second finding is that national health expenditures decrease traffic fatalities in the long-term, for both developing and developed countries. This study then questions the idea that conditions behind the reduction in fatalities and injuries are entirely the same. Lastly, in order to complement these global analyses, the case of Chile is analyzed in depth. After Chile approved its traffic law reform in 2005, which closely followed the recommendations of the World Health Organization, traffic police enforcement increased, which in turn reduced both traffic fatalities and injuries. This dissertation therefore highlights how the interaction between global, regional, and national forces is associated with variation in traffic fatality and injury, and suggests how implementation of specific policies,

regardless of countries' economic development, can improve road safety. Promoting policies that can be effective in countries at any level of economic development can reduce the global inequity in traffic deaths.

RÉSUMÉ DE LA THÈSE

En 2010, 1,24 million de décès dans le monde étaient dus à des accidents de la circulation routière. La mortalité due à la circulation routière affecte de manière disproportionnée les pays en développement. En effet, bien que les pays en développement ne comptent que 48 % des véhicules motorisés à travers le monde, 91% des décès de la route dans le monde se produisent dans ces pays. Ainsi, si le développement économique est reconnu comme un facteur important, nous ne savons pas dans quelle mesure l'interaction entre les forces mondiales, régionales et nationales peut expliquer les différences internationales dans les blessures et les accidents mortels attribuables à la circulation routière. Cette thèse utilise un ensemble de données inusitées assemblées par l'auteur consistant en des séries chronologiques transnationales permettant d'évaluer la diffusion mondiale de trois mesures de sécurité routières à travers 170 pays: 1) les agences de sécurité routière; 2) la législation des système de retenue pour enfants; et 3) l'utilisation obligatoire des feux de jour. En ce qui concerne ces trois mesures, les résultats montrent que les agences de sécurité routière tendent à être diffusées régionalement (par opposition à l'échelle nationale et à l'échelle mondiale), les lois de système de retenue pour enfants sont diffusés à l'échelle mondiale, et les feux de jour ont été diffusés principalement en Europe. En second lieu, à l'aide de données des séries chronologiques transnationales couvrant 126 pays, la thèse contraste les effets de la diffusion des agences de sécurité routière avec ceux des systèmes de santé nationaux sur les accidents mortels de la circulation, les blessures et la gravité des accidents. Les résultats suggèrent que la diffusion mondiale des agences de sécurité routière est associée à une diminution à long terme des blessures de la circulation dans les pays développés. Une deuxième constatation est que les systèmes nationaux de santé diminuent les accidents de la circulation dans le long terme, tant pour les pays en développement et que parmi ceux plus développés. Cette étude suggère ainsi que les conditions d'émergence des décès et des blessures de la route sont exactement les

mêmes. Enfin, afin de compléter ces analyses globales, le cas du Chili est analysé en profondeur. Après que le Chili eut approuvé sa réforme du code de la sécurité routière en 2005 (suivant en ceci de près les recommandations de l'Organisation Mondiale de la Santé), le contrôle de la police a augmenté, ce qui réduit à son tour autant les accidents de la route que les blessures. Cette thèse met donc en évidence comment l'interaction entre les forces globales, régionales et nationales est associée à des variations dans la mortalité et les blessures attribuables à la circulation routière, et indique comment la mise en œuvre de politiques ciblées, indépendamment du développement économique du pays, peut améliorer la sécurité routière. Ainsi, la promotion des politiques qui peuvent être efficaces dans les pays à tous niveaux de développement économique pourrait aider à réduire l'inégalité globale observée aujourd'hui dans les décès dus à la circulation routière.

STATEMENT OF ORIGINALITY

In recent years, the world has seen an increase in road fatalities. In 2010, road fatalities accounted for a total of 1.24 million in the world and road injuries were the second cause of deaths with 10.9% for males aged 15-49 at the global level. Further, although developing countries account for only 48% of motorized vehicles worldwide, 91% of global road deaths occur in these countries. A large portion of the road safety literature has suggested that economic growth and road safety policy implementation can account for these differences. The work contained here represents an original and important contribution to this research area. First, it draws from and extends prior findings by using a unique sociological approach that considers the interplay of global, regional and national forces on road safety policy development and their impact on traffic fatality, injury and accident severity outcomes. This study contributes to the road safety literature by suggesting that traffic outcomes need to be differentiated from each other, in order to assess more precisely the actual impact of a given public policy. Specifically, it finds that road safety agencies are associated with a long-term decrease in traffic injuries in developed countries, and well-developed health systems decrease traffic fatalities across the world. This thesis also analyzes processes of global policy convergence and diffusion, further noting that depending on the road safety policy analyzed, different convergence outcomes emerge and that the constructivist and competition mechanisms are more prevalent than the coercion mechanism in the realm of road safety policy diffusion. This study builds an innovative time series cross-national data for the period 1957-2013, regarding three road safety measures across 182 countries: 1) national road safety agencies; 2) child restraint laws; and 3) mandatory use of daytime running lights. As such this thesis is the first to standardize and use comparable road safety policies across countries to contrast and highlight how global, regional and national forces interact among each other. This thesis is the first to use two-stage least square regression with instrumental variables to under-

stand the range of global and national factors relating to traffic mortality, traffic morbidity, and accident severity variation. Finally, this dissertation focuses on the case of Chile since it offers an explicit test of national pathways through which the influence of global forces can contribute to changes at the national level. As such this thesis is the first to comprehensively quantify the effects of road safety institutional mechanisms on traffic fatalities, distinguishing between different types of road users, and severe injury rates in a South American country. The research findings, research questions, methods, overarching theory and hypotheses represent original work. Under the guidance of my research committee, I conceived of this study, carried out comprehensive literature reviews, collected and systematized the data, conducted all statistical analyses and wrote each chapter in its entirety.

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I would like to express my deepest gratitude to my supervisors Axel van den Berg and Amélie Quesnel-Vallée. In 2002, coming from a school of sociology in which the prevalence of grand sociological theories had eclipsed my understanding of what sociology should be, I entered into the Master's Program of Sociology in McGill. In that year, influenced by Professor van den Berg's seminars and works, I understood the (pretentiousness and) vagueness of grand sociological theories, and realized that other sociological avenues were indeed very fertile. I was also captured by Professor van den Berg's analytical capabilities and drive for parsimonious explanations, which since then, I have always tried to emulate. Little less than one decade after, I requested him to be my supervisor for this road-safety-sociological project, and as result in the past four years he was extremely committed with both my dissertation project and my intellectual development. He was decisive in how to structure and interrelate the research questions and how I should tackle them, as well as in how to integrate my road safety interests with a sociological perspective. My expectations of his mentorship were overpassed to no end.

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my approach to tackle health-related outcomes sociologically. I had the immense privilege of simultaneously being her teaching assistant, research assistant, and lab manager of the IRIS lab, and, of course, having her as my supervisor. Thanks to her guidance in these different tasks I believe I am now more aware of the need of integrating theoretical and methodological gaps--when tackling research questions. In regards to my dissertation her supervision was crucial in both shaping and sharpening the explanation of how global and national forces were interwoven. She always pushed me to think how to translate my research into policy practice, without compromising the required methodological rigour to understand policy development. Her approach to develop comparative studies of health inequalities was fundamental on defining the methodological design of this dissertation.

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While this research project was designed to be a bridge between sociologists and road safety academics, his guidance reminded me that this work was also a great opportunity to engage with a sociological audience avid of new research foci.

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EXECUTIVE SUMMARY

Background: In recent years the world has seen an increasing of road fatalities. In 2010, 1.24 million of deaths worldwide were due to road traffic crashes. Projections indicate that road traffic crashes will raise from the eighth leading cause of death in 2010 to the fifth in 2030 (Norton and Kobusinge 2013). The burden of traffic fatalities and injuries, however, posits the following problem: Traffic mortality disproportionately affects developing countries. Indeed, although developing countries count only 48% of motorized vehicles worldwide, 91% of global road deaths occur in these countries (WHO 2013). Furthermore, developing countries vary significantly in their patterns of traffic mortality, for instance in Southern sub-Saharan Africa, Eastern sub-Saharan Africa, Central sub-Saharan Africa road injuries are the 12th cause of death, whereas in Central Latin America and Andean Latin America are third and second respectively.

This state of affairs had triggered a strong global response led by international organizations providing aid and guidance to different countries (Ameratunga et al 2006; Sharma 2008; Rosenberg et al. 2010; Bliss and Breen 2009). In 2004 the World Health Organization (WHO) launched the *World report on road traffic injury prevention* (Peden et al 2004), through which a set of policies were both chosen and promoted to tackle the burden of road traffic fatalities and injuries. The *World report* recommended legislative measures such as use of child safety restraints and seat belts, and design and implement road safety agencies. And non-legislative measures such as safer roadway infrastructure, implementing vehicle and safety-equipment standards (i.e. airbags, daytime running lights, among others), enforcing road safety legislations, and providing pre-hospital care and opportune transportation to hospitals.

Differences in the development of road safety policies, as well as road traffic fatality rates in low- and middle-income countries have not been systematically accounted for. Nor whether is there any relationship between these policies and current outcomes. The research

questions that guide this dissertation follow a two-stage strategy. In the first part, two research questions are introduced to analyze the global diffusion and convergence of road safety policy and their cross-national impact on traffic outcomes. The second part studies the case of Chile, thereby two more questions are stated to more precisely identify some of the institutional mechanisms behind the interplay of global, regional and national forces on the selected traffic outcomes.

Methodology: In order to tackle the research questions I applied a two-stage methodology:

First, to identify if, when and where the creation of a road safety agency (RSA), legislation of child restraints (ChRL), and mandatory use of day running lights (DRL) were adopted, I collected and standardized information from more than 295 sources including, national traffic legislation, peer-reviewed articles, international reports from the WHO, the World Bank (WB), the Organization for Economic Co-operation and Development (OECD), and government websites. This information was used to build three dependent variables corresponding to 182 countries. Variables to predict policy adoption were taken from the WHO's health indicators and its road safety global campaign, United Nations traffic convention signatures and Commodity Trade Statistics database, and the WB development indicators. To obtain valid estimates to test the global diffusion of these measures, I employed survival analysis. The final analysis corresponds to time series cross-national data for the period 1957 to 2013 in 170 countries.

The creation of RSAs and the development of health systems (HS) were used to assess three traffic outcomes (traffic fatality, traffic injury and accident severity). I compiled traffic mortality and injury rates from the WHO Mortality Database and the OECD's International Road Traffic and Accident Database respectively, and constructed the accident severity variable by combining these two variables. Variables to control for the effect of these policies were taken

from the WHO, the WB, and the Food and Agriculture Organization whereby, health expenditure, economic growth, population density and alcohol consumption among others were gathered. Given the results obtained from the diffusion of road safety policies, I applied two-stage regression models--to control for endogeneity of RSA formation. Specific analysis for OECD countries which have traffic injuries rates available were also carried out. Traffic fatality analysis correspond to time series cross-national data for the period 1994 to 2012 in 125 countries, and analyses of injury and accident severity correspond to 28 countries for the same period.

Second, to examine the institutional mechanisms that worked in Chile, I requested Chile's Commission of Road Safety data regarding traffic fatalities and injuries by type of road users (i.e. pedestrians, passengers and drivers) per each Chile's region. I also gathered information from the Ministries of Justice, Public Works and Energy, to build economic, social and police enforcement variables. In order to test what type of institutional mechanisms were at work I applied structural equation models and piecewise random effects models. I specifically tested the indirect impact of Chile's traffic law on traffic outcomes, by introducing variables representing both police enforcement and alcohol consumption. I also assessed the role of road infrastructure investment in Chile's traffic outcomes trends. The final analysis corresponds to time series cross-regional data for 2000 to 2012 in 13 Chilean regions.

Results: Estimates from the survival analysis when assessing the global diffusion of these three road safety policies suggest that ChRLs have been fully globally diffused and the other two, RSA and DRL, only disseminated to specific regions. More specifically, the adoption of RSA was successfully diffused in Africa and Latin America and the Caribbean, and the mandatory use of DRL spread more consistently throughout Europe.

The results of the two-stage regression's estimators suggest that RSAs are not likely to be associated with fatalities, accident severity variation, but in the long term their effects, in OECD countries, significantly reduced traffic injuries. Results also indicate that well-developed HS significantly reduced traffic fatalities across the world. Its impact is associated with a global reduction of 5% of traffic fatalities. These effects were similar regardless of the different statistical models applied. Furthermore, sub-regional models indicate that within Asian regions, and African and European countries, these systems were more consistently effective than in the Latin American and Caribbean region. Across OECD countries, the strength of HS is not associated with traffic injuries variation, but is associated with a decline in traffic severities. More specifically, I found that the effects of HS change direction over time. For about eight years of HS investment in OECD countries, accident traffic severity rates improved. However, from this threshold on, the improvement effect of HS begins to plateau.

Empirical estimates from the structural equation models suggest that the enactment of Chile's traffic law is significantly associated with a 7% reduction of pedestrians. This association is entirely mediated by the positive association the law had with increasing police enforcement and reducing alcohol consumption. Piecewise regression models' results for the post-legislation period suggest that police traffic enforcement reduced traffic fatalities by 59% and severe injuries by 37%.

Discussion: seven general conclusions arise from these results:

i. The global efforts led by the WHO, from 2004 onwards, are significant and effective in shaping road safety policies across the world. A global increase of ChRL, and RSAs in Africa and Latin America and the Caribbean, and DRLs in Europe are solid evidence of these efforts. The WHO's leading experience in disseminating these policies needs to be studied further in

order to identify with more precision what made regions and countries to adopt measures in such short period. These efforts however are complemented by regional dynamics. The diffusion of DRLs are also explained by the regional road safety institutions working in Europe. This unique institutional capacity made these countries more frequently exposed to this road safety measures. Global efforts can also be accompanied by common institutional legacies as the African region shows. Commonwealth countries in this region were more likely to adopt RSA, suggesting that historical links to specific forms of British colonial rule created conditions for these institutions to be disseminated.

ii. Sociological studies on policy diffusion should account for the implementation of different policies simultaneously in order to conduct more systematic tests of falsification and to eventually requalify the most prevailing theories applied in this field. Doing so will lead to more nuanced and precise specifications of why policies successfully diffused or not and what the borders/limits of these diffusion processes are.

iii. The global diffusion of RSAs is not associated with traffic fatalities reduction across the world but is with improvements in traffic injuries in OECD countries. As such one should question the idea that conditions behind the emergence of fatalities and injuries are entirely the same. RSAs may be more effective in targeting and changing those circumstances that lead to the occurrence of injuries rather than the ones that are associated with fatal crashes. This is the case when RSAs introduce road safety legislation that, even though their initial objective was to target the complete road user population, only reaches specific groups of this population. This suggests that road users' populations have differentiated access to resources, in which some groups can more rapidly adapt to the incentives or restrictions introduced by new road safety legislations.

iv. The development of HS are effective in reducing traffic fatalities across the world. This may be linked to pre-hospital care and opportune transportation to hospitals. This association merits a closer look since the most conservative figure suggests that well-developed HS are associated with a 5% of traffic fatality reduction. More specifically, in order to understand this relation further, factors such as population density—in which emergency medical response services can be better provided given shorter average distances between crash locations and trauma centers, and/or the more availability of trauma resources to attend traffic injuries—and identification of secular decrease of non-traffic related injuries associated with development more generally, should be studied further.

v. The interest of sociology in policy implementation should be driven by a research agenda in which contrasting policy failure and policy success is done simultaneously. Further, comparing different policies with different outcomes was a necessary first step, but finer analyses regarding the mechanisms behind these processes are required to advance more precise policy recommendations. Policy decoupling, as the neo-institutionalist literature has suggested can be explained by several mechanisms (i.e. emergence of contingencies, lack of resources, absence of political will, path-dependency, problems in translating policy, among others), but if these mechanisms cannot be disentangled from each other, then our uncertainty of the mechanisms at play remains unchallenged. Conversely, policy success can be explained by the opposite mechanisms (i.e. absence of contingencies, access to resources, presence of political will, adequate translating processes, among others), but if these mechanisms cannot be differentiated from each other our understanding of policy implementation remains at best hypothetical.

vi. The case of Chile illustrates the importance of two elements: from a theoretical perspective, comprehensive traffic reforms can be effective tools in decreasing negative traffic outcomes, as long as these policies effectively reduce risky behaviors (i.e. alcohol consumption) and increase protective factors (i.e. police enforcement). From a methodological perspective, by having access to grainer data, in which is possible to disaggregate fatalities and injuries by type of road user (i.e. pedestrians, passengers and drivers), one can capture more precisely the effects of road safety policies. In other words, traffic fatality and injury variation can be better explained as long as one recognizes that road safety polices may have impacts on specific road users' population, rather than on the road user population at large.

vii. The case of Chile's traffic law approved in 2006 also highlights a finer description of the interplay between global and national forces. The timely dissemination of the *World Report* in 2004 accelerated the implementation of traffic law reform which was held up more than twelve years in parliament. More particularly this report helped both to document the need of tackling a serious global challenge as well as to inform law makers of the existence of scientifically-proven successful road safety measures. While some of the report's recommended measures were considered (i.e., mandatory use of child restraints, or banning cell phone use while driving) and others left behind (i.e., mandatory use of helmets for cyclists on all roads, not only on urban roads), nevertheless, it was useful in increasing the sense of urgency in the need to target the road safety challenge that Chile had left unattended.

> "Not every kind of human contact is social in character: it is only when one person's behavior is related to its meaning to the behavior of other people. For example a collision between two cyclists is a mere occurrence, like a natural event. But when *they try to give way to each other*, or when they engage in insults, fisticuffs, or peaceful discussion after the collision, this does 'count as social action'." (Weber 1978: 23)(My emphasis)

INTRODUCTION

While Weber suggests that traffic crashes or collisions are not social actions per se, he however notices that both the anticipation and consequences of these occurrences are indeed social. In line with what Weber implies, I argue that both prevention and mitigation of these events can be explained sociologically. In short, the absence or presence of crashes and related outcomes indicates some form of social action; the question is which types of social action. A good starting point is to analytically distinguish between two broad types of social forces, on the one hand, how road users interact with each other, their environment, and their vehicles (Weber's cyclists can be taken as examples of this type of social force). But also how societies—being the main unit of analysis of my dissertation—through their public and private institutions, acknowledge these road interactions, and then set practices to intervene on their public spaces.

Indeed some countries have been more successful than others when developing road safety policies and tackling the occurrence of traffic fatalities and injuries. There is a variety of economic, engineering and epidemiological explanations which have been successfully introduced to account for traffic fatality variation in the last two decades. However, an important gap within the cross-national literature has been identified: studies have not considered the potential influence of global factors on both the adoption of road safety policies and their relative impacts in road users. I expect to tackle this challenge by introducing in this dissertation a unique sociological perspective into this debate.

RESEARCH QUESTIONS

The research questions that guide this dissertation follow a two-stage strategy. In the first part, two research questions are introduced to analyze the global diffusion and convergence of road safety policy and their cross-national impact on traffic outcomes. The second part studies the case of Chile, thereby two more questions are stated to more precisely identify some of the institutional mechanisms behind the interplay of global, regional and national forces on the selected traffic outcomes.

i) First part: a twofold sociological puzzle

In recent years, the world has seen an increase in road fatalities. In 2010, road fatalities accounted for a total of 1,24 million deaths in the world and road injuries were the second cause of deaths with 10.9% for males aged 15-49 at the global level. Projections indicate that road traffic crashes will rise from the eighth leading cause of death in 2010 to the fifth in 2030 (Norton and Kobusinge 2013).

This state of affairs has triggered a strong global response led by international organizations providing aid and guidance to different countries (Ameratunga et al. 2006; Sharma 2008; Rosenberg et al. 2010; Bliss and Breen 2012). In 2004, the WHO, in conjunction with the World Bank (WB), launched the *World report on road traffic injury prevention* (Peden et al 2004), through which a set of policies—based on scientific publications and advice provided by road safety experts—were promoted to tackle the burden of road traffic fatalities and injuries.

These policies can be broadly divided into two classes: legislative and non-legislative. Within the legislative approach, the *World report* recommended measures such as the mandatory use of child safety restraints and seat belts, regulation of impaired driving, mandatory use of motorcycle and bicycle helmets, graduated driver licensing systems for novice drivers, regulation of speed limits and design and implementation of road safety agencies or institutions. Among the

non-legislative policies, we find measures such as safer roadway infrastructure, introducing traffic calming measures to reduce speed in urban areas[1], implementing vehicle and safety-equipment standards such as airbags, daytime running lights[2] and/or anti-lock braking systems[3], enforcing road safety legislation, and providing pre-hospital care, opportune transportation to hospitals and rehabilitation programs for crash victims.[4]

The burden of traffic fatalities and injuries, and the development of road safety policies, however, posit a twofold sociological problem:

First, in the last report on the global status of road safety, the WHO (2013) acknowledged that only 28 countries, representing 7% of the world population, have adequate legislation in every aspect previously mentioned. Further, unlike developed countries, developing ones have been less likely to adopt comprehensive road safety legislations. For instance, in the Latin American and the Caribbean region, only 58% and 88% of the countries have mandatory child restraint laws and road safety agencies respectively. Systematic information on measures such as traffic calming, road infrastructure, airbags or anti-lock braking systems is not yet available at this point. Furthermore, while there has been an increased and sustained political interest in road safety in developing countries, research on this matter has lagged (Lagarde 2007; Naci et al. 2009; Chandran et al. 2010; Hijar et al. 2012). More particularly little is known about why countries, developed and developing, adopt road safety policies when they do.

[1] Traffic calming are measures "taken to reduce traffic volume and/or speed, in particular in residential areas" (Elvik and Vaa 2004:1043). These are also usually designed to tackle "black spots", that is, road locations with an abnormally high number of crashes. In Australia (Meuleners et al. 2008), Germany and United Kingdom (Bunn et al. 2003) roundabouts are usually designed and implemented as traffic calming measures to reduce crashes in black spots.

[2] Daytime running lights are vehicle headlights used "during daytime in order to enhance vehicle conspicuity" (Elvik and Vaa 2004:1033). A more complete description of this measure can be found in Chapter 1.

[3] Antilock braking systems are "fitted to many cars with the aims of improving their ability to steer while braking heavily and of reducing stopping distances on some surfaces" (Broughton and Baughan 2002:347).

[4] According to the WHO these measures can be understood as the most effective in reducing both traffic fatality and morbidity rates. However, it is important to acknowledge that these measures represent only a part of a larger range of alternatives. Elvik and Vaa (2004) actually describe 124 road safety measures which have been implemented in high-income countries, and through meta-analysis report the effects of 104.

An important tradition in social science research, the world-society perspective, has advanced several hypotheses regarding the global diffusion of public policies which can be revisited to explain to what extent road safety policies, promoted by international actors such as the WHO and the WB, have globally converged.

Second, traffic mortality disproportionately affects developing countries. Indeed, although developing countries account for only 48% of motorized vehicles worldwide, 91% of global road deaths occur in these countries (WHO 2013). Furthermore, developing countries vary significantly in their patterns of traffic mortality. For instance, in Southern sub-Saharan Africa, Eastern sub-Saharan Africa, and Central sub-Saharan Africa, road injuries are the 12th cause of death, whereas in Central Latin America and Andean Latin America, they are third and second respectively. Are these differences explained by economic development, as some commentators have argued (Kopits and Cropper 2005), and/or do successful countries rely on a variety of public policies that allow them to decrease traffic crashes and their related outcomes? Do these policies help to reduce all of these outcomes, some of them, or are they simply ineffective? A body of research has tackled these questions. Kopits and Cropper (2003) have suggested that after a certain economic growth threshold is reached there is a change in the composition of the road user population. The increasing of vehicle fleet due to economic growth has as consequence that more individuals become drivers and/or passengers, and therefore are likely to be protected by the outer structure of the vehicle, seat-belts or airbags when car crashes occur. Elvik and Vaa (2004) have analyzed a significant number of road safety measures, and suggested that when countries implement specific road safety polices they are more likely to decrease both traffic fatalities and injuries. However, these studies do not consider the interaction between global, regional and national forces when explaining traffic outcomes. In short, differences in the diffu-

sion of road safety policies, as well as their effects on road traffic fatality and morbidity rates have not been systematically accounted for.

The diffusion of public policies and their implementation are the result of the interaction of multiple forces, such as the international community, regional institutions, and national dynamics (Marsh and Sharman 2009). As such, I am interested primarily in how a given country's road safety policy choices are affected by international organizations and regional actors, as well as in understanding how the relative position of countries, which have been influenced by global processes of diffusion, explains traffic outcomes variation. As such, this dissertation has two main objectives. First, I wish to identify the mechanisms that either facilitate or inhibit the global diffusion of road safety policies. I particularly focus on three policies: the creation of road safety agencies (RSA), mandatory child restraint legislation (ChRL), and mandatory day-time running lights (DRL). The research question which addresses the first objective is: what has caused these three road safety policies to diffuse across time and space? But I am also interested in identifying what factors put the brakes on such diffusion; that is, could it be the case that some policies do not necessarily follow a global pattern, but only regional ones? I am also interested in problematizing the notions of global and regional convergence since certain policies may converge unintentionally, in other words it could be the case that countries simultaneously adopt a similar policy because their national dynamics are alike.

My second objective is to explain cross-national differences in traffic fatality, traffic injury and traffic accident severity rates in reference to two public policy domains: RSA and health systems (HS). The research question for the second objective is: to what extent RSAs and the presence of a well-developed HSs are effective in explaining differences in traffic fatalities, injuries and accident severities across countries? In this particular case, I am interested in identifying

how the relative position that a country has in the global diffusion process of RSAs explains its relative rates of these three traffic outcomes. The analysis of HS also merits attention since this policy area has been regarded by the WHO as one of the key functions that a country should develop to attend more efficiently to the consequences of road crashes. A comparison of these two policies also allows me to explore whether their effects are more specifically related to the type of traffic outcome i.e. injuries or fatalities being analyzed, that is whether these policies are more effective in reducing one rather than the other traffic outcome and vice versa. Returning to Weber's insight, countries can be effective in targeting road safety challenges because they set policies to prevent road crashes or to mitigate the harmful effects of road crashes, RSA representing the former and HS the latter.

In short, the first part of this dissertation examines the global forces that help account for the spread of road safety policies cross-nationally and their impact on traffic fatalities, injuries and accident severities.

ii) Second part: refining the twofold sociological questions with the case of Chile

While time series cross-national studies are excellent alternatives to capture general processes of public policy development at the global level, particularly when analyzing the global diffusion of public policies, time series studies at the national level can complement this approach in important ways. A single time series case study can be quite effective in testing other hypotheses, which, due to data limitations, could not be otherwise examined. Furthermore a single case study can shed light on some aspects of the institutional mechanisms at play in order to explain variation in the analyzed outcomes. This last point is of particular importance since one can assess the ways in which the external influences (here, the global promotion of road safety policies) are linked to various outcomes (traffic fatalities by different road users, severe injuries

and accidents) via the actual implementation of these policies in interaction with domestic institutions.

Hence, the last two research questions of this dissertation are: to what extent can Chile's traffic law reform—which closely followed the recommendations set by the *World report,* be associated with a reduction in a diverse range of traffic outcomes such as traffic fatality, by type of road user (driver, passenger and pedestrian), severe injuries and traffic accidents in Chile. My global analysis considers traffic fatalities without differentiating between road users, and as such I am unable to determine to what extent the assessed policies are effective in targeting each of these populations. Road infrastructure is a very important factor in explaining traffic outcomes variation since road design has a direct effect on reducing the severity of vehicle crashes. However, global data are very limited in regards to public and private road infrastructure. With the Chilean data I can overcome these two limitations by disaggregating traffic fatalities by drivers, passengers and pedestrians, and introducing both public and private expenses on road infrastructure. In other words, with the analysis of Chile I can arrive at a much finer explanation of how globally promoted road safety legislation in tandem with other national policies explain changes in drivers', passengers' and pedestrians' fatalities, as well as in severities and accidents.

The last research question of this dissertation is to identify which institutional mechanisms were behind the downward trends which Chile experienced after the implementation of its traffic law reform. More particularly, I focus on analyzing the extent to which the Chilean police enforced the new traffic law reform. Unfortunately, road safety global studies cannot assess the role of police forces because time series information on the number of police officers involved in traffic safety activities or regarding numbers of traffic tickets is rather scarce. These two methodological challenges can be tackled with the case of Chile, since this country has information on

numbers of police officers as well as traffic tickets. As such this country provides us with a unique opportunity: assessing to what extent the combination of both government and parliament institutions after introducing the traffic law reform, was effective in increasing police efforts, which in turn led to the decrease of both traffic fatality and injury trends

In the remainder of this Introduction I present the analytical approach that I will use to address the aforementioned questions. I will briefly review the concepts of global, regional and unintended convergence, and three mechanisms of diffusion: constructivist, coercion and competition. I also discuss the two most common theoretical explanations applied to understand traffic outcome differences across countries: modernization and the piecemeal social engineering approach, and revisit a sociological theoretical tradition that can help to identify why certain policies fail. I end by previewing the main findings of each chapter.

THE ANALYTICAL APPROACH

To answer the questions described above, I adopt a theoretical approach that combines references to global dynamics with the implementation of policies at the local level. The analytical approach is divided into two parts. First, I discuss some of the current explanations regarding the global diffusion of public policies. Second I review explanations of road traffic outcomes variation.

i) The global convergence and diffusion of road safety policies

Studies have empirically shown that in order to have a clear account of how public policies' implementation and impact take place it is necessary to understand both their global diffusion (Hafner-Burton and Tsutsui 2005; Shor 2008) and mechanisms connecting international and national actors (Ancelovici and Jenson 2012). Sociology has been quite prolific in researching the global diffusion and impacts of public policies. Under this particular area one finds analyses which have focused on the diffusion of economic policies (Brooks 2005; Kil Lee and Strang

2008; Kogut and Macpherson 2011; Kogut and Macpherson 2008; Weyland 2005), health policies (Gilardi, Fuglister and Luyet 2009; Iriart, Merhy and Waitzkin 2001; Luke and Watkins 2002; Wipfli, Fujimoto and Valente 2010), and political public policies such as the spread of democratic institutions, human rights laws, and laws against terrorism (Gleditsch and Ward 2008; Pegram 2010; Hafner-Burton and Tsutsui 2005; Shor 2008 and 2013; Shor et al 2014). While road safety policies could be grouped under the study of the diffusion of health policies—analyses of this type of policy have focused on hospital financing and care, reproductive rights and tobacco prevention and control—there has not been an account which has provided an explanation of which and why certain road safety policies have diffused. An analysis of this type will help to determine why countries have different road safety policies and adopt them at different moments. In order to tackle this question two elements need to be briefly discussed, i) what global diffusion is, and ii) what sociological theories have been introduced to understand the spreading of public policies throughout the world.

i.i) What is global diffusion?

The concept of diffusion is not itself a strictly sociological one.[5] For instance, some studies examine how animals spread illnesses within the same species and to other ones (Morens, Folkers and Fauci 2004; Wolfe, Dunavan and Diamond 2007). However, if one were to understand and define diffusion, from both traditional and contemporary sociological perspectives, at least three elements should be considered: i) social actors, ii) their interactions—affecting the diffusion among these actors, and iii) how this process evolves through time. The explicit presence of social actors and their interactions, as direct sources of influence in this particular process, follows the tradition of sociological studies initiated by Tarde (1962[1903]) and Simmel

[5] For an account in which the topic of diffusion is analyzed with sociological lens see Wejnert (2002).

(1955). [6] Rogers (1962) offers a theoretical understanding of why and how this process occurs on a more abstract level, and Marsh and Sharman (2009), tackle this question for the particular topic of policy diffusion at the international level. These last two authors expanded the unit of analysis from individuals to states, also suggesting that analyzing the impact of the policies should be part of the global diffusion research program.

Marsh and Sharman (2009) and other scholars who have worked extensively in this particular research area (Dolowitz and Marsh 1996; Dolowitz and Marsh 2000; Marsh and McConnell 2010; Sharman 2006), have identified various aspects, which are noteworthy for the purposes of this dissertation. First, since this type of research identifies processes within the international arena, the state becomes one of the most important social actors. They define the process of international diffusion of public policies as "knowledge about policies, administrative arrangements, institutions and ideas in one political setting (…) used in development of policies, administrative arrangements, institutions and ideas in another political setting" (Marsh and Sherman 2009:270). These authors suggest that states can adopt different tools from other states or other international actors.

Marsh and Sherman point out that 'structural' explanations are the most pervasive ones within this field of research. Their operationalization of structure considers variables such as "trade partnership, geographical proximity, trade with United States and previous economic out-

[6] Tarde proposes both a general theoretical consideration of why diffusion occurs and in what shape. His theory suggests that groups who are likely to initiate the diffusion of ideas or practices are composed of cosmopolitan individuals; furthermore cosmopolitan individuals are also likely to more rapidly adopt new ideas or practices when exposed to them (Tarde 1962[1903]: Chapter VII). Secondly, he states that social processes of diffusion follow a statistical model which usually takes a normal S-shaped distribution over time (Tarde 1962[1903]: Chapter V). Simmel argues that in order to understand social diffusion thoroughly, it is important to identify the type of actors who are located at the intersection of various groups (Simmel 1955). These actors, Simmel states, similarly to what Tarde points out in regards to cosmopolitan actors, usually fulfill criteria of maximum inclusion. More specifically, these individuals have the ability to establish relationships with different groups—which might complement or contradict each other—because they can express and communicate ideas that can be understood simultaneously by individuals whose backgrounds are potentially dissimilar. In sum, these individuals can facilitate social interactions between groups and thus are essential in the process of diffusion of ideas and practices.

comes" (Marsh and Sharman 2009:274). However, they argue that diffusion processes are 'dialectical', or interactive and iterative, and so suggest that a more complete understanding of diffusion processes should consider the interaction between 'agency' and 'structure'. Further, these authors stress that a more complete research agenda should introduce cases of convergence and divergence (i.e., adoption as well as absence of adoption). Lastly, they state that research of global diffusion should also include analysis which assesses the impact of the policy that was successfully adopted.

i.ii) Explaining the global convergence of (road safety) policies

When analyzing convergence of public policies, it is important to analytically distinguish between convergence as an outcome (i.e., global convergence, regional convergence or unintended convergence) and the mechanisms that may produce convergence, i.e., the social processes (constructivist, coercion, and competition) that are behind the emergence of these outcomes.

a) Types of convergence outcomes

Global convergence. An important number of scholars have reached the conclusion that, in the specific realm of public policy formation, the world experienced since the 1980s a process in which nation-states have been characterized by isomorphism, or global convergence (Harvey1989; Meyer et al. 1997; Martinelli 2005; Herkenrath et al. 2005). According to this view, nation-states became isomorphic because world models have been propagated through global cultural and associational processes (Meyer et al. 1997).

Regional convergence. Other scholars suggest that before understanding global convergence it is necessary to distinguish different convergence outcomes (Herkenrath et al. 2005). For these authors, the implication of this analytical distinction is that convergence between two or more countries may not necessarily lead to global convergence, but rather an emergence of regional clusters.

Unintended convergence. A last convergence outcome is one in which countries adopt the same policy but there is no convincing evidence of global or regional forces causing this outcome. Instead of following international influences, these countries may be constrained by similar national dilemmas and thus their solutions converge unintentionally. This type of position has been taken by scholars who conceptualize nation–states as purposively rational actors (Herkenrath et al. 2005; Gilpin 1981).

b) Mechanisms of diffusion

Several prominent authors identify constructivism, coercion and competition as the main mechanisms providing theoretical and empirical understanding of why the global diffusion of public policies occurs (Lee and Strang 2006; Marsh and Sharman 2009; Simmons, Dobbin and Garrett 2008). I will briefly discuss each of these mechanisms.

b.1) Constructivism (an old label for new-institutionalism)

Meyer and his colleagues argue that world models, produced by a world-culture, have impacted states in at least two aspects: structure and policies (Meyer et al. 1997). Structure simply refers to an organizational model which carries specific functions in order to reach state goals; and policies are guidelines that respond to the question of what a state ought to do in order to reach a given goal. The world-culture, Meyer et al. (1997) argue, is homogenous and therefore the structures and policies embedded in it are also similar. As a result, public policies (and state structures) exhibit a high degree of isomorphism.

Unlike coercion and competition theories, constructivism highlights the predominance of the world-culture in the process of diffusion of public policies. The world-culture has an impact on determining which public policies are in vogue or legitimized. Policies whose goals are socioeconomic development, citizen rights, individual self-development, and civil international rela-

tions, among others, are commonly referred to as legitimate as they are based on values such as democracy, human rights freedom and equality (Elliot 2007; Meyer et al. 1997).

Two sources of social influence facilitate the global diffusion of public policies (Strang and Meyer 1993): i) countries follow other countries which are regarded as either leaders or successful in specific areas; ii) communities of experts or international organizations promote policies which have been proven, theoretically or empirically, effective, and as a result "policy makers [have access] to rationales for adopting [them]" (Dobbins, Simmons and Garret 2008:452).

b.2) Coercion

The starting point of this theory is the work developed by Wallerstein and his contributions to world-systems theory. Similarly to Meyer et al. (1997), who analyze the global system, Wallerstein argues that states are subject to world systemic pressures which influence their performances (Wallerstein 1974; 1979; 1998). However, Wallerstein maintains that culture is not what connects the world, but rather an economic system which favors the 'ceaseless accumulation of capital' (Wallerstein 1980). The change of unit of analysis, from the nation-state to the world-system, allows Wallerstein to retain part of Marx's classic conceptualization of class warfare, dividing nations into three categories: core, periphery and semiperiphery nations. Each of these has different and complementary roles in the functioning of the world-economy.

Core nations exercise coercion through war, subversion and diplomacy in order to receive the greatest share of surplus (Wallerstein 1980:21). Wallerstein (2004) and Owen (2002) claim that specific international organizations, such as the International Monetary Fund (IMF) or the World Trade Organization (WTO), fulfill roles in this line because they have promoted public policies which aim at helping the accumulation of capital through measures such as reduction of taxation (Wallerstein 2004), or in the case of nongovernmental actors, through physical force (Owen 2002). Henisz, Zelner and Guillen (2004) notice further that "much research on interna-

tional coercion highlights the role of multilateral agencies, which control financial resources sorely needed by many countries, have a considerable amount of legitimacy, and typically enjoy the backing of the dominant states that contribute to them financially" (Henisz, Zelner and Guillen 2004:16). According to several authors the most relevant actors in this regard, along the IMF and the WTO, are the U.S. administration, the World Bank (WB), and think-tanks located in Washington DC (De Vries 1987; Edwards 1995). Essentially all of these actors, given their economic or political position in the world-economy, can exercise a strong influence on what other states are likely to do and thus are capable of changing their incentives.

b.3) Competition

The main argument of this theory is: "country A adopts new policies to compete with B for [having access to resources provided by] country C" (Dobbins, Simmons and Garret 2008:459). Chile has been taken as an example which influenced Latin America in the 1990s. This country was presented as both an example of successful socio-economic development and as capable of diverting potential investments historically targeted to other Latin American countries. Most countries of that region imitated Chile in order to remain attractive to foreign investments (Simmons and Elkins 2004). Dobbins, Simmons and Garret also argue that developing countries adopt a new policy because they want to keep their competitive advantage, which in this case can consist of two elements: provision of cheap labor and/or policies which facilitate both the fluid entrance and exit of capital (Dobbins, Simmons and Garret 2008).

In contrast to coercion theory and similar to constructivists, this approach assumes that states are relatively independent actors, and thus decisions of adopting a given policy depend on their own judgments or assessments, rather than from pressure from powerful actors. Whereas coercion and constructivist theories can be potentially applied to a diverse set of public policies

(e.g., education, democracy, economic policy), competition theory seems limited to economic policies such as regulation of trade or more generally pro-market measures.

Lastly, unlike constructivist theory, and similar to coercion theory, competition is ambivalent towards the thesis of isomorphism. While the former two are likely to predict similar state structures and public policies, given the predominance of cultural models and the power position of core countries, competition theory assumes both divergence and convergence, and these outcomes depend on the type of policies concerned. On the one hand, evidence shows that capital tax rates have been consistently reduced in OECD countries (Dobbins, Simmons and Garret 2008). However, competition can also deepen gaps between countries, and therefore the convergence thesis is questioned. For instance, capital is likely to flow to countries where less restriction exists, while labor does not. More specifically Dobbins, Simmons and Garret (2008) argue that once capital has fled out from a given jurisdiction, protectionist measures are likely to emerge, yet other countries still promote market friendly policies through which capital can flow more freely.

ii) *The unequal distribution of traffic fatalities and injuries*.

While experts from disciplines such as economics, epidemiology or transport engineering have systematized different explanations to understand patterns of traffic mortality rates across countries, sociologists on the other hand, have been mostly silent in this particular area of research. Indeed sociology has made contributions to both transport research in general (Goffman 1971; Boer 1986) and the road safety literature in particular (Philips 1979; Gusfield 1984; Parusel and McLaren 2010:129-130; McLaren and Parusel 2011:161). However, with the sole exception of Norbert Elias (1995), this discipline has provided very limited accounts of how and why traffic fatalities vary among countries. Nevertheless, sociology has made important contributions to

improve our understanding of policy implementation; particularly policies, which have been globally diffused. More specifically, neo-institutionalism theory has been interested in exploring how globalization processes of public policy diffusion affect their local implementations. In short, our understanding of cross-national traffic fatality and injury variations can be enhanced once we introduce some of the hypotheses advanced by neo-institutionalists. In sum, different theoretical contributions to understand country variation can be analytically grouped under three clusters: modernization theory, the piecemeal social engineering approach, and neo-institutionalism theory.

ii.i) Modernization theory

Modernization theory[7] focuses mostly on how societies change over time. Its explanations highlight the predominance of economic growth (Bernestein 1971; Chase-Dunn 1975). Within road safety research, the modernization approach has been widely applied to understand differences in traffic fatality rates between countries (van Beeck et al. 2000; Kopits and Cropper 2005; Bishai et al. 2006; Paulozzi et al. 2007; Vasconcellos 1996; Forjuoh 2003; Anbarci et al. 2009; Law et al. 2011).

In 1949, Smeed published a seminal article on traffic fatalities in the *Journal of the Royal Statistical Society*, in which he empirically showed that road users in developed countries for the 1930-1940 decade changed their mobility patterns from pedestrians to drivers or vehicle passengers, and how this fact accounted for variability in traffic fatality rates (Smeed 1949). Following this work, several authors (Whitlock 1971; Jacobs 1976; Jacobs and Sayer 1984; Wintemute 1985 and 1986; Söderlund and Zwi 1995; van Beeck et al. 2000; Kopits and Cropper 2005; Bishai et al. 2006; Paulozzi et al. 2007) have argued that the relationship between the rate of

[7] While it is difficult to delimitate where the postulates of modernization theory begin or end (Tipps 1973:201), I will only highlight those elements that provide falsifiable explanations when understanding traffic fatalities and injuries.

crashes and the rate of economic growth has an inverted U-shaped pattern (i.e., Kuznet's curve).[8] During initial stages of development—that is when there is substantial growth of both income and vehicle fleets—traffic fatality rates tend to increase. However, after a given GDP threshold has been reached, pedestrians actually decrease their traffic risk vulnerability, since they will have adopted new travel patterns as Smeed had already suggested. In other words, a rise in the absolute number of drivers and passengers brings with it safer travel patterns, because these two types of road users, unlike pedestrians, are likely to be protected by the outer structure of the vehicle, seat-belts or airbags when car crashes occur. This particular relationship holds even if the total number of crashes between vehicles has increased.

ii.ii) The piecemeal social engineering approach

Beyond some methodological limitations in modernization studies,[9] there is one element which has not been explicitly tested by this theory: the *piecemeal social engineering*[10] approach, that is, the consideration of specific road safety measures as instruments that can deliberately change traffic outcomes.

This approach, pursued by a heterogeneous group of scholars who have assessed the impact of particular road safety policies, from disciplines such as epidemiology and transport engineering, emphasizes the importance of scientific knowledge and its application for reducing road

[8] Simon Kuznet (1955) argued in his famous "*Economic growth and income inequality*" article that income inequality is not a linear function of economic growth, but rather an inverted-U shape function. Kuznet made no reference to a very similar idea proposed by Adam Smith in his *Wealth of Nations*, when he discusses the relationship between opulence growth and inequality. See Kuznets Simon. 1955. Economic Growth and Income Inequality. *American Economic Review*, 45 (1):1-28 and Smith, Adam. 1952. *An inquiry into the nature and causes of the wealth of nations*. Chicago: Encyclopædia Britannica.

[9] Some of the methodological limitations of modernization studies have been the account of technological advancement and road safety institutional level of development through statistical methods (i.e. fixed effects). More specifically some of these studies assume that the introduction of occupant protection devices, the presence of institutional road safety capacity and improvements in pre-hospital and medical care could account for traffic fatality variation, but none of these factors have been operationalized.

[10] I am deliberately using Karl Popper's *piecemeal social engineering* concept since the spirit of his definition captures rather well the notion that evidence-based road safety policies can effectively target traffic outcomes. Popper (1963) suggested that piecemeal social engineers were responsible for designing social institutions and reconstructing and running those already in existence.

crashes and their consequences.[11] Oppe actually suggests that "society learns more and more how to deal with safety problems (…) [The] learning effect results partly from the learning of individual road users to deal with traffic, but also from the increase in knowledge with regard to vehicle design, road design and maintenance, legislation, training, education, safety campaigns, and so on" (Oppe 1991:401). Overlapping with some of the hypotheses advanced by modernization studies, the piecemeal social engineering approach states that a more precise understanding of road traffic fatality and injury variations can be reached once the actual evaluation of road safety policies' implementation is carried out. Further, it recognizes that countries might have different road safety challenges and therefore can be constrained to choose one particular set of measures over another given its own particularities (Elvik 2010a).[12] In sum, the piecemeal social engineering approach complements modernization theory, by operationalizing and testing the direct impact of specific road safety policies in traffic outcomes and recognizes the presence of national particularities as elements that can affect them positively or negatively.

While there is a large variety of studies that analyze road safety challenges at the national level (Elvik and Vaa 2004), cross-national research, under the piecemeal social engineering approach, has been limited to almost exclusively to high income countries. The road safety measures analyzed have been: automobile insurance models (Lemaire 1995; Dionne 2001); helmet laws (Law et al. 2009); speed limits; presence of points-based driving licenses regulation;

[11] A very early version of the piecemeal social engineering approach can be found in Smith's *Wealth of Nations*, where he argues that political institutions have an important influence on the state of the roads—the importance of road infrastructure in traffic fatalities and injuries has been widely acknowledged not only by engineers (Hauer 1997) but also by prominent epidemiologists (Haddon 1967). He particularly compares how the centralization of political power in France, unlike in the United Kingdom, affects the security of cross-roads. Smith notices that France's political authorities only focus on the road that connect principal towns among each other, leaving minor roads entirely neglected. He states that these roads, which constitute the largest part of the French road network, are "impassable for any heavy carriage [and] in some places it is even *dangerous to travel on horseback*, and mules are the only conveyance which can be safely trusted" (Smith 1952:122) (My emphasis).

[12] Elvik points out nine dimensions which policy makers, researchers and road users consider when facing and assessing road safety problems: magnitude, severity, externality, inequity, complexity, spatial dispersion, temporal stability, perceived urgency and amenability of treatment (Elvik 2008).

blood alcohol concentration rates (Castillo-Manzano et al. 2013); and quantified targets for the reduction of the number of fatalities (Wong et al. 2006; Elvik 2010b; Allsop et al. 2011).

ii.iii) New institutionalism

At least two interrelated elements are usually discussed to describe neo-institutionalism in sociology. First, this theory essentially challenges accounts stating that public policies are products of intentional and rational efforts. Neo-institutionalist scholars actually argue that public policy formation is a process in which efficiency is not necessarily the major force in determining its shapes, but rather cultural practices embedded in the larger contexts are likely to affect the design of policies (Hall and Taylor 1996). Second, many neo-institutionalist studies have noticed a disjuncture between public policy design and its implementation in contemporary societies. Neo-institutionalists label this phenomenon 'policy decoupling.' For neo-institutionalists, there are at least four overlapping instances that may explain policy decoupling.

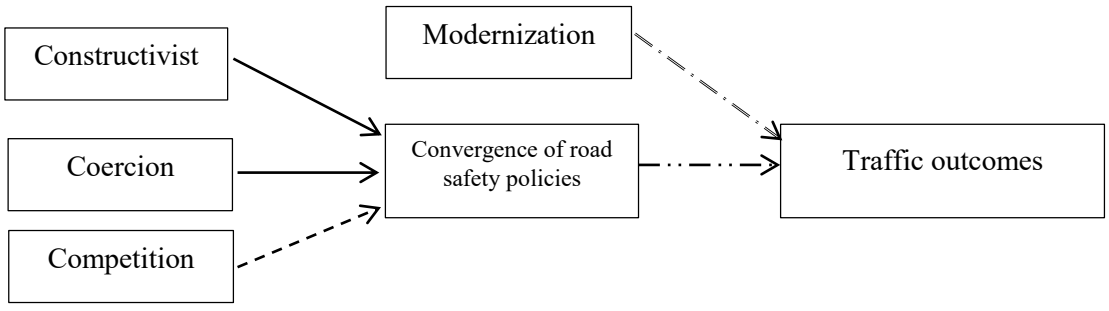
First, Meyer and Rowan (1977) suggest that policies in highly interconnected societies may fail, because contingencies constantly emerge. Second, Westphal and Zajac (2001) suggest that decoupling may reflect efforts by organizational leaders to avoid that either their political interests or influence over the organization are challenged. More particularly, a disjuncture between policy design and outcome can be observed when in face of external pressures these actors favor a response that "involves separating the substantive activities of the organization from the formally adopted policy, thus enabling [these actors] to preserve their discretion over the allocation of resources" (Westphal and Zajac 2001:206). Third, Meyer et al. (1997) argue that nation-states are influenced by a variety of dominant models of public policies, but these policies cannot be exported wholesale. The diffusion processes of these policies work at different levels (world to nation, nation to state (or province), state (or province) to city), and thus both the transmission and implementation of these policies can become incoherent or ineffective. Last, Meyer et al.

(1997) state that decoupling may also occur because of lack of resource capacity. Less developed countries, due to their limited resources, tend to highlight formal objectives rather than substantive ones. Decoupling is a solution to a trade-off that nation-states face when they are under pressure to conform to expectations without having the resources to effectively meet them.

iii) A complete theoretical model: the interplay of international and national forces

In the final analysis, considering both the international factors associated with global diffusion of policies as well as national forces will likely be necessary if we are to achieve a more comprehensive understanding of the variation between countries in terms traffic mortality rates. The foregoing is summarized in Figure 0. Black arrows indicate how the constructivist and coercion, mechanisms should impact the convergence of road safety policies. The broken line indicates that the competition mechanism can lead to both convergence and divergence of road safety policies. The long dash dot line indicates that traffic mortality and injury variation is associated with economic growth. Lastly, the dash dot dot line, how the relative position of countries in the diffusion of public policies, mediated by the adoption of specific road safety policies, has an effect on traffic outcomes.

Figure 0 Complete theoretical model for capturing cross-national variation among countries in terms of traffic mortality and morbidity rates, and global convergence of road safety policies.



This complete theoretical model, I propose, allows us to understand more comprehensively and precisely traffic fatality and injury variation across countries. If I were to assess traffic outcomes by only referring to the important contributions made by modernization theory, the piecemeal social engineering approach, and new-intuitionalist theory, I would be providing an incomplete account of this phenomenon. That is, I would have incorrectly assumed that policy development and implementation are independent processes from the influence that the international community exercises over countries and/or from policy exchanges among nation-states. However, by first examining the global diffusion and convergence processes of road safety policies, I can more accurately account for the distribution of traffic outcomes variation, since these are likely to be associated with the interplay of global forces, regional characteristics, and national dynamics. In short, countries do not develop road safety policy randomly, but rather they introduce these policies depending on what their relative position in the global diffusion of policies is, and what national circumstances experience. Once this position is identified, one can assess more accurately what the policy impact on traffic fatalities and injuries is.

Further, if I were to assess policy diffusion and convergence of road safety policies without their link to traffic fatalities and injuries, my analysis while valuable, would be limited to a literature that, according to Marsh and Sharman (2009), has focused mostly on identifying the mechanisms of diffusion and convergence. In this regard by prolonging the analysis of the mechanisms of diffusion processes, I can suggest how the presence of constructivist, competition and coercion mechanisms can lead to policy success or failure. Another reason of why I advance the theoretical link between mechanism of diffusion and convergence and traffic outcomes is to provide criteria to assess road safety policy success or failure more comprehensively. Of course this has normative implications. Certain governments may regard a road safety policy success, for

instance, the actual appointment of a road safety institution or the formalization of a road safety law—which no doubt in the short term may be political achievements. But without accounting for their impacts, standards of road safety appraisal will remain low and our understanding of road safety policy development incomplete.

Lastly, my theoretical approach also contributes to specific analytical discussions within each sub-research area (i.e. diffusion of public policies and policy impact). By studying the global spreading of road safety policy, I can both assess the limits of public policy convergence and adjudicate between mechanisms of policy diffusion. By examining the impacts of the selected public policies I can advance more rigorous both road safety policy recommendations and methods to assess these policies.

STRUCTURE OF THE DISSERTATION AND MAIN FINDINGS

Following the objectives previously outlined, the dissertation is composed of five chapters. In Chapter 1, I explore the generalizability of the policy convergence claim, which states that countries are likely to adopt the same policies if they have been exposed to similar world forces. I also revisit the theoretical frameworks applied to examine the mechanisms that facilitate convergence. In order to examine to what extent policy convergence occurs at the global level, I study the adoption of three road safety policies: i) the creation of a road safety agency (RSA); ii) enactment of child restraint laws (ChRL); and iii) introduction of mandatory use of daytime running lights (DRL). Results suggest that only ChRL have been fully globally diffused; in contrast, the other two policies exhibit a fractured global convergence process, likely as a result of competing international and national forces. This finding may reflect the lack of necessary conditions at the regional and national levels for the acceleration of the global spread of policies, adding further nuance to the global convergence thesis. A second main finding is that the adoption of

RSAs diffused in Africa and Latin America and the Caribbean, while the mandatory use of DRL spread throughout Europe. This may mirror the existence of specific elective affinities, as a result of which policies only disseminate at the regional level. By recognizing fractured convergence processes my results call for rethinking the concept of global convergence and more consistently reintegrating regional analyses into the sociology of policy diffusion.

In Chapter 2, I tackle the second objective of this dissertation, examining the effects of two sets of public policies, RSAs and HSs, on three outcomes: traffic fatalities, traffic injuries and traffic accident severities. As the results of Chapter 1 suggest, I analyze cross-sectional time series data using regression models to account for the endogeneity of RSA formation. My first finding is that the creation of RSAs is associated with a decrease of traffic injuries in the long term in OECD countries. A second main finding is that the presence of well-developed HSs uniformly decrease traffic fatalities by 5%. The effectiveness of these systems is prevalent in Europe, Asia and the Pacific, Western Asia and Africa, but not in Latin America and the Caribbean. These results call for revisiting and carefully rethinking the specific mechanisms through which RSAs and HSs are effective in affecting different types of traffic outcomes.

In Chapter 3, I assess the contribution of Chile's 2005 traffic law reform to the reduction of traffic fatalities and severe injuries from 2000 to 2012. Empirical estimates suggest the enactment of the traffic law reform is associated with a 7% reduction of pedestrians' fatalities. But this association is entirely mediated by the positive association the law had with increasing 'Police enforcement' and reducing 'Alcohol consumption'. Finally, 'Road infrastructure investment' is significantly associated with a direct reduction of 11% in pedestrian fatalities, and the number of total crashes significantly mediates the effect of road infrastructure investment on the reduction of severe injuries. These results suggest that 'Traffic law reform', 'Police enforcement', and

'Road infrastructure investment' have complex interwoven effects that can reduce both traffic fatalities and severe injuries. While traffic reforms are ultimately designed to affect traffic outcomes by changing road users' behaviors, it is also important to acknowledge that legislative changes may be supported by road infrastructure investment, in order to effectively decrease traffic fatalities and injuries. Furthermore, depending on how road safety measures are designed, coordinated and implemented, their effects on different types of road users are likely to vary.

In Chapter 4, I analyze whether the interaction between Chile's police enforcement and its traffic law reform affected the downward trends of traffic fatality and injury rates. Empirical estimates for the period 2000-2012 suggest that the enactment of the traffic law reform in interaction with the number of traffic tickets per police officer is associated with a decrease of 8% in traffic fatalities and 7% in severe injuries. Results for the period 2007-2012 suggest that police traffic enforcement reduced traffic fatalities by 59% and severe injuries by 37%. These findings suggest that for traffic law reforms to have an effect on both traffic fatality and injury rates reduction, changes in police enforcement practices are required as well. Lastly, the case of Chile also illustrates how the diffusion of successful road safety practices globally promoted by the WHO and the WB can be an important influence to enhance national road safety practices.

In the fifth and last Chapter, I review the most important findings and advance a series of public policy and research strategy recommendations for the case of road safety. I particularly highlight the need for implementing a multi-sectorial approach to target a complex problem, as well as point out various research foci which need to consider traffic outcome differentiation, road safety policy variation and world-regions, in order to complement and test the generalizability of some findings of this dissertation. I also discuss the full analytical approach I use in the

dissertation and reaffirm its utility when studying the link between globally promoted policies and their actual impacts on nation-states.

PREAMBLE TO CHAPTER 1

The Introduction outlined the research program in which I consider the interplay between global, regional and national forces as a complete theoretical approach to assess traffic outcomes variation across the world. In the Introduction I also noted that a more complete research agenda should introduce cases of convergence and divergence in order to explain the limits of public policies' globalization processes. The overarching goal of this dissertation is to help to explicate to what extent global and regional forces affect national dynamics in the form of public policies' adoption and then on traffic fatalities, injuries and accident severity. The next chapter represents an attempt to consider the impact of global and regional factors on national adoption of three road safety polices. I specifically study RSAs, ChRLs and DRLs. In this chapter I test the generalizability of the global convergence thesis and examine what mechanisms of diffusion prevail when examining the process of road safety policy adoption. This allows me to identify how the three different diffusion processes unfolded, and what mechanisms of diffusion were more prevalent. I end by discussing how different convergence outcomes (global, regional and unintended) interact with the mechanism of diffusion. This ultimately helps me to set the base of my complete theoretical approach, in which by identifying the most relevant mechanisms at play and their relations to the diffusion of road safety policies, a more direct link between global and regional forces can be introduced when understanding traffic outcomes' variation. Due to paper-based format of the dissertation, the theory section below largely replicates portions of the analytical approach of the introduction and may be skipped by the reader if necessary.

CHAPTER 1: FRACTURED GLOBAL CONVERGENCE: EXAMINING THE DIFFUSION OF ROAD SAFETY POLICY, 1957-2013

Author José Ignacio Nazif-Muñoz

Abstract

Global convergence of public policies has been regarded as a defining feature of the late twentieth century. This study explores the generalizability of this claim for three road safety policies: i) the creation of road safety agencies; ii) child restraint laws; and iii) mandatory use of daytime running lights. I analyze cross-national longitudinal data using survival analysis for the years 1957-2013 in 170 countries. My first main finding is that only child restraint laws have been fully globally diffused; in contrast, the other two policies exhibit a fractured global convergence process, likely as the result of competing international and national forces. This finding may reflect the lack of necessary conditions at the regional and national levels that accelerate the global spread of policies, adding further nuance to the global convergence thesis. A second main finding is that the adoption of road safety agencies diffused in Africa and Latin America and the Caribbean, while the mandatory use of daytime running lights spread throughout Europe. This may mirror the existence of specific elective affinities, where policies only disseminate at the regional level. By recognizing fractured convergence processes our results call for rethinking the concept of global convergence and reintegrating more consistently regional analyses in the sociology of policy diffusion.

INTRODUCTION

Political scientists, economists, international relations experts and sociologists have prolifically researched the convergence of public policies. Under this particular area one finds analyses which have focused on the diffusion of economic policies (Brooks 2005; Kil Lee and Strang 2008; Kogut and Macpherson 2011; Kogut and Macpherson 2008; Weyland 2005), health policies (Gilardi, Fuglister and Luyet 2009; Iriart, Merhy and Waitzkin 2001; Luke and Watkins 2002; Wipfli, Fujimoto and Valente 2010), and political public policies, such as democracy, human rights laws, and laws against terrorism (Gleditsch and Ward 2008; Pegram 2010; Hafner-Burton and Tsutsui 2005; Shor 2008 and 2013; Shor et al. 2014). One of the main conclusions of these studies has been that global convergence occurs, that is, a strong tendency towards isomorphism has been identified across nation-states.

At least three theoretical frameworks have been used to understand the mechanisms of policy convergence: i) constructivist; ii) coercion; and iii) competition. The first highlights a global environment characterized by cultural norms influencing the adopters. The second stresses the presence of strong international actors forcefully inducing policy-making in specific directions. The third emphasizes exogenous changes in global trades, which countries follow in order to remain competitive.

In this chapter, I explore the generalizability of the policy convergence claim and revisit the theoretical frameworks applied to examine the mechanisms that facilitate convergence. In order to examine to what extent policy convergence occurs at the global level, I suggest examining the adoption of three road safety policies: i) the creation of a road safety agency (RSA); ii) enactment of child restraint laws (ChRL); and iii) introduction of mandatory use of daytime running lights (DRL). Two reasons stand out for choosing these road safety policies. First, in the

study of the diffusion of health policies, among which I count road safety measures, previous studies looked at hospital financing and care, reproductive rights and tobacco prevention and control. None of them, however, examined which road safety policies have converged and why. Second, road safety policies have been endorsed by the World Health Organization (WHO), and the World Bank (WB), and thus been purposefully disseminated in the world, through regional and national forums and other relevant media.

In order to assess the salience of the theoretical frameworks used for analyzing the mechanisms of policy convergence, I examine their effects at both global and regional levels, considering variables associated with each policy specifically. This strategy allows me to more adequately contrast the effects of specific global mechanisms with the ones that occur at the regional and national levels. For instance, variables representing the influence of the automobile industry are more relevant when analyzing the convergence of DRL, than when examining the adoption of ChRL. At the regional level, the existence of regional road safety councils, such as the one existing in Europe, can be more adequate to explain faster adoption rates of these policies than in regions in which these organizations are inexistent.

Results suggest the presence of three types of convergence: *global*, *regional* and *unintended*. *Global convergence* occurs for ChRL even when accounting for national characteristics. That is, global forces are significantly associated with the increasing rate of the adoption of this policy over time and across countries. I suggest that this effect over time was associated with specific global and regional mechanisms represented by the constructivist approach. For instance, the road safety global campaign led by the WHO significantly increased the rate of adoption of ChRL across the world.

In contrast, the concepts of *regional-spatial convergence and regional-temporal convergence* seem more adequate to explain policy diffusion processes in cases in which global convergence is not observed. Under certain conditions, one can observe various global tendencies capable of influencing national policy-making processes. However, the global convergence thesis fails to notice that these forces may be only effective in certain world regions, or certain groups of countries that share a significant event, and thus their convergent impact cannot be regarded as global but rather regional or temporal. *Regional-spatial convergence* occurs in the enactment of RSAs in Africa and Latin America and the Caribbean, and DRL in Europe. I suggest that the global influence of the WHO was successful in increasing the implementation rate of RSAs in Latin America and the Caribbean because the WHO operated through regional forums interacting with national authorities. In reference to DRL, I suggest that the significant acceleration rate of adoption of this policy in Europe is due to its unique regional road safety institutional framework. The European Transport Safety Council and three independent European road safety research institutions (the Organisation for Applied Scientific Research, Institute for Road Safety Research, and the Institute of Transports Economics) formally recommended that the European Union implement this measure across Europe. *Regional-temporal convergence* of RSAs occurs in African countries which are formally linked to the Commonwealth. The case of the United Kingdom seems to be particularly relevant for explaining this type of convergence. The UK's road safety institutional frame, one of the first to be implemented in the world—which has been regarded by the WB as an exemplary institution—led to the early creation of road safety institutions in the 1970s in Botswana, Malawi and United Republic of Tanzania. Lastly, the convergence of national solutions can be the result of similar characteristics which countries have, I call this *unintended* convergence. The adoption of RSAs across the world was associated with popu-

lation and political violence; the larger the population and the less political violence in a country the more likely the enactment of a RSA.

This analysis contributes to three emergent research areas of studies of the global convergence of public policies. First, studies of global convergence of public policies, as Marsh and Sharman (2009) have noticed, are more likely to analyze case studies, which may lead to a bias in supporting the generalizability of the convergence thesis. In contrast, my research follows in the footsteps of a nascent body of cross-national studies in this area, and supports the notion that observing the generalizability of this thesis largely depends on the methods used. Second, few studies have compared convergence processes of different public policies across countries. Wotipka and Tsutsui (2008) analyzed simultaneously seven human rights international treaties, Koo and Ramírez (2008) studied the adoption of two national human rights institutions, Frank, Camp and Boutcher (2010) examined the convergence of criminal regulation of rape, adultery, sodomy, and child sexual abuse, and Shor et al. (2014) applied a cross-sectional analysis to examine four practices of state repression. Similarly, I simultaneously analyze the effects of three different policies, which share the objective of decreasing traffic injuries and fatalities. That is, I analyze the effect of similar forces on different outcomes, which allows me to identify more clearly when the convergence thesis can be accepted, rejected or reformulated. Lastly, to examine the thesis of global convergence, I argue that it is important to introduce similar conditions of falsifiability when dealing with the duration of the global diffusion of a given policy. In other words, in order to examine more rigorously the convergence thesis, the time period for different policies should be relatively constant. By introducing similar time periods one can avoid invoking the 'not yet' type of ad-hoc explanations, when cases of global convergence are not observed. Thus, in order to introduce objective time conditions to uniformly test the thesis of con-

vergence across policies I selected a set of policies which have at least 40 years of formal existence. The first RSA was established in Norway in 1957, the first ChRL was simultaneously enacted in Belgium and Denmark in 1975, and the first mandatory DRL norm in Finland in 1972. This time span across policies allows us to reasonably minimize the introduction of ad-hoc explanations in the event that global convergence will not be observed, but also to test the convergence thesis more consistently.

THE CASE FOR ROAD SAFETY POLICIES

From 1990 to 2010, the fraction of global deaths due to injuries increased from 8.8% to 9.6% of global deaths (Lozano et al. 2013). Lozano et al. (2013) argued that this was driven by a 46% growth in deaths worldwide due to road traffic crashes. Indeed, over this period, the age-standardized death rates due to road traffic crashes increased from 18.4 to 19.5 per 100 000. Accordingly, in 2010, road injuries were the second cause of death among males aged 15-49 at the global level, accounting for 10.9% of the deaths in that age group. Finally, these trends are unlikely to abate, as projections indicate that road traffic crashes will rise from the eighth leading cause of death in 2000 to the fifth in 2030, with the burden unequally distributed globally, as poor and middle-income countries will see crashes match HIV/AIDS as a cause of death (Norton and Kobusinge 2013).

This state of affairs has triggered a strong global response led by international organizations providing aid and guidance to different countries (Ameratunga et al. 2006; Sharma 2008; Rosenberg et al. 2010; Bliss and Breen 2009). In 2004, the WHO, in conjunction with the WB, launched the *World report on road traffic injury prevention* (WHO 2004), through which a set of policies—based on scientific publications and advice provided by road safety experts—were chosen and promoted to tackle the burden of road traffic injuries and fatalities. After the launch-

ing of this report, the WHO has led a global campaign aimed at reducing traffic fatality and injuries rates across the world by promoting several road safety policies. In particular, three road safety policies have been recognized to be effective and thus several bodies of the UN have regarded them as cases of best practices: i) creation of RSAs, ii) ChRL and iii) DRL (WHO 2004; Bliss and Breen 2009; Rizzi et al. 2011).

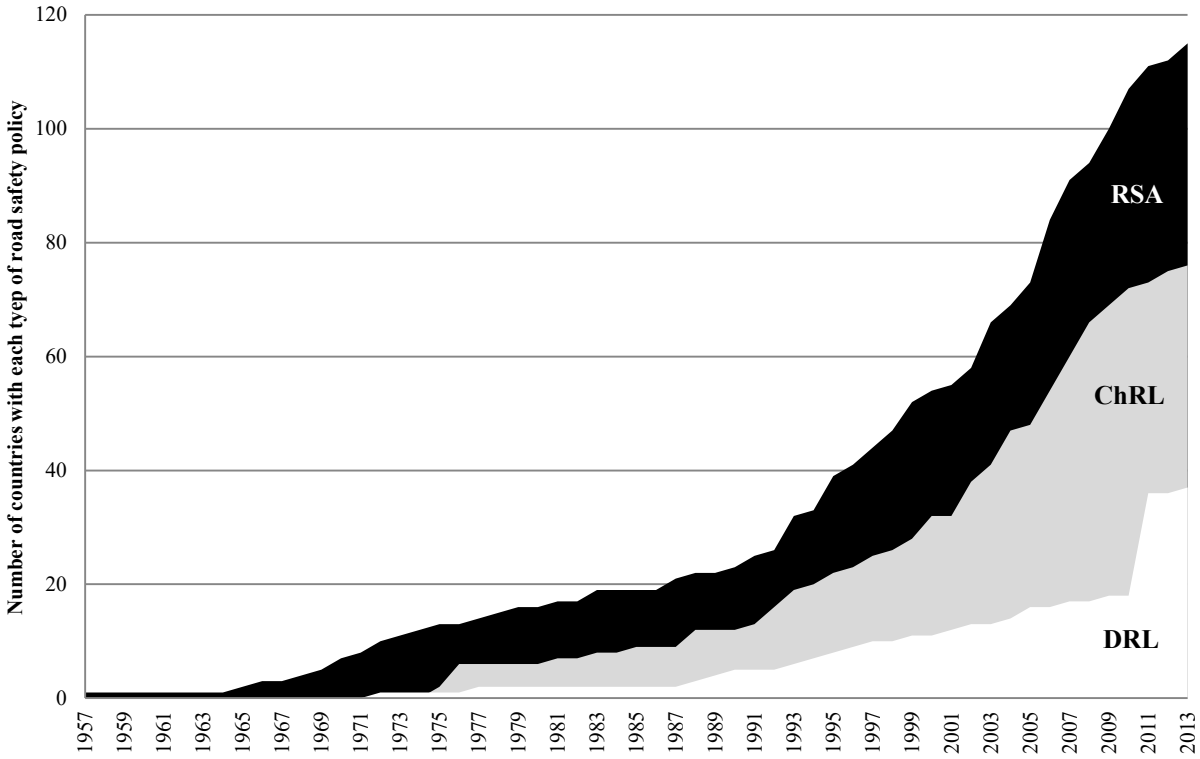
i) Road safety agencies

Lacking the appropriate institutional arrangement can impede the curbing of traffic injuries and fatalities. According to various WHO reports, identifying and implementing a RSA is the first arrangement that should be considered to attain these objectives successfully (WHO 2004, 2009 and 2013, Bliss and Breen 2009). More particularly, this type of institution becomes necessary because road safety work involves coordinating representatives of different governmental (such as health, transport, public works or police) and private sectors (highway construction, or automobile and alcohol industries). However, the WHO recognizes that various institutional forms have been developed in order to decrease the occurrence of traffic injuries and fatalities, that is, a RSA can be a designated stand-alone bureau, a committee or council representing several different government bodies, or it could depend on the Ministry of Health, Transports or Security. Furthermore these agencies can perform different functions such as: coordinate the activities of different stakeholders involved in road safety policy making, introduce road safety legislation, monitor and assess the implementation of road safety policies, and set road traffic fatality reduction goals. By 2013, 126 countries had appointed a RSA, and within this group 100% coordinated other road safety stakeholders' policy processes, 91% promoted the introduction of road safety legislation, 83% monitored or assessed road safety policy implementation and 73% had set road traffic fatality reduction goals (WHO 2013).

ii) Child restraints laws

Restraints in cars are intended to keep the child in her/his place on the seat so that in the event of sudden braking or vehicle crash the child is not thrown against the interior or out of the car (Elvik 2004). As such ChRL are designed to reduce the number of injured children by assuring that a higher proportion of them are secured in the vehicles. Meta-analysis led by Elvik and Vaa (2004) suggests that the effect of mandatory wearing of child restraints in cars decreased by 15% the number of children injured in cars.

Figure 1.1 Number of National Road Safety Policies, 1957 to 2013



Note: RSA = road safety agencies; ChRL = child restraint laws; DRL = daytime running lights

iii) Daytime running lights

Many traffic crashes happen because road users do not notice each other in time or do not notice each other at all. This situation can emerge in darkness as well as in daylight. Vehicle visibility is

therefore one of the factors affecting the number of traffic crashes. Use of DRL in all light conditions is intended to reduce the number of multi-vehicle crashes by increasing the cars' visibility and making them easier to notice in good time. Meta-analyses led by Rune Elvik (2004) and the European Union (2003) have suggested that DRL reduce multi-vehicle crashes by around 6%.

Figure 1.1 plots the cumulative number of the adoption of these three road safety policies over time. By 2013, nearly 120 national RSAs had been established, 80 ChRL were enacted, and 40 DRL were approved across the world.

THEORIZING CONVERGENCE OUTCOMES AND THEIR MECHANISMS OF PUBLIC POLICY DIFFUSION.

When analyzing convergence of public policies, it is important to analytically distinguish between convergence as an outcome (i.e., global convergence, regional convergence or unintended convergence) and the mechanisms that may produce convergence, i.e. the social processes (constructivist, coercion, and competition) that are behind the emergence of these outcomes.

i) Types of convergence outcomes

Global convergence. Three positions have been identified in the global convergence debate: *global convergence*, where countries are more likely to increase their similarities; *global divergence*, where countries are more likely to differentiate from each other; and *glocalization*, in which countries adapt global models to their local circumstances (Guillén 2001). However, an important number of scholars have reached the conclusion that, in the specific realm of public policy formation, the world experienced since the 1980s a process in which nation-states have been characterized by isomorphism, or global convergence (Harvey1989; Meyer et al. 1997; Martinelli 2005; Herkenrath et al. 2005). According to one view, nation-states became isomorphic because world models have been propagated through global cultural and associational processes (Meyer et al. 1997).

From 1956, year in which the first RSA was enacted in Norway, up until 2013, various road safety policies have been propagated globally through the signature of international conventions, such as the Geneva Convention or the "Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be fitted and/or be used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions" (AAUTPWH)—in which road safety principles and policies have been acknowledged; though the creation of road safety regional councils, such as the European Traffic Safety Council—in which attention to road safety policy debates have been fostered; and through the exchange of knowledge among scholars from different countries in forums such as the Association for the Advancement of Automotive Medicine—in which the assessment of road safety policies has been a common practice of road safety scholars. For this reason, I pose the following hypothesis:

> *Hypothesis 1*: From 1956 onwards up until 2013 the three road safety policies will show a significant degree of global convergence.

Regional convergence. Other scholars suggest that before understanding global convergence it is necessary to distinguish different convergence outcomes (Herkenrath et al. 2005). For these authors, the implication of this analytical distinction is that convergence between two or more countries may not necessarily lead to global convergence, but rather an emergence of regional clusters. While these authors do not provide a set of criteria for identifying regional cluster formation, I suggest two types of regional convergence outcomes: *regional spatial convergence*, in which convergence may be facilitated due to the spatial proximity which countries share (e.g. Latin America and the Caribbean or Europe); and, *regional temporal convergence*, in which convergence may be expedited due to a number of significant events that some countries have

jointly experienced (e.g. Commonwealth countries). I suggest one hypothesis for the *regional spatial convergence*, and another one for the *regional temporal convergence*.

Regional spatial convergence may have occurred in Europe, Africa and Latin America and the Caribbean because of two unique regional elements. In 1992, in Europe, the European Traffic Safety Council was created. The objective of this organization has been contributing to the reduction of traffic injuries and fatalities across this continent by promoting evidence-based road safety policies. On the other hand, from 2004 onwards in Africa and Latin America and the Caribbean, several international organizations, such as the Economic Commission for Africa, the Africa Development Bank and the World Health Organization in the African region, the Pan American Health Organization, the Economic Commission for Latin America and the Caribbean and the Inter-American Development Bank worked closely with transport and health authorities of these two regions to promote road safety policies in their countries. This work was aligned with the road safety global campaign led by the WHO, the WB and other international actors. For these reasons, I pose the following hypothesis:

> *Hypothesis 2*: Road safety policies will show *regional spatial convergence* in Europe, Africa, and Latin America and the Caribbean based on their unique road safety institutional characteristics.

Regional temporal convergence may have occurred for Commonwealth countries due to two reasons. First, Leichter (1983) argues that four elements have facilitated convergence within the Commonwealth: a common colonial experience and legacy, near universal use of English among elites, widespread movement of persons among the countries, and formal communications that occur through existing Commonwealth institutions. Second, the UK has pioneered the imple-

mentation of successful road safety policies (Bliss and Breen 2009), and implemented these innovations across the Commonwealth. For these reasons, I pose the following hypothesis:

Hypothesis 3: Based on the pioneering role that the UK has played in road safety policy development, road safety policies will show *regional temporal convergence* in Commonwealth countries.

Unintended convergence. A fourth convergence outcome is one in which countries adopt the same policy but evidence of global forces is not suggestive of this outcome. Instead of following international influences these countries may be constrained by similar type of national *dilemmas* and thus their solutions unintendedly converge. This type of position has been led by scholars who conceptualize nation–states as purposively rational actors (Gilpin 1981).

There are at least two national factors that can facilitate or inhibit the appointment of RSAs or ChRL. First, countries may be attracted to adopt these policies when their population is large. More specifically, given that population size is associated with traffic crashes and fatalities, countries with larger populations may be more inclined to adopt these policies to tackle these transport externalities. Second, countries in which political violence is high may not consider road safety to be a national priority or lack the capacity to tackle it. As such, chances of appointing a RSA or introducing ChRL may be lower than in countries in which political violence may not be relevant. Given these circumstances I pose the following two hypotheses:

Hypothesis 4.1: Countries with large population will show unintended convergence on RSAs and ChRL.

Hypothesis 4.2: Countries with low level of political violence will show unintended convergence on RSAs and ChRL.

Lastly, in regards to DRL, one could expect that countries in which there are specific problems of road visibility, such as in Nordic countries (Koornstra 1993), will be more likely to implement this road safety measure.

Hypothesis 4.3: Countries with low yearly average of bright sunshine will show unintended convergence on DRL

ii) Mechanisms of public policy convergence

As noted earlier, several authors have identified constructivism, coercion and competition as some of the main mechanisms that explain the convergence of public policies (Lee and Strang 2006; Dobbin, Simmons and Garrett 2007; Simmons, Dobbin and Garrett 2008; Marsh and Sharman 2009).

Constructivism. Constructivists highlight the predominance of the world-culture in the process of public policies convergence. Meyer et al. (1997) state that nation-states are likely to copy ideas and adopt practices which are in vogue or legitimized. Policies whose goals are socioeconomic development, citizen rights, and civil international relations, among others, are commonly referred to as legitimate, as they are based on values such as democracy, freedom, equality and human rights (Elliot 2007; Meyer et al. 1997). Ultimately, regardless of what type of national dynamics countries may have, Elliot (2007) and Meyer et al. (1997) suggest that the majority of countries will adopt policies which foster the aforementioned values.

Two sources of social influence favor policy convergence: i) communities of experts, and ii) NGOs with links to global alliances. These groups usually promote policies which have been proven, theoretically or empirically, effective, and provide "policy makers [with] rationales for adopting [them]" (Dobbins, Simmons and Garret 2008; Strang and Meyer 1993).

There are two elements that coincide with the constructivist approach in the diffusion of road safety policies. First, from 2004 onwards, the WHO, in conjunction with the WB and many international road safety international actors, as representatives of communities of experts, led a campaign to promote road safety practices at the country level. Second, the Global Alliance of NGOs for Road Safety has actively interacted with national NGOs to foster road safety policies at the national level. For these reasons I pose the following two hypotheses:

Hypothesis 5.1: Countries will be more likely to adopt road safety policies after the introduction of the global campaign promoted by the WHO.

Hypothesis 5.2 Countries will be more likely to adopt road safety policies if they have a road safety NGO with membership to Global Alliance of NGOs for Road Safety

Coercion. One of the most important influences to understand how this mechanism operates is the work developed by Wallerstein. Similarly to Meyer et al. (1997), in that the unit of analysis is the global system, Wallerstein argues that states are subject to world systemic pressures which influence their policies (Wallerstein 1974; 1979; 1998). However, unlike the former authors, Wallerstein sustains that culture does not connect the world, but an economic system which favors the 'ceaseless accumulation of capital' (Wallerstein 1980). According to this author both national and international actors, given their relative economic position in the world-economy, can exercise a strong influence on what both national and foreign states are likely to do.

The car industry can be a good arena to test Wallerstein's main thesis in the specific realm of road safety policies, for three reasons: first, any attempt to regulate vehicle safety standards has a direct impact on vehicles' factory costs, or in Wallerstein words the "ceaseless accumulation of capital." Second, the car industry is relatively concentrated, with the largest twenty firms producing greater than 95% of the world's vehicles (Sturgeon and Florida 2000). Third, in

order to assess how strong a car industry is in a given country, one can distinguish between vehicle-exporter countries and vehicle-importer countries, with the former group representing the stronger one. Vehicle-exporter countries are stronger because they occupy a privilege economic position in the world-economy of the car industry.

Within the convergence of road safety policies literature, Mohan and Roberts (2001) have argued that the formation of public policies can be affected by the interest of car manufacturers. They specifically note that this industry has been an important stakeholder of the Global Road Safety Partnership (GRSP) alliance which has played a prominent role in road safety policy development since 1999. Mohan and Roberts (2001) suggested that car companies, through their participation in the GRSP were more likely to reject road safety measures that increase the costs of cars manufacturing. Roberts et al. (2006) provide evidence that global organizations which were supported by the car industry were unlikely to promote measures that affected their commercial interests.

While DRL is in itself a safety requirement which the car industry would need to accommodate more evidently, RSAs may also represent a threat to the 'ceaseless accumulation of capital' of the car industry, because the introduction of vehicle safety standards could be one objective of these agencies. At any rate both policies could represent potential increases of automobile factoring costs. Following Wallerstein one could expect this threat to be more acute in vehicle-exporter countries than in vehicle-importer countries, for the following reason: the industry of vehicle-exporter countries would be larger than in vehicle-importer ones, and therefore industries in these countries would have more resources to coerce any attempt of road safety policy that challenges their interests. In order to test the coercion mechanism I propose the following hypothesis:

Hypothesis 5.3: Vehicle-exporter countries will be less likely to adopt RSAs and DRLs than vehicle importer countries.

Competition. This mechanism works as follows: when two countries (countries A and B) trade with a third one (country C), country A will adopt a new policy in order to obtain competitive advantage over country B, if country C will be more attracted to acquire products which are manufactured following the new policy. This situation will have an impact on country B and thus it will later on also adopt the new policy to avoid exclusion from the trade (Dobbins, Simmons and Garret 2008:459). Chile has been taken as example that influenced the adoption of several policies in Latin America in the 1990s. Chile was taken as both an example of socio-economic development and a case which could divert potential investments historically targeted to other Latin American countries (Simmons and Elkins 2004). Dobbins, Simmons and Garret (2008) also argue that countries adopt a new policy because they want to keep their competitive advantage, facilitating both the fluid entrance and exit of capital.

Vehicle-exporter countries trade with both vehicle-exporting and vehicle-importing countries. However, markets represented by vehicle-exporting countries are larger than the ones represented by vehicle-importing countries (United Nations 2014a). Hence, if some vehicle-exporting countries introduce and implement in their production lines national safety regulations that prevent other vehicle-exporting countries from participating in their market, the remaining vehicle-exporting countries will adjust their safety practices in order to remain competitive and not being excluded. Moreover, since vehicle-importing countries do not have commercial incentives to adopt new safety regulations, introduction of these norms becomes an unlikely event. In order to test the competition mechanism I suggest the following hypothesis:

Hypothesis 5.4 Vehicle-exporter countries will be more likely to adopt DRL than vehicle importer countries.

METHODS AND DATA

To test the global convergence thesis and its mechanisms, I compiled and analyzed data on up to 170 countries between 1957 and 2013.

i) Method

To obtain valid estimates to test the convergence thesis and the mechanisms of global diffusion, I employ survival analysis. This method allows explaining events occurring to countries over a specified period of time (Cleves et al., 2010; Jenkins 2005; Strang 1994b; Tuma and Hannan 1984). Survival analysis has been used for various types of events ranging from decolonization (Strang 1994a) to policy adoption (True and Mintrom 2001; Murillo and Martínez-Gallardo 2007; Kogut and Macpherson 2008; Wotipka and Ramirez 2008; Jordana et al. 2011). I particularly use the Weibull hazard function since its ρ value can be used to interpret whether policy adoption significantly increases during the observed period.[13]

It is important to notice that since heterogeneity could be a result of modeling countries as if they had been equally exposed to the same time risk, I defined the onset of risk depending on when the country had acquired national independence. In other words, exposure to adopt a policy started only when national independence had been acquired. However, if the country had obtained independence before the year in which the first policy was enacted, its exposure to road safety policy adoption started in the year in which the policy was enacted for the first time. Information about countries' independence was obtained from the CIA's World Factbook (CIA 2014). Under this modeling, Norway, Belgium, Denmark and Finland were not part of the analy-

[13] To indirectly assess whether the results of the mechanisms of global diffusion were robust to model specification I also used the semi-parametric Cox model and parametric Exponential and Gompertz models. Results were robust to model specification. Findings are available upon request.

sis of the diffusion of RSAs, ChRL and DRL, since they were the pioneers of each policy respectively.

Furthermore, since unobserved heterogeneity could also arise from road safety information that countries share due to their regional closeness, implying that unobserved processes could bias the results of the parameters (Cleves et al. 2010), I adjusted the precision of the estimates for their adoption time rates in reference to 17 regional clusters. In other words, each regional cluster was assigned a random effect—whose distribution does not depend on the observed variables—to model the potential impact of road safety information exchange among countries within each cluster.

ii) Dependent variables

I analyzed the enactment of three road safety policies—RSAs, ChRL and DRL. These policies were first implemented in 1957, 1975 and 1972 respectively. I examine each policy for three different periods 1957 to 2013; 1975 to 2013 and 1972 to 2013. Information to establish the year in which each country implemented each policy was systematically gathered and coded according to a standardized scheme from the WHO reports on road safety (2004, 2009 and 2013), national traffic laws, peer-reviewed journals, governmental and international organization reports, and personal communication via email with road safety country representatives.

The WHO reports identify whether each country has a RSA and ChRL. The WHO applies a specific methodology to collect reliable information per country. The WHO sends biannually a questionnaire that must be completed by 5 representatives of each country, and in order to publish this information these national representatives must agree on their responses as well as provide official documents, such as traffic laws or any other legal instrument, stating that the information is accurate.

Then from each available source, I extracted, and when necessary translated, the norms which regulated child restraint and day-time running lights use, in traffic laws, and the dates of when the RSAs were appointed. In regards to ChRL and DRL the task was simplified by the fact that child restraints regulations were located under the norms of seat-belts use, and the use of day-time running lights under the use of lights. I also located definitions of the concepts "beginning of sunlight" or "end of sunlight" to determine when the use of lights was mandatory. In reference to the RSAs, I identified in the WHO reports the specific names that each agency has, and proceed to locate their institutional websites and other reports to find the years in which these organizations were appointed.

In the end, data regarding these three policies remain missing for some countries. Nevertheless, the resulting dataset is unique in breadth and depth. In Table 1.1 I present the years of enactment for each policy for 182 independent countries (sources for each country and road safety policy, and quotes can be found in the Appendix 6 in Tables 6A.1, 6A.2 and 6A.3). For more than 77%—for 140 countries to be exact—I achieved full coverage, defined as data on RSAs, ChRL and DRL. Coverage for RSAs was 94%, for ChRL 95%, and for DRL 83%.

I treated policy adoption as an event that did or did not occur. The three dependent variables were: i) 'Time to adopt a RSA'; ii) 'Time to adopt ChRL'; and iii) 'Time to adopt DRL'. In order to facilitate the global convergence thesis, I did not impose any restriction on which type of RSA, ChRL, or DRL should be considered. For instance, whether a RSA was dependent on the Ministry of Transports or Health or combined the use of public and private resources, it was deemed as a case of adoption. If a ChRL was mandatory for children under any age and/weight, and whatever the type of seat or booster, this was regarded as a case of enactment. Lastly, DRLs were considered mandatory if these norms were to be observed all year on all roads, and irre-

spective of whether it was a technical or behavioral requirement, that is, whether legislation was enacted to make automatic DRLs mandatory in the vehicles, as is the case in Canada, or whether the driver was made responsible to turn them on, as is mandated in the Swedish legislation (Knight et al. 2006).

Table 1.1 Road Safety Policies enactment in the world

Country	RSA	ChRL	DRL
Afghanistan	No	No	No
Albania	DK	2011	No
Angola	2013	2010	No
Argentina	2008	2008	2014
Armenia	2010	DK	DK
Australia	1997	1976	No
Austria	2006	1994	2011
Azerbaijan	No	No	No
Bahamas	2013	2002	No
Bahrain	No	No	No
Bangladesh	1995	No	No
Barbados	2012	2002	No
Belarus	DK	1995	No
Belgium	2001	1975	2011
Belize	2007	No	No
Benin	1987	No	DK
Bhutan	1999	No	No
Bolivia (Plurinational State of)	2007	No	No
Bosnia and Herzegovina	2010	2006	2005
Botswana	1975	No	DK
Brazil	2005	2008	No
Brunei Darussalam	1977	2009	DK
Bulgaria	2002	2009	2011
Burkina Faso	2011	No	No
Burundi	No	No	No
Cabo Verde	2005	2007	2005
Cambodia	2005	2006	No
Cameroon	1999	No	DK
Canada	1995	1988	1989
Central African Republic	No	No	No
Chad	No	No	DK
Chile	1993	2006	No

China	2003	No	No
Colombia	2013	2002	2004-2011
Comoros	2008	No	DK
Congo	No	No	DK
Cook Islands	No	No	No
Costa Rica	1979	2012	No
Côte d'Ivoire	1995	No	No
Croatia	No	2008	No
Cuba	2010	No	No
Cyprus	2006	2007	2011
Czech Republic	2004	2006	2001
Democratic People's Republic of Korea	No	No	DK
Democratic Republic of the Congo	No	No	No
Denmark	1966	1975	1990
Dominica	No	No	No
Dominican Republic	No	No	No
Ecuador	2011	2008	No
Egypt	2003	No	No
El Salvador	2005	No	No
Equatorial Guinea	DK	No	DK
Estonia	1992	1996	1995
Ethiopia	2011	2009	DK
Fiji	1994-2010	2000	No
Finland	No	1984	1972
France	1972	1992	2011
Gabon	DK	DK	DK
Gambia	2009	2009	DK
Georgia	No	DK	1997
Germany	1969	1992	2011
Ghana	1999	2004	DK
Greece	1999	1999	2011
Guatemala	No	No	No
Guinea	No	No	DK
Guinea-Bissau	No	No	DK
Guyana	2009	2002	No
Honduras	2006	No	No
Hungary	No	2000	1994
Iceland	2002	1991	1993
India	No	No	No
Indonesia	No	No	No
Iran (Islamic Republic of)	2006	No	DK
Iraq	DK	No	No
Ireland	2006	1993	2011

Israel	2006	2004	No
Italy	2000	2006	2002
Jamaica	1993	1999	No
Japan	1970	2000	No
Jordan	DK	No	No
Kazakhstan	No	No	No
Kenya	1981	No	No
Kiribati	2003	2002	No
Kuwait	No	No	No
Kyrgyzstan	No	No	No
Lao People's Democratic Republic	2007	No	DK
Latvia	1991	1998	1996
Lebanon	No	No	No
Lesotho	2003	No	No
Liberia	No	No	No
Lithuania	2000	2006	2011
Luxembourg	No	1993	2011
Madagascar	2010	No	DK
Malawi	1978	No	No
Malaysia	2004	No	No
Maldives	No	DK	DK
Mali	2009	No	DK
Malta	No	2004	2011
Marshall Islands	No	No	No
Mauritania	DK	DK	No
Mauritius	2006	No	No
Mexico	1987	No	No
Micronesia (Federated States of)	No	No	DK
Mongolia	No	DK	DK
Montenegro	2010	No	Yes
Morocco	1993	No	No
Mozambique	1993	No	No
Myanmar	No	No	DK
Namibia	1996	2004	No
Nepal	No	No	DK
Netherlands	No	1976	2011
New Zealand	1993	1976	No
Nicaragua	2003	2003	No
Niger	2011	No	DK
Nigeria	1988	No	No
Niue	No	No	No
Norway	1956	1988	1988
Oman	DK	No	No

Pakistan	2006	No	No
Palau	No	No	DK
Panama	2006	2007	No
Papua New Guinea	1997	No	No
Paraguay	2009	No	No
Peru	1996	No	No
Philippines	1991	No	No
Poland	1993	1997	2011
Portugal	2007	1995	2011
Qatar	2010	No	No
Republic of Korea	No	1997	No
Republic of Moldova	2009	2010	No
Romania	1995	2002	No
Russian Federation	2006	1993	2016
Rwanda	No	No	No
Saint Kitts and Nevis	No	DK	DK
Saint Lucia	No	No	No
Saint Vincent and the Grenadines	No	2006	DK
Samoa	2007	DK	No
San Marino	2008	2008	No
Sao Tome and Principe	No	No	2013
Saudi Arabia	DK	No	No
Senegal	No	No	No
Serbia	2009	1992	2009
Seychelles	No	No	No
Sierra Leone	1997	No	No
Singapore	No	2012	DK
Slovakia	2004	2007	2011
Slovenia	1972	1976	2011
Solomon Islands	No	No	No
South Africa	1999	2000	No
Spain	1990	2004	2011
Sri Lanka	1998	No	No
Sudan	2010	No	No
Suriname	No	2005	No
Swaziland	1983	No	No
Sweden	1968	1988	1977
Switzerland	1998	1981	2014
Syrian Arab Republic	2003	No	No
Taiwan	1983	2004	No
Tajikistan	No	2003	No
Thailand	2003	No	No
The former Yugoslav Republic of Macedonia	2007	No	2007

Timor-Leste	No	2003	No
Togo	DK	No	DK
Tonga	No	No	No
Trinidad and Tobago	No	2010	No
Tunisia	2003	No	No
Turkey	2002	2007	No
Uganda	1998	No	No
Ukraine	No	No	No
United Arab Emirates	2006	No	No
United Kingdom	1965	1983	2011
United Republic of Tanzania	1973	No	No
United States of America	1970	1985	No
Uruguay	2007	2013	1999
Uzbekistan	DK	DK	DK
Vanuatu	No	No	No
Venezuela (Bolivarian Republic of)	No	2008	No
Viet Nam	1995	No	No
Yemen	DK	No	No
Zambia	1995	2010	No
Zimbabwe	1971	No	No

DK: Do not know. Information regarding an enactment of a road safety particular policy was not found.
No: The country does not have a policy in place

iii) Independent variables

a) Types of convergence

Global convergence. In order to determine whether global convergence has been reached, I utilize the shape parameter ρ of the Weibull function of the survival analysis models. In reporting the results, following Fogut and Macpherson (2008), I also call this shape parameter "time," as its sign provides information whether baseline adoption increases or slows during the observed period. A declining hazard rate can represent statistical bias arising from unobserved heterogeneity, meaning that conditions to accept the global convergence thesis are not met (Fogut and Macpherson 20008). More precisely, for the thesis of convergence to be supported by the results, the parameter ρ should increase significantly, because it would run counter to the heterogeneity bias. However, declining hazard rates can be the product of high-hazard countries, which leave behind the group of low-hazard cases leading to the suggestion that the overall hazard has declined with

time. If the convergence process was a response to a local or regional stimulus, with those countries most predisposed to road safety policy adopting first, then the baseline hazard would not increase as the first adopters were censored. If instead an ongoing global diffusion process is boosting the adoption of road safety policies, a significant increase in the baseline hazard of global models should be observed.

I also use two international treaties which deal a series of road safety matters: the "Geneva Convention on Road Traffic", and the AAUTPWH. International treaties, understood as variables that represent global forces, have been used to predict the adoption of national policies, particularly in the realm of human rights (Cole 2009). The Geneva Convention on Road Traffic was designed to promote the development of traffic safety by establishing certain uniform rules. Information of which countries signed the convention and the date of the signature is provided by the United Nations (2014b). This variable was dichotomous in which '0' corresponds to the period before the signature, and represents not having signed the convention, and '1' the period after having signed the convention, and represents whether a country has been formally exposed to road safety policy debates. The AAUTPWH was promoted to establish rules of reciprocity between signing countries. This agreement set the conditions to discuss the uniform provisions concerning ChRL as well as DRL. Information of which countries and the date of its signature is provided by the United Nations (2014c). Similarly to the Geneva Convention, this variable was dichotomous in which '0' corresponds to the period before the signature and represents not having signed the convention, and'1'the period after having signed the convention, and represents whether a country was exposed to more specific road safety debates regarding ChRL and DRL. It is expected that countries which had signed both treaties are more likely to adopt RSA, ChRL and DRL.

Regional spatial convergence. This type of convergence was assessed both indirectly and directly. Indirectly, by observing the shape of parameter ρ of the Weibull function for each region: Africa, Asia and the Pacific, Western Asia, Europe and North America, and Latin America and the Caribbean. These regions were chosen because the United Nations, through its five economic commissions (i.e. Economic Commission for Africa, Economic and Social Commission for Asia and the Pacific, Economic Commission for Latin America and the Caribbean, Economic Commission for Western Asia, and Economic Commission of Europe), regionally diffuses different type of policies including road safety ones.

In order to determine regional convergence a significant increase in this parameter should be observed. Directly, by assessing the impact of the *Creation of the European Transport Safety Council* in European models. Founded in 1993, this organization has provided road safety expertise to members of the European Commission and European Parliament. It has brought together more than 200 transport safety experts and organizes a European conference on road safety every year since its foundation (European Transport Safety Council 2008). This variable was dichotomous, with '0', corresponding to the period before 1993, representing the absence of this institution, and '1', the period of 1993 onwards, representing the time period following the launch of this institution.

Regional temporal convergence. Similarly to the regional spatial convergence this type of convergence was assessed indirectly and directly for commonwealth countries. Indirectly by assessing the shape of parameter ρ of the Weibull function for the sample of countries corresponding to Commonwealth countries. Directly, by identifying whether a country is a formal member of this group in the world sample. Membership identification may be obtained from the Com-

monwealth (2014). This variable was set to be dichotomous where '0' corresponds to non-Commonwealth countries, and '1' represents Commonwealth ones.

Unintended convergence. In order to adjudicate the unintended convergence outcome I introduce two types of variables, general national circumstances and specific national circumstances. The first captures situations which can affect policy adoption processes of any type, the second type of situations can affect road safety policy in particular. In other words, some national conditions at large may affect the general road safety situation of a given country. In this case large populations for instance, may create conditions to target road traffic fatalities by using a combination of road safety measures. On the other hand, very specific conditions, such as snow storms or shorter duration of sunlight, may require very ad-hoc road safety measures such as regulation of tyres for snow or day-time running lights.

General national circumstances. Population size. Population sizes have been obtained from the WB (2013). I logged this variable to correct for its skewed distribution. It is expected that countries with large population size would be more likely to enact road safety practices, since population size is correlated with number of crashes.

General national circumstances. Political violence. Political violence is defined by the systematic and sustained use of lethal violence by organized groups that result in at least 500 directly-related deaths over the course of the episode. Each episode is designated to span a certain number of years and judged to have been of a certain, general "magnitude of societal-systemic impact". An eleven-point scale, 0-10 gathered from the Center for Systemic Peace was used (Marshall 2014). It is expected that countries are less likely to adopt any road safety policy when violence is prevalent since their state capacity may be impeded to do so or simply road safety is not a national priority.

Specific national circumstances. Average yearly total number of hours of Bright sunshine. According to the World Meteorological Organization (2009), bright sunshine duration during a given period is defined as the sum of the sub-period for which the direct solar irradiance exceeds 120 W m^{-2}. It is expected that countries with lower average of bright sunshine would be more inclined to adopt this measure, since it can provide road users with better conditions of visibility. Data were gathered from the World Resources Institute (2013).

Specific national circumstances. Existence of a RSA. It represents whether a country has this type of institution. It is expected that countries with these types of organizations would be more likely to adopt ChRL or DRL, since they have road safety interest and can have the resources to initiate and sustain parliamentary debates. This variable was constructed from the sources provided when explaining the first dependent variable 'Adoption of a RSA.'

b) Mechanisms of convergence.

Variables representing these processes were introduced to examine what mechanisms may have facilitated the adoption of these policies. These were divided into three types: constructivist; coercion; and competition.

Constructivist. World Health Organization road safety global campaign. In 2004, this UN body launched a global campaign to promote the implementation of road safety measures in order to reduce the toll of traffic fatality and injury rates across the world (WHO 2009 and 2013). From 2004 up until today, this organization has written a series of reports and carried out several world and regional forums to endorse a series of road safety best practices. This variable was dichotomous with '0' corresponding to the period before 2004, and representing the absence of the global campaign, and '1' representing the period of 2004 onwards, following the launching and dissemination of the global campaign. It is expected that after the launch of this campaign countries

were more likely to adopt the three road safety policies, since countries can be exposed to policies that are legitimized by international actors.

Constructivist. Existence of road safety NGOs. The presence of a road safety NGO in each country represents whether a country has this type of institution. Information was obtained from the Global Alliance for NGOs for Road Safety (2014). This variable was dichotomous, with '0' corresponding to countries without membership, and '1' representing countries with membership. It is expected that countries with road safety NGOs with international links are more likely to adopt these policies because these organization can transmit to their governments, policies that can tackle road crashes.

Coercion. Type of importer-exporter vehicle country. Three categories were used to classify a country within the vehicle global trade market: i) '*Vehicle-importer country*', was a country which did not export any type of vehicle; ii) '*Vehicle-importer-exporter country*', was a country which its vehicle importation trade value was higher than its exportation trade value; and iii) '*Vehicle-exporter country*' was a country where the vehicle exportation trade value was higher than its importation trade value. Information was gathered from the United Nations Commodity Trade Statistics Database (United Nations 2014a). In order to determine the category of each country I added up its total number of vehicle exports trade value and compare it to its total number of imports vehicle trade value. This was applied for the period in which data for the country was available. It is expected that *Vehicle-exporter countries* are less likely to appoint RSAs or make DRL mandatory because these measures can go against the interest of the automobile industries.

Competition. Type of importer-exporter vehicle country. Using the same categories and data to assess the coercion mechanism, but it is expected an inverse result, which is *Vehicle-exporter*

countries are more likely to adopt DRL since that can allow these countries to remain competitive with other countries that require this device to be mandatory.

iv) Control variables

Gross Domestic Product. It is necessary to take into account a nation's level of development in order to make sure that any effects discovered are independent of a nation's level of wealth, particularly since economic development may increase a nation's ability to tackle road safety challenges (Kopits and Cropper 2005; Sze et al. 2014). I employ a measure of gross domestic product (GDP) per capita at purchasing power parity for 2000 US$. These data have been obtained from the WB (2013). I log these data because of their skewed distribution. It is expected that GDP per capita would increase road safety policy enactment.

Urbanization. I also include the percent of the population living in urban areas in the analysis (percent urban). These percentages have been obtained from the WB (2013). It is expected that urbanization may increase the enactment of road safety practices since an increase traffic density poses more challenges to regulating ground transportation (Grimm and Treibich 2010).

Table 1.2 reports the descriptive statistics of both control and independent variables.

Table 1.2 Descriptive statistics of control and independent variables, grouped by theoretical approach and predicted effect

Variables	Source	Years	Mean	SD	Min	Max	Percentage	Predicted effect
Global convergence								
Geneva Convention on Road Traffic	United Nations (2014b)	1949-2013	0.418	0.493	0	1		Increase of RSA, ChRL and DRL enactment
Agreement concerning the Adoption of Uniform Technical Prescriptions for Vehicles	United Nations (2014c)	1958-2013	0.108	0.310	0	1		Increase of RSA, ChRL and DRL enactment
Regional spatial convergence								
Creation of the European Transport Safety Council	European Transport Safety Council (2008)	1957-2013	0.088	0.283	0	1		Increase of RSA, ChRL and DRL enactment
Regional temporal convergence								
Commonwealth country	Commonwealth (2013)	1957-2013	0.267	.442	0	1		Increase of RSA, ChRL and DRL enactment
Unintended convergence								
General national circumstances								
Political violence (ln)	Marshall (2014)	1957-2013	0.222	0.537	0	2.890		RSA, ChRL and DRL less likely to be enacted
Population (ln)	World Bank (2013)	1950-2013	15.252	2.069	9.200	21.004		
Specific national circumstances								
Average yearly total number of hours of bright sunshine	World Resources Institute (2013)	1957-2013	1855.5	666.1072	500	3000		Increase of DRL enactment
Mechanisms of diffusion								
Constructivist								
World Health Organization road safety global campaign	World Health Organization (2004)	1957-2013	0.113	0.316	0	1		Increase of RSA, ChRL and DRL enactment
Existence of road safety NGOs	Global Alliance for NGOs for Road Safety (2014)	1957-2013	0.659	0.473	0	1		Increase of RSA, ChRL and DRL enactment
Coercion or Competition								
Importer vehicle country	United Nations (2014a)	1996-2013					21.86	Under coercion RSA and DRL less likely to be enacted Under competition increase of DRL
Importer-exporter vehicle country	United Nations (2014a)	1996-2013					64.65	
Exporter vehicle country	United Nations (2014a)	1996-2013					10.49	
Controls								
GDP per capita (ln)	World Bank (2013)	1950-2013	7.205	1.602	3.565	11.626		Increase of RSA, ChRL and DRL enactment
Urbanization	World Bank (2013)	1950-2013	46.418	24.177	2.115	100		Increase of RSA, ChRL and DRL enactment

RESULTS

I present the results in two sections. The first examines convergence outcomes and their mechanisms for the three policies globally; the second investigates convergence results of each world-region, by reviewing the mechanisms which operate at this level.

i) Global results

Table 1.3 reports the structural parameter ρ for each global model in which the policies are analyzed. I observe that for RSAs (Models 1 and 2) the structural parameters do capture an increase (1.444 and 1.529), indicating that the adoption of this measure has steadily risen across countries and time (as Figure 1.1 depicts it). However its level of statistical significance suggests that the likelihood to implement RSAs is not exclusively tied to global forces, and therefore conditions to accept the global convergence thesis are not met. This is corroborated when I observe that both international treaties are not significantly associated with the appointment of RSAs across the world. On the other hand, the establishment of a RSA may be a case of an *unintended convergence* and/or *regional temporal convergence*. This can be examined when I analyze both variables population and political violence which depict general national conditions. In Models 1 and 2, population is significantly associated with RSAs implementation and in Model 2 I observe that countries which did experience major episodes of political violence were more likely to delay the enactment of this type of institution. Secondly, commonwealth countries were more likely to adopt this measure, as shown in Model 2.

Table 1.3 Global convergence of RSA, ChRL and DRL

	RSA (Model 1)	RSA (Model 2)	ChRL (Model 3)	ChRL (Model 4)	DRL (Model 5)	DRL (Model 6)
Global convergence						
Geneva Convention on Road Traffic	0.142	1.015	**1.821***	1.474	1.105	0.981
	(0.48)	(0.05)	**(2.04)**	(1.23)	(-0.01)	(-0.64)
Agreement concerning the Adoption of Uniform Technical Prescriptions for Vehicles	1.294	1.259	**3.595*****	**2.970*****	2.165	2.047
	(0.70)	(0.65)	(3.97)	(3.61)	(1.39)	(1.14)
Regional spatial convergence						
Creation of the European Transport Safety Council	-----	-----	-----	-----	**3.716†**	**4.616†**
					(1.72)	(1.82)
Regional temporal convergence						
Commonwealth country	1.551	**1.955***	1.215	1.033	0.649	0.798
	(1.41)	(2.33)	(0.46)	(0.07)	(-1.85)	(-0.36)
Unintended convergence						
General national circumstances						
Population (ln)	**1.170***	**1.176***	1.041	0.956	**0.773†**	0.828
	(2.04)	(1.99)	(0.46)	(-0.38)	(-1.43)	(-1.39)
Political violence (ln)	-----	**0.636****	-----	0.936	-----	**0.000*****
		(-2.62)		(-0.18)		(-19.67)
Specific national circumstances						
Average yearly total number of hours of bright sunshine	-----	-----	-----	-----	0.999	1.000
					(-0.10)	(0.02)
Road Safety Agency	-----	-----	-----	**2.134***	-----	1.561
				(2.23)		(0.88)
Mechanisms of diffusion						
Constructivist						
World Health Organization road safety global campaign	**4.174*****	**4.258*****	**2.253****	**1.992****	**4.939****	**4.382*****
	(5.79)	(5.42)	(2.70)	(2.66)	(3.84)	(3.12)
Existence of road safety NGOs	.958	0.968	0.706	0.824	0.884	1.103
	(-0.16)	(-0.11)	(-0.80)	(-0.35)	(-0.34)	(0.19)
Coercion or Competition (ref. 'Importer vehicle country')						
Importer-exporter vehicle country	**1.965***	**2.408***	-----	-----	**1.17e+07 ***	**2809908*****
	(2.12)	(1.97)			(22.80)	(22.84)
Exporter vehicle country	1.662	2.256	-----	-----	**1.88e+07*****	**3208444*****
	(0.99)	(1.53)			(23.52)	(18.61)
Control						
GDP per capita (ln)	1.123	1.094	**1.889****	**1.897****	1.368	**1.363†**
	(0.80)	(0.63)	(4.57)	(4.45)	(1.54)	(1.93)
Urbanization	0.997	0.996	1.002	0.997	1.009	1.010
	(-0.33)	(-0.41)	(0.25)	(-0.26)	(1.50)	(1.46)
Time (ρ)	1.444	1.529	**1.577*****	**1.425***	0.941	0.757
	(1.16)	(1.45)	(2.73)	(2.47)	(-0.24)	(-0.85)
Number of countries	165	144	170	137	140	118
Number of adoptions	99	92	69	59	34	31
Observations	5225	4610	5146	4171	4498	3826
Log likehood	-105.353**	-89.613***	-82.941***	-67.737***	-36.658	-30.202
df	10	11	8	10	11	12

Absolute values of z statistics in parentheses. *** significant at 0.1%; **significant at 1%; *significant at 5%; † significant at 10%.
All models adjusted for clustering at the region level.

In regards to the mechanisms, I observe that the rate of RSAs' implementation increases significantly after the global campaign led by the WHO was launched. Nevertheless this positive

association is not strong enough to regard this policy as a case of global convergence as the ρ value of both models suggest. Lastly, there is evidence to support the competition mechanism rather than the coercive one, because 'Vehicle importer-exporter' countries are more likely to enact RSAs than 'Vehicle importer' ones.

Unlike the former policy, I do observe for the case of ChRL (Model 3) a significant increase of adoption overtime and across countries (1.577). These parameters suggest that worldwide forces have indeed shaped a convergence outcome as the global convergence thesis states. This is confirmed when I consider the models introducing the two international variables: the "World Health Organization road safety global campaign" and the AAUTPWH. I notice that following the launch of this campaign and the signature of this international agreement, the adoption of ChRL increased significantly. In Model 4 I also observe the same tendency. While the parameter estimate of this model decreases slightly (1.425), it nonetheless remains statistically significant after the variable representing RSAs was introduced. In other words, neither pure independent national decision making processes nor national dynamics (i.e. a large population) were sufficient to explain this convergence.

In regards to the convergence of DRL, I observe in Model 5 that the structural parameter not only is not significant but also lower than 1 (0.941), which suggests that a global convergence has not occurred. When the political violence and RSAs variables are introduced (Model 6), I observe a decrease in this parameter (0.757), confirming that pure global dynamics may not be in place when explaining the adoption rate of this policy. Nevertheless, these two models present evidence that supports two types of mechanisms of convergence: constructivist and competition. The constructivist mechanism highlights the importance of worldwide legitimate actors, such as the WHO, when disseminating policies across the world. Regarding the mechanism of

competition one observes that 'Exporter-vehicle countries' and 'Importer-exporter vehicle countries' were more likely to adopt DRL than 'Importer-vehicle countries'. This may reflect that in countries in which there is a higher demand for safer vehicles, the introduction of DRL devices may be a necessary condition that vehicle-exporter countries need to follow to remain competitive. In order to understand this mechanism more precisely it is necessary to analytically distinguish between early and late adopters. By updating national vehicle norms, that is, by adopting DRL, late adopter countries can decrease trade restrictions when exporting to early adopter countries. On the other hand, importer countries do not have the same incentive to adopt DRL, because vehicle exportation is inexistent. Lastly, it is important to notice that after the RSAs variable has been introduced, one observes an increase of the estimates for the European Transport Safety Council variable. The effect of this variable may reflect a regional convergence.

ii) Regional results

Tables 1.4a and 1.4b report the structural parameter ρ for each regional model, for RSA and ChRL. When I analyze these parameters for the RSAs models (Models 8a, 9a, 10a, 11a, 12a and 13a) one observe that regional spatial convergence occurs in Africa, Asia and the Pacific, Western Asia and Latin America and the Caribbean. However, the adoption processes of the European North America, and Commonwealth countries follow other characteristics. This confirms the rejection of the pure global convergence thesis for this policy. A potential case of regional convergence will be examined in the next section.

Table 1.4a Regional spatial and temporal convergence of RSA and ChRL

	Africa		Asia and the Pacific		Western Asia[a]
	RSA	**ChRL**	**RSA**	**ChRL**	**RSA**
	(Model 8a)	**(Model 8b)**	**(Model 9a)**	**(Model 9b)**	**(Model 10a)**
Global convergence					
Geneva Convention on Road Traffic	0.900	.732	**10.91***	------	**35.347†**
	(-0.25)	(-0.29)	(2.12)		(1.81)
Agreement concerning the Adoption of Uniform Technical Prescriptions for Vehicles	------	**-0.000*****	1.266	**9.011*****	------
		(-11.49)	(0.29)	(3.80)	
Regional spatial convergence					
Creation of the European Transport Safety Council	------	------	------	------	------
Regional temporal convergence					
Commonwealth country	**3.437*****	0.775	**0.45†**	0.238	------
	(4.20)	(-0.27)	(1.95)	(-0.89)	
Unintended convergence					
General national circumstances					
Political violence (ln)	**0.654†**	------	.746	1.804	0.057
	(-1.671)		(-1.10)	(0.48)	(-0.79)
Specific national circumstances					
Population (ln)	1.275	1.261	**1.659†**	0.498	2.120
	(0.84)	(0.55)	(1.67)	(-1.42)	(0.77)
Road Safety Agency	------	5.297	------	2.654	------
		(1.25)		(0.75)	
Mechanisms of diffusion					
Constructivism					
World Health Organization road safety global campaign	**2.683****	**3.359***	1.643	0.887	2.665
	(2.58)	(2.28)	(1.31)	(-0.18)	(1.52)
Existence of road safety NGOs	1.471	**0.280***	**0.272****	0.882	**2.53e+09*****
	(0.76)	(-2.39)	(-3.01)	(-0.0)	(6.59)
Coercion or Competition (ref. '*Importer vehicle country*')[a]					
Importer-exporter vehicle country	2.483	------	0.599	------	144.503
	(1.44)		(-0.46)		(1.22)
Exporter vehicle country	43.067	**------**	0.082	**------**	------
	(1.63)		(-1.56)		
Controls					
GDP per capita (ln)	1.654	1.163	1.693	**1.931***	**97.890*****
	(1.23)	(0.21)	(1.37)	(2.41)	(4.68)
Urbanization	0.988	1.043	0.980	1.012	0.730
	(-0.63)	(0.99)	(-0.88)	(0.34)	(-4.26)
Time (ρ)	**2.206†**	1.777	**2.432*****	0.64	**9.713****
	(1.91)	(0.66)	(3.99)	(-1.25)	(2.74)
Number of countries	43	41	33	32	14
Number of adoptions	28	7	18	8	7
Observations	1485	1496	998	947	477
Log likehood	-22.252	-10.562	-13.111	-11.640	7.697

Absolute values of z statistics in parentheses. ***significant at 0.1%; **significant at 1%; *significant at 5%.
All models adjusted for clustering at the region level.
[a] Western Asian countries did not enact ChRL

The mechanisms that explain convergence in each region suggest an image of a fractured globalization process. In other words, mechanisms that explain convergence within regions are not consistent across regions, which is why I did not observe RSAs to globally converge. The regional convergence of both Africa and Latin America and the Caribbean are linked to mechanisms represented by the constructivist perspective (Models8a and 12a). The global campaign led by WHO was significantly associated with an increase in the RSA adoption rate within these two regions.

In Asia and the Pacific (Model 9a) one observes evidence that supports the regional convergence thesis. Countries who had signed the Geneva Convention were more likely to appoint RSAs. This may suggest that countries of this region enacted these organization at early stages. This may be also explaining why the rho of this region (2.432) is statistically significant. An unexpected result is how the presence of NGOs with ties to the international road safety community is associated with a delay in the enactment of RSAs.

In Western Asia (Model 10a) one observes that the existence of road safety NGOs is more likely to be associated with the appointment of RSAs. The international treaty, the Geneva Convention on Road Traffic, is also significant at $p<.1$. These results may explain why I also observe regional convergence within Western Asian countries. Lastly, one also observes that rich countries are more likely to appoint RSAs.

In Europe and North America (Model 10a) one observes a more complex array of mechanisms at play. First, the constructivist and network mechanisms do indeed accelerate the rate of adoption. That is, having participated in the Convention of Geneva, and the WHO's road safety campaign had a positive effect on RSAs adoption. Second, after the creation of the European Transport Safety Council, the rate of adoption increased significantly. Lastly, I notice that coun-

tries whose level of political violence was high were more likely to delay RSAs adoption, thus suggesting that national factors had a significant effect on shaping the structural parameter of this region. In sum, the case of this region may reflect different waves of RSAs adoption, which may explain why the structural parameter ρ is not only no significant but also lower than 1.

In reference to the 'Regional temporal convergence' variable I observe that the adoption of RSAs is only significant in Africa. This regional finding also suggests why this variable was significant in the global convergence model of RSAs (Model 2) but non-significant in the global models of ChRL (Models 3 and 4). Once I analyze the case of Commonwealth countries (Model 12a) I observe that the variables which examine outcomes and mechanisms of convergence are not significant.

In regards to the ChRL adoption rates across regions, I observe that only Europe and North America and Latin America and the Caribbean have significant structural parameters ρ higher than 1. In regards to the Commonwealth countries (Model 13b) I observe that the structural parameter is not significant.

The mechanism of diffusion for Africa (Model 8b) is constructivist since the global campaign is significantly associated with an increase of the ChRL adoption rate in this region. However, unlike what constructivists suggest, I observe that African countries with road safety NGOs significantly delay the adoption of this policy. In Asia and the Pacific the enactment of ChRL (Model 9b) is tied to the signature of the AAUTPWH, anticipating perhaps the implementation of the global campaign. In this region I also notice that countries with higher GDP were more likely to enact ChRL.

Table 1.4b Regional spatial and temporal convergence of RSA and ChRL

	Europe and North America		Latin America and the Caribbean		Commonwealth	
	RSA (Model 11a)	**ChRL (Model 11b)**	**RSA (Model 12a)**	**ChRL (Model 12b)**	**RSA (Model 13a)**	**ChRL (Model 13b)**
Global convergence						
Geneva Convention on Road Traffic	**5.852***** (3.99)	0.626 (-0.96)	0.505 (-0.28)	1.192 (0.26)	0.680 (-0.78)	1.906 (0.95)
Agreement concerning the Adoption of Uniform Technical Prescriptions for Vehicles	1.746 (0.79)	0.627 (-1.30)	------	------	------	0.539 (-0.58)
Regional spatial convergence						
Creation of the European Transport Safety Council	**7.620** (3.22)	**2.217**** (2.18)	------	------	------	------
Regional temporal convergence						
Commonwealth country	**11.934*** (2.30)	1.415 (0.33)	2.864 (0.43)	**656.528**† (1.85)	------	------
Unintended convergence						
General national circumstances						
Political violence (ln)	**0.500*** (-2.13)	9.833 (1.57)	0.564 (-0.32)	1.503 (0.29)	1.049 (0.16)	0.574 (-0.88)
Specific national circumstances						
Population (ln)	1.198 (1.19)	0.770 (-1.24)	0.734 (-0.72)	1.306 (0.71)	1.068 (0.53)	0.986 (-0.07)
Road Safety Agency	------	**2.542**** (2.10)	------	0.985 (0.23)	------	**3.974**† (1.90)
Mechanisms of diffusion						
Constructivism						
World Health Organization road safety global campaign	**5.852***** (5.35)	1.411 (0.84)	**4.229*** (2.23)	**0.089*** (-2.40)	1.827 (1.05)	1.385 (0.40)
Existence of road safety NGOs	1.637 (0.90)	1.587 (0.31)	1.771 (0.44)	3.085 (1.39)	1.228 (0.47)	0.732 (-0.52)
Coercion or Competition (ref. '*Importer vehicle country*')[a]						
Importer-exporter vehicle country	------	------	------	------	1.655 (0.86)	------
Exporter vehicle country	0.939 (-0.11)	------	8.019 (0.95)	------	0.887 (-0.07)	------
Controls						
GDP per capita (ln)	0.782 (-1.02)	**2.414***** (7.35)	0.471 (-0.89)	**0.356**** (-3.00)	1.062 (0.20)	1.944 (1.29)
Urbanization	0.989 (-0.65)	0.995 (-0.27)	1.023 (0.38)	1.062 (1.44)	0.996 (-0.19)	1.205 (1.42)
Time (ρ)	0.668 (-0.81)	**1.807**** (3.07)	**5.988***** (4.41)	**21.792***** (13.55)	1.760 (1.28)	0.976 (-0.05)
Number of countries	34	35	23	23	33	32
Number of adoptions	25	32	17	11	26	12
Observations	818	609	924	880	996	1069
Log likehood	-17.949	-12.086	2.541	3.620	-30.062***	-14.086

Absolute values of z statistics in parentheses. *** significant at 0.1%; **significant at 1%; *significant at 5%.
All models adjusted for clustering at the region level.
[a] For the Model 9a RSA in Latin America and the Caribbean, the reference category is a combination of the categories 'Importer vehicle country' and 'Importer-exporter vehicle country.'

The European and North American case illustrates (Model 11b) the importance of specific regional institutions and national dynamics. After the enactment of the European Transport Safety Council, the adoption rate of this policy in this group of countries increased significantly. Furthermore, I observe that countries with RSA are also more likely to adopt ChRL. The case of Latin America and the Caribbean region is a complex one. Firstly, the estimate of the WHO road safety global campaign (Model 12b) is significantly negative, denoting that after this campaign the rate of adoption decreased with time. In other words, Latin American and the Caribbean countries adopt ChRL but they seem to be a region composed of late adopter countries. For instance, Costa Rica, Trinidad and Tobago, and Uruguay, only adopted ChRL after 2010. Nevertheless, I observe that countries with ties to the Commonwealth, which are mostly located at the Caribbean, are more likely to adopt this policy, and as such this could be reason of why the ρ in this model (21.792) is statistically significant. Lastly, the case of Commonwealth countries is in itself very interesting. Within this group of countries I observe a type of unintended convergence, since only RSA accounts for the enactment of this policy. This is indirectly confirmed by the level of significant of the structural parameter and variables representing the constructivist approach.

In regards to the regional analysis of DRL in Europe (Table 5), we observe than the structural parameter ρ is higher than 1 (1.137) and significant. This finding suggests a regional spatial convergence outcome. The introduction of the global campaign and the signature of the "Agreement concerning the Adoption of Uniform Technical Prescriptions for Vehicles" coincide with an increasing adoption rate of this policy across Europe. I notice, however, that this regional pattern is tempered by national dynamics tied to political violence. Political contexts marked by violence decrease the likelihood of adopting DRL, perhaps suggesting a specific timing of when

a window of opportunity opened. In regards to mechanisms of convergence the constructivist is the only one which captures a significant association.

Table 1.5 Regional spatial and temporal convergence of DRL in Europe and North America

	DRL (Model 14)
Global convergence	
Geneva Convention on Road Traffic	0.749
	(-0.81)
Agreement concerning the Adoption of Uniform Technical Prescriptions for Vehicles	**2.819****
	(2.70)
Regional spatial convergence	
Creation of the European Transport Safety Council	0.420
	(-0.81)
Regional temporal convergence	
Commonwealth country	-----
Unintended convergence	
General national circumstances	
Political violence (ln)	**0.000*****
	(-6.14)
Population (ln)	0.882
	(-0.88)
Specific national circumstances	
Average yearly total number of hours of bright sunshine	**1.000**†
	(1.89)
Road Safety Agency	1.851
	(1.04)
Mechanisms of diffusion	
Constructivist	
World Health Organization road safety global campaign	**13.269*****
	(2.27)
Existence of road safety NGOs	-----
Coercion or Competition (ref. 'Importer vehicle country')	
Importer-exporter vehicle country	-----
Exporter vehicle country	0.911
	(-0.14)
Control	
GDP per capita (ln)	**1.397***
	(1.98)
Urbanization	**1.005***
	(2.12)
Time (ρ)	**1.137***
	(2.09)
Number of countries	33
Number of adoptions	26
Observations	810
Log likehood	-6.540
df	2

Absolute values of z statistics in parentheses. *** significant at 0.1%; **significant at 1%; *significant at 5%.
All models adjusted for clustering at the region level.

DISCUSSION AND CONCLUSION

My analyses show that there was a convergence with respect to the three road safety policies examined—which emerged approximately at the same time, and have been promoted by recognized international actors such as the WHO and the WB. Nevertheless, unlike what advocates of the global convergence thesis predict, the shape of their convergence varies. I thus conclude that the nature of convergence depends on regional arrangements, type of international actors involved and national dynamics, rather than exclusively on global forces spreading nation-states' *scripts* homogeneously across the world.

I also found that effects of global forces are facilitated by regional efforts and that spreading of policies can indeed overcome national dynamics. Thus, for the case of RSA and ChRL in Africa and for RSA in Latin America and the Caribbean I observe that the WHO's global campaign increased the rate of adoption of these policies respectively, operating through the functioning of specific working groups. For instance in Africa the adoption of a RSA and ChRL is explicitly recognized in the Accra Declaration which points out that:

> [The African Ministers responsible for Transport and Health state [that] member States [should] use the *World Report on Road Traffic Injury Prevention* as a framework for road safety and implement its recommendations to substantially reduce the causes and risk factors associated with road accidents, namely the non-use of safety belts and **child restraints** … [As well as to] set and achieve measurable national targets for road safety and traffic-injury prevention in all Member States to contribute to the achievement of Africa's overall targets to reduce accidents fatalities by half by 2015. In this regard, Member States should designate **a lead agency**, with legal backing and adequate and sustainable financial resources, to ensure the achievement of the targets" (Economic Commission for Africa and WHO 2007:2-3)(Emphases added)

In Latin America and the Caribbean, on the other hand, several international organizations, such as the Pan American Health Organization, Economic Commission of Latin America and the Caribbean, and the Inter-American Development Bank, in coordination with national representatives, have jointly developed a regional approach for the road safety challenge for the past 10 years. They have, in different instruments or forums, recognized the importance of RSA.

For instance, in the *Programa Mesoamericano de Seguridad Vial* they explicitly state as one of the most prominent objectives to "Appoint and strengthen **road safety agencies** with capacity to develop national road safety strategies, with clear goals and indicators. These strategies must be supported by scientific evidence in order to assess the design of the road safety measures to be implemented and monitor their implementation and effectiveness… " (Proyecto Integración y Desarrollo Mesoamérica, Consejo de Ministros de Salud de Centroamérica y República Dominicana, 2012:15, emphases added).

In Asia and the Pacific, however, the commitment to road safety is not as clearly established. The Bangkok declaration, for instance, only vaguely asserts that road safety must be placed high on the policy agenda: "road safety is a public policy issue of major concern that requires a strong political commitment and effective interventions if road traffic fatalities, injuries and related human suffering are to be reduced significantly" (Economic and Social Commission For Asia and the Pacific 2009:2). However, references to any of these three specific types of road safety policies here analyzed are absent.

The puzzle of DRL convergence deserves a lengthier discussion. While the evidence indicates that the constructivist mechanism is quite adequate to understand the convergence on this policy throughout Europe, I still need to account for, at least indirectly, why it did not diffuse to other regions more consistently, given that this is measure is not new, and scientific evidence has been used to document its effectiveness. Three explanations can be proposed, of which the last two seem to be the most plausible ones. First, this measure may not have been championed as perhaps the cases of RSA or ChRL policies suggest. Behind the ChRL, there has been historical support for this measure from the pediatric community (American Academy of Pediatrics 1996, 2002, Durbin 2011) and the WB has been a key organization in promoting RSAs (Bliss and

Breen 2009). This explanation could be plausible if I disregard the WHO as champion of this measure, even though in several reports DRL's benefits were indicated. Granted this may suggest a weakness on how the global campaign was operationalized, however if this were so, the convergence of RSA or ChRL should also be questioned.

Second, and in line with realist international relations explanations, Simmons, Dobbin and Garret (2009) have argued that understanding the role of the USA can provide with different insights when examining the convergence of policies. While the USA enacted its road safety agency (National Highway Traffic Safety Administration (NHTSA)) in 1968, and the last US state enacted ChRL in 1983, DRL remains up to date not compulsory. In this regard, it is important to notice that representatives of the automobile industry within the USA have had a prominent role in attempting to disseminate this policy in this country; but the NHTSA has resisted its enactment. In the years 1993 and 2001, representatives of General Motors formally requested, previous presentation, of two studies regarding the effectiveness of this measure, the introduction of this device to be mandatory. On both occasions, the NHTSA disregarded these requirements providing both methodological arguments and studies which questioned the efficacy of this measure. In 2009, the NHTSA concluded that "the agency … has been unable to determine if there are any demonstrable safety benefits associated with DRLs, and therefore leaving them as a manufacturer option is the best outcome" (NHTSA 2009:30993). In other words, the USA's road safety prominence has been followed by the majority of countries. More particularly, if this country has not had legislation that supports DRL, then other countries can invoke the USA's experience to challenge the effectiveness of this policy at times in which a regulation attempts are set forth.[14]

[14] The case of the automobile industry promoting DRL in the USA indeed questions the notion that this industry should resist the introduction of safety devices *tout court*. Nevertheless, this example actually reinforces what I

Lastly, in juxtaposition with the second explanation, I also suspect that what Asian regions, Africa or Latin America and the Caribbean lack, in terms of having an institution that resembles the European Transport Safety Council, can provide us with a sound explanation of why DRL has not globally spread. The European Transport Safety Council is composed of a formal network of academics, researches and government representatives, who congregate formally and regularly with the aim to debate and analyze road safety measures. Lacking this institutional structure may make the global diffusion of contested road safety policies at the regional level more challenging, since more sustained efforts may be needed to promote them. The official position of this council, after the European Union requested a public consultation for considering the approval of this policy, was to mandate "equipment of low-energy consumption dedicated DRL on all new vehicles accompanied by a measure mandating the use of dipped headlights on existing vehicles" (European Transport Safety Council 2006: 4). In Europe, this position was endorsed by three research centers, the Organisation for Applied Scientific Research, Institute for Road Safety Research, and the Institute of Transports Economics, which conducted research to assess the effectiveness of this measure.

Table 1.6 displays the mechanisms which facilitated convergence in each road safety policy. I observe that at least two mechanisms explain different types of policy convergence, and thus, in the field of road safety policy adoption it would be unwise to suggest the existence of a supernumerary mechanism. Nevertheless the mechanisms which are depicted by constructivists and the local perspective are the ones which most consistently explain convergence in the three policies. Relatively, the other two mechanisms (coercion and competition) are less frequent, denoting either limitation on how they were operationalized or simply lack of generalizability.

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found in the models, that is, the automobile industry may not be a homogenous group, and as such supporting or rejecting road safety legislation would need to be in function of other factors other than the 'ceaseless accumulation of capital.'

Table 1.6 Type of convergence outcomes and mechanisms of convergence by RSA, ChRL and DRL

Road safety policy	Type of convergence outcomes	Mechanisms of diffusion	Local dynamics
RSA	Unintended convergence in the world	Constructivist Competition	Political violence Population
	Regional convergence in Africa	Constructivist	Political violence
	Regional convergence in Asia and the Pacific	Constructivist	Population
	Regional convergence in Western Asia	Constructivist	No
	Regional convergence in LAC	Constructivist	No
	Unintended convergence in Europe and North America	Regional spatial Regional tem-poral Constructivist	Political violence
	No temporal convergence in the Commonwealth	No mechanism of diffusion	
ChRL	Global convergence	Constructivist	Road Safety Agencies
	Unintended convergence in Africa	Constructivist	Political violence
	No convergence in Asia and the Pacific	Constructivist	No
	Regional convergence in LAC	Regional spatial Constructivist	No
	Regional convergence in Europe and North America	Regional spatial	Road safety agencies
	No temporal convergence in the Commonweatlh	No mechanism of diffusion	Road safety agencies
DRL	No convergence in the world	Constructivist Competition	Political violence
	Regional convergence in Europe and North America	Constructivist	Political violence

At any rate, it is important to highlight that conceptually, mechanisms do not have to compete with each other. Rather, it seems that if one is interested in understanding how policy convergence occurs more thoroughly, one is better off assuming that these mechanisms may capture different stages of the convergence processes. For instance, I notice that in Europe and

North America the convergence and spreading of RSA is facilitated by both the formation of early networks, as well as by national dynamics which signal the emergence of a public concern. Secondly, countries of the Asia and the Pacific, and the Western Asia regions are more likely to appoint RSA after the enactment of the Geneva Convention on Road Traffic. And lastly, this policy spreads to regions such as Africa and Latin American and the Caribbean thanks to the efforts led by the WHO after the year 2004.

In conclusion, my analysis suggests that future studies on policy diffusion should account for regional and national dynamics as well as conduct more systematic tests of falsification by contrasting the implementation of different policies simultaneously. Doing so will lead to more nuanced and precise theoretical specifications. My agnostic theoretical framework allowed me to recognize the contributions that different scholars have made to the debate of diffusion policy and types and mechanisms of convergence. However, comparing different policies across countries as an analytical strategy to test for global, regional or national forces is rarely done, likely because both those who side with the world-society perspective as well as those who highlight national dynamics only dispute what leads to convergence, but not what types of convergence one observes. Hence, by highlighting differences in the diffusion of distinct policies, I show that convergence indeed takes different shapes: global, regional spatial, regional temporal and even unintended ones. And by demonstrating that the extensions and forms of these policies vary, I was able to show more precisely how the mechanisms through which these measures disseminated across countries, regions and the world, worked.

PREAMBLE TO CHAPTER 2

Chapter 1 above considered how global, regional and national factors affected the adoption of three road safety policies, and found that these policies depict different convergence outcomes. We saw that ChRLs globally diffused, and RSAs and DRLs portray a fractured dissemination process, since these policies spread to specific regions, such as Africa, Latin America and the Caribbean and Europe. This implies that those who describe public processes of global convergence, as scholars belonging to the world-society tradition, may be wrong. Moreover, we observe that different mechanisms of global diffusion can work simultaneously. Both competitive and constructivist mechanisms, represented by the presence of countries who import and export vehicles, and legitimate international actors such as the WHO and the European Transport Safety Council, facilitated the dissemination of these policies across the world and specific regions. As it was suggested in the Introduction, traffic outcomes may be related to the interplay of national, regional and global forces. The next chapter looks at the relationship between two public policies, RSA and health systems (HS), on three traffic outcomes: road fatalities, traffic injuries, and accident severity. RSAs represent the link to international dynamics, since these institutions followed adoption patterns marked by constructivist mechanisms of global diffusion, and HSs characterize a more direct connection to national forces. Comparing these two policies allows us to note that their implementation affect different aspects of the road safety challenge experienced by countries. While RSA are related to traffic injury variation, well-developed HS to road death reductions. The reader may skip the theoretical discussion since in the Introduction were systematized the most important elements of the piecemeal social engineering approach and the new institutionalist theory.

CHAPTER 2: ASSESSING THE IMPACT OF ROAD SAFETY AGENCIES AND HEALTH SYSTEMS IN TRAFFIC OUTCOMES, 1994-2012

Author José Ignacio Nazif Muñoz

Abstract

Road safety policies, defined as public measures to tackle and decrease traffic mortality and morbidity rates, have emerged worldwide. This chapter examines the effects of two public policies, road safety agencies and health systems, on three outcomes: traffic fatalities, traffic injuries and traffic accident severities. I analyze cross-sectional longitudinal data using regression models to account for the endogeneity of road safety agency formation. My first finding is that road safety agencies are associated with a decrease of traffic injuries in the long term. This trend is only observed in developed countries. A second main finding is that health systems decrease traffic fatalities in the long-term, and traffic accident severities in the mid-term. The effectiveness of these systems is prevalent in both developed and developing regions. Results call for revisiting and carefully rethinking the specific mechanisms which explain why road safety agencies and health systems seem effective in decreasing different traffic outcomes.

INTRODUCTION

The concept of isomorphism is frequently invoked by neo-institutionalists to describe the undisputed adoption of similar public policy models across the world. Indeed many countries have followed the rhythm and shapes of several public policies suggested by international organizations. Neo-institutionalists also argue that these policy models fail to bring about their desired changes. To describe this situation these authors use the concept of 'decoupling'—in simpler words, when policies fail to meet their planned outcomes. At this point, any research that attempts to demonstrate the failures of globally promoted public policies has become trivial. Given this state of affairs, what are social scientists interested in the diffusion of public policy to do? One option is to find and secure a place within neo-institutionalists by examining fashionable public policies and restating once more the phenomenon of decoupling. Another alternative is studying public policies which have not received much scholar attention in the realm of policy diffusion analysis, and examining under what circumstances these policies fail or not.

In this chapter, I empirically examine the effects of road safety agencies (RSA) and health systems (HS) on three core sets of outcomes: traffic fatalities, traffic injuries and traffic accident severities. Both of these policies can affect traffic outcomes, but through different pathways: the former have been argued by the World Bank, to be institutions which can play an important role in devising and implementing policies that reduce both incidence of crashes and the severity of the resulting injuries (primary and secondary prevention; Bliss and Breen 2009), while the World Health Organization (WHO) suggests the latter can indirectly mitigate the consequences of car crashes when HS offer emergency assistance and sustain medical care systematically (secondary and tertiary prevention; WHO 2013). In studying the effects of both policies I consider variation in *outputs*, as well as *inputs*. This allows me to potentially identify under what circumstances RSAs are more effective than HS and vice versa. I also explore dynamic processes

by analyzing the non-linear effects of both policies. Lastly, in order to identify the strength of the results, I complement global analyses with regional ones.

I arrive at four main conclusions. First the effects of RSAs are stronger for traffic injuries than for traffic fatalities and traffic accident severities. I suggest that these agencies, when introduce road safety legislation, are effective in deterring specific segments of the population, rather than the population at large. Second, these effects are not straightforwardly linear. The effect of RSAs on injuries is negative in the short term but becomes positive over time. The initial increase in traffic injuries may be due to a reporting effect, because RSAs increase the likelihood that traffic incidents will be detected and reported. Third, the effect of HS is stronger for traffic fatalities and traffic accident severity, than for traffic injuries. I suggest that the institutional capacity of HS to attend traffic incidents immediately after these have occurred, through the provision of emergency services and hospital treatment, can decrease both traffic fatalities and the severity of these events. Fourth, while the effects on traffic fatalities are linear over time, the effects on traffic accidents severity are not. I suggest that HS show a diminishing marginal effect on the reduction of traffic accident severities due to an increase of the vehicle fleet.

My analysis departs in one substantive way from existing studies of policy decoupling. While sociology has made significant contributions to the phenomenon of policy decoupling in domains associated with human rights (Baker and LeTendre 2005; Schofer and Meyer 2005; Suárez 2007; Meyer et al 2012), educational enrolments (Meyer et al 1992; Meyer et al 1997; Ramirez et al 2006; Ramirez and Christensen 2012), environmental protection (Frank et al 2000; Meyer and Jepperson 2000; Drori et al 2003; Schofer 2003; Elliott 2007; Frank et al 2009; Longhofer and Schofer 2010), international treaties (Leeds amd Savun 2007; Valentino et al 2006; Goldstein et al 2007), and women's rights (Swiss 2009; Fallon et al 2012; Pierotti 2013),

sociologists have been surprisingly silent in examining the effectiveness of road safety policies.[15] I thus offer to examine whether this notion applies to this previously unexamined field.

This chapter also contributes to an emergent literature that models policies' effects, as not straightforwardly linear. Analyses of peace agreements compliance (Fortna 2003), women's legislative representation in developing nations (Fallon, Swiss and Viterna 2012), and physical integrity rights (Cole and Ramirez 2013) have suggested that effective policies effects can be followed by ineffective ones or vice versa. Similarly, I find that policy effectiveness is a dynamic temporal process. Although RS and traffic injuries are initially decoupled, over time this policy becomes more effective in reducing these outcomes.

My focus on different outcomes and temporal effects draws attention away from the standard interpretation of decoupling as a mere structural problem, and instead highlights the conditions under which policies may be optimal, sub-optimal or ineffective. In sum, my findings emphasizes a richer approach to acknowledge the variety of potential outcomes to public policy implementation.

THEORIZING THE EFFECTS OF ROAD SAFETY AGENCIES AND HEALTH SYSTEMS ON TRAFFIC OUTCOMES

i) The piecemeal social engineering approach to curb road crashes

A group of scholars and policy makers, who have assessed the impact of road safety policies, have argued that both scientific knowledge and its application are necessary conditions for reducing road crashes and their consequences. Oppe (1991) suggests that "society learns more and more how to deal with safety problems (…) [The] learning effect results partly from the learning of individual road users to deal with traffic, but also from the increase in knowledge with regard

[15] While some prominent sociologist such as Goffman (1971) and Elias (1995) showed some interest in the road safety phenomenon, sociology overall has made very few and dispersed contributions to this area of research (Philips 1979; Gusfield 1984; Boer 1986; Green 1997; Parusel and McLaren 2010; McLaren and Parusel 2011).

to vehicle design, road design and maintenance, legislation, training, education, safety campaigns, and so on" (p. 401). In general, this group of scholars state that a more precise understanding of road traffic fatality and injury variations can be reached once road safety policies' assessments are carried out. Further, they recognize that while countries might have different road safety challenges, and therefore can be constrained to choose one specific set of measures over another given their own particularities, if countries implement evidence-based measures a reduction on traffic externalities ought to be observed (Elvik 2008; Rizzi et al. 2011).

While there is a large variety of studies which analyze road safety challenges at the national level (Elvik and Vaa 2004), cross-national research is very limited and of different quality. Furthermore, the sample of countries used by scholars working in this group of studies has largely been limited to high-income countries. Road safety measures analyzed in past cross-national research include: automobile insurance models (Lemaire 1995; Dionne 2001); motorcyclists' helmet laws (Law et al. 2009); maximum blood alcohol concentration rates (Castillo-Manzano et al. 2013); and quantified targets for reduction of the number of fatalities (Wong et al. 2006; Elvik 2010b; Allsop et al. 2011).

Lemier (1995) focused on the effect of the insurance system on traffic fatalities per kilometer traveled. He argued that a more rigorous automobile insurance system is more likely to yield drivers' safer behaviors.[16] According to his data, there was indeed a negative relationship between the rigor of the bonus system and the number of fatalities. That is, the stricter the system in a particular country the lower its traffic fatality rate is. However, this relationship may be confounded by a number of potential factors, such as improvement of health services, police en-

[16] The rigorousness of an insurance system is based on "the size of the difference, measured in monetary terms, between the highest and lowest bonuses, and how rigorously the system punishes claims in the form of loss of bonus" (Elvik and Vaa 2004:950). Under the classification developed by Lemier, Italy was regarded as having the least rigorous insurance system, and Sweden the most rigorous one.

forcement, or technological advancements. As these were not controlled for, the association should be treated cautiously. Law et al. (2009) reviewed the impact of motorcyclists' helmet laws implementation on traffic fatalities, and considered explicitly political and economic elements. Their results indicated that motorcycle helmet laws were significant in the reduction of fatality rates of these road users. An important limitation of this study, however, is that it did not capture the temporal variation of helmet laws, that is, when the motorcycle laws were introduced. Castillo-Manzano et al. (2013) analyzed 27 European countries for the period 2000-2009. These authors were interested in testing whether Europeanization (number of years that a country has been a European Union member) and blood alcohol concentration rate allowed, had an impact on road traffic fatality rates. Their results suggest that fatality rates were reduced by the 'Europeanization' variable and blood alcohol concentration rates. That is, the longer the membership into the European Union and the stricter the regulation on acceptance on driver's alcohol consumption, the more likely the country was to decrease its traffic fatality rate. Wong et al. (2006), Elvik (2010b) and Allsop et al. (2011) use samples of highly motorized countries to examine the effectiveness of quantified road safety targets. According to the OECD report on traffic safety (OECD 2008), setting quantified road safety targets can serve as a catalyst that sparks decision making processes to support the formulation of an over-arching road safety policy. It particularly helps to reframe how road safety should be both perceived and managed. In each of these studies the introduction of this measure was found to have positive impacts in reducing traffic fatalities.

i.i Hypotheses for RSAs and HS as effective public policies in the realm of traffic outcomes

Based on the cases of New Zealand, Great Britain, Australia and Sweden (each country with a superb record of reduced traffic fatalities in the past 30 years) the World Bank (Bliss and Breen 2009) have argued that RSAs models should be implemented in order to tackle road safety challenges. They specifically pointed out that RSAs can be successful if these institutions have a re-

sult-focused approach (i.e. road safety goals are directly tied to their performance), coordinate and align the efforts of related institutions, introduce and update road safety legislation, monitor their performance, and develop knowledge that contributes to the efficiency and effectiveness of the road safety management system. Furthermore, the institutional capacity of RSA has been regarded as one important factor in effecting the decreasing of traffic indicators such as traffic fatalities and traffic injuries. More specifically, Bliss and Breen (2009) have argued that long-term and constant investment are necessary conditions to improve RSA effectiveness. Under this institutional model, interventions must not be fragmented, efforts coordinated, and funding strong. For these reasons I pose the following hypothesis:

> *Hypothesis 1.1*: RSAs will be more effective in decreasing traffic fatalities, injuries and severities the stronger their capacity, the older they are and if they have a result-focus approach.

The World Health Organization has pointed out that HS must introduce post-impact care measures to avoid traffic death and disability, to limit the severity of the injury and to assure that crash' victims can recover and reintegrate into society (WHO 2004). In this regard measures surrounding pre-hospital and hospital care provision can help mitigate car crashes consequences. For instance, individuals who arrive first at the scene of a crashes can play determinant roles through timely contacting emergency services, applying first aid, or helping to put out any fire. The WHO also notices that emergency rescue personnel and equipment play a relevant role since their work and correct application is essential to provide basic life support. Lastly, in reference to the hospital care provision, the WHO has also stated that training for managing trauma care, equipment and supplies, and hospital administration are vital to tackle road crashes' consequenc-es. Castillo-Manzano et al. (2014) analyzed 27 European countries for the period 1999-2009 and

tested to what extent health expenditure—used as a proxy for emergency services and advanced trauma care—was associated with road traffic fatality and injury rate reduction. Their results suggest that health expenditure was associated with a reduction of 5% fatality rate per capita and 7% of injury rate per capita. For these reasons I suggest the following hypothesis:

Hypothesis 1.2: Well-developed HS will reduce traffic fatalities and injuries.

Another view has suggested that in developed countries the relationship between HS and health outcomes is non-linear (Castilla 2004; Olsen and Svenn-Åge 2007). That is, in wealthier countries a diminishing marginal effect of HS on health outcomes is observed, because population health depends more on other structural variables than on country's health expenditures. Similarly, I expect to observe a non-linear relationship between HS and traffic outcomes. At a certain threshold, further reduction in traffic fatality, injury and accident severity depends more on structural variables such as the safety of road infrastructure and vehicle safety technology than additional investment in the HS. As such I pose the following hypothesis:

Hypothesis 1.3: HS will have a diminishing marginal effect on the reduction of traffic fatalities, injuries and the severity of car crashes across developed countries.

ii) New institutionalism

The new institutionalism research agenda is one of the most successful paradigm in public policy analysis (Radaelli, Dente and Dossi 2012). At least two interrelated elements are usually discussed to describe neo-institutionalism in sociology.[17] First, this theory essentially challenges accounts which state that public policies are products of intentional and rational efforts. Neo-institutionalist scholars actually argue that public policy formation is a process, in which effi-

[17] The description of neo-intuitionalism theory here suggested is not intended to be neither comprehensive nor exhaustive. It is simply to highlight some features of this theory. Furthermore this brief description corresponds to some of the definitions discussed in the realm of sociology and not in the economics nor political science. For a more detailed description of this theory please see Hall and Taylor (1996) or DiMaggio and Powell (2012).

ciency is not necessarily the major force in determining its shapes, but rather cultural practices embedded in the larger contexts are likely to affect the design of policies (Hall and Taylor 1996). Second, many neo-institutionalist studies have noticed that the disjuncture between public policy design and its implementation is a common feature of contemporary societies; they label this phenomenon 'policy decoupling.' For neo-institutionalists, there are at least four overlapping instances that may explain policy decoupling:

First, Meyer and Rowan (1977) suggest that policies in highly interconnected societies are doomed to fail, because contingencies constantly emerge. As result, Meyer and Rowan argue, that high representatives of social organizations acknowledge the phenomenon of decoupling and thus invest their efforts to restating the goals that these organizations should aim at, by making them more ambiguous, for instance "hospitals treat, not cure, patients. Schools produce students, not learning" (Meyer and Rowan 1977:357), and in turn the survival of the organization no longer depends on performance, but rather on how organization activities and practices are communicated both formally and informally. Lastly, when organizations systematically face decoupling their members tend to reject any form of evaluation by introducing caveats of different types and thus make the organizations immune to inspections.

Second, Westphal and Zajac (2001) suggest that decoupling may reflect efforts by organizational leaders to avoid that either their political interests or influence over the organization are challenged. More particularly a disjuncture between policy design and outcome can be observed when in face of external pressures, these actors will favor a response that "involves separating the substantive activities of the organization from the formally adopted policy, thus enabling [these actors] to preserve their discretion over the allocation of resources" (Westphal and Zajac 2001:206).

Third, Meyer et al. (1997) extrapolate the concept of decoupling to world-society dynamics. Nation-states are influenced by a variety of dominant models of public policies, which composed the so-called 'World culture', but these policies cannot be exported wholesale, they state. The diffusion processes of these policies work at different levels (world to nation, nation to state (or province), state (or province) to city), and thus the transmission and implementation of these policies become incoherent or ineffective.

Four, Meyer et al. (1997) state that decoupling may also occur because of resource capacity. For instance, using the language of dependency theory these authors state that peripheral countries due to their limited resources, tend to highlight formal objectives rather than substantive ones. Decoupling is a trade-off which nation-states face in order to conform to (worldly) expectations of forms rather than outcomes.

ii.i Hypotheses for RSAs and HS as an ineffective public policies in the realm of traffic outcomes

Two hypotheses can be derived from neo-institutionalism theory, one regarding developed countries and another developing ones:

Hypothesis 2.1: RSAs and well-developed HS will not be effective in decreasing traffic fatalities, injuries and accident severities across developed countries.

Hypothesis 2.2: RSAs and well-developed HS will not be effective in decreasing traffic fatalities across developing countries.

METHODS AND DATA

i) Method

To assess the effects of the RSA and well-developed HS on traffic fatality, injury and accident severity rates, I analyze a longitudinal sample of countries over an 18-year period using a cross-sectional time series approach. Simmons (2010), in an extensive literature review of policy de-

coupling across the world, has noticed that these studies have failed to account for endogeneity. This author argues that policies are not randomly distributed globally, but in certain cases national circumstances also favor the adoption. As I showed in Chapter 1, countries do no to adopt RSAs at random and thus I employ methodological techniques that attempt to account for endogeneity of RSA formation. More specifically, countries which adopted these organizations were influenced by both national and international forces. Failure to account for systematic variation in the factors that predict RSA adoption can lead to biased estimates of their subsequent effects. I used two-stage least square regression with instrumental variables following the form:

$$Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 X_{it-1} + \beta_3 HS_{it-1} + \beta_4 RSA_{it-1} + \varepsilon \quad (1)$$

and

$$RSA_{it-1} = \gamma_0 + \gamma_1 X_{it-2} + \gamma_2 Y_{it-2} + \gamma_3 Z_{it-2} + \upsilon, \quad (2)$$

where *i* and *t* represent countries and years respectively; Y is the traffic outcome of interest (traffic fatalities, injuries and accident severities); X is a matrix of control variables described below; HS is a variable representing the health system policy; RSA is an endogenous variable counting the number of years since country *i* established this type of organizations; Z is a vector of instrumental variables; β and γ regression coefficients; and ε and υ are error terms. Note that both equations include a lagged dependent variable. In Equation 1 this variable adjusts for autocorrelation and models changes in countries' traffic outcomes; in Equation 2 it accounts for the possibility that RSA is endogenous to a country's national and international characteristics (i.e., that RSA adoption could be consequence of national capacity to build these organizations and/or regional and international forces such as the presence or absence of road safety regional institutions, or the road safety global campaign).

I instrumented RSA adoption using the following variables: a dummy variable for WHO road safety campaign to tap the effect of the global diffusion of this policy; country's relative position in the automobile exporting-importing market to gauge their effect on decreasing or increasing the adoption of RSA; dummy variable for Commonwealth countries since these countries were more likely to adopt RSAs; and variables that model duration dependence (three cubic splines), as suggested by Simmons (2009) and Simmons and Hopkins (2005).

In order to account for unobserved heterogeneity, I introduce fixed effects for both equations. This methodological approach allows us to better estimate the standard errors for the coefficients and accommodate the unbalanced nature of the panel.

Lastly, in order to assess the robustness of this approach I also model RSAs as if were randomly distributed by fixing both time and year effects. Introducing this method will also allow me to compare results which may be contradictory.

$$Y_{it} = \beta_0 + + \beta_1 Y_{it-1} + \beta_2 X_{it-1} + \beta_3 HS_{it-1} + \beta_4 RSA_{it-1} + \gamma_2 E_2 + \ldots + \gamma_n E_n + \delta_2 T_2 + \ldots + \delta_t T_t + \varepsilon \quad (3)$$

where *i* and *t* represent countries and years respectively; Y is traffic fatalities; X is a matrix of control variables described below; HS is a variable representing the health system policy; RSA is a variable counting the number of years since country *i* established this type of organization; E is the country n; γ is the coefficient for the binary regressors of the countries; T is time as binary variable; δ is the coefficient for the binary time regressors; and ε error terms.

ii) Data

The sample consists of observations for 127 countries from 1994 through 2012.The dataset is an unbalanced panel in which the maximum number of observations for a country is eighteen, and the minimum is one. New countries are entered into the dataset during the first observed year

following their independence or creation.[18] Table 2.1 reports the descriptive statistics of dependent, independent and control variables.

iii) Dependent variables

I analyzed three measures of traffic safety—'traffic fatality per population', 'traffic injury per population', and 'traffic accident severity.'

Traffic fatality per population. Traffic fatality data was gathered from the WHO's Mortality Database. WHO collects and standardizes mortality data submitted by national vital records agencies worldwide. I chose this data source because it uses a standardized coding scheme, the International Classification of Diseases Population (ICD). More specifically, the total number of fatalities was taken from the codes E811 to E819 from the ICD-9 dataset and from the codes V01 to V89 from the ICD-10. In order to obtain the traffic fatality per population rate, fatality numbers were divided by population and multiplied by 100 000. Population data was taken from the World Development Indicators from the World Bank (2013). This variable was logged due to its skewedness.

Traffic injury per population. Traffic injury data were gathered from the Organization for Economic Cooperation and Development -- International Road Traffic and Accident Database

[18] The sample includes 127 countries: Afghanistan, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belgium, Belize, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Cote d'Ivoire, Cabo Verde, Cambodia, Cameroon, Canada, Chile, China, Colombia, Comoros, Croatia, Cuba, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Fiji, Finland, France, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea-Bissau, Guyana, Honduras, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Lao People's Democratic Republic, Latvia, Lebanon, Lithuania, Luxembourg, Macedonia, Malaysia, Mali, Malta, Mauritius, Mexico, Mongolia, Montenegro, Mozambique, Namibia, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Rwanda, Serbia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syrian, Tajikistan, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United States, United Kingdom, United Republic of Tanzania, Uruguay, Venezuela, Vietnam, Yemen and Zambia.

(OECD/IRTAD 2013).[19] This dataset compiles information for 27 OECD countries and two non-OECD ones. To obtain traffic injuries per population, same population data and methods to build the 'Traffic fatality per population' variable were applied.

Traffic accident severity. Values to construct this variable were obtained from dividing the log of 'traffic fatality rate per population' by the log of 'traffic injury rate per population.' Even though some countries have similar traffic fatalities rate per population, these countries may differ in terms of the number of injuries. Hence, by combining these two variables one can identify other types of traffic outcomes because countries which do not differ from one another in terms of traffic fatalities but have high number of injuries suggest the presence of less lethal or severe traffic outcomes.

[19] I would like to thank Véronique Feypell, administrator of the International Transport Forum of OECD, who kindly facilitated me access to this dataset.

Table 2.1 Descriptive statistics of dependent, independent and control variables

Variables	Source	Years	Mean	SD	Min	Max	Percentage	Predicted effect
Dependent variables								
Traffic fatality per population	World Health Organization (2013) and World Bank (2013)	1990-2012	2.283	1.676	-11.512	4.928		
Traffic injury per population	Organization for Economic Cooperation and Development -- International Road Traffic and Accident Database (2013) and World Bank (2013)	1990-2012	5.645	0.531	3.980	6.784		
Traffic accident severity	Organization for Economic Cooperation and Development -- International Road Traffic and Accident Database (2013) World Health Organiza-tion (2013) and World Bank (2013)	1990-2012	-3.246	0.577	-4.592	-1.869		
Public policies								
Existence of RSA	Multiple sources	1949-2013	0.183	0.386	0	1		Decrease traffic fatalities, injuries and accident severity
Years of RSA	Multiple sources	1949-2013	2.44	7.126	0	57		Decrease traffic fatalities, injuries and accident severity
Square years of RSA	Multiple sources	1949-2013	54.744	237.082	0	3249		Decrease traffic fatalities, injuries and accident severity
Health expenditure	World Bank (2013)	1994-2013	6.340	2.653	0	22.186		Decrease traffic fatalities, injuries and accident severity
Controls								
Economic development GDP per capita (ln)	World Bank (2013)	1950-2013	7.205	1.602	3.565	11.626		Increase and then decrease traffic fatalities, injuries and accident severity
Unemployment	World Bank (2013)	1994-2013	8.881	6.271	0.300	39.3		Increase traffic fatalities, injuries and accident severity
Alcohol consumption (ln)	World Resources Institute (2013)	1957-2013	1855.5	666.1072	500	3000		Increase traffic fatalities, injuries and accident severity
Population (ln)	World Bank (2013)	1950-2013	46.418	24.177	2.115	100		Increase traffic fatalities, injuries and accident severity
Population density	World Bank (2013) and Cia (2013)	1950-2013	3.833	1.450	-0.045	8.928		Decrease traffic fatalities, injuries and accident severity

iv) Independent variables

There are three independent variables to account for RSA and HS.

Presence of RSA. I operationalized RSA as dichotomous variable '0' indicating the absence of this organization and '1' suggesting its existence. This operationalization allows us to see whether any effect on the outcomes is associated with the presence of this organization as the piecemeal social engineering approach suggests. To be considered a RSA, these organizations should have jointly four functions: i) having a result-focused approach (i.e. road safety reduction goals); ii) coordinating the efforts of related institutions; iii) introducing and updating road safety legislation; and iv) monitoring their performance.

Years of RSA. This counts the number of years since a country established a RSA. In order to determine at what year a RSA was set in place, information was coded from the WHO reports on road safety (2004, 2009 and 2013), national laws, peer-review journals, and governmental and international organization reports. This operationalization assumes that RSA will have a stronger effect on practices as time elapses, based on the notion that the RSA have specified "a long-term investment strategy to accelerate the process of shifting from a weak to high capacity safety management system" (Bliss and Breen 2009:16).

Health system. This variable is the sum of public and private health expenditure as a percentage of the gross domestic product. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health. This operationalization allows us to identify the strength of a HS and thus the capacity to attend traffic crashes and provide sustainable care for their victims. These data were obtained from the World Bank (2013). This variable has only been previously tested in the European context by Castillo-Manzano et al. (2014).

In some analyses, I also included squared terms to explore nonlinear temporal effects of both policies because that will allow me to examine whether their impact may diminish over time or be latent.

v) Control variables

Analyses control for a number of variables that have been shown to affect traffic outcomes. All of the following variables are lagged by one year in my models.

Economic Development. Research on the role of economic development in road safety outcomes has shown a cumulative pattern in terms of the consistency of results from one study to the next. One pioneering work in cross-national analysis was carried out by van Beeck et al. (2000). While their sample consisted of OECD countries exclusively, their evidence supported Smeed's hypothesis of a non-linear relationship between prosperity and both traffic mortality and morbidity rates. Kopits and Cropper's work (2005) made two important variations in this area of inquiry. First they explained fatalities per both population and vehicle fleet, and second they expanded the sample and introduced developing countries into their analysis. Their results, in both variables are consistent with those of Smeed. Bishai et al. (2006) assessed the impact of GDP in a sample of 41 developed and developing countries, by focusing particularly on the identification of what makes GDP growth a protective factor per se. These authors compared mortality, morbidity and crash rates among countries to indirectly test whether i) introduction of occupant protection devices, ii) the presence of institutional capacity of the country to control externalities, and iii) accumulation of investments, could account for differences among countries. It is important to notice that their models did not operationalize any of these factors, and that they assume them to be different between developed and developing countries. They worked under the assumption that GDP was confounded with these three unmeasured factors. They concluded that

these three factors were in place. Since their results showed only a decline in deaths, but no decline of crashes or injuries, they favored the technological change explanation as the leading factor behind the successful control of traffic casualties in higher income countries. Lastly, Anbarci et al. (2006 and 2009) and Law et al. (2011) claim that technological changes have an important influence on traffic fatalities. They, however, focus their analysis on medical technology. Similar to Bishai et al. (2006), this work uses very crude proxies to capture their more prominent variables. In this case, they use physicians per 100 000 population and infant mortality rate to account for health-related technological changes. Their results indicate that an increase in income per capita induces technological and managerial improvements in health services leading to a reduction in road fatalities. I employ a measure of gross domestic product (GDP) per capita at purchasing power parity for 2000 US$. These data have been obtained from the World Bank (2013). I log these data because of their skewed distribution. It is expected that GDP per capita will decrease traffic outcomes because the introduction of technological advancements in both road infrastructure and the safety of vehicles will protect road users in the long term. This relationship however is non-linear since these advancements are not observed to have an immediate effect.

Unemployment. This variable refers to the share of the labor force that is without work but available for and seeking employment. These data were obtained from the World Bank (2013). It is expected that a high level of unemployment will decrease traffic outcomes (Stuckler et al. 2009) because unemployed road users would travel less frequently and therefore the level of risk exposure decreases (Lu and Pas 1999).

Alcohol consumption. Here I measure recorded adult per capita consumption (in liters of pure alcohol). I log this variable because of its skewed distribution. It is expected that high alcohol consumption rates will increase traffic fatalities (Noland 2003; Holmgren et al. 2005) and inju-

ries (Skog 2001; Laumon et al. 2005) because individuals under the influence of alcohol may impair the required abilities to travel safely as drivers, passengers or pedestrians.

Population size. Population size is expected to increase the potential for traffic incidents due to higher presence of both road users and travel patterns. Population size controls for a simple law of probability: the more people in a country, the higher the exposure to road risk. I therefore included a measure of (logged) population from the World Bank (2013).

Population density. This variable is a measurement of population per unit area. In order to obtain the population density, population numbers were divided by land squared meters of each country. Population data was taken from the World Development Indicators from the World Bank (2013), and land squared meters from the CIA (2013). This variable was logged due to its skewedness. Population density is expected to decrease the potential for traffic incidents due to travel patterns. This variable controls for the idea that in less dense populated countries road users are expected to travel longer distances and therefore their road risk exposure increases. Long distances may also negatively affect the timely provision of health services.

RESULTS

I present the results in three sections. The first examines the effects of RSA and HS globally in traffic fatalities; the second investigates results of each world-region also in traffic fatalities; and the third includes an analysis of traffic injuries and traffic accident severity for a sample of OECD countries.

i) Global results

Table 2.2 presents estimates for the effect of RSA and HS on traffic fatalities. I report three different models for RSAs: the first evaluates the effect of presence or absence of an RSA (Model 1); the second the linear effect of years since establishment of these institutions (Model 2); and

the third adds a squared term to assess nonlinear effects. In order to identify the linear effect of the HS policy on the selected outcome I use the same HS variable.[20]

First, to assess the validity of the two-stage least square regression with instrumental variables models applied I assess whether the instruments are weak, that is whether the correlation with the endogenous variable (i.e. RSA) is high but also uncorrelated with the error term, and if the models are over identified, that is whether the structural error terms are uncorrelated with the instruments (Wooldridge 2012). Given the F test to assess whether the instruments are weak, I observe its value to be over 20 in each model and its level of significant is $p < .000$, therefore this suggests that the instruments are strong. I also observe that both the Sargan and Basmann tests for each model (1, 2 and 3) are not significant, which suggest that the instruments are valid, and therefore the structural model is correctly specified since the instruments are uncorrelated with the structural error term.

The statistically insignificant coefficient for the RSA variables in Models 1, 2 and 3 shows that these organizations across the world are not associated with either linear or curvilinear improvement in traffic fatalities. On the other hand, the variable representing HS is statistically significant across the three models. It suggests that increases in health expenditures are associated with a 5% decrease of traffic fatalities. In order to assess how robust these results are, Models 4, 5, and 6 report the estimates of Fixed Effects. With the only exception of the change of the sign in the 'Presence of RSA' variable (Model 1 compared to Model 4), the magnitude and significance of the two policies of interest are very similar, that is, RSAs are not significantly associated with traffic fatalities variation, but HS is associated with a 5% decrease.

[20] I also introduced squared terms to assess nonlinear effects of HS but they were not significant. Since the effect of this variable was significant the relationship can be regarded as linear.

Table 2.2 'Two-Stage Least-Squares Analyses with Instrumental Variables' and 'Fixed Effects' for the effect of Road Safety Agency and Health Expenditure on traffic fatalities

	Two-Stage Least-Squares			Fixed effects		
	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)	(Model 6)
Presence of RSA	0.104 (0.30)			0.116 (1.53)		
Years of RSA		-0.009 (-0.64)	-0.018 (-.99)		0.001 (0.17)	-0.002 (-0.22)
Years of RSA squared			0.000 (0.90)			0.000 (0.48)
Health expenditure	**-0.056*** **(-2.50)**	**-0.058**** **(4.76)**	**-0.058**** **(-2.75)**	**-0.050*** **(2.30)**	**-0.053*** **(2.44)**	**-0.053*** **(2.45)**
Traffic fatalities (lagged)	**0.223***** **(8.62)**	**0.226***** **(9.12)**	**0.226***** **(9.12)**	**0.226***** **(8.74)**	**0.228***** **(8.84)**	**0.228***** **(8.84)**
GDP per capita (ln)	**1.561***** **(5.70)**	**1.504***** **(5.29)**	**1.564***** **(5.55)**	**1.500***** **(4.79)**	**1.504***** **(5.22)**	**1.529**** **(5.23)**
GDP per capita (ln) squared	**-0.086***** **(-5.16)**	**-0.083***** **(-4.76)**	**-0.087***** **(-5.02)**	**-0.084***** **(-4.79)**	**-0.084***** **(-4.74)**	**-0.085**** **(-4.76)**
Unemployment	-0.012 (-1.47)	**-0.014†** **(1.77)**	**-0.014†** **(-1.81)**	-0.012 (-1.46)	-0.013 (-1.60)	-0.01 (-1.62)
Alcohol consumption (ln)	0.015 (0.42)	0.009 (0.27)	0.008 (0.23)	0.016 (0.43)	0.014 (0.39)	0.013 (0.36)
Population (ln)	**1.344***** **(5.51)**	**1.344***** **(5.65)**	**1.336***** **(5.63)**	0.274 (0.95)	0.290 (1.00)	0.298 (1.03)
Population density (ln)	**-1.052*** **(-2.31)**	**-1.053*** **(-2.36)**	**-1.024*** **(-2.30)**			
Constant	**-21.050***** **(-7.51)**	**-20.592***** **(-7.77)**	**-20.865***** **(-7.87)**	**-8.505†** **(-1.75)**	**-8.708†** **(-1.78)**	**-8.953†** **(1.82)**
Years fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N (country-year observations)	1544	1556	1546	1569	1571	1571
N (countries)	125	125	125	125	126	126
Wald X^2	1674.17	1676	1676.47			
R^2	0.52	0.52	0.52			
F test for instruments weakness	21.12***	270.591***	385.052***			
Sargan	1.786	1.466	0.867			
Basmann	1.616	1.325	0.782			
ρ				0.54	0.55	.55
Df	146	147	148	25	24	25

Note: z values in parentheses for the Two-Stage Least-Square models and t values for the Fixed Effects models
All 'Road safety agency' variables for the Two-Stage Least-Squares are instrumented using a dummy variable for Common wealth countries and WHO road safety global campaign; country's relative position in the automobile exporting-importing market; three cubic splines; and fixed effects for time.
†<.1; *p < .05; **p < .01; ***p < .001 (two-tailed tests).

Apart from these two variables, the effects of the control variables GDP per capita and GDP per capita squared are consistent with previous studies. Over time economic development

correlates with better traffic fatalities indicators. As Beeck et al. (2000) and Bishai et al. (2006) suggested, this variable could be capturing the introduction of occupant protection devices, and the accumulation of investments. More specifically, economic development first leads to a growing number of traffic fatalities but later it becomes protective as improvements in the traffic infrastructure and vehicle safety are introduced.

Regarding the other four control variables ('Unemployment', 'Alcohol consumption', 'Population' and 'Population density'), I observe that only 'Alcohol consumption' is not significant in predicting variation in the dependent variable in models 2 and 3. As it was suggested 'Unemployment' may have captured the notion of exposition to road risk, in which more employment means more travel (Lu and Pas 1999). In regards to 'Population' and 'Population density' I observe that countries with large populations or which are less densely populated are more likely to experience higher traffic fatality rates. Nevertheless the Fixed Effect models (4, 5 and 6) show that these factors are not significant, thus suggesting that the literature, which has regarded these factors to be of theoretical importance, should be taken more cautiously.

ii) Regional results

Turning to Tables 2.3 to 2.6, I analyze the impact of these policies per world-regions (Africa (Table 2.3); Asia and the Pacific (Table 2.4); Western Asia (Table 2.5); Europe (Table 2.6); and Latin America and the Caribbean (Table 2.7). In regards to validity of the two-stage least square regression with instrumental variables models applied for each region I observe that the models in which RSAs are operationalized as a dichotomous variable are not valid. Following Stock, Wright and Yogo (2002) a model to be reliable should display and F values higher than 10, when only one endogenous regressor has been introduced.

I observe that RSAs are not statistically associated with traffic results in any region and this is regardless of the statistical analysis applied. On the other hand, I observe HS to be statistically significant with respect to traffic fatalities in Africa[21]; Asia and the Pacific; Western Asia and Europe in the two-stage least-square models, but this variable is only significant in the Fixed Effect models in the Asia and the Pacific region.

The effects of the variables GDP per capita and GDP per capita squared, for the Asia and the Pacific and Europe regions[22] are similar as has been found before. However, this variable is associated with an increase in traffic fatalities in the Latin America and the Caribbean region.[23] This may be because this region may be experiencing a significant increase of vehicles, but unlike the Asia and the Pacific, Western Asia, and Europe regions, its traffic and health investment are not yet set in place. In other words, economic growth stimulates an increase of vehicle fleet, but only in Asia and the Pacific, Western Asia, and Europe, I observe that only later this variable produces the needed resources to improve traffic control, highway investment and health care. In regards to the variable 'Unemployment' I found mixed effects. In the Western Asian region this variable is negatively associated with traffic fatalities and in the Latin America and the Caribbean region is positively related to these outcomes. As such, and unlike of what other studies have suggested that employment is related to more mobility (Stuckler et al. 2009), the relationship between this variable and traffic outcomes should be taken with more caution. In other words, it should be further explored whether unemployment is a good proxy to capture mobility at all. In regards to 'Population density,' we observe that this variable is significant in three regions: Asia and the Pacific, Western Asia and Latin America and the Caribbean. This may be capturing, as

[21] For Africa I only report Fixed Effects models because the two-stage least-square regression models were not correctly specified.
[22] The association between GDP and GDP squared is significant for Europe only in the Fixed Effect models.
[23] In other models it was also introduced a squared term but since both variables were not significant we can regard this relationship, unlike Asia and Europe, to be linear and not curvilinear.

Ewing et al. (2003) suggest, more widely dispersed populations, and thus when mobilizing they have to travel longer distances, which in turn increases their exposure to traffic risks. This variable, for the Latin America and the Caribbean region, can also be capturing the untimely provision of health services.

Table 2.3 'Fixed Effects' for the effect of Road Safety Agency and Health Expenditure on traffic fatalities in Africa[24]

	Two-Stage Least-Squares		
	(Model 7)	**(Model 8)**	**(Model 9)**
Presence of RSA	-0.185 (-1.16)		
Years of RSA		0.007 (0.50)	0.008 (0.39)
Years of RSA squared			-0.000 (-0.04)
Health expenditure	**-0.055*** **(-2.09)**	**-0.058*** **(-2.15)**	**-0.058*** **(-2.09)**
Traffic fatalities (lagged)	0.089 (1.20)	0.090 (1.20)	0.090 (1.20)
GDP per capita (ln)	0.009 (0.06)	0.001 (0.01)	0.000 (0.00)
Unemployment	-0.007 (-0.59)	-0.008 (-0.67)	-0.008 (-0.67)
Alcohol consumption (ln)	-0.029 (-0.59)	-0.006 (-0.05)	0.006 (-0.05)
Population (ln)	0.634 (0.75)	1.180 (1.61)	1.185 (1.60)
Constant	-7.722 (-0.58)	-16.398 (-1.43)	-16.467 (-1.41)
Years fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
N (country-year observations)	209	211	143
N (countries)	23	24	37
ρ	0.96	0.98	0.99

Note: t values in parentheses.
†<.1; *p < .05; **p < .01; ***p < .001 (two-tailed tests).
Countries included in the models: Botswana; Burkina Faso; Côte d'Ivoire; Cabo Verde; Cameroon; Comoros; Egypt; Kenya; Mali; Mauritius; Mozambique; Namibia; Niger; Nigeria; Rwanda; South Africa; Sudan; Swaziland; Tunisia; Uganda; United Republic of Tanzania; Zambia

[24] Given the results obtained for the Sargan and Basmann tests for the Two-Stage Least-Square models, I only report the Fixed Effects models for Africa

Table 2.4 'Two-Stage Least-Squares Analyses with Instrumental Variables' and 'Fixed Effects' for the effect of Road Safety Agency and Health Expenditure on traffic fatalities in the Asian and the Pacific region

	Two-Stage Least-Squares			Fixed effects		
	(Model 10)	(Model 11)	(Model 12)	(Model 13)	(Model 14)	(Model 15)
Presence of RSA	0.112 (0.42)			0.017 (0.33)		
Years of RSA		-0.002 (-0.39)	-0.019 (-1.05)		0.003 (0.52)	0.005 (0.38)
Years of RSA squared			0.001 (1.12)			-0.001 (0.14)
Health expenditure	**-0.052†** **(-1.88)**	**-0.061***** **(3.71)**	**-0.066***** **(-3.85)**	**-0.060**** **(-3.34)**	**-0.062***** **(-3.56)**	**-0.062**** **(-3.47)**
Traffic fatalities (lagged)	**0.582***** **(12.17)**	**0.596***** **(15.75)**	**0.600***** **(15.65)**	**0.596***** **(14.73)**	**0.596***** **(14.78)**	**0.595***** **(14.72)**
GDP per capita (ln)	**0.888***** **(4.56)**	**0.874***** **(4.33)**	**0.899***** **(4.45)**	**0.881***** **(-3.70)**	**0.913***** **(4.37)**	**0.911***** **(4.34)**
GDP per capita (ln) squared	**-0.048***** **(-3.88)**	**-0.046***** **(-3.66)**	**-0.047***** **(-3.72)**	**-0.047***** **	**-0.049***** **(-3.70)**	**-0.049***** **(-3.69)**
Unemployment	-0.000 (-0.08)	-0.007 (-0.11)	-0.007 (-0.11)	-0.003 (-0.05)	-0.000 (-0.03)	-0.000 (-0.03)
Alcohol consumption (ln)	**-0.031†** **(1.94)**	**-0.033*** **(-2.04)**	**-0.032** **(1.97*)**	**-0.032†** **(-1.90)**	**-0.032†** **(1.85)**	**-0.032†** **(1.85)**
Population (ln)	**0.498***** **(3.88)**	**0.514***** **(4.12)**	**0.529***** **(4.18)**			
Population density (ln)	**-0.321†** **(-1.67)**	**0.319†** **(1.68)**	**0.332†** **(1.72)**	**0.828**** **(2.72)**	**0.804**** **(2.62)**	**0.802*** **(2.60)**
Constant	**-11.210***** **(4.42)**	**-11.213***** **(-4.44)**	**-11.596***** **(4.54)**	**-6.320***** **(-3.72)**	**-6.349***** **(-3.74)**	**-6.349***** **(-3.74)**
Years fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N (country-year observations)	326	326	326	339	339	339
N (countries)	29	29	29	30	30	30
Wald X^2	5195.82	5235.13	5187.53			
R^2	0.94	0.94	0.94			
Sargan	2.768	2.809	3.175			
Basmann	2.312	2.347	2.646			
F test for instruments weakness	2.55*	246.175***	53.995***			
ρ				0.98	0.98	0.99
Df	32	32	33	29	29	

Note: z values in parentheses for the Two-Stage Least-Square models and t values for the Fixed Effects models.
All 'Road safety agency' variables for the Two-Stage Least-Squares are instrumented using dummy variables for having signed the Road Traffic Geneva Convention, presence of a road safety NGO, and being a Commonwealth country; three cubic splines; and fixed effects for time.
†<.1; *p < .05; **p < .01; ***p < .001 (two-tailed tests).
Countries included in the models: Afghanistan; Armenia; Australia; Azerbaijan; Bangladesh; Brunei Darussalam; Cambodia; China; Fiji; Georgia; India; Indonesia; Iran (Islamic Republic of); Japan; Kazakhstan; Kyrgyzstan; Lao People's Democratic Republic; Malaysia; Mongolia; New Zealand; Papua New Guinea; Philippines; Republic of Korea; Russian Federation; Singapore; Sri Lanka; Tajikistan; Thailand; Turkey

Table 2.5 'Two-Stage Least-Squares Analyses with Instrumental Variables' and 'Fixed Effects' for the effect of Road Safety Agency and Health Expenditure on traffic fatalities in the Western Asia region

	Two-Stage Least-Squares			Fixed effects		
	(Model 16)	**(Model 17)**	**(Model 18)**	**(Model 19)**	**(Model 20)**	**(Model 21)**
Presence of RSA	-0.051 (-0.04)			-1.002 (-1.63)		
Years of RSA		-0.036 (-0.79)	0.051 (0.28)		-0.034 (-0.56)	0.043 (0.19)
Years of RSA squared			-0.009 (-0.50)			-0.009 (-0.37)
Health expenditure	-0.231 (-1.10)	**-0.241*** **(2.09)**	**-0.254*** **(2.15)**	-0.085 (-0.48)	-0.241 (-1.55)	-0.255 (-1.59)
Traffic fatalities (lagged)	0.171 (1.64)	-0.165 (-1.58)	-0.171 (1.63)	-0.175 (-1.29)	-0.165 (-1.18)	-0.183 (-1.27)
GDP per capita (ln)	0.520 (1.63)	0.358 (0.95)	0.506 (1.06)	0.489 (1.18)	0.367 (0.73)	0.517 (0.83)
Unemployment	**-0.160†** **(-1.88)**	**-0.182**** **(2.93)**	**-0.162*** **(2.20)**	**-0.215**** **(2.74)**	**-0.181*** **(-2.17)**	-0.160 (1.66)
Alcohol consumption (ln)	**-0.121*** **(2.36)**	**-0.127**** **(3.46)**	**-0.124**** **(3.35)**	**-0.151**** **(-3.02)**	**-0.127*** **(-2.57)**	**-0.124*** **(-2.47)**
Population (ln)	0.291 (0.45)	0.293 (1.39)	0.203 (0.74)			
Population density (ln)	**-0.718*** **(-1.99)**	**-0.944*** **(-2.05)**	**-0.941*** **(-2.05)**	0.056 (0.08)	-0.641 (-0.90)	-0.741 (-0.98)
Constant	-2.385 (-0.23)	0.499 (0.07	0.155 (0.02)	1.084 (0.20)	5.471 (0.80)	4.124 (0.55)
Years fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N (country-year observations)	72	72	72	72	72	72
N (countries)	9	9	9	9	9	9
Wald X^2	214.74	215.74	216.99			
R^2	0.75	0.75	0.75			
Sargan	3.563	2.939	2.728			
Basmann	2.030	1.660	1.496			
F test for instruments weakness	4.01*	1197.53***	95.67***			
ρ				0.97	0.95	0.96
Df	32	32	33	8	8	8

Note: z values in parentheses for the Two-Stage Least-Square models and t values for the Fixed Effects models.
All 'Road safety agency' variables for the Two-Stage Least-Squares are instrumented using dummy variables for having signed the Road Traffic Geneva Convention, presence of road safety NGO, and being a Commonwealth country; three cubic splines; and fixed effects for time.
†<.1; *p < .05; **p < .01; ***p < .001 (two-tailed tests).
Countries included in the models: Bahrain; Egypt; Kuwait; Lebanon; Qatar; Syrian Arab Republic; Tunisia; United Arab Emirates; Yemen

Table 2.6 'Two-Stage Least-Squares Analyses with Instrumental Variables' and 'Fixed Effects' for the effect of Road Safety Agency and Health Expenditure on traffic fatalities in the European region

	Two-Stage Least-Squares			Fixed effects		
	(Model 22)	**(Model 23)**	**(Model 24)**	**(Model 25)**	**(Model 26)**	**(Model 27)**
Presence of RSA	-0.569 (-0.18)			0.246 (1.40)		
Years of RSA		0.036 (0.27)	0.006 (0.03)		0.009 (0.44)	0.007 (0.24)
Years of RSA squared			0.002 (0.21)			0.000 (0.10)
Health expenditure	-0.323 (-1.54)	**-0.312†** **(1.67)**	**-0.319†** **(1.71)**	-0.078 (-1.18)	-0.088 (-1.34)	-0.088 (-1.34)
Traffic fatalities (lagged)	**0.353***** **(4.32)**	**0.349***** **(4.25)**	**0.350***** **(4.22)**	**0.183*****	**0.188***** **(4.27)**	**0.188***** **(4.27)**
GDP per capita (ln)	4.838 (1.57)	5.147 (1.58)	5.218 (1.63)	1.521 (1.35)	**1.925†** **(1.72)**	**1.950†** **(1.70)**
GDP per capita (ln) squared	-0.285 (-1.48)	-0.325 (-1.52)	-0.119 (-1.62)	-0.096 (-1.42)	**0.118†** **(1.72)**	**0.120†** **(1.75)**
Unemployment	-0.000 (-0.01)	0.008 (0.16)	0.002 (0.04)	-0.018 (-0.96)	-0.019 (-0.99)	-0.019 (-1.00)
Alcohol consumption (ln)	0.194 (0.32)	0.280 (0.39)	0.322 (0.48)	0.334 (1.17)	0.341 (1.19)	0.336 (1.15)
Population (ln)	-1.92 (-0.23)	0.870 (0.11)	1.681 (0.23)			
Population density (ln)	-0.766 (-0.18)	0.583 (0.15)	0.963 (0.27)	0.487 (0.26)	1.212 (0.67)	1.212 (0.67)
Constant	-21.439 (0.13)	-34.320 (0.20)	-17.600 (20.063)	-5.742 (-0.47)	-10.555 (-0.89)	-10.721 (-0.90)
Years fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N (country-year observations)	567	567	567	567	567	567
N (countries)	37	37	37	37	37	37
Wald X^2	95.20	96.58	96.66			
R^2	0.40	0.40	0.40			
Sargan	0.045	0.008	0.002			
Basmann	0.034	0.006	0.001			
F test for instruments weakness	1.946	42.597***	25.08***			
ρ					0.70	0.71
Df	32	32	33		36	36

Note: z values in parentheses for the Two-Stage Least-Square models and t values for the Fixed Effects models.
All 'Road safety agency' variables for the Two-Stage Least-Squares are instrumented using a dummy variable for WHO road safety global campaign, having signed the Road Traffic Geneva Convention, and the creation of the European Traffic Safety Council; three cubic splines; and fixed effects for time.
†<.1; *p < .05; **p < .01; ***p < .001 (two-tailed tests).
Countries included in the models are: Austria; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Italy; Latvia; Lithuania; Luxembourg; Macedonia; Malta; Montenegro; Netherlands; Norway; Poland; Portugal; Republic of Moldova; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; United Kingdom; and Ukraine.

Table 2.7 'Two-Stage Least-Squares Analyses with Instrumental Variables' and 'Fixed Effects' for the effect of Road Safety Agency and Health Expenditure on traffic fatalities in the Latin America and the Caribbean region

	Two-Stage Least-Squares			Fixed effects		
	(Model 28)	**(Model 29)**	**(Model 30)**	**(Model 31)**	**(Model 32)**	**(Model 33)**
Presence of RSA	0.096 (0.71)			0.033 (0.62)		
Years of RSA		0.003 (0.69)	-0.004 (-0.30)		-0.001 (-0.15)	-0.013 (-0.56)
Years of RSA squared			0.003 (0.40)			0.003 (0.56)
Health expenditure	-0.002 (-0.36)	-0.002 (-0.35)	-0.003 (-0.40)		-0.019 (-1.37)	-0.020 (-1.42)
Traffic fatalities (lagged)	**0.917***** **(33.34)**	**0.925***** **(37.13)**	**0.927***** **(36.76)**	**0.632***** **(13.01)**	**0.630***** **(12.95)**	**0.630***** **(12.92)**
GDP per capita (ln)	0.007 (0.30)	0.008 (0.35)	0.011 (0.46)	**0.231**** **(3.38)**	**0.222**** **(3.31)**	**0.218**** **(3.22)**
Unemployment	0.003 (1.17)	0.002 (1.05)	0.002 (0.92)	**0.013*** **(2.35)**	**0.013*** **(2.29)**	**0.013*** **(2.25)**
Alcohol consumption (ln)	-0.021 (-0.49)	0.280 (0.39)	-0.024 (-0.54)	0.042 (0.56)	0.041 (0.55)	0.040 (0.54)
Population (ln)	-0.000 (-0.05)	-0.000 (0.08)	-0.000 (-0.09)			
Population density (ln)	**-0.030*** **(-2.50)**	**0.030*** **(2.53)**	**-0.030*** **(-2.57)**	-0.258 (-0.71)	-0.258 (-0.71)	-0.274 (-0.75)
Constant	0.212 (0.99)	0.223 (1.02)	0.196 (0.91)	0.025 (0.02)	0.109 (0.08)	0.214 (0.15)
Years fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N (country-year observations)	355	355	355	355	355	355
N (countries)	25	25	25	25	25	25
Wald X^2	1615.72	1622.89	1623.50			
R^2	0.81	0.82	0.82			
Sargan	0.018	0.051	0.294			
Basmann	0.017	0.047	0.271			
F test for instruments weakness	8.501***	150.235***	159.087***			
ρ				0.74	0.74	0.76
Df	24	24	25	24	24	25

Note: z values in parentheses for the Two-Stage Least-Square models and t values for the Fixed Effects models.
All 'Road safety agency' variables for the Two-Stage Least-Squares are instrumented using a dummy variable for WHO road safety global campaign, having signed the Road Traffic Geneva Convention, and the creation of the European Traffic Safety Council; three cubic splines; and fixed effects for time.
†<.1; *p < .05; **p < .01; ***p < .001 (two-tailed tests).
Countries included in the models are: Argentina; Bahamas, Barbados; Belize; Bolivia; Brazil; Chile; Colombia; Cuba; Dominican Republic; Ecuador; El Salvador; Guatemala; Guyana; Honduras; Jamaica; Mexico; Nicaragua; Panama; Paraguay; Peru; Suriname; Trinidad and Tobago; Uruguay; Venezuela.

iii) Traffic injuries and traffic accident severity for a sample of OECD

Lastly in Table 2.8, I present models regarding traffic injuries (Model 34, 35 and 36) and traffic accident severity scores (Model 37, 38 and 39) for OECD countries.[25] Firstly, an important difference between these two outcomes is that two different type of statistical approaches were utilized. Fixed Effects were used to examine traffic injuries, and two-stage least-squared for traffic accident severity. In regards to injuries, Fixed Effects are reported because the two-stage least-squared applied were not valid. The values of the F tests to measure the weakness of the instruments were low, which suggested a poor correlation with the endogenous variable. In relation to the traffic accident severity outcomes (Models 37, 38 and 39) one can observe that the values for the Sargan and Basmann tests and F tests suggest that the approach is reliable.

I observe that RSAs in OECD countries are significantly associated with traffic injuries reduction in the long term (model 36) but not to traffic accident severity. Their effect on injuries is non-linear. The positive linear coefficient points to a short-term increasing in traffic injuries rates, but the negative coefficient on the squared term indicates a significant, and *healthy*, decrease of injuries. The point of inflection, calculated by dividing the coefficient of the linear term by 2 times the value of the squared term's coefficient, identifies the point at which the effect changes direction. According to Model 36, RSAs are associated with an increase on traffic injuries after approximately 2 years of their introduction (0.003/ [-2 x 0.0005]). This finding is relevant because it provides evidence that this type of institutional arrangements may be effective in implementing injury prevention measures in the long term. Secondly, I observe that well-developed HSs are not associated with traffic injuries variation (Models 34, 35 and 36) but it is significantly associated with traffic accident severity (Models 37, 38 and 39) and its effect is curvilinear. In Model 39 I observe that the negative linear coefficient points to a mid-term reduc-

[25] Data on these dependent variables were not available for other nations

tion in traffic accident severity rates, and the positive coefficient on the squared term suggests that HS reduced this indicator up until 8 years of implementation (-0.008/ [-2 x 0.0005]). This finding is relevant because the study carried out by Castillo et al. (2014) examined a shorter period (2000-2009) in 27 European countries and therefore the non-linear effect of this policy could not have been captured.

In regards to the control variables I observe mixed results. On the one hand, GDP per capita and GDP per capita squared (Model 34) denote a significant curvilinear effect. In other words, a significant increase of injuries is registered after 10 years of economic development (-0.322/ [-2 x 0.013]). On the other hand, these variables when predicting traffic severity scores signal a significant decrease after 10 years (0.035/ [-2 x -0.002]). In reference to alcohol, I notice that this variable is associated with a decrease of traffic injuries, but with a significant increase of traffic severities. Lastly, the variables 'Population' and 'Population density' and are only significantly associated with traffic accident severity scores. In both cases the relationship is counterintuitive, since an increase of 'Population' or decrease of 'Population density' decrease the traffic accident scores. While the results of the models of traffic severity scores are closely related to those of traffic fatality rates—confirming RSAs are not effective in these two specific outcomes and requalifying part of the effects of HS, the models predicting traffic injuries display other patterns. Unlike traffic fatalities and traffic accident severity, the variable traffic injury is more heterogeneous because it can include a wide range of possibilities for instance from less to more severe injuries. In this regard RSAs may be effective because some of the measures that these organizations recommend and/or implement may tackle milder road users' risk behavior. Lastly, the most puzzling association is between the decrease of alcohol consumption and increase of injuries, because a positive relationship was expected. While this relationship is statistically sig-

nificant, it is important to note that in the period 1995-2010 most European countries experienced a decrease in their alcohol consumption levels (WHO 2010). As such, an increase is the number of traffic injuries is spuriously correlated with alcohol consumption levels.

Table 2.8 'Fixed Effects' for the effect of RSA on traffic injuries in OECD countries, and 'Two-Stage Least-Squares Analyses with Instrumental Variables' for the effect of RSA on traffic severity in OECD countries

	Traffic injuries			Traffic severity		
	(Model 34)	(Model 35)	(Model 34)	(Model 37)	(Model 38)	(Model 39)
Presence of RSA	-0.000 (-0.03)			-0.002 (-0.92)		
Years of RSA		-0.000 (-0.25)	**0.003†** **(1.68)**		**0.000†** **(1.77)**	-0.000 (-0.90)
Years of RSA squared			**-0.000**** **(2.39)**			**0.000†** **(1.69)**
Health expenditure	-0.007 (-1.17)	-0.007 (-1.11)	-0.007 (-1.16)	**-0.007**** **(-2.67)**	**-0.006*** **(-2.45)**	**-0.008**** **(-2.72)**
Health expenditure squared				**0.000***** **(3.19)**	**0.000**** **(2.89)**	**0.000**** **(3.25)**
Traffic injuries (lagged)	**0.855***** **(32.28)**	**0.855***** **(32.53)**	**0.838***** **(30.92)**			
Traffic severity (lagged)				**0.619***** **(17.41)**	**0.613***** **(17.15)**	**0.611***** **(17.36)**
GDP per capita (ln)	-0.175 (-1.10)	-0.183 (-1.17)	**-0.322†** **(-1.94)**	**0.021†** **(1.72)**	**0.031*** **(2.39)**	**0.035*** **(2.62)**
GDP per capita (ln) squared	0.008 (1.14)	0.009 (1.13)	**0.016†** **(1.86)**	-0.001 (-1.63)	**-0.001*** **(-2.32)**	**-0.002*** **(-2.55)**
Unemployment	0.001 (1.06)	0.001 (1.01)	0.002 (1.26)	0.000 (0.05)	-0.000 (0.51)	-0.000 (-0.14)
Alcohol consumption (ln)	**-0.101**** **(2.65)**	**-0.101**** **(2.66)**	**-0.070†** **(1.74)**	**0.012***** **(3.98)**	**0.013***** **(4.30)**	**0.010**** **(3.35)**
Population (ln)				**-0.153***** **(-4.35)**	**-0.184***** **(-4.29)**	**-0.143**** **(-3.12)**
Population density (ln)	-0.122 (-0.93)	-0.124 (-0.94)	**-0.258†** **(-1.81)**	**0.161***** **(3.73)**	**0.175***** **(4.95)**	**0.142***** **(3.12)**
Constant	**2.398*** **(2.07)**	**2.448*** **(2.09)**	**3.743**** **(2.91)**	**1.952**** **(3.441)**	**2.186***** **(3.89)**	**1.647**** **(2.69)**
Years fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N (country-year observations)	460	460	460	416	416	416
N (countries)	29	29	29	29	29	29
Wald X^2				11944.90	11922.70	12322.55
R^2				.96	0.96	.97
Sargan				7.23	4.915	4.461
Basmann				6.38	4.316	3.902
F test for instruments weakness				30.072***	63.889***	100.437***
ρ	0.91	0.91	0.97			
Df	28	28	25	52		

Note: t values for the Fixed Effects models in parentheses and z values for the Two-Stage Least-Square models.
All 'Road safety agency' variables are instrumented are instrumented using a dummy variable for WHO road safety global campaign, country's relative position in the automobile exporting-importing market, country's relative position in the automobile exporting-importing market and being a member of the Commonwealth; three cubic splines; and fixed effects for time.
Traffic severity events are traffic fatalities divided by the sum up of traffic injuries and traffic fatalities.
†<.1; *p < .05; **p < .01; ***p < .001 (two-tailed tests).
Countries included in the models are: Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom and United States of America. The non-OECD countries are: Argentina and Cambodia.

DISCUSSION AND CONCLUSION

My analyses show that, for the period 1994-2012, RSAs are not likely to be associated with fatalities, accident severity variation, but in the long term their effects, in OECD countries, significantly reduced traffic injuries. Results also indicate that HS significantly reduced traffic fatalities across the world. These effects were similar regardless of the different statistical models applied. Furthermore, sub-regional models indicate that within Asian, African and European countries, well-developed HS were more consistently effective than in the Latin American and Caribbean ones. Across OECD countries, HS is not associated with traffic injuries variation, but is associated with a decline in traffic severities. More specifically, I found that the effects of well-developed HS change direction over time. For about eight years of HS investment in OECD countries, accident traffic severity rates improved. However, from this threshold on, the improvement effect of HS begins to plateau. I thus conclude, that the type of traffic outcome being targeted for improvement, are related to the type of public policy implemented.

Three theoretical elements deserve closer inspection regarding RSAs findings. First, findings are not completely in line with the literature which has argued that global policies are doomed to fail due to problems of adaptation, lack of access to resources, presence or absence of political will, and/or path-dependency (Meyer et al. 1997; Bromley and Powell 2012). My analysis suggests that when RSAs have four specific functions (i.e. a result focus approach, monitoring, coordinating and involvement on road safety legislation) a reduction in injuries can be observed over time. That is, a specific type of institutional capacity is required to achieve desired results.

Second, in the realm of road safety, two hypotheses have been advanced to explain why RSA can fail. First, some authors (Forjuoh 2003; Rauch and Evans 2000) have suggested a nega-

tive and direct relationship between meritocratic recruitment of officers in RSA and traffic outcomes. These authors have theorised that authorities who lacked road safety knowledge or did not have the necessary qualifications were ultimately barriers for implementing successful road safety plans. Second, another author (Køltzow 1993) has pointed out that these institutions fail because road safety is not a priority. In sum in each of these studies, assessment of RSA failure is based on the principles that these institutions may not change over time and/or are object of constant pressures which ultimately neutralize or immobilize their performance. In other words, these organizations are conceptualized as both passive and weak institutions. Unlike this theoretical conceptualization, I favoured an approach in which RSAs' performance could both change and strengthen over time. By recognizing RSAs as active institutions, I was able to capture a long term effect in their performance when targeting traffic injury outcomes. In other words, I did observe that RSAs were correlated with an increase of injuries in the first two years of their existence, but once this threshold was reached, RSAs' interventions began to be effective. Ultimately the effect of my conceptualization questions the idea that recruitment processes of RSAs were arbitrary, or that road safety is not a priority in OECD countries.

Third, neo-institutionalists have suggested that when organizations systematically face policy failure, their members tend to reject any form of evaluation by introducing caveats of different types and thus make the organizations immune to inspections. My findings suggest, on the other hand, that even if RSA are ineffective as the results of traffic fatalities and traffic accident severities illustrate, RSAs have actually assumed clear and measurable objectives such as specific rates of decrease in traffic mortality. More interestingly the RSA models globally promoted by the WB and the WHO have actually highlighted the need of introducing quantitative road safety targets as a necessary condition for these organizations to succeed. Indeed 70% of the countries

that appointed RSAs have set clear and measurable targets associated of traffic fatalities reduction (WHO 2013), and unlike what neo-institutionalists would predict, their specific notion of accountability has been globally adopted, and in this case proven to be associated with a reduction of traffic injuries.[26]

In sum, the results of my study suggest that policy failure more generally, and RSAs' ineffectiveness more specifically, cannot be taken for granted. Following neo-institutionalists' arguments, one should expect RSAs to fail because of the emergence of contingencies, lack of access to resources, presence or absence of political will, path-dependency, and problems in translating policy. While most of these mechanisms could be identified to explain the failures of RSAs in the regions of Latin America and the Caribbean and Africa when targeting traffic fatalities—because these regions have historically faced countless challenges to tackle their own development—RSA's *incapacity* to curb traffic fatalities but effectiveness to attend injury outcomes across OECD countries is indeed puzzling. In other words, if RSAs in OECD countries would have had access to the same resources, been subject of the same path-dependency patterns, or faced similar implementation dilemmas, one should expect RSAs to be unsuccessful in targeting both outcomes.

However, we do observe that RSAs are significantly associated with a change in injury rates, suggesting that some elements of policy are translated from policy to practice. This gives rise to the speculation that the conditions behind fatalities and injuries are not similar. More specifically, it is possible that fatalities and injuries belong to different populations, each exposed to different conditions and each with a differential capacity to utilize the information and programs

[26] I also modelled traffic injury variation with RSAs which had at least one of the four characteristics discussed. Results suggest that when a looser conceptualization of RSA is introduced, their impact on traffic injury is null. Results are available on Table A2 of Appendix 2.

provided by RSAs. In other words, as it has been pointed out by Link and Phelan (1995), populations have differentiated access to both social and economic resources, which in turn affect their multiple health outcomes. Further, as these authors argue, populations from higher socio-economic status—which are already at a lower risk for negative health outcomes—are more likely to utilize new health opportunities made possible by government policies. As such RSAs may be more effective because after these institutions improve the safety standards of both vehicles and road constructions—which as result mitigate the consequences of vehicles crashes—only some populations have easier access to safer vehicles, and/or live in places in which roads' design and con-struction follow strict.

That well-developed HSs have been effective in decreasing traffic fatalities and traffic accident severity rates, and ineffective in decreasing injuries, is consistent with the overall function that this type of policies fulfils. Funding allocated to provide post-crash services (i.e. provision of ambulances, emergencies services, trauma centers and hospital attention) can indeed reduce the severity of crash events. Further, when resources tackle the 'Platinum Ten Minutes' (Calland 2005)—the critical period in which the removal of the casualty to hospitals, or other alternative health services, improves their chances of survival—one can expect to observe the decreasing of both fatalities and severity. In reference to my results five elements need to be discussed further.

First, it is noteworthy that attention to the 'Platinum Ten Minutes' period is not solely based on HS (Ersonn et al 1999). Other institutions such as traffic police and firefighters can also provide complementary services—first aid or special extrication procedures—which increases the chances of survival of crash victims. One of the consistent findings of the road safety literature, also observed in this chapter, is the relationship between economic growth and traffic fatali-

ties variation. While this literature usually uses this variable to either highlight the country's vehicle fleet safety capacity, technology, and/or investment in road infrastructure in reference to traffic fatalities, one can also suggest that this variable complements HS. More concretely, both specific equipment and trained personnel, which are part of police forces and firefighting services when attending crashes (Olson et al 2003), can be a function of economic prosperity.

Second, while the findings regarding all the regions are not surprising, the case of Africa deserves a closer inspection. My models suggest that HS are associated with a decrease of 5% of traffic fatalities in this region. There are two complementary hypotheses that can explain this finding. First, as the case of South Africa suggests, there has been a significant change in the pattern of injury. For the period 1985-2001 a decline in stab-wounds was observed and motor vehicle injuries remained stable (Bowley et al. 2002; Goosen et al 2003). As such all the resources that were allocated to attend stab-wounded injuries could have been re-allocated to treat car crash injuries, and therefore the survival rate of crash victims improved. Nevertheless, further studies would have to be carried out to detect whether a change in the pattern of injury has been registered across Africa. Second, the Advanced Trauma Life Support (ATLS) course is training oriented for the first few hours of trauma care in the emergency room environment. Application of ATLS has been proven to be effective in improving outcomes of trauma care in developing countries (Ali et al 1993). In Africa a pioneer version of ATLS was developed in South Africa to meet specific demands of this country to improve the capacity of health practitioners to attend trauma (Mock, Arreola-Risa and Quansah 2003). As a result, the South African version of ATLS has been diffused to other African countries such as Ghana (Mock, Quansah, Addae-Mensah 1999) and Ethiopia (Rennie 1999; Rennie and Janka 1997). In this regard it would have

to be examined to what extent ATLS has been diffused to other African nations, as well as its effectiveness in targeting car crashes injuries.

Third, the relationship between HS and severity and injuries rates may be declining over time, because OECD countries have on average registered an increase in the number of motor vehicles from 350 to 400 per 1,000 inhabitants for the period 1995-2011 (Goodwin 2012). The increasing of the vehicle fleet augments the amount of travel which in turn is correlated with both crashes and injuries—but no longer associated with traffic fatalities.

Fourth, the results regarding the severity variable are interesting from both a theoretical and methodological perspective. From a theoretical perspective, two possible interpretations arise: First, over time the effectiveness of HS declines because the constant increase of vehicle fleet and injuries surpassed their institutional capacity to attend these events. Second, it may also be the case that HS expenditures have plateaued, making the gap between vehicle fleet growth and HS larger. From a methodological perspective, more precise operationalizations are required when modeling phenomena that varies steadily. In other words, when HS' effects as conceptualized as if they are constant over time, one may end up underestimating their total impact on traffic injuries because these events may be linked to vehicle fleet exponential growth.

Ultimately, results regarding the association between severity rates and HS may help us to better understand the interest of health professionals in the realm of transport. In fact, some of these professionals have been actively involved in promoting transport policies, such as the restriction of car mobility, promotion of public transportation and cycling, and other measures that tackle transportation demand management which are linked to issues of primary prevention (WHO 2006). Furthermore, given that the development of ground transportation has also been associated with an increase in air pollution (associated with cardio-respiratory, lung cancer and

cardio-vascular diseases), noise (linked to the exacerbation of sleep disturbance), and less walkability (related to an increase of obesity), it is not difficult to understand why health professionals also encourage the notion of sustainable transport as a more encompassing and preventable approach to target transport externalities.

From my analysis a larger implication for road safety policy analysis can be suggested. My results suggest that while there is no dispute that developed countries have reduced traffic fatalities and injuries, it would be incorrect to assign an exclusive role to either RSAs or HS. Actually, one of the most challenging aspects of road safety policy implementation, is the need of introducing multi-sectorial and multi-disciplinary approaches. That is, road safety policies succeed, when actions of various governmental sectors (health, police, education and transport) jointly target the different process and/or events that lead to the occurrence of transport externalities. In terms of policy adoption in developing countries, appointing RSA as potential catalyzers of road safety policies across governments can indeed be quite attractive because these organizations can be taken as ready-to-use measure to tackle a complex phenomenon. However, as my results suggest, these countries should avoid the temptation of favouring the RSA institutional option exclusively. As such developing countries should also prioritize institutional efforts to improve their HSs, since they are also necessary to reduce traffic outcomes.

There are three limitations that need to be addressed to qualify the results and conclusions of this chapter. First, the operationalization of the variable traffic injuries, unlike fatalities, is relatively heterogeneous across countries, even for OECD countries (Ameratunga et al 2006; Amorós et al 2011), and thus the association between RSA and this outcome may not have been accurately captured. Second, the variable fatality includes deaths in the three type of road users (drivers, passengers and pedestrians), and as such, some policies which are designed to target the

decrease of fatalities in one of these sub-populations, and were implemented by RSAs, may not be assessing the impact of these institutions in specific road users' population. Lastly, my analysis covers the period, from 1994 to 2012, for which data are available. However, it may be that the success to decrease traffic fatalities of RSAs occurred mainly in the 1980s, a decade in which the majority of OECD countries also displayed significant decreases of traffic fatalities which was not assessed.

In conclusion, this analysis suggests that future studies of policy diffusion should account simultaneously for different outcomes and temporal dynamics. Doing so will lead to more nuanced—and more accurate—theoretical generalizations. However, this chapter calls for a fundamental rethinking of policy analysis evaluation, since public policy effects are not necessarily homogenous across time nor have the same effect on different outcomes. More specifically, by analyzing different outcomes I observe that HS are indeed successful in targeting traffic fatalities but RSAs are rather ineffective. By paying attention to temporal dynamics, I show that RSAs have beneficial effects in the long run when targeting traffic injuries, and HS have diminishing return effects when targeting traffic accident severities. Finally, this study recognizes that the mechanisms of both RSAs and well-developed HS in successfully reducing traffic injuries and fatalities respectively require further unpacking.

PREAMBLE TO CHAPTER 3

The first two chapters have jointly considered the interplay between global, regional and national forces in regards to road safety policy adoption and traffic outcomes. A link between international forces, which spread RSAs across world-regions and traffic outcomes, particularly, traffic injury, was established. This paper considers explicitly how in a national context—the case of Chile—the influence of a global actor, the WHO, affected more grained traffic outcomes. In order to understand the decreasing of several traffic outcomes that this country experienced in the period 2000-2012, we examine the effect of the implementation of a traffic law reform that followed closely some of the *World report's* recommendations. More specifically, we focus on the institutional mechanisms that were at play, and other national factors, which the literature has identified as theoretically relevant. As such, we assess the interaction between police enforcement and the traffic law reform, and, the role that investment on road infrastructure, on five outcomes: total number of traffic fatalities, drivers', passengers' and pedestrians' fatalities and traffic severe injuries. We argue that global recommendations can be successful only when these are supported by other road safety requirements at the national level.

CHAPTER 3: EXPLAINING CHILE'S TRAFFIC FATALITIES AND INJURIES REDUCTION FOR 2000-2012

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JINM was responsible of the conception and design of the study, collection and interpretation of data, and drafting of the chapter, AQV and AVB were responsible of interpreting results and critically revised the chapter for important intellectual content, and JINM, AQV and AVB approved the final of the version.

Abstract

The objective of this chapter is to determine the contribution of Chile's 2005 traffic law reform, police enforcement and road investment infrastructure to the reduction of traffic fatalities and severe injuries from 2000 to 2012. Analyses based on structural equation models (SEM) were carried out using a unique database merging aggregate administrative data from several Chilean public institutions. The sample was balanced (13 regions, over 13 years; N = 169). Dependent variables were rates of traffic fatality (total, drivers, passengers and pedestrians) and severe injuries per vehicle fleet. Independent variables were: 1) 'Traffic law reform'; 2) 'Police enforcement', and 3) 'Road infrastructure investment'. Total number of crashes, oil prices, alcohol consumption, proportion of male population 15-24 years old, unemployment, years' effects and regions' effects, and lagged dependent variables were entered as control variables. Empirical estimates from the SEMs suggest the enactment of the traffic law reform is significantly associated with a 7% reduction of pedestrians' fatalities. This association is entirely mediated by the positive association the law had with increasing 'Police enforcement' and reducing 'Alcohol consumption'. In turn, 'Police enforcement' is significantly associated with a direct decrease in total fatalities, drivers' fatalities, passengers' fatalities and pedestrian fatalities by 17%, 18%, 8% and 60% respectively. Finally, 'Road infrastructure investment' is significantly associated with a direct reduction of 11% in pedestrian fatalities, and the number of total crashes significantly mediates the effect of road infrastructure investment on the reduction of severe injuries. Tests of

sensitivity indicate these effects and their statistical significance did not vary substantively with alternative model specifications. Results suggest that 'Traffic law reform', 'Police enforcement', and 'Road infrastructure investment' have complex interwoven effects that can reduce both traffic fatalities and severe injuries. While traffic reforms are ultimately designed to change road users' behaviors at large, it is also important to acknowledge that legislative changes may require institutional changes—i.e., intensification of police enforcement— and be supported by road infrastructure investment, in order to effectively decrease traffic fatalities and injuries. Furthermore, depending on how road safety measures are designed, coordinated and implemented, their effects on different types of road users vary. The case of Chile illustrates how the diffusion of road safety practices globally promoted by the World Health Organization and World Bank, particularly in 2004, can be an important influence to enhance national road safety practices.

INTRODUCTION

In 2004, the World Health Organization (WHO) along with the World Bank (WB) published the "*World report on road traffic injury prevention*" (Peden et al. 2004) to globally promote several road safety measures to tackle the roots of road crashes and avoid their tragic consequences. After twelve years of parliamentary and governmental debate, and following closely the recommendations set by the *World report*, Chile approved in 2005 a comprehensive traffic law reform (Government of Chile 2005; Urzua 2014).[27] Statistics indicate that traffic fatality and severe injury rates declined by 38 % and 33 % respectively between 2006 and 2012 (please refer to Table 3.1). However, the role of Chile's 2005 traffic law reform – and by extension, those of the recommendations made by the WHO and the WB - in this impressive downward trend remains unknown.

While a vast body of literature suggests that road traffic legislation reforms *per se* help to prevent the occurrence of traffic crashes and their consequences (Bhattacharyya and Layton 1979; Carpenter and Stehr 2008; Cohen and Einav 2003; Elvik et al. 2009; Harvey and Durbin 1986; Houston, Richardson Jr. and Neeley 1995; Sen and Mizzen 2007; Smiley et al. 1989), others have argued that this type of measure is ultimately sterile or at best short-lived (Garbacz 1990; Ross 1993). The latter has been particularly noticeable in Latin American and the Caribbean countries (Moura et al. 2009; Nazif and Perez 2013; Pechansky and Chandran 2012), since in many cases they lack the necessary resources to implement legislative changes. However, there is other literature focusing on institutional and social mechanisms (Coleman 1990; Hedström and Swedberg 1998) that offers more precise explanations of the potential impact of legal reform. These studies have argued that road safety legislation reforms can be effective when they are coupled with particular types of institutional mechanisms, such as the creation of road safety

[27] Details of the reform are provided in Appendix 2.

agencies (Peden et al. 2004), and increased police enforcement (Hauer, Ahlin and Bowser 1982; Wiliszowski and Jones 2003) and the introduction of technological devices such as red-light cameras (Chin and Quddus 2003; Huang, Chin and Haque 2008; Shin and Washington 2007), automatic speed enforcement (Goldenbeld and van Schagen 2005; Newstead and Cameron 2003), road infrastructure investment (Bunn et al. 2003; Gitelman et al. 2012; Grundy et al. 2009), and effective public campaigns (Elder et al. 2004; Elvik 2000; Nazif and Pérez 2011).

In this chapter, we contribute to this body of research by using Chilean data from 2000 to 2012 to empirically assess the effects of (a) the enactment of a comprehensive traffic law reform, (b) police enforcement and (c) road infrastructure investment, on traffic fatality and morbidity rates. Particular attention will be given to different types of road users' fatalities (drivers, passengers and pedestrians) since the implementation of these measures may impact these populations differently. Such an assessment is obviously highly relevant for Chile as a policy impact evaluation, but it also has both theoretical and methodological implications for the field of study at large. First, unlike other federal countries from which most of the research in this area emanates, such as the USA, and where the implementation of traffic reforms may not have been uniform, Chile, as a centralized state, provides an opportunity to examine an entire national jurisdiction unit over time. The latter therefore can be regarded as a national "natural policy experiment" (Quesnel-Vallée and Jenkins 2010). Furthermore, it is worth noting that under Chile's administrative regime, in which a single national police body is responsible for patrolling traffic, we would expect less variation in coordination of enforcement and a more uniform effect of the national traffic law reform. Second, as noted by Elvik et al. (2009), while there is a significant amount of research on the efficacy of road traffic legislation reforms and the institutional mechanisms associated with them in the USA, the Commonwealth and European countries, there re-

mains a remarkable paucity of similar research exploiting cross-jurisdictional time-series variation in other regions of the world, and particularly in South America. This dearth of research is particularly puzzling in light of the fact that many South American countries enacted substantial reforms to their traffic law over the past decade (Nazif and Pérez 2013). One notable exception is found in Campos et al. (2013), who made a substantial contribution to the road safety literature in South America by assessing the impact of the new traffic law on drinking and driving in Brazil. However, this valuable work only analyzed one city (São Paulo) and drinking and driving behavior, but remained silent about the overall impact of this law on traffic fatalities or injuries at both the city and national level. Third, the case of Chile offers an explicit test of national pathways through which the influence of global forces, such as the policy diffusion of the *World report*, can ultimately contribute to changes at the national level (Pierotti 2013). Last, from a methodological point of view, the rich cross-region time-series data available for Chile allow us to control for the impact of unobserved region and/or time-specific determinants of traffic incidents, such as climate variation, with the help of fixed effects when carrying out structural equation models (Koetse and Rietveld 2009; Bollen and Brand 2010). Indeed, Chile comprises a wide range of weather conditions extending across 38 degrees of latitude. Simple OLS estimates of the impact of traffic reform or police enforcement might be confounded with unobserved determinants of traffic crashes such as climate variation between regions from 2000 to 2012. The present chapter proposes an empirical contribution to this literature by testing how the Chilean case aligns with previous research, and thus it will expand our road safety knowledge of the South American region more generally, and contribute to our understanding of how, in the realm of road safety policies, global factors impact national settings.

RESEARCH QUESTION

Figure 3.1 shows a steady decline in Chilean traffic fatality and severe injury rates (per 10,000 vehicles) between 2000 and 2012. Specifically, traffic fatalities have dropped by roughly 52 % ([7.97 – 3.83]/7.97), and severe injuries by 56% ([38.01-16.53]/38.01). In contrast the decrease for traffic crashes per 1,000 vehicles is much more modest with a reduction of 19% ([19.22 – 15.54]/19.22) for that period.

Figure 3.1 Fatalities and serious injuries per 10,000 vehicles and crashes per 1,000 vehicles, 2000-2012

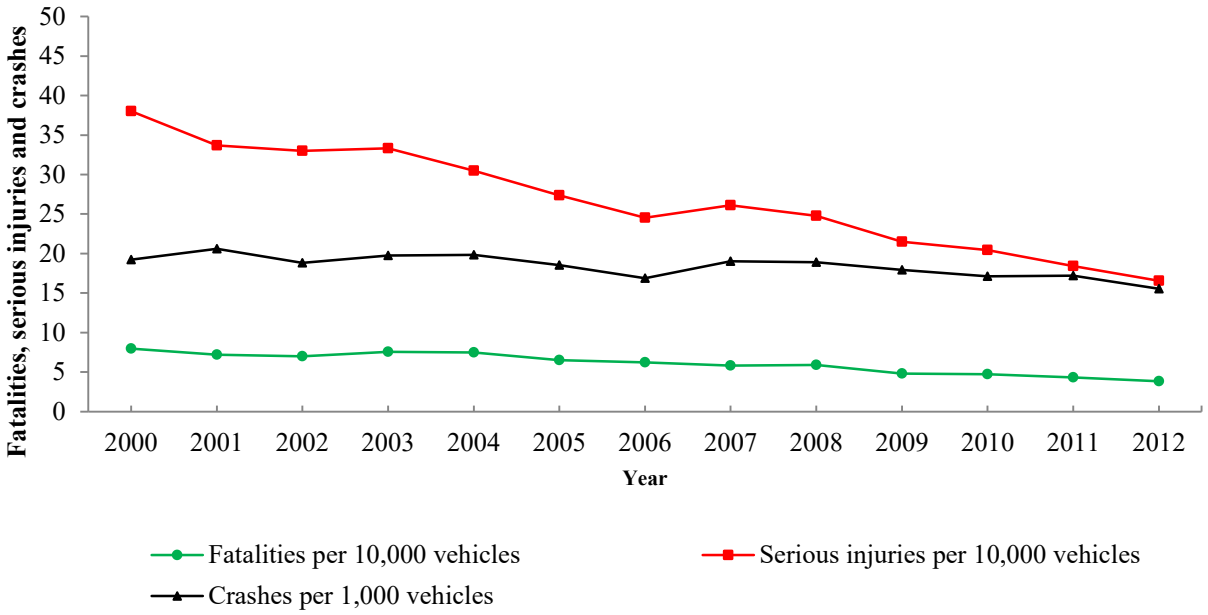

Table 3.1 documents cross-regional variation in traffic fatality, serious injury and crash rates in 2000 and 2012, the two end-year sample points. These numbers suggest significant cross-regional variation in both fatality and severe injuries in the year 2000 but less variation for crash rates. In 2000 five regions, O'Higgins, Maule, Biobío, La Araucanía and Los Lagos had an average total fatality rate of 12.1 individuals per 10,000 vehicles, while, with the clear exception of the Magallanes region (1.91 fatalities per 10,000 vehicles), all the other regions had an average of 6.81 fatalities per 10,000 vehicles. Regarding severe injury rates, for the same year, we

observe that Atacama, Coquimbo, Biobío, La Araucanía, Los Lagos and Aysén had an average of 46.18 individuals injured per 10,000 vehicles, whereas the group composed of Tarapacá, Antofagasta, Valparaíso, O'Higgins, Maule and the Metropolitan region had an average of 34.80 individuals injured per 10,000 vehicles. For this particular rate as well Magallanes has a very low rate of 24.40 individuals injured per 10,000 vehicles.

Table 3.1 Variation in Fatalities, Serious Injuries and Crashes 2000-2012

Regions	Fatalities[a]	Severe injuries[a]	Crashes[b]
2000			
Tarapacá[b]	4.99	29.82	20.71
Antofagasta	7.73	35.80	18.51
Atacama	8.85	52.10	14.82
Coquimbo	7.35	43.98	18.80
Valparaíso	6.92	36.99	20.01
O'Higgins	11.52	32.85	11.05
Maule	11.06	37.63	19.56
Biobío	13.82	46.09	16.13
La Araucanía	14.13	49.83	16.15
Los Lagos[c]	12.07	42.61	12.42
Aysén	6.42	42.52	20.94
Magallanes	1.90	24.44	12.36
Metropolitana	5.46	35.68	22.31
2012			
Tarapacá[b]	5.60	17.79	14.57
Antofagasta	5.70	15.62	8.70
Atacama	4.40	18.96	14.08
Coquimbo	4.65	16.91	13.05
Valparaíso	3.13	18.90	19.37
O'Higgins	5.56	15.96	14.54
Maule	4.88	14.49	14.83
Biobío	5.84	29.14	17.34
La Araucanía	5.88	25.77	24.27
Los Lagos[c]	5.47	21.03	18.27
Aysén	2.74	9.43	17.45
Magallanes	2.77	15.88	17.05
Metropolitana	2.29	11.91	14.33

[a] Per 10,000 vehicles
[b] Per 1,000 vehicles
[c] It includes Arica and Parinacota territories
[d] It includes Los Rios territory

Lastly we notice that for crashes the variation is not as significant since nine regions have values between 16.13 and 20.94 crashes per 100,000 vehicles. In 2012, the data suggest that

variation between and within regions has decreased relative to 2000 for both traffic fatality and serious injury. However, this trend is not observed for crash rates in 2012, as some regions have increased and other have decreased crash rates relative to 2000.

METHODS AND DATA

i) Data

Complete data for all 13 regions are available from 2000 until 2012 for all the variables described below. This yields a balanced sample with N = 169 region-year observations. Table 3.2 provides summary data for all the variables.

Thus, the regional data point to both overall decreases in traffic fatality and severe injury rates and a convergence across regions from 2000 to 2012. One potential explanation for these parallel trends could lie in the introduction of a comprehensive traffic law reform in 2005. However as we can observe in Figure 3.1 a decreasing tendency was evident before the enactment of this law, particularly for severe injuries. As such, there are other elements that, as noted in the literature, should be considered, since traffic law changes may be confounded with other significant factors or may not have an effect strong enough to influence variation in these rates. For instance, several studies have indicated that increasing infrastructure development (Elvik et al. 2009), oil prices (Chi et al. 2011; Grabowski and Morrisey 2004), alcohol prices (Adrian, Ferguson and Her 2001; Wagenaar, Tobler and Komro 2010), or unemployment (Scuffham 2003; Stuckler et al. 2009) can also help produce a downwards tendency. Furthermore, a more direct pathway might also be found in changes in police enforcement practices, particularly in the Chilean context where the centralized nature of the state presumably ensures that these practices are uniformly applied across regions.

Table 3.2 Summary statistics 2000-2012

	Obs.	Mean	Std. Dev	Min	Max
Dependent variables					
Traffic fatalities	169	4.182	0.430	2.944	4.950
Driver fatalities	169	3.127	0.465	0.833	4.073
Passenger fatalities	169	2.850	0.524	1.119	4.061
Pedestrian fatalities	169	3.067	0.740	0	4.154
Severe injuries	169	5.821	1.010	3.433	8.085
Independent variables					
Traffic law reform	169	0.538	0.500	0	1
Police enforcement	169	10.807	1.189	8.120	13.788
Road infrastructure investment	169	17.035	1.092	12.651	19.372
Controls					
Oil price average	169	6.244	.261	5.694	6.667
Alcohol consumption	169	4.203	.116	3.814	4.365
Percentage of young male population	169	11.646	1.084	9.029	14.007
Unemployment	169	-2.559	0.342	-3.756	-1.897
Total number of crashes	169	5.061	0.326	3.779	5.670

ii) Dependent variables.

Five dependent variables were used: Total number of fatalities, drivers' fatalities, passengers' fatalities, pedestrians' fatalities and serious injuries per 10,000 vehicles. Data on traffic and injuries were obtained from Chile's National Road Safety Commission of the Ministry of Transport. This organization has compiled, from police reports, an extensive database of traffic fatalities, injuries and crashes in Chile from 1972 to the present. Fatalities are classified according to road user type (driver, passenger, motorcyclist, bicyclist, and pedestrian), age, gender, and time and day of the accident. Injuries are classified as severe, less severe and minor. Data on the vehicle fleet were obtained from the National Institute of Statistics. The denominator of the vehicle fleet

was chosen over population per capita measurements since it has been argued to better capture potential level of traffic risk (Elvik and Vaa 2004). Furthermore in Chile the number of vehicles is collected yearly and regionally, whereas information regarding the population is based on projections from decennial censuses held in 1992, 2002 and 2012 (Bianchini et al. 2013; Institute for Health Metrics and Evaluation 2014). The vehicle fleet is thus a more sensitive indicator to current national variations.

iii) Independent variables.

The set of selected independent variables includes three types of road safety measures that a state can implement to tackle traffic fatalities and injuries. 1) 'Traffic law reform,' coded as a yearly dummy variable, '0' for the 2000-2005 period when the law had not been approved, and '1' from 2006 to 2012, the period when the reform was in force. 2) 'Police enforcement', measured as the number of traffic tickets processed by local courts, using data provided by the Ministry of Justice. 3) 'Road infrastructure investment' measures the total amount of both public and private infrastructure spending allocated to the design, construction and maintenance of public roads, using data provided by the Ministry of Public Works.

Unlike Sass and Zimmerman (2000) and Sen and Mizzen (2007), who use the number of police officers as a proxy to capture police enforcement, we followed the operationalization proposed by Lee (2012) in using traffic tickets. Indeed, police officers have duties other than patrolling traffic, such that an increase in the number of police officers cannot be assumed to automatically lead to a commensurate increase in road safety. Of course, an increase in traffic ticketing may not necessarily imply more police enforcement either, since the number of traffic tickets could increase simply by virtue of having new types of infractions introduced after the enactment of a traffic law. However, we found a positive correlation of .54 between police ticketing and

police vehicles investment in the analyzed period. This strongly suggests that the observed increase in traffic ticketing is not only due to an increase in enforceable infractions, but that it also occurred in parallel with an increase in police traffic enforcement capacity over this period.

iv) Control variables.

In consideration of previous literature, several control variables were taken into account: 1) 'Total number of crashes', using data from the Chile's National Commission of Road Safety of the Ministry of Transport. Crashes are identified as any collision between two or more vehicles, one vehicle against any object, or a vehicle impacting one or more pedestrians; 2) 'Oil price average' measures the average price of four types of combustible: 93, 95 and 97 octanes and diesel, using data from the National Commission of Energy. 3) 'Unemployment rate' comes from the National Institute of Statistics. 4) 'Percentage of young male population' measures the male population between 15 and 24 years old, as a proportion of the total population, using data from the National Institute of Statistics. 5) 'Alcohol consumption' measures the regional proportion of respondents having consumed alcohol in the last month, using data from the Drugs and Alcohol Prevention and Rehabilitation National Service. Since data corresponding to alcohol consumption are biannual, averages between years were used to complete missing years.

v) Approach

Structural equation models (SEMs) were used to test the total, direct and indirect effects of the independent and control variables on the selected dependent variables, using Stata 12 software. We first differentiated equations predicting fatalities or injuries (equation 1) from equations predicting 'Total number of crashes' (equation 2). 'Total number of crashes' is thus simultaneously exogenous and endogenous variable for the specification of the models. This approach allows us to distinguish the impact of policies on crashes from the impact on fatality and injury outcomes. Given the centralized character of Chile's national state, we also modeled 'Police enforcement'

to directly respond to the traffic law's change (equation 3). Lastly, since penalizing drinking and driving can affect alcohol drinking patterns, the potential impact of 'Traffic law reform' on 'Alcohol consumption' was also modeled (equation 4). Keele and Kelly (2006) suggest that in order to capture dynamics of time-series data, lagged dependent variables need to be introduced when the series is stationary as well as when autocorrelation has been detected.[28] Given the stationary characteristic of each dependent variable, we introduced a lagged dependent variable in each equation.[29]

vi) Model selection

Table 3.3 shows the correlations between the independent and control variables. Since some of the independent and control variables are correlated, I estimated 8 different models for each of the five dependent variables (a total of 40 models), in which different combinations of the independent variables of interest were introduced to predict equation 1. This allowed me to test for the direct, indirect and total effect of each variable of interest and their respective statistical significance. Model 1 features only 'Total number of crashes', 'Traffic law reform', 'Police enforcement', 'Road infrastructure investment' and 'Alcohol consumption', while in model 8 we introduced all the independent and control variables. On the other hand, equations (2), (3) and (4) remain unalterable, that is, in order to keep the parsimony of the analysis we did not introduce any other combination of variables. Their information however is utilized to measure both total and indirect impacts of the independent variables in equation 1. Table 3.4 describes estimates for comparing and determining model fit for the 40 models. Aside from the criteria of theoretical validity and model parsimony, we followed Bollen and Brand (2010) and Hooper, Coughlan and

[28] Please refer to Appendix 4 to see what dependent variables were auto-correlated and results of the Levin-Lin-Chu test to determine whether the series of the lagged variables was stationary

[29] In Appendix 5 we provide the equations detailing model specifications

Mullen (2008) who recommend a selection of models based on the lowest values assigned to BIC and RSMS respectively. The chosen models to carry out the analysis are bolded.

RESULTS

Since we theorized that the three independent variables of interest, 1) 'Traffic law reform', 2) 'Police enforcement', and 3) 'Road infrastructure investment' may have different effects on the dependent variables, we divide the presentation of the results into direct, indirect and total effects.

i) Direct effects of the three road safety policies on dependent variables

Table 3.5 shows the results of the selected structural statistical models for each dependent variable analyzed: total fatalities, drivers', passengers' and pedestrians' fatalities and severe injuries. With the exception of 'Traffic law reform', which is a dichotomous variable, we log-transformed our dependent, independent and control variables to account for their skewed distribution.

Regarding the direct effects of the three road safety policies analyzed, we observe the following results across models: first, 'Traffic law reform' does not appear to be directly associated with any of the dependent variables. In turn, increases in 'Police enforcement' is directly associated with decreasing total, drivers, passengers and pedestrians fatality rates by 17%, 18%, 8% and 60% respectively. Finally, 'Road infrastructure investment' is directly associated with a reduction of 11% in the log of pedestrian fatalities. In other words, we observe that two of these road safety policies affect road users differentially. 'Police enforcement' is broadly associated with fatality rates, with the strongest decline associated with pedestrian fatalities, while 'Road infrastructure investment' is only significantly associated with pedestrians' fatalities.

As suggested in the literature we also observe in Table 3.5 that both the 'Percentage of young male population' and 'Total number of crashes' are significantly associated with severe

injuries. We also notice that the 'Percentage of young male population' is associated with an increase of total fatalities and pedestrian fatalities. The latter suggests the consistent finding that the male population between 15 and 24 years old tends to be overrepresented in death from trauma and vehicle crashes.

ii) Direct effects of the three road safety policies on mediating variables

In table 3.5 we observe that the three policies are also differentially associated with the mediating variable 'Total number of crashes'. As suggested by the literature, 'Police enforcement' and 'Road infrastructure investment' appear to have a negative effect on 'Total number of crashes', that is, increasing in these two variables lead to a decrease of total number of crashes. But the result associated with 'Traffic law reform' is more puzzling since it appears to be associated with an increase in 'Total number of crashes'. This could be due to an increase in the number of reports regarding traffic crashes after the enactment of the law. Lastly, we observe that in equations 3 and 4, 'Traffic law reform', as has been previously suggested, is significantly associated with a reduction in alcohol prevalence and an increase in police enforcement.

It is noteworthy that the three road safety policies analyzed had indirect effects on each of the dependent variables in these models. Indeed, it appears that the association of 'Traffic law reform' with the dependent variables is mediated by 'Police enforcement', 'Alcohol prevalence' and 'Total number of crashes'. In turn, the impacts of 'Police enforcement' and 'Road infrastructure investment' are both mediated by 'Total number of crashes'. In the next sub-section we proceed to quantify the total and indirect effects of each road safety policy on the dependent variables.

Table 3.3 Correlations between independent and control variables

	Traffic law reform	**Police en-forcement**	**Road infra-structure investment**	**Oil price average**	**Alcohol consumption**	**Percentage of young male population**	**Unemployment**	**Number of crashes**
Traffic law reform	1.000							
Police enforcement	.105	1.000						
Road infrastructure investment	.530*	.519*	1.000					
Oil price average	.044	.828*	.444*	1.000				
Alcohol prevalence	.019	-.621*	-.282*	-.629*	1.000			
Percentage of young male population	.928*	.081	.552*	.092	.093	1.000		
Unemployment	.287*	-.431*	-.117	-.433*	.332*	0.315*	1.000	
Number of crashes	.202*	.304*	.312*	.203*	-.047	0.226*	.058	1.000

Table 3.4 Models for total fatalities, severe injuries, fatality- drivers, passengers-fatalities and pedestrian-fatalities. Fit Statistics (N = 156)

	Model specification	Log Likelihood	Tm (LR chi-square)	df	RMSEA	AIC	BIC
Total fatalities	(1) $FAT_{it} = \rho FAT_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + \eta_i + \varepsilon_{it}$	-129.794	66.450	24	0.106	311.588	390.884
	(2) $FAT_{it} = \rho FAT_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + \eta_i + \varepsilon_{it}$	**-127.081**	**61.025**	**23**	**0.103**	**308.163**	**390.509**
	(3) $FAT_{it} = \rho FAT_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + UNE_{it} + \eta_i + \varepsilon_{it}$	-129.695	66.254	23	0.110	313.392	395.738
	(4) $FAT_{it} = \rho FAT_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-129.781	66.426	23	0.110	313.564	395.910
	(5) $FAT_{it} = \rho FAT_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + UNE_{it} + \eta_i + \varepsilon_{it}$	-127.054	60.971	22	0.107	310.109	395.505
	(6) $FAT_{it} = \rho FAT_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-127.075	61.014	22	0.107	310.152	395.548
	(7) $FAT_{it} = \rho FAT_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-129.663	66.188	22	0.107	315.326	400.722
	(8) $FAT_{it} = \rho FAT_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-127.041	60.945	21	0.110	312.082	400.528
Fatality-drivers	(1) $DRI_{it} = \rho DRI_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + \eta_i + \varepsilon_{it}$	-197.903	65.790	24	0.106	447.806	527.103
	(2) $DRI_{it} = \rho DRI_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + \eta_i + \varepsilon_{it}$	-196.129	62.241	23	0.105	446.258	528.604
	(3) $DRI_{it} = \rho DRI_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + UNEit + \eta_i + \varepsilon_{it}$	-196.408	62.799	23	0.105	446.816	529.162
	(4) $DRI_{it} = \rho DRI_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-197.894	65.772	23	0.109	449.789	532.135
	(5) $DRI_{it} = \rho DRI_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + UNE_{it} + \eta_i + \varepsilon_{it}$	**-194.727**	**59.439**	**22**	**0.104**	**445.455**	**530.851**
	(6) $DRI_{it} = \rho DRI_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + A{+}LC_{it} + MAL_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-196.118	62.220	22	0.108	448.237	533.633
	(7) $DRI_{it} = \rho DRI_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-196.378	62.739	22	0.109	448.756	534.152
	(8) $DRI_{it} = \rho DRI_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-194.703	59.390	21	0.108	447.407	535.853
Fatality-passengers	**(1) $PAS_{it} = \rho PAS_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + \eta_i + \varepsilon_{it}$**	**-213.499**	**55.519**	**24**	**0.092**	**479.000**	**558.296**
	(2) $PAS_{it} = \rho PAS_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + \eta_i + \varepsilon_{it}$	-213.476	55.471	23	0.095	480.952	563.298
	(3) $PAS_{it} = \rho PAS_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + UNE_{it} + \eta_i + \varepsilon_{it}$	-212.762	54.044	23	0.093	479.525	561.871
	(4) $PAS_{it} = \rho PAS_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-213.455	55.431	23	0.095	480.911	563.257

	(5) $PAS_{it} = \rho PAS_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + UNE_{it} + \eta_i + \boldsymbol{\varepsilon_{it}}$	-212.757	54.034	22	0.097	481.514	566.910
	(6) $PAS_{it} = \rho PAS_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-213.431	55.383	22	0.099	482.864	568.260
	(7) $PAS_{it} = \rho PAS_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-212.603	53.727	22	0.096	481.208	566.604
	(8) $PAS_{it} = \rho PAS_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-212.599	53.719	21	0.100	483.200	571.646
Fatality-pedestrians	(1) $PED_{it} = \rho PED_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + \eta_i + \varepsilon_{it}$	-312.568	84.747	24	0.127	677.137	756.433
	(2) $PED_{it} = \rho PED_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + \eta_i + \varepsilon_{it}$	**-299.874**	**59.359**	**23**	**0.101**	**653.749**	**736.095**
	(3) $PED_{it} = \rho PED_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + UNE_{it} + \eta_i + \varepsilon_{it}$	-312.391	84.393	23	0.131	678.783	761.129
	(4) $PED_{it} = \rho PED_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-312.565	84.742	23	0.131	679.132	761.478
	(5) $PED_{it} = \rho PED_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + UNE_{it} + \eta_i + \boldsymbol{\varepsilon_{it}}$	-298.911	57.432	22	0.102	653.822	739.218
	(6) $PED_{it} = \rho PED_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-299.863	59.336	22	0.104	655.726	741.122
	(7) $PED_{it} = \rho PED_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-312.389	84.389	22	0.135	680.779	766.175
	(8) $PED_{it} = \rho PED_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	-298.899	57.409	21	0.105	655.799	744.245
Severe injuries	(1) $SEV_{it} = \rho SEV_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + \eta_i + \varepsilon_{it}$	53.376	111.773	24	0.153	-54.753	24.544
	(2) $SEV_{it} = \rho SEV_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + \eta_i + \varepsilon_{it}$	**72.366**	**73.793**	**23**	**0.119**	**-90.733**	**-8.386**
	(3) $SEV_{it} = \rho SEV_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + UNE_{it} + \eta_i + \varepsilon_{it}$	53.446	111.633	23	0.157	-52.893	29.454
	(4) $SEV_{it} = \rho SEV_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	53.440	111.643	23	0.157	-52.882	29.464
	(5) $SEV_{it} = \rho SEV_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + UNE_{it} + \eta_i + \boldsymbol{\varepsilon_{it}}$	72.451	73.622	22	0.123	-88.904	-3.508
	(6) $SEV_{it} = \rho SEV_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	72.538	73.449	22	0.122	-89.076	-3.680
	(7) $SEV_{it} = \rho SEV_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	53.488	111.549	22	0.162	-50.977	34.419
	(8) $SEV_{it} = \rho SEV_{it-1} + ACC_{it} + LAW_{it} + TRT_{it} + RII_{it} + ALC_{it} + MAL_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it}$	72.687	73.151	21	0.126	-87.375	1.071

Note: each model includes equations (2) and (3)

Table 3.5 Selected structural equation models on traffic total fatality, severe injuries, fatality-drivers, fatality- passengers and fatality-pedestrians rates per 10,000 vehicles, 2001-2012

	Total Fatalities (Model 2)	**Drivers (Model 5)**	**Passengers (Model 1)**	**Pedestrians (Model 2)**	**Severe injuries (Model 2)**
Type of fatality ←					
(equation 1)					
Traffic law reform	-.014 (.063)	.009 (.087)	.006 (.089)	.100 (.120)	.016 (.039)
Police enforcement	-.167*(.067)	-.181* (.083)	-.084* (.033)	-.602***(.129)	.043 (.037)
Road infrastructure investment	-.035 (.280)	-.020 (.037)	-.033 (.037)	-.110* (.053)	-.029 (.017)
Alcohol consumption	.209 (.233)	.134 (.303)	.433 (.324)	.258 (.443)	.084 (.144)
Percentage of young male population	.188* (.080)	.185 (.100)		.846***(.161)	.488*** (.074)
Unemployment		.160 (.095)			
Total crashes	-.045 (.068)	-.088 (091)	-.026 (.098)	-.177 (.133)	.148** (.044)
Lag of type of fatality	.657*** (.057)	.535*** (.062)	.558*** (.069)	.382*** (.067)	.431*** (.070)
Total crashes ←					
(equation 2)					
Traffic law reform	.173** (.065)	.173** (.065)	.173** (.065)	.173** (.065)	.173** (.065)
Police enforcement	-.121* (.048)	-.121* (.048)	-.121* (.048)	-.121* (.048)	-.121* (.048)
Road infrastructure investment	-.060* (.023)	-.060* (.023)	-.060* (.023)	-.060* (.023)	-.060* (.023)
Oil price average	.167 (.141)	.167 (.141)	.167 (.141)	.167 (.141)	.167 (.141)
Alcohol consumption	.189 (.198)	.189 (.198)	.189 (.198)	.189 (.198)	.189 (.198)
Percentage of young male population	.177*** (.058)	.177*** (.058)	.177*** (.058)	.177*** (.058)	.177*** (.058)
Unemployment	.029 (.060)	.029 (.060)	.029 (.060)	.029 (.060)	.029 (.060)
Lag of number of crashes	.690*** (.055)	.690*** (.055)	.690*** (.055)	.690*** (.055)	.690*** (.055)
Police enforcement ←					
(equation 3)					
Traffic law reform	.070* (.035)	.070* (.035)	.070* (.035)	.070* (.035)	.070* (.035)
Lag of police enforcement	.973*** (.014)	.973*** (.014)	.973*** (.014)	.973*** (.014)	.973*** (.014)
Alcohol prevalence ←					

(equation 4)					
Traffic law reform	-.036*** (.009)	-.036*** (.009)	-.036*** (.009)	-.036*** (.009)	-.036*** (.009)
Lag of alcohol prevalence	.861*** (.044)	.861*** (.044)	.861*** (.044)	.861*** (.044)	.861*** (.044)
Tm (LR chi-square)	70.103	67.490	60.097	57.409	73.151
df	27	27	27	21	21
RMSEA	.101	.098	.089	.105	0.126
AIC	309.241	443.507	477.577	655.799	-87.375
BIC	379.388	513.654	547.724	744.245	1.071
N			156		

Note * p < .05, ** p < .01, *** p < .001

All models with year and region effects

Standard errors in parentheses

iii) Total and indirect effects of the three road safety policies on the dependent variables

Table 3.6 shows the results regarding both the total and indirect effects on the dependent variables. This information is taken from the estimates of equations (2), (3) and (4) of Table 3.5. First, we can observe that the indirect effects of the traffic law are significant in reducing pedestrians' fatalities. This can be associated with two mechanisms: i) the implementation of the law is associated with a lower 'Alcohol consumption', which may have affected drinking patterns of drivers who otherwise could have been involved in causing both pedestrian accidents (reduction of total crashes), and pedestrian crashes with fatal consequences (reduction of pedestrian fatalities); ii) the enactment of the law increased 'Police enforcement', and therefore riskier drivers were either directly controlled or penalized, or observed other drivers to be controlled or penalized, and thus benefits of risky driving were outweighed by direct and indirect police enforcement. In turn, 'Police enforcement' led to a reduction of pedestrian accidents (reduction of total crashes), as well as pedestrian crashes with fatal consequences (reduction of pedestrian fatalities).

Table 3.6 Total and indirect effects of traffic law, police enforcement and road investment infrastructure on dependent variables.

Variables	**Total Fatalities (Model 2)**		**Drivers (Model 5)**		**Passengers (Model 1)**		**Pedestrians (Model 2)**		**Severe injuries (Model 2)**	
	Total	*Indirect*	*Total*	*Indirect*	*Total*	*Indirect*	*Total*	*Indirect*	*Total*	*Indirect*
Traffic law	-.040	-.026	-.021	-.031	-.018	-.025	.020	-.079*	.040	.023
Police enforcement	-.162*	.005*	-.170*	.010*	-.080*	.003*	-.580***	.021*	.025	-.017**
Road investment infrastructure	-.032	.002	-.014	.005	-.031	.001	-.099	.010	-.038*	-.008*

Note * p < .05, ** p < .01, *** p < .001

Second, 'Police enforcement' indirectly reduces total, drivers', passengers' and pedestrians' fatalities. That is, we observe that a direct reduction of 'Total number of crashes' produced by an increasing of 'Police enforcement' decreases the fatal consequences of these events for every road user group. However, similarly to the finding associated with the law having a posi-

tive effect on car crashes, the indirect increase of severe injuries may be related to changes in police reporting crashes which led to reporting more severe injuries.

Lastly, we observe that 'Road infrastructure investment' has significant total and indirect effects on decreasing severe injuries. Thus, while there are no direct effects of this variable on severe injuries, we observe a total effect of 'Road infrastructure investment' that is entirely mediated by crashes. In other words, improvements in this area are only indirectly associated with reductions in severe injuries through their negative association with crashes, which in turn are associated with a reduced rate of severe injuries.

DISCUSSION AND CONCLUSION

In this study we provide evidence of how a combination of 'Traffic law reform', 'Police enforcement' and 'Road infrastructure investment' can steadily decrease traffic fatalities and severe injuries directly and indirectly. Furthermore our results show that these policies affect road users differentially. More specifically, the statistical analysis suggests a variety of reduction effects in the variables analyzed: 'Police enforcement' on total, drivers', passengers' and pedestrians' fatalities, and 'Road infrastructure investment' on pedestrians' fatalities. One additional and important finding of our study is the operation of an institutional mechanism, namely the increasing of 'Police enforcement', after the implementation of 'Traffic law reform', which served as a mediator of the law's effect in reducing pedestrians' fatalities. Furthermore we also notice that 'Road infrastructure investment' indirectly reduced severe injuries by reducing the toll of 'Total number of crashes'. Two limitations of the current study should be mentioned, however. One, we were not able to include cyclists as a separate category of fatalities. Two, unfortunately we do not have information on exposure to road risk of road users for Chile, as measured by kilometers

travelled, and therefore we acknowledge this imposes some caution on how results should be analyzed.

There are three elements that need to be considered further in order to understand our results. First, the Chile's traffic law reform included a whole range of norms regulating not only drivers', but also passengers', cyclists' and pedestrians' behaviors. As a result, drivers probably changed their behaviors, but the National Police was also able to expand its repertoire of traffic control strategies since a whole new array of road safety behaviors could be sanctioned. Second, parallel to these two road safety determinants, we also found that investment on road infrastructure can lead to positive results. Significant direct effects were observed on pedestrian fatalities and indirect effects on severe injuries. In regards to pedestrians, this may be related to particular road designs in which the safety of pedestrians was more fully considered (for instance, sidewalks clearly segregated from rural highways, by as much space as available within the right of way). The indirect decreasing of severe injuries, on the other hand, could be associated to construction of both safer and more forgiving highways. For instance, the implementation of some road designs may have, first, provided drivers with better environmental conditions to avoid crashes—which had an effect on reducing the toll of crashes, and second, these road designs, also provided with solutions to account for the unexpectedly case of the occurrence of these events, that is, the direct impact of crashes on drivers and passengers could have also been absorbed by the road infrastructure. However, in order to test these two suggestions more precise information, such as the exact location of the incidents, would have to be examined. Lastly, in order to understand why road safety legislation—which was both debated and held up more than twelve years in parliament—was ultimately approved in 2005, it is important to acknowledge the influence of the *World report* launched in 2004. The timely introduction of this report in the par-

liamentary debate helped both to document the need of tackling a serious global challenge as well as to inform law makers of the existence of scientifically-proven successful road safety measures. While some of the report's recommended measures were considered and others ignored, it was nevertheless useful in increasing the sense of urgency in the need to target the road safety challenge that Chile had tackled unevenly. This element highlights how a particular type of global forces can have a positive impact on local practices. To conclude, the current study is the first to comprehensively quantify the effects of road safety institutional mechanisms on traffic fatalities, distinguishing between different types of road users, and severe injury rates in a South American country. It thus contributes to understanding road safety processes in a region to which more research effort should be directed, given that its traffic fatality and injury rates are among the highest in the world.

PREAMBLE OF CHAPTER 4

In Chapter 3 we brought the case of Chile to understand some of the institutional mechanism and other national variables that were at play in order to understand the link between the recommendations set forth by the WHO—representing the influence of global forces, and a diverse range of traffic outcomes. This chapter introduces a more refined approach to examine the influence of police enforcement on Chile's traffic fatality reduction. First, we expand the analysis by comparing traffic fatalities by two denominators, vehicle fleet and population. Second, we improve our operationalization of police enforcement since we measured it in two different ways: one by introducing number of traffic tickets and the other by considering the total number of police officers nationally. We also assess two periods of post-traffic law reform in order to observe to what extent police enforcement was associated to road death variation. Due to the paper-based format of the dissertation the introduction and research question sections below largely replicates portions of Chapter 3, as such they may be skipped (to pp. 167, § Methods and Data) by the reader if necessary.

CHAPTER 4: DID CHILE'S TRAFFIC LAW REFORM PUSH POLICE ENFORCEMENT? UNDERSTANDING CHILE'S TRAFFIC FATALITIES AND INJURIES REDUCTION

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JINM was responsible of the conception and design of the study, collection and interpretation of data, and drafting of the chapter, AQV and AVB were responsible of interpreting results and critically revised the chapter for important intellectual content, and JINM, AQV and AVB approved the final of the version.

Abstract

The objective of the current study is to determine to what extent the reduction of Chile's traffic fatalities and injuries during 2000-2012 was related to the police traffic enforcement increment registered after the introduction of its 2005 traffic law reform. Thus, a unique data-set with assembled information from public institutions, and analyses based on Ordinary Least Square and Robust Random Effects models were carried out. Dependent variables were traffic fatality and severe injury rates per population and vehicle fleet. Independent variables were: 1) presence of new national traffic law; 2) police officers per population; 3) number of traffic tickets per police officer; and 4) interaction effect of number of traffic tickets per police officer with traffic law reform. Oil prices, alcohol consumption, proportion of male population 15-24 years old, unemployment, road infrastructure investment, years' effects and regions' effects represented control variables. Empirical estimates from instrumental-variables suggest that the enactment of the traffic law reform in interaction with number of traffic tickets per police officer is significantly associated with a decrease of 8% in traffic fatalities and 7% in severe injuries. Piecewise regression models' results for the 2007-2012 period suggest that police traffic enforcement reduced traffic fatalities by 59% and severe injuries by 37%. Findings suggest that traffic law reforms in order to have an effect on both traffic fatality and injury rates reduction require changes in police enforcement practices. Lastly, this case also illustrates how the diffusion of successful road safety

practices globally promoted by the World Health Organization and World Bank can be an important influence to enhance national road safety practices.

INTRODUCTION

In 2004 the World Health Organization (WHO) along with the World Bank (WB) launched the "*World report on road traffic injury prevention*" and globally promoted several road safety measures to tackle the roots of road crashes and avoid their tragic consequences (Peden et al. 2004). After twelve years of parliamentary and governmental debate, and following closely the recommendations set by the *World report* in 2005 Chile approved a comprehensive traffic law reform, which via decree regulation was enacted at the end of 2006 (Urzúa 2014) . This reform included measures such as: i) mandatory seat-belt use for all-vehicle occupants, ii) introduction of child restraints, iii) day-running lights for motorcycles, iv) banning the use of cell phone while driving, v) stricter requirements to obtain driver licenses to drive light-vehicles, and vi) higher fines for driving under the influence of alcohol (Government of Chile 2005) . Statistics indicate that traffic fatality and severe injury rates per 100,000 population declined by 13% and 5% respectively between 2006 and 2012. However, the role of Chile's traffic law reform – and by extension, those of the recommendations set by the WHO and the WB - in this downward trend remains unknown.

While a vast literature suggests that road traffic legislation reforms *per se* may help to prevent the occurrence of traffic crashes and its consequences (Bhattacharyya and Layton 1979; Carpenter and Stehr 2008; Cohen and Einay 2003; Elvik et al 2009; Harvey and Durbin 1986; Houston, Richardson and Neeley 1995; Sen and Mizzen 2007; Smiley et al. 1989) others have argued that this type of measure is ultimately sterile or at best short-lived (Garbacz 1990; Ross 1993). The latter has been particularly noticeable in Latin American countries since in many cases they lack the necessary resources to implement legislative change (Moura et al. 2009; Nazif and Pérez 2013; Pechansky and Chandran 2012). However, there is another literature focusing on institutional mechanisms (Coleman 1990; Hedström and Swedberg 1998) which offers more

precise explanations of the potential impact of legal reform. These studies have argued that road safety legislation reforms can only be effective in reducing crashes and traffic fatalities when they are followed up with particular types of institutional mechanisms, such as police enforcement (i.e. stationary or patrolling Hauer, Ezra, Ahlin, and Bowser 1982; Wiliszowski and Jones 2003; Shin and Washington 2007) or the creation of road safety agencies (Peden et al. 2004; Bliss and Breen 2009), as well as with the introduction of technological devices, such as red-light cameras (Chin and Quddus 2003; Huang et al. 2008), and automatic speed enforcement (Glodenbed and van Scahen 2005; Newstead and Cameron), youth-focused intervention programs (Chandran et al. 2014) and/or diffusion of public campaigns (Elder et al. 2004; Elvik 2000; Nazif and Pérez 2011)

In this chapter, we contribute to this body of research by using Chilean data between 2000 and 2012 to empirically assess the effects of (a) traffic law reform, (b) police officers per capita (c) police traffic enforcement and (d) the interaction of traffic law reform with police traffic enforcement on traffic and morbidity rates. Such an assessment is evidently highly relevant for Chile as a policy impact evaluation, but it also has both theoretical and methodological implications for the field of study at large. First, unlike other federal countries such as Brazil, Canada or the USA, where traffic reforms may have not been universal, Chile, as a centralized country, provides an opportunity to examine an entire national jurisdiction unit over time. The latter therefore can be regarded as a "natural policy experiment" (Quesnel-Vallée and Jenkins 2010). Furthermore, it is worth noting that under Chile's administrative regime, in which a single national police body is responsible for patrolling traffic, coordination of enforcement should be less problematic and therefore a traffic law reform might uniformly intensify it. Second, as noted by Elvik et al. (2009), while there is a significant amount of research on the efficacy of road traffic

legislation reforms and the institutional mechanisms associated with them in the USA, the Commonwealth and European countries, there remains a remarkable paucity of similar research exploiting cross-jurisdictional time-series variation in other regions of the world, and particularly in South America. Third, this case offers an explicit test of national pathways through which the influence of global forces such as the policy diffusion of the *World Report*, can ultimately contribute to changes in national territories can play out (Pierotti 2013). Last, from a methodological point of view, the rich cross-region time-series data available for Chile allows us to control for the impact of unobserved region and/or time-specific determinants of traffic incidents such as climate variation with the help of random effects models (Koetse and Rietveld 2009). Indeed, Chile comprises a wide range of weather conditions extending across 38 degrees in latitude. Simple Ordinary Leas Squares estimates of the impact of traffic reform, policer officers per capita, or police traffic enforcement might be otherwise confounded with unobserved determinants of traffic crashes such as climate variation within regions through during 2000-2012. Hence, using Chilean data permits us to evaluate the robustness of the literature of road safety institutional mechanisms, expand our road safety knowledge of the South American region more generally and of this country more particularly, and contribute to our understanding of how, in the realm of road safety policies, global factors impact national territories.

RESEARCH QUESTION

Figure 4.1 shows a steady decline in Chilean traffic fatality and severe injury rates (per 10,000 vehicles) between 2000 and 2012. Specifically, traffic fatalities have dropped by roughly 52 % ([7.97 – 3.83]/7.97), and severe injuries by 56% ([38.01-16.53]/38.01). This figure also shows a less pronounced decline in traffic fatality (per 100,000 population) and severe injury rates (per 10,000 population). Particularly, traffic fatalities under this indicator dropped by approximately 21% ([11.02 – 8.75]/11.02) and severe injuries by 28% ([5.25 –3.77]/5.25).

Figure 4.1 Traffic fatalities per 10 000 vehicles and 100 000 population and severe injuries per 1000 vehicles and 10 000 population, 2000–2012.

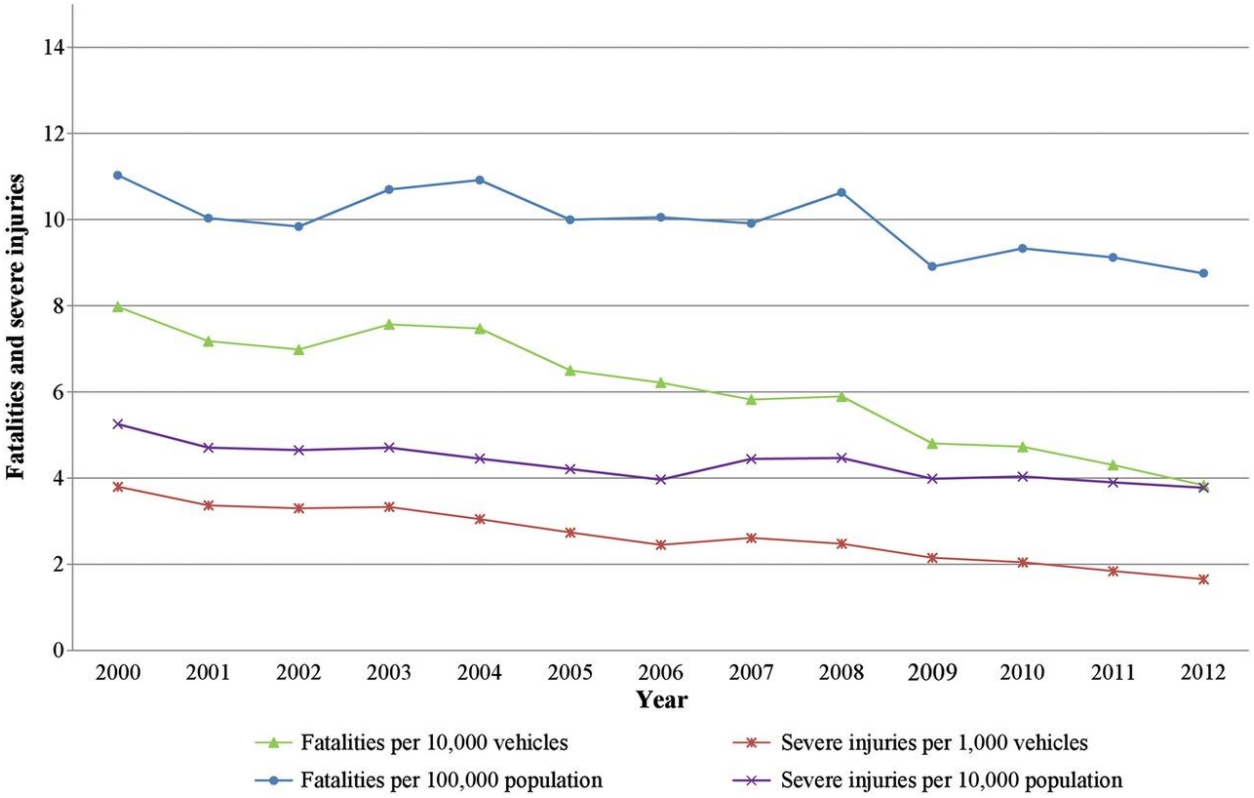

Table 4.1 documents cross-regional variation in traffic fatality and serious injury rates in 2000 and 2012, the two end-year sample points for both rates: vehicle fleet and population. These numbers suggest significant cross-regional variation in fatality and severe injury rates in the year 2000. In 2000 five regions, O'Higgins, Maule, Biobío, La Araucanía and Los Lagos had an average of 12.1 traffic fatality rates per 10,000 vehicles, while, with the clear exception of the Magallanes region, all the other regions had an average of 6.81. A very similar pattern is observed in fatalities per 100,000 population. We observe the Magallanes region to be the exception with the lowest rate of 4.56. On the other hand, O'Higgins, Maule, Biobío, La Araucanía, Los Lagos and Atacama had an average of 14.4, and all the other regions an average of 9.49. Regarding severe injury rates per, for the same year, we observe that Atacama, Coquimbo, Biobío, La Araucanía, Los Lagos and Aysén had an average of 46.18 per 10,000 vehicles, whereas the group composed

of Tarapacá, Antofagasta, Valparaíso, O'Higgins, Maule and the Metropolitan region had an average of 34.80. For this particular rate as well Magallanes has a very low rate of 24.40. When we analyze the severity rate per population, Atacama is the region with the highest rate with an average of 79.17, Los Lagos region having the lowest rate with 44.27 and all the other regions had an average of 53.4. The first four columns for the year 2012 indicate that variation between and within regions has overall decreased.

Thus, the regional data point to overall decreases in traffic fatality and severe injury in both vehicles and population rates, and a convergence across regions. One potential explanation for these parallel trends could lie in the enactment of a comprehensive traffic law reform in 2006, which may have impacted police traffic enforcement. However, as we can observe in Figure 4.1 a decreasing tendency was evident before the enactment of this law, particularly for fatalities per 10,000 vehicles and severe injuries per 1,000 vehicles. There are other elements that, as noted in the literature, should be considered, since traffic laws changes might be confounded with other significant factors or not strong enough to influence variation in these rates. For instance, several studies have indicated that increasing of oil prices (Chi et al 2011; Grabowski and Morrisey 2004), alcohol prices (Adrian, Ferguson and Her 2001; Wagenaar, Tobler and Komro 2010), infrastructure development (Elvik et al. 2009), or unemployment (Scuffham 2003; Stuckler et al 2009) can also help produce a downwards tendency. Furthermore, a more direct pathway might also be found in changes in police enforcement practices, particularly in the Chilean context where the centralized nature of this state ensures that these practices are uniformly applied across regions.

Table 4.1 Variation in Fatalities, Serious Injuries and Crashes 2000-2012

Regions	Fatalities per 10,000 vehicles	Fatalities per 100,000 population	Severe injuries 10,000 vehicles	Severe injuries 100,000 population
2000				
Tarapacá[a]	4.99	9.35	29.82	55.89
Antofagasta	7.73	12.25	35.80	56.74
Atacama	8.85	13.45	52.10	79.17
Coquimbo	7.35	8.45	43.98	50.56
Valparaíso	6.92	10.37	36.99	55.43
O'Higgins	11.52	16.96	32.85	48.37
Maule	11.06	14.81	37.63	50.38
Biobío	13.82	15.10	46.09	50.36
La Araucanía	14.13	15.00	49.83	52.91
Los Lagos[b]	12.07	12.54	42.61	44.27
Aysén	6.42	8.53	42.52	56.53
Magallanes	1.90	4.56	24.44	58.71
Metropolitana	5.46	8.01	35.68	52.37
2012				
Tarapacá[a]	5.60	16.46	17.79	49.77
Antofagasta	5.70	14.96	15.62	40.97
Atacama	4.40	12.64	18.96	54.46
Coquimbo	4.65	10.14	16.91	36.93
Valparaíso	3.13	6.88	18.90	41.55
O'Higgins	5.56	13.55	15.96	38.88
Maule	4.88	12.90	14.49	38.30
Biobío	5.84	11.76	29.14	58.71
La Araucanía	5.88	9.83	25.77	43.08
Los Lagos[b]	5.47	10.09	21.03	37.13
Aysén	2.74	8.4	9.43	29.03
Magallanes	2.77	9.3	15.88	53.86
Metropolitana	2.29	5.3	11.91	27.58

[a] It includes Arica and Parinacota territories
[b] It includes Los Rios territory

METHODS AND DATA

i) Data

Complete data for all 13 regions are available from 2000 until 2012. This provides us with a balanced sample with N = 169 region-year observations.

ii) Dependent variables.

Data on i) traffic fatalities and ii) severe injuries were obtained from Chile's National Commission of Road Safety of the Ministry of Transport. This organization has compiled, from police reports, an extensive data set of traffic fatalities and injuries in Chile from 1972 to the present. Fatalities are classified according to status (driver, passenger, motorcyclist, bicyclist, and pedes-

trian), age, gender, and time and day of accident. Following the Chilean Penal Code, police officers classify injuries as severe (i.e. injury which prevents the person from performing acts, which constitute such person's usual and customary daily activities, at least thirty days or more immediately following the occurrence of the injury), less severe (injury which prevents the individual from returning to previous activities up until thirty days immediately following the occurrence of the injury) and minor (injury which does not require immediate medical attention). Data on vehicle fleet and population were both obtained from the National Institute of Statistics. Traffic fatalities and serious injuries per 10,000 vehicles and per 100,000 population were the outcome variables assessed in this study, for a total of four dependent variables. By analyzing these variables separately, we may be able to identify the specific impact of each policy in similar, but not identical, outcomes. Lastly, by introducing the two denominators (vehicle fleet and population) we facilitate international comparisons of the results as well as to test robustness across models.

iii) Independent variables.

'Traffic law reform' which was coded as a yearly dummy variable, '0' being the 2000-2005 period when the law had not been approved, and '1' from 2006 to 2012, period where the reform was in force. 'Police per 100,000 population' is the national number of police officers, using data from United Nations Office on Drugs and Crime. 'Police traffic enforcement', is measured as the number of traffic tickets processed by local courts, using data provided by the Ministry of Justice, divided by the national number of police officers, using data from United Nations Office on Drugs and Crime. It must be noted that due to security reasons the Chilean Police Force (*Carabineros de Chile*) only provides information regarding the number of police officers at the national level. Thus the operationalization of 'Police traffic enforcement' is number of tickets per region and year divided by the national number of police officers per year. While the literature

suggests number of police officers (Sen and Mizzen 2007; Sass and Zimmerman 2000), or number of traffic tickets (Lee 2012), as separate proxies of police traffic enforcement, we actually propose a combination of these two factors to capture more accurately this road safety measure. Firstly, since police officers have duties other than patrolling traffic we recognize that an increase in the number of police officers cannot be assumed to automatically lead to a commensurate increase in traffic ticketing. Secondly, because significant changes in the total number of police officers can actually trigger any absolute increase in the number of traffic tickets, we acknowledge that an increase of traffic ticketing per se may be cofounded with the number of police officers, and thus cannot be assumed to have a clear-cut effect on traffic fatalities or severe injuries. In order to assess the effect of the road safety institutional mechanism for the Chilean case an interaction variable of 'Traffic law reform' and 'Police traffic enforcement' was introduced; this variable is labeled 'Road safety institutional mechanism'. This effect captures how traffic fatality and morbidity rates may be sensitive to police traffic enforcement, a practice which in turn is sensitive to law changes, given the centralized character of Chile's political regime.

iv) Control variables.

In consideration of previous literature, several control variables were introduced: 1) 'Oil price average' measures the average price of four types of combustible: 93, 95 and 97 octanes and diesel, using data from the National Commission of Energy. 2) 'Unemployment', using data from the National Institute of Statistics. 3) 'Percentage of young male population' measures the male population between 15 and 24 years old, as a proportion of the total population, using data from the National Institute of Statistics. 4) 'Alcohol consumption' measures national alcohol consumption per year per population, using data from the Drugs and Alcohol Prevention and Rehabilitation National Service. 5) 'Road infrastructure' measures the total amount of both pub-

lic and private infrastructure spending allocated to the design, construction and maintenance of public roads, using from the Ministry of Public Works.

Table 4.2 provides a summary of the dependent, independent and control variables used in the models.

Table 4.2 Summary statistics 2000-2012

	Obs.	Mean	Std. Dev	Min	Max
Dependent variables					
Traffic fatalities per vehicle	169	4.182	.430	2.944	4.950
Traffic severe injuries per vehicle	169	5.821	1.010	3.433	8.085
Traffic fatalities per population	169	2.423	.314	1.518	3.125
Traffic severe injuries per population	169	3.843	.203	3.166	4.371
Independent variables					
Traffic law reform	169	.538	.5	0	1
Police officers per 100000 population					
Police traffic enforcement	169	5.496	1.183	2.903	8.529
Controls					
Road infrastructure investment	169	17.035	1.092	12.651	19.372
Oil price average	169	6.244	.261	5.694	6.667
Alcohol consumption	169	4.203	.116	3.814	4.365
Percentage of young male population	169	11.646	1.084	9.029	14.007
Unemployment	169	-2.559	.342	-3.756	-1.897

v) Approaches

Using Ordinary Least Square (OLS) and Robust Random Effects (RRE) models values of the four dependent variables were examined from 2000—when there was enough information to have a balanced sample—through 2012. These models were chosen in order to test the robustness of each independent variable of interest. Following Bell and Jones (2014) we suggest that by carrying out RRE models, rather than Fixed Effects models or Ordinary Least Square (OLS), more information could be accounted for and thus a more precise testing could ultimately be provided. In this way, we can capture information regarding regions even though they are time-

invariant variables. Our choice of RRE models have the advantage of allowing us to capture the effects of a theoretical important time invariant variable 'number of police officers per 100,000' population, which we cannot assess using a Fixed Effect model. Lastly, it is important to notice that since simple random effects models can be sensitive to heteroskedasticity, the robust option, which is facilitated by the software Stata, was introduced to control for this type of anomaly. We also use piecewise RRE in order to test more accurately the effect of police traffic enforcement after the enactment of the law in two different periods 2006-2012 and 2007-2012. The rationale for distinguishing these two periods is based on the implementation process of this law. While the law was approved in December of 2005, it is important to notice that in December of 2006 various decrees regulating implementation specifics of the norms approved by this law reform (i.e. technical characteristics of helmets of cyclists, child restraints or hands free mobile phone devices) were enacted and thus the law could have affected police traffic enforcement in either 2006 or 2007. In order to decrease the type I error associated with the variables introduced in each model, we set two significance levels $p<.05$ and $p<.01$.

RESULTS

Table 4.3 shows the results of four statistical OLS models and four RRE models, estimating the effectiveness of the current overall ratings in predicting traffic fatality rates during 2000–2012. With the exception of 'Traffic law reform', which is a dichotomous variable, we log-transform our dependent, independent and control variables to account for their skewed distribution. We observe five important results across models: i) neither traffic law nor police traffic enforcement appear to be independently associated with traffic fatality rates nor severe injury variations in the Chilean case; ii) the results for the interaction effect between 'Traffic law reform' and 'Police traffic enforcement' suggest that it captures a significant decreasing effect on both traffic fatality and severe injury rates for 2000-2012. The size of the impact of this institutional mechanism is

7.1 % (for OLS and RRE models) when analyzing fatalities per vehicle fleet, and 8.3 % (for OLS and RRE models) when analyzing fatalities per population. This institutional mechanism is also associated to a decrease of 7.2% in severe injuries per vehicle (for OLS and RRE models), and 7.5% in severe injuries per population (for OLS and RRE models); iii) we observe that 'Police per 100,000 population' is negatively and significantly associated to fatalities per vehicle in both OLS and RRE models, and severe injuries per population in the OLS model; iv) with regards to 'Percentage of young male population', and in accordance with the literature, a significant effect is captured by the two RRE models that predict severe injuries. That is, the smaller this population is the more likely a reduction of severe injuries can be observed; and v) 'Alcohol consumption' is only significant when predicting severe injuries per population in the RRE model, suggesting that a decline in this variable reduces the overall severity of injuries.

The 'Road safety institutional mechanism' is statistically significant at $p < .01$ in five models. The three models in which the effect of this variable is significant at $p<.05$ are: the OLS fatality per vehicle model, the RRE severe injury per vehicle model, and the RRE of severe injuries per population. Theoretically, we are inclined to choose all the RRE models over OLS' ones because residuals are not independently and identically distributed. Secondly, we also prefer the RRE model over OLS, because, the variable region can be absorbed by this model specification. In this case for instance, weather variation, which is associated to traffic events, may also affect police enforcement, and therefore indirectly influence traffic events. Since we do not have access to weather information, RRE is the preferable option. But in any case, in the eight models the introduction of the 'Road safety institutional mechanism' is consistent in both significance and size when predicting traffic fatalities and severe injuries. Therefore we can suggest that the in-

troduction of a traffic law reform in Chile had a positive impact on police traffic enforcement since a steadier increase is registered after this legislative change.

Table 4.4 shows the results of eight piecewise RRE models for the periods 2006-2012 and 2007-2012.[30] This analytical strategy allows us to account more accurately for how the road safety institutional mechanism operated. Here we observe three important results: i) Police per 100,000 population does not seem to be independently associated with traffic fatality rate nor severe injury variations in these two periods; ii) regardless of which denominator is chosen to assess severe injury rates variation, police traffic enforcement is associated with significant reductions of 34% for the 2006-2012 period, and 37% for the 2007-2012 period. This also suggests an effective intensification of this measure after the year 2007; and iii) in terms of traffic fatalities, we also notice a decline of these rates, in both periods for both denominators. However the range is much larger because on the 2006-2012 period fatalities per vehicle are associated with a reduction of 42% ($p < .01$), whereas fatalities per population decrease by 21%, but this result is not statistically significant ($p < .05$). In regards to the 2007-2012 period, we observe that the reduction has increased to 79% for fatalities per vehicles and 59% for fatalities per population, both significant at $p<.01$, reinforcing the suggestion that police traffic enforcement was significantly intensified after the enactment of the law and that this had the intended effect.

[30] OLS results are not displayed but are extremely similar to the ones presented here. These results are available upon request

Table 4.3 OLS and RRE models of the effects of Traffic law reform, Police traffic enforcement, Police per 100,000 population and Road safety institutional mechanism on traffic fatality and severe injury rates per 10,000 vehicles and per 100,000 population, 2000-2012

	Fatalities per vehicle		**Fatalities per population**		**Severe injuries per vehicle**		**Severe injuries per population**	
	OLS	RRE	OLS	RRE	OLS	RRE	OLS	RRE
Independent variables								
Traffic law reform	.365 (1.215)	.365 (.897)	.650 (1.182)	.650 (.836)	-.096 (.893)	-.096 (.868)	-.218 (.894)	-.218 (.931)
Police traffic enforcement	.082 (.085)	.082 (.081)	.154 (.083)	. .154 (.102)	-.056 (.062)	-.056 (.098)	-.062 (.063)	-.062 (.103)
Police per 100,000 population	-2.022 (.954)**	-2.022 (.889)**	-1.166 (.928)	-1.166 (.650)	-1.283 (.701)	-1.283 (1.108)	-1.414 (.702)**	-1.414 (1.158)
Road safety institutional mechanism[a]	-.071 (.029)**	-.071 (.023)***	-.083 (.028)***	-.083 (.019)***	-.072 (.021)***	-.072 (.033)**	-.075 (.021)***	-.075 (.034)**
Controls								
Road infrastructure investment	.022 (.042)	.022 (.045)	.024 (.041)	.024 (.048)	-.000 (.031)	-.000 (.027)	.000 (.031)	.000 (.027)
Oil price average	.180 (1.600)	.180 (1.277)	.218 (1.557)	.218 (1.125)	.790 (1.176)	.790 (1.205)	.871 (1.177)	.871 (1.305)
Alcohol consumption	-.234 (.322)	-.234 (.316)	-.299 (.313)	-.299 (.300)	.465 (.237)	.465 (.243)	.465 (.237)	.465 (.228)**
Percentage of young male population	-.172 (.296)	-.172 (.360)	-.153(.288)	-.153 (.284)	.201 (.217)	.201 (.076)***	.193 (.217)	.193 (.097)**
Unemployment	-.063 (.095)	-.063 (.109)	-.041 (.092)	-.041 (.125)	.030 (.070)	.030 (.101)	.032 (.070)	.032 (.104)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Overall R^2	.23	.82	.61	.68	.97	.98	.46	.56
N	169		169		169		169	

Note ** p < .05, *** p < .01

[a] Interaction effect of 'Traffic law reform'*'Police traffic enforcement'

Table 4.4 Piecewise RRE models of the effects of Police traffic enforcement and Police per 100,000 on traffic fatality and severe injury rates per 10,000 vehicles and per 100,000 population, in 2006-2012 and 2007-2012

	2006-2012				**2007-2012**			
	Fatalities per vehicle	*Severe injuries per vehicle*	*Fatalities per population*	*Severe injuries per population*	*Fatalities per vehicle*	*Severe injuries per vehicle*	*Fatalities per population*	*Severe injuries per population*
Independent variables								
Police traffic enforcement	-.415 (.154)***	-.337 (.102)***	-.218 (.149)	-.346 (.103)***	-.788 (.267)***	-.374 (.121)***	-.588 (.253)***	-.372 (.127)***
Police per 100,000 population	-2.878 (3.551)	-2.642 (2.352)	-3.026 (2.505)	-2.992 (2.325)	-4.748 (4.229)	-.764 (3.531)	-3.973 (3.621)	-1.035 (3.511)
Overall R^2	.84	.98	.78	.72	.85	.98	.80	.73
N	91				78			

*Note ** p < .05, *** p < .01*

All models are adjusted for 'Road infrastructure investment'; 'Oil price average'; 'Alcohol consumption'; 'Percentage of young male population'; 'Unemployment'; 'Year fixed effects'; and 'Region fixed effects'

DISCUSSION

The current study provides evidence of how, in a centralized country, a combination of traffic law reform with police enforcement can steadily decrease both traffic fatalities and severe injuries. The statistical analysis suggests the constitution of an effective institutional mechanism, police enforcement intensification following closely after the enactment of Chile's traffic law reform. However three limitations of the current study need to be mentioned in order to temper the analysis. First, Chile unfortunately does not have information on exposure to road risk, measured as kilometers travelled, and therefore we acknowledge this to impose some caution on how results should be analyzed. Nevertheless, by having introduced two different rates (per vehicle fleet and population), we are confident that the results are likely to be robust. Second, we lacked information to capture variation in both type of traffic infractions and vehicle safety, and thus some elements of the downward trend observed from 2000 onwards and for both post-enactment law periods were unfortunately not fully captured. However, our RRE models indirectly accounted for this lack of information. Third, as has been pointed out in the literature (Elvik and Mysen 1999; Hauer and Hakkert 1998; Savolainen et al. 2011) the classification of injuries made by police officers, relative to those made by health professionals, can be biased and thus we understand how these particular results may not be as precise as one would like them to be. In this regard it would be important to carry out further analysis using health service datasets in order to test our severe injury models.

There are four elements that need to be considered further in order to understand how this case unfolded: first, the traffic law reform included a whole range of norms regulating not only drivers', but also passengers', cyclists' and pedestrians' behaviors. As a result, the National Police was able to expand its repertoire of traffic control strategies since a whole new array of road risky behaviors could be addressed. Second, we observed that, as some literature had suggested

(Garbacz 1990; Ross 1993), traffic law reforms can be sterile if these instruments are not supported by other actions. In this particular case, we actually notice that the traffic law reform did not have a significant independent impact on traffic fatalities or severe injuries for the 2000-2012 period. Nevertheless since Chile is a centralized country, we did observe that the police force, sensitive to this law change, increased its controls, and thus a reduction of both traffic fatality and a severe injury rates was observed after the enactment of the reform. In other words, while we registered the presence of police traffic enforcement during the period before the enactment of the law in 2006—but it seems to have been insufficient in explaining the downward tendency observed for these years—it is only after the implementation of the legislation that police enforcement seemed effective. At any rate this institutional mechanism between parliament, central government and police institution is ultimately fundamental to reduce traffic fatality and morbidity rates, since in centralized countries police enforcement practices are sensitive to macro political outcomes. The institutional mechanism sheds light on why a decrease tendency in traffic fatalities and injuries within and among regions was observed. Third, our observation of an important intervening road safety institutional mechanism implies that legislative changes may not necessarily or automatically translate into immediate traffic fatalities reductions. This is particularly relevant when we observe that police traffic enforcement, when analyzing traffic fatality by population rates, is only significant for one of the two analyzed post-enactment periods. The following hypothesis could be advanced to understand why the law did not impact police enforcement practices immediately: various decrees, which were regulating the implementation specifics of some of the new norms—such as stipulating required safety characteristics for the production of helmets for cyclists, child restraints and hands free mobile phones devices—were in fact enacted at the end of 2006. Thus police officers could only enforce road users' behaviors associated

with the correct use of these devices once the final regulation of these elements was actually in force. Lastly, in order to understand why road safety legislation—which was both debated and held up more than twelve years in parliament—was ultimately approved in 2005, it is important to acknowledge the influence of the *World report* launched in 2004. The timely introduction of this report in the parliamentary debate helped both to document the need of tackling a serious global challenge, as well as to inform law makers of the existence of scientifically-proven successful road safety measures. While some of the report's recommended measures were considered (i.e., mandatory use of child restraints, or banning cell phone use while driving) and others left behind (i.e., mandatory use of helmets for cyclists on all roads, not only on urban roads; reducing the accepted blood alcohol level, and not only increasing penalties for driving under the influence of alcohol), nevertheless, it was useful in increasing the sense of urgency in the need to target the road safety challenge that Chile had left unattended. This element highlights how a particular type of global forces can ultimately have a positive impact on local practices. To conclude, the current study contributes to understanding road safety processes in a region to which more research effort should be directed, given that its traffic fatality and injury rates are among the highest in the world.

> « …Enfin, le profil brossé des victimes et des accident … a souligné l'importance des mesures de prévention… mais a surtout fait ressortir la nécessité d'intégrer ces moyens d'intervention à l'intérieur d'un programme global de santé publique… » (Le Bourdais 1979:162)

CONCLUSION

Following the classic definition of social action provided by Weber, I suggest that both prevention and mitigation of traffic incidents can be explained sociologically. While a strict interpretation of this particular concept of Weber's refers to actions at the individual level, his proposition also implies the existence of social conditions which anticipate and follow the occurrence of crash incidents—which of course goes far beyond the potential transformation from cyclists to pugilists.

With this valuable insight, I argue that those conditions can be sociologically identified by, on the one hand, analyzing how road safety policies emerge, diffuse and converge across time and space, and, on the other, examining how the implementation of road safety policies can minimize the consequences of vehicle crashes. It is the interweaving of global, regional and national forces that allows one to identify two elements: First, road safety policy adoption is not a globally uniform process. Second, to understand the distribution of traffic fatalities and injuries more thoroughly, a country's position in the global diffusion process and its national conditions need to be simultaneously examined. Further, results indicate that whereas traffic fatalities are likely to be decreased by HSs, mainly through the provision of trauma care, road injuries can be targeted by RSAs' actions. Moreover, when analyses distinguish between road users and types of traffic severities one observes that globally promoted road safety legislations must be accompanied by other national efforts, otherwise the suggested policy changes can be futile. In other words, by differentiating traffic outcomes, the analysis of road safety policies gains in nuance.

Given this state of affairs what, then, ought policymakers and researchers committed to road safety do? This dissertation suggests three lessons. First, they should acknowledge that adoption processes respond to national, regional and global processes simultaneously. This is why some countries adopt first, others later, others partially adopt, and lastly, some nations may simply reject the adoption of measures even if these are supported by relevant international actors. Second, they should recognize that global forces operate unevenly. No matter how convincing the evidence used by international organizations, many determinants of traffic outcomes remain internal to nation-states, and therefore some of these measures may face strong structural constrains that impede their successful implementations. Health expenditure, economic growth, population and population density have direct effects on determining traffic fatalities. Road safety promoters should pay particular attention to HSs and economic growth because behind these macro variables various road safety mechanisms are at play. Third, traffic outcomes need to be analytically differentiated. Processes that lead to fatalities do not necessarily overlap with those which lead to injuries. Traffic outcome heterogeneity speaks to the need of differentiating public responses more explicitly. While some road safety policies are effective in decreasing fatalities others are quite ineffective. But the very same policies can be effective in decreasing injuries or changing risky behaviors and thereby lead to less severe traffic outcomes.

This concluding chapter summarizes the dissertation's main findings, which support these three lessons. Moreover, it offers directions for future research—which take into account not only unanswered research questions regarding some of the road safety policies here analyzed, but also issues related to the global diffusion of public policies—and discusses some implications for the sociological theories that intercalated through this work. I end the dissertation with a brief note on road safety policy implications.

Arguments, findings, extensions, and implications for sociological theory.

The first argument I examine is that road safety polices are not evenly diffused. Indeed, the simultaneous interrelation of global, regional and national forces shapes this outcome. As such the claim that global convergence is a definite feature of the last 30 years of public policy development is not accurate, or at least for transport policies this is not the case. The realm of road safety policy actually illustrates a more nuanced policy development process, with our comparative analysis of these three policies—RSAs, ChRL, and DRLs—indicating the simultaneous presence of global convergence, regional convergence and unintended convergence outcomes. Indeed there was global convergence with respect to ChRL, that is, a diverse array of global forces have a similar effect across the world, as the rate of adoption of this policy in the last 30 years has been quite rapid. These forces were stronger than regional and national ones which might have impeded its diffusion. More particularly, both the World Health Organization road safety global campaign and the UN Agreement concerning the AAUTPV are directly related to the increase of this policy. My analysis of RSAs suggests mixed findings in which the prevalence of national variables such as political violence introduces obstacles for RSAs to be disseminated and global forces accelerate the adoption processes in specific regions. In other words, my regional analyses allow me to observe finer processes than unilateral globalization. For instance, European countries respond to three different stimuli: one regional (the creation of the European Transport Safety Council) and two global ones (the Geneva Convention on Road Traffic and the World Health Organization road safety global campaign). This is a continent in which conditions to adopt public policies are more favorable than the other analyzed regions. Another interesting region is Africa. In this region commonwealth countries are more likely to adopt RSAs supporting the theoretical idea that having access to common avenues of the diffu-

sion of ideas facilitates the adoption of policies.[31] But notice that the avenues of diffusion for these two regions are not all the same. In other words, whereas United Nations channels and spatial regional networks are more prominent for the diffusion and convergence of RSA in European countries, a common colonial experience and legacy is one of the conditions that makes African countries to converge. The presence of multiple channels facilitates the spread of policies, but since countries do not have equal access to these, both diffusion and convergence show uneven patterns. Lastly, the case of DRL represents a unique case of road safety policy development. The diffusion and convergence patterns of DRL in Europe are similar to those I describe for the case of RSA. Furthermore the resistance of the US government to implementing this type of legislation reveals a tension that needs to be studied further. Is it the absence of strong regional road safety bodies like the European Transport Safety Council that impedes convergence on this policy, or do states with strong research capacity explain rejection to adopt? In this regard my evidence only suggests potential mechanisms that need to be addressed through qualitative studies. In other words, my research at this stage only points to certain conditions that eventual case studies should consider further: i.e., studying countries in which attempts to introduce DRL have been ineffective, where DRL adoption has been incomplete, or where DRL were once introduced and then rejected.

In terms of the mechanisms that facilitate convergence, I observe that constructivist mechanisms are the most prominent, followed by mechanisms of competition, while there is no evidence at all of outright coercion. This leads me to suggest that when studying mechanisms of global diffusion it is necessary to look at more than one mechanism, since these can operate sim-

[31] As has been advanced by Lange (2009), former British colonies do not have the same level of development. Two forms of British colonialism, direct and indirect rule led to more or less development respectively. In this regard one could hypothesize that because a higher proportion of Commonwealth countries in Africa were exposed to direct rule than Commonwealth countries in Latin America and the Caribbean, the former group of countries were more likely to adopt RSA than the latter one.

ultaneously. Further, as reviewed in Chapter 1, distinguishing between outcomes of convergence and mechanisms of convergence is an analytical contribution to the global diffusion literature because identifying the presence of specific mechanisms at play is not a sufficient condition for observing a given outcome. In the end, it is the interplay of these two aspects that will provide researchers with a more complete perspective on the limits of different global processes.

Another argument I develop and test is that differences in how countries participate in the global diffusion of road safety policies have important implications for traffic outcomes. The presence of RSAs, promoted by the WB, is likely to be associated with improvements in traffic injuries, as these institutions implement policy tools to change road safety legislation, coordinate efforts of other government, private and civil society institutions involved in road safety policies, measure their own performance, and set reductions goals. My findings suggest that when these institutions are created, attention towards road safety issues increases, which may lead to an improvement on how injuries are reported and targeted. As a result, the longer a RSA performs its four functions (legislation, coordination, monitoring, goal-oriented), as reviewed in Chapter 2, the greater the reduction of injuries should be. More specifically, I argue that only specific segments of the road user population respond positively to the new incentives that RSAs introduce into the transport system, which in turn reduce their risk behaviors.

At the same time, however, the global diffusion of RSAs is not associated with traffic fatalities reduction, and this is regardless of whether the diffusion of these institutions occurs in more or less advanced regions. This is rather perplexing. Some of the mechanisms identified by the neo-institutionalist literature could be brought in to understand this apparent disjuncture between RSAs and traffic fatalities. Problems of implementation could be experienced in countries regardless of their development level. That is, after RSAs have been successfully appointed

across the globe, some of their recommended measures require implementations in which different levels of bureaucratic administration (from national to city, passing in certain cases through provincial or state levels) need to work tightly together. Yet, when communication or transferring of resources between the respective authorities of these levels fail, these measures will be more likely to be incomplete and therefore ineffective. But if these mechanisms were to be present, one should also expect to observe insignificant injury variation. However, we do observe that RSAs are significantly associated with a change in injury rates, suggesting that some elements of policy are translated from policy to practice. This gives rise to the speculation that the conditions behind fatalities and injuries are not similar. More specifically, it is possible that fatalities and injuries belong to different populations, each exposed to different conditions and each with a differential capacity to utilize the information and programs provided by RSAs. In other words, as has been pointed out by Link and Phelan (1995), populations have differentiated access to both social and economic resources, which in turn affect their multiple health outcomes. Further, as these authors argue, populations from higher socio-economic status—which are already at a lower risk for negative health outcomes—are more likely to utilize new health opportunities made possible by government policies. As such RSAs may be more effective because after these institutions improve the safety standards of both vehicles and road construction—which as a result mitigate the consequences of vehicle crashes—only some populations have *easier* access to safer vehicles, and/or live in places in which roads' design and construction follow strict guidelines.

My work suggests interesting avenues of future road safety research, which require further investigation using similar statistical approaches. For instance, as I observe in Chapter 1, the presence of RSAs is strongly correlated with the adoption of ChRL, a finding which suggests the

next step should be to assess the extent to which the interaction between these two policies is effective in decreasing both traffic fatalities and injuries in the child population across countries. This will inform us of what type of specific institutional mechanisms are at play, that is, whether the effects of RSAs are mediated by the introduction of ChRL. Another research question, for a sample of European countries, can be the interaction between RSAs and DRL in targeting both injuries and vehicle collisions. This could be particularly interesting since DRLs have been recently adopted in that region so that such an analysis would enable us to assess the strength of DRL's short term effects. In both cases one would be assessing how these types of legislation mediate the impact of RSAs.

Whereas the focus of this dissertation is on causal processes related to the global diffusion of road safety policies, many of the determinants of traffic outcomes are domestic. This is particularly true for HS, economic growth, population and population density. How much a country proportionately spends on health expenditures has a significant effect on both fatalities and accident severities outcomes. The analysis of the two-stage least square regression with instrumental variables and fixed effects models indicate that the overall effect of HS, is to decrease traffic fatalities by 5%. That is, the higher the public and private health expenditure as a percentage of the gross domestic product in a state the more likely a state is to successfully provide pre- and post-hospitalization services to crash victims.. In comparison to other road safety policies promoted by the WHO, such as enforcement of seat-belt use or public campaigns to change road safety behaviors, the effect of this variable is smaller. Meta-analyses indicate that enforcement of seat belt use and road safety campaigns reduce fatalities by 11% and 9% respectively (Elvik and Vaa 2004). Nevertheless, this is not to suggest these two policies, from a cost-benefit analysis perspective, should be preferred over measures that strengthen post-crash response. Rather it

seems more adequate that countries should consider these measures simultaneously because they target different aspects of road crashes, seat-belt use and road safety campaigns focus on prevention whereas HS brings about mitigation.

Moreover, regional analyses allow me to observe that both developed and developing regions, with the exception of Latin America and the Caribbean, have well-developed HS that are associated with significant reduction of traffic fatalities. Further the range of HS effectiveness runs from to 5% to 30%. This suggests an interesting scale of the indirect influence of HS on traffic outcomes, inviting us to study further why in certain regions these systems are more effective than others. Is it because of factors endogenous to HS such as better allocation of resources, presence of more and better prepared health professionals, and/or more ambulance per capita? Or external factors such as countries with denser populations, in which emergency medical response services can be better provided given shorter average distances between crash locations and trauma centers, and/or the more availability of trauma resources to attend traffic injuries, due to a secular decrease of non-traffic related injuries associated with development more generally? Is it because specific countries have stronger weights in pulling the results towards certain averages of traffic fatality reduction? Answering these questions could inform policymakers of the limitations and possibilities of HS when indirectly targeting traffic outcomes.

In terms of the association between economic growth and traffic outcomes, my findings replicate previous studies, that is, over time, economic development correlates with better traffic fatalities indicators. However, it remains an important research challenge to disentangle the specific effects of this variable. In this regard, the interaction between RSAs, HS and economic growth should be considered further, by asking, for instance, do developed countries, at certain

thresholds of economic growth, provide more resources to HS? Do RSAs facilitate resource transfers to HS?

Research should also consider the relationship between vehicle technologies, road infrastructure and economic growth. Depending on data availability two potential methods of research are cross-national time-series studies and time-series studies at the national level. For instance, if data on vehicle fleet, divided by type of vehicle and average age, and legislation that regulates vehicle safety standards are available, the design and implementation of cross-national time-series studies that aim to explore this relationship are facilitated. As such, within specific countries one could assess the extent to which economic growth is related to vehicle fleet changes and how those in turn have an effect on traffic outcomes. On the other hand, time-series studies at the national level could be advanced when richer data on both road users' behaviors and road infrastructure are available.

Another objective of this dissertation is to facilitate the cross-country, cross-regional and over time assessment of traffic outcomes and road safety policy development. Whereas road safety researchers of different disciplines have long been interested in the causal connections between policies and traffic outcomes, their capacity to assess these associations in a large-N context has been limited by the lack of data regarding RS policies in non-Western contexts. I have generated a dataset of three road safety policies covering 182 countries and spanning the years between 1958 and 2012. These measures serve as three dependent variables in the various analyses reported in Chapter 1. Whereas these measures have their own limitations, such as not capturing finer changes over time[32] they offer advances over existing cross-national measures. In particular, the dataset allows us to consider government behavior over time, rather than simply

[32] For instance countries which have adopted ChRL may have changed the specificities of children's age thereby expanding the target population, or RSAs may not perform the four recommended functions in some countries

noticing whether a country does or does not have a particular type of road safety policy; and these policies were based on multiple sources of information. My variable of RSAs allows me to differentiate their effects on three different traffic outcomes, and the potential effects of the other two road safety policies ChRL and DRL can be assessed on more specific outcomes such as the road user children's population and vehicle crashes once these two variables are available.

More generally, scholars of road safety research can continue to improve our analytical grasp of the linkages between global, regional and national forces that affect road safety outcomes and policy development. First, one can refine further my cross-national measures of traffic outcomes by analyzing specific populations either by distinguishing age groups or road users, or a combination of both. In addition one can expand the battery of road safety policies to be analyzed. Regulation of airbags, seat-belts, helmets for cyclists and motorcyclists and limits on working hours for professional drivers are all interesting policies for consideration since they cover aspects related to preventive and mitigating factors. Moreover, road safety policy development goes beyond the transport sector, since measures in the infrastructure, health or labour areas are also likely to have a significant impact on road safety outcomes. With the exception of the RSA variable, the other two road safety policy variables of the global analysis, ChRL and DRL, can be linked to the transport field, so differences between policies that can emanate from the infrastructure, health or labour sectors were not studied. A more comprehensive battery of road safety policies would allow us to see more directly the determinants and correlates of traffic outcomes. This could, for instance, increase our understanding of the extent to which traffic outcomes are better tackled by one road safety policy sector rather than another. In other words, by comparing policies that are led by the infrastructure sector (i.e. formally introducing road safety audits for every new road), to policies that regulate labour issues (i.e. regulating the maximum of

hours that drivers of buses or trucks can drive) one could understand the overall contribution of each policy in traffic outcomes.

Chapters 3 and 4 extend the analysis in a different way, since, by focusing on the case of Chile, I refine the explanations of the interaction between world and local dynamics. This country provides an excellent case for advancing our understanding of the affinity between specific national conditions and global forces as a potential explanation of how and why improvement of traffic outcomes accelerated. By following closely the recommendations made by international organizations, in particular those promoted by the *World report on road traffic injury prevention*, Chile has effected an upgrading of its road safety legislation. In particular, in 2005 Chile introduced a traffic law reform which included measures such as: i) mandatory seat-belt use for all vehicle occupants, ii) introduction of child restraints, iii) day-running lights for motorcycles, iv) banning the use of cell phones while driving, v) stricter requirements to obtain driver licenses to drive light vehicles, and vi) higher fines for driving under the influence of alcohol.

Yet at the same time, Chile is characterized by a strong road infrastructure public program which anticipated the introduction of its traffic law reform, and the operation of highly coordinated traffic enforcement efforts, due to its centralized character. The road safety policy situation of Chile is properly understood when these three elements are taken into account. My analysis suggests that Chile's traffic law is not directly associated with any traffic outcome analyzed. I observe, however, that this legislative change was effective in increasing traffic police enforcement which in turn was effective in decreasing fatalities and severe injuries. Further, this reform, similarly to what I notice in regards to RSAs in OECD countries, is associated with an increase in vehicle crashes, which is a measure less vulnerable to reporting bias.

Different aspects of road users' behavior and police enforcement practices should be studied further in order to understand how traffic law reforms operate. In this regard, the significant association between alcohol consumption patterns of the Chilean population and the introduction of its traffic law introduces a relevant avenue of research: do legal changes affect social conditions that lead to traffic incidents? In terms of the police enforcement practices, are these affected by traffic laws because one can observe a change in the police officers repertoire to control traffic or because police officers renew or improve their commitment towards road safety by increasing their actual number of hours dedicated to execute this task? Do their enforcement practices have an indirect deterrence effect, that is, are road users, who observe traffic police controls more likely to drive more safely?

Road safety infrastructure was associated with a direct reduction by 11% of pedestrian fatalities, and the number of total crashes significantly mediates the effect of road infrastructure investment on the reduction of severe injuries. Further research should examine whether this is related to particular road designs in which the safety of pedestrians was more fully considered (for instance, sidewalks clearly segregated from rural highways, by as much space as available within the right of way). In regards to severity variation, further studies could also analyze whether the implementation of some road designs may have provided drivers with better environmental conditions to avoid crashes, which had an effect on reducing the toll of crashes. These studies can also focus on whether the road infrastructure followed principles of "forgiving road designs." That is, whether existent roads introduce infrastructure elements which are designed to decrease the impact of a crash. For instance the installation of road barriers that avoid the occurrence of multiple roll-overs after a driver loses control of the vehicle or when motorcyclists impact road barriers as result of which they are not decapitated. One ought to explore, therefore,

the conditions under which road safety policy differences operate jointly and separately at the national level.

Last, there are four general implications for the sociological theories I discussed throughout the dissertation. First, sociological studies on policy diffusion should account for the implementation of different policies simultaneously in order to conduct more systematic tests and to eventually further specify the most widely held theories in this field. Doing so will lead to more nuanced and precise specifications of why policies successfully diffused or not and what the borders/limits of these diffusion processes are. More concretely, by having studied the diffusion of different policies, the notion of globalization that assumes convergence patterns across countries faced a more severe examination of its generalizability. While recognizing that the global convergence thesis lacked generalizability, the merit of this conceptualization, however, relies on what Lakatos (1978) has referred to as a 'progressive research programme.' Indeed studies on global diffusion of public policies have followed a progressive path by studying the global convergence thesis. By progress, I simply mean that studies of the globalization of public policies have evolved in the direction of providing better insights for the sociological understanding of convergence outcomes. In other words, one of the unintended characteristics of the global convergence thesis has been its *capacity* to attract defenders, attackers and re-qualifiers, and from those academic dialogues more precise understanding of the limits of global diffusion processes has been gained. This study, after taking as its departure point the general questioning of the global convergence thesis, has provided a unique perspective in which the variation of convergence outcomes was captured. The demonstration of the unevenness of policy diffusion processes suggests the need for further investigations of the mechanisms responsible for such processes at different levels.

Second, sociology has been long interested in studying how nation-states attempt to change their paths of development through planned public policy. In that regard the implementation of public polices has become an important area of sociological inquiry, and policy failure has been one of the most salient aspects that contemporary sociology has identified. The interest of sociology in this research area however should not eclipse other efforts that attempt to understand successful cases of policy implementation. In fact, the contrast between policy failure and policy success is precisely what can allow researchers to improve our understanding of the circumstances that favoring one outcome over another. This is not a simple task, however. Disagreements on specific operationalizations of policies can arise very easily. For instance, if efforts that make policies comparable (among regions, countries, provinces, cities, and even between two different points of time) are only done by oversimplifying what the substantive contents of these policies are, our understanding of whether the analyzed policies were successful or not remains limited. Differences on interpreting outcomes can also emerge even though an agreement on the operationalization of policies has been reached. Policy failure, as the neo-institutionalist literature has suggested, can be explained by several mechanisms (i.e. emergence of contingencies, lack of resources, absence of political will, path-dependency, problems in translating policy, among others), but if these mechanisms cannot be disentangled from each other, then our uncertainty of the mechanisms at play remains unchallenged. Conversely, policy success can be explained by the opposite mechanisms (i.e. absence of contingencies, access to resources, presence of political will, adequate translating processes, among others), but if these mechanisms cannot be differentiated from each other our understanding of policy implementation remains at best hypothetical. The study of mechanisms of failure as well as mechanisms of success is certainly a research area that needs to be tackled more consistently. Having compared

more than one policy on more than one outcome was a necessary first step, but finer analyses of the mechanisms of diffusion are required if more precise policy recommendations are to be advanced.

Third, extending the analysis of the mechanisms of global diffusion was one of the promises of introducing a complete theoretical model in order to understand what their influence was on policy success and failure. In other words, the theoretical link between mechanisms of global diffusion and traffic outcomes is what ultimately allows us to provide criteria to assess road safety policy success or failure more comprehensively. I did not limit the analysis to the factors that explained where and when road safety policies were adopted, because I also examined the effects of RSAs across the world. Indeed countries have been adopting this type of institutions in the past 30 years, and their diffusion was mostly characterized by constructivist and competition mechanisms, since the dissemination of the *World report*, and importer-exporter vehicle countries played a significant role in this process. Nevertheless, these two mechanisms, do not guarantee that traffic fatalities will be successfully tackled across the world. Neither the diffusion activities led by the international community, nor the competition between importer-exporter countries were sufficient conditions to reduce road deaths fatalities globally. This implies that a theoretical link between these outcomes and these global forces was not necessarily at play, and indirectly highlights the importance of national dynamics as the relation between well-developed HS and traffic fatality reduction suggests. However, the international effort led by the WHO does demonstrate an indirect impact in reducing traffic injuries in OECD countries, since RSAs were rapidly diffused in these countries after the dissemination of the *World report*. This, on the other hand, indicates that the theoretical link between global forces and this specific traffic outcome was present. In order to test the generalizability of this theoretical claim, however, it is necessary

to study the effects of globally promoted RSAs on injuries variations in other world regions, or other road safety policies in other traffic outcomes or road users' populations.

Last, it is important to reflect upon an implicit claim behind the discussion of mechanisms of global diffusion and their relation to the concept of legitimacy, as a social dynamic that can speak of the tension between policy failure and success more accurately. The classic Weberian idea that legitimacy facilitates compliance allows us to assume that constructivist mechanisms, unlike coercive ones, could result in successful policy implementation practices. In other words, when countries adopt policies recommended by authorized global institutions, such as the WHO, one could expect observing reductions in traffic fatalities and injuries since countries' incentives may be *genuinely* committed to solve road safety challenges. Nevertheless, as one could observe with regards to traffic fatalities, and assuming that countries' interests were authentic, that did not translate into successful RSAs. Two complementary implications follow from this consideration: the mere presence of a legitimate global actor is not a sufficient condition for reducing death roads across the world if the promoted road safety policy is misspecified. Second, when legitimate global actors promote well-specified policies then one can observe national traffic reductions, as the relation between RSAs and injury variation across OECD countries indicates.

(Road Safety) Policy implications

What lessons do the arguments presented in this dissertation hold for the future in terms of policy diffusion and road safety policy? Trends in traffic outcomes in Europe highlight the potential for changes in the connections between regional approaches and traffic outcomes. It is nearly impossible to read an account of successful measures that does not discuss developed countries with particular attention to European countries. Such discussions (Elvik and Vaa 2004) often depict

these countries as examples in which the downward trend of negative/health-threatening traffic outcomes is a function of precise design and implementation of road safety measures. Other countries that are unsuccessful, another argument would go, have little choice but to adopt these measures to target crashes and their consequences. Otherwise, these countries will continue reporting the highest rates of traffic fatalities and injuries. There are a number of handbooks and guidelines based on such arguments which summarize both what measures are the most effective ones and how to implement them. But these valuable guidelines naturally omit some of the processes behind the design, implementation and diffusion of these measures.

In terms of the diffusion of policies, the European case illustrates the existence of several research networks which have facilitated a permanent scientific dialogue to examine more rigorously the efficacy of road safety measures in different countries for this continent. The creation of the European Transport Safety Council, which has brought together more than 200 transport safety experts and organizes a conference every year since 1993, has made the dialogue between researches and with national government representatives more fluid. The existence of an institution of this type in other regions, such as Africa or Latin America and the Caribbean, could foster research that better responds to these realities as well as open possibilities of research innovation for the realm of road safety. Regional organizations such as the Pan American Health Organization, the Economic Commission for Latin America and the Caribbean, the Economic Commission for Africa, or the Regional Office for Africa of the World Health Organization are all relevant institutions, but their mandates are not designed to meet what is required to sustain scientific dialogue among road safety experts. A regional road safety organization could provide better evidence to policymakers of these regions since research would be focused on specific road safety challenges that are related to local circumstances rather than to developed countries. This does

not imply that the aforementioned guidelines would have to be discarded because they were designed for other contexts but rather that one must make the necessary efforts to adapt them to local circumstances. This type of organization would also create conditions for researchers to be in constant contact with each other, which would increase the chance of disseminating research projects and policies within these regions. As the case of the European Transport Safety Council illustrates, formal interactions with national road safety authorities in these regions would permit assessing different types of measures, including controversial ones. This aspect ultimately favours more independent policymaking processes. Lastly, if these organizations were introduced in the aforementioned regions, the potential dialogue among regions would also be fostered, and therefore road safety diffusion and, most importantly, knowledge development around the globe would be greatly advanced.

Regarding the successful diffusion of RSAs to Africa and Latin America and the Caribbean, it would be important to assess two aspects of these institutions in order to confirm whether this type of institution requires substantive changes to improve traffic outcomes in countries of these two regions. First, to identify countries which have standardized datasets with traffic injuries information in order to test to what extent the OECD experience can be generalizable. Second, to carry out analysis that assesses the mechanisms which these institutions are implementing in order to identify to what extent they have been successful in targeting traffic outcomes. As in the case of Chile, carrying out studies which trace and assess some of the institutional mechanisms at play can inform us of why certain policies may be either effective or ineffective. This is also relevant because so far across the world close to 120 RSAs have been created and by identifying more precisely when, how and why these institutions fail or meet their objectives non-RSA

countries can have better information on whether adopting such an agency is a reasonable option to follow.

The last implication is in regards to the idea of a multi-sectorial approach. My findings suggest that a combination of different policies in aspects such as enforcement, trauma care services, and infrastructure lead to successful outcomes. Investment in road infrastructure can decrease severities and pedestrian fatalities, police enforcement can decrease passengers' and drivers' fatalities, HSs are associated with targeting any type of road user fatalities, and lastly RSAs with target traffic injuries. The policy implication is clear: a combination of policies in different realms is a necessary condition to tackle road traffic fatalities and injuries, and therefore any attempt that introduces a type of silver bullet approach is likely to fail or at the very best to be short lived. Focusing exclusively on police enforcement will not produce the required changes to improve road infrastructure, vehicle safety standards or crash victims' rehabilitation, or targeting only vehicle technology will not necessarily deal with how to protect vulnerable road users. Moreover, implicit in the multi-sectorial approach is the notion of coordination, that is, whether different measures are introduced in different stages, target different populations, or aim at changing different behaviors. But it also implies that design, implementation and evaluation are carried out by different sectors, not limited to government spheres but also, by private and civil society efforts. The challenge is not necessarily diffusing the multi-sectorial approach globally, but rather how the policy coordination is *really* done. And this challenge remains an open question for both policymakers and road safety researchers.

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Glossary

AAUTPWH: Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be fitted and/or be used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions

AIC: Akaike information criterion

ATL: Advanced Trauma Life Support

BIC: Bayesian information criterion

ChRL: Child Restraint Legislation

DRL: Day-time Running Lights

GDP: Gross Domestic Product

HS: Health Systems

IMF: International Monetary Fund

IRTAD: International Road Traffic and Accident Database

LR: Likelihood-ratio

NHTSA: National Highway Traffic Safety Administration

OECD: Organisation for Economic Co-operation and Development

OLS: Ordinary Least Squares

RMSEA: Root Mean Square Error of Approximation

RRE: Robust Random Effects

RSA: Road Safety Agency

SEM: Structural Equation Models

UN: United Nations

WB: World Bank

WHO: World Health Organization

WTO: World Trade Organization

Appendix 1

Table A1 Distribution of Importer vehicle country, Importer-exporter vehicle country and Exporter vehicle country by years 1996 and 2012

Country	1996	2012
Afghanistan	Importer vehicle country	Importer vehicle country
Albania	Importer-exporter vehicle country	Importer-exporter vehicle country
Angola	Importer vehicle country	Importer vehicle country
Argentina	Importer-exporter vehicle country	Importer-exporter vehicle country
Armenia	Importer vehicle country	Importer-exporter vehicle country
Australia	Importer-exporter vehicle country	Importer-exporter vehicle country
Austria	Importer-exporter vehicle country	Importer-exporter vehicle country
Azerbaijan	Importer vehicle country	Importer-exporter vehicle country
Bahamas	Importer vehicle country	Importer-exporter vehicle country
Bahrain	Importer vehicle country	Importer vehicle country
Bangladesh	Importer vehicle country	Importer vehicle country
Barbados	Importer vehicle country	Importer-exporter vehicle country
Belarus	Importer vehicle country	Importer-exporter vehicle country
Belgium	Exporter vehicle country	Exporter vehicle country
Belize	Importer vehicle country	Importer vehicle country
Benin	Importer vehicle country	Importer vehicle country
Bhutan	Importer vehicle country	Importer vehicle country
Bolivia (Plurinational State of)	Importer vehicle country	Importer vehicle country
Bosnia and Herzegovina	Importer vehicle country	Importer-exporter vehicle country
Botswana	Importer vehicle country	Importer-exporter vehicle country
Brazil	Importer vehicle country	Importer-exporter vehicle country
Brunei Darussalam	Importer vehicle country	Importer-exporter vehicle country
Bulgaria	Importer-exporter vehicle country	Importer-exporter vehicle country
Burkina Faso	Importer vehicle country	Importer vehicle country
Burundi	Importer vehicle country	Importer-exporter vehicle country
Côte d'Ivoire	Importer vehicle country	Importer-exporter vehicle country
Cabo Verde	Importer vehicle country	Importer vehicle country
Cambodia	Importer vehicle country	Importer-exporter vehicle country
Cameroon	Importer vehicle country	Importer-exporter vehicle country
Canada	Exporter vehicle country	Exporter vehicle country
Central African Republic	Importer vehicle country	Importer vehicle country
Chad	Importer vehicle country	Importer vehicle country
Chile	Importer vehicle country	Importer-exporter vehicle country
China	Importer-exporter vehicle country	Importer-exporter vehicle country
Colombia	Importer-exporter vehicle country	Importer-exporter vehicle country
Comoros	Importer vehicle country	Importer vehicle country
Congo	Importer vehicle country	Importer vehicle country
Cook Islands	Importer vehicle country	Importer vehicle country

Costa Rica	Importer vehicle country	Importer-exporter vehicle country
Croatia	Importer vehicle country	Importer-exporter vehicle country
Cuba	Importer vehicle country	Importer vehicle country
Cyprus	Importer-exporter vehicle country	Importer-exporter vehicle country
Czech Republic	Exporter vehicle country	Exporter vehicle country
Democratic People's Republic of Korea	Importer vehicle country	Importer vehicle country
Democratic Republic of the Congo	Importer vehicle country	Importer vehicle country
Denmark	Importer-exporter vehicle country	Importer-exporter vehicle country
Dominica	Importer vehicle country	Importer-exporter vehicle country
Dominican Republic	Importer vehicle country	Importer-exporter vehicle country
Ecuador	Importer-exporter vehicle country	Importer-exporter vehicle country
Egypt	Importer vehicle country	Importer-exporter vehicle country
El Salvador	Importer vehicle country	Importer-exporter vehicle country
Equatorial Guinea	Importer vehicle country	Importer vehicle country
Estonia	Importer-exporter vehicle country	Importer-exporter vehicle country
Ethiopia	Importer vehicle country	Importer-exporter vehicle country
Fiji	Importer vehicle country	Importer-exporter vehicle country
Finland	Importer-exporter vehicle country	Importer-exporter vehicle country
France	Importer-exporter vehicle country	Importer-exporter vehicle country
Gabon	Importer vehicle country	Importer vehicle country
Gambia	Importer-exporter vehicle country	Importer-exporter vehicle country
Georgia	Importer vehicle country	Importer-exporter vehicle country
Germany	Exporter vehicle country	Exporter vehicle country
Ghana	Importer vehicle country	Importer-exporter vehicle country
Greece	Importer-exporter vehicle country	Importer-exporter vehicle country
Guatemala	Importer vehicle country	Importer-exporter vehicle country
Guinea	Importer vehicle country	Importer vehicle country
Guinea-Bissau	Importer vehicle country	Importer vehicle country
Guyana	Importer vehicle country	Importer-exporter vehicle country
Honduras	Importer vehicle country	Importer-exporter vehicle country
Hungary	Importer-exporter vehicle country	Exporter vehicle country
Iceland	Importer vehicle country	Importer-exporter vehicle country
India	Exporter vehicle country	Exporter vehicle country
Indonesia	Importer-exporter vehicle country	Importer-exporter vehicle country
Iran (Islamic Republic of)	Importer vehicle country	Importer vehicle country
Iraq	Importer vehicle country	Importer vehicle country
Ireland	Importer-exporter vehicle country	Importer-exporter vehicle country
Israel	Importer-exporter vehicle country	Importer-exporter vehicle country
Italy	Importer-exporter vehicle country	Importer-exporter vehicle country
Jamaica	Importer vehicle country	Importer-exporter vehicle country
Japan	Exporter vehicle country	Exporter vehicle country
Jordan	Importer vehicle country	Importer-exporter vehicle country
Kazakhstan	Importer vehicle country	Importer-exporter vehicle country

Kenya	Importer vehicle country	Importer vehicle country
Kiribati	Importer vehicle country	Importer-exporter vehicle country
Kuwait	Importer vehicle country	Importer vehicle country
Kyrgyzstan	Importer vehicle country	Importer-exporter vehicle country
Lao People's Democratic Republic	Importer vehicle country	Importer vehicle country
Latvia	Importer vehicle country	Importer-exporter vehicle country
Lebanon	Importer vehicle country	Importer-exporter vehicle country
Lesotho	Importer vehicle country	Importer vehicle country
Liberia	Importer vehicle country	Importer vehicle country
Lithuania	Importer vehicle country	Importer-exporter vehicle country
Luxembourg	Exporter vehicle country	Importer-exporter vehicle country
Madagascar	Importer-exporter vehicle country	Importer-exporter vehicle country
Malawi	Exporter vehicle country	Importer vehicle country
Malaysia	Importer vehicle country	Importer-exporter vehicle country
Maldives	Importer vehicle country	Importer vehicle country
Mali	Importer vehicle country	Importer-exporter vehicle country
Malta	Importer-exporter vehicle country	Importer-exporter vehicle country
Marshall Islands	Importer vehicle country	Importer vehicle country
Mauritania	Importer vehicle country	Importer vehicle country
Mauritius	Importer vehicle country	Importer-exporter vehicle country
Mexico	Exporter vehicle country	Exporter vehicle country
Micronesia (Federated States of)	Importer vehicle country	Importer vehicle country
Mongolia	Importer vehicle country	Importer vehicle country
Montenegro	Importer vehicle country	Importer-exporter vehicle country
Morocco	Importer vehicle country	Importer-exporter vehicle country
Mozambique	Importer vehicle country	Importer-exporter vehicle country
Myanmar	Importer vehicle country	Importer vehicle country
Namibia	Importer vehicle country	Importer-exporter vehicle country
Nepal	Importer vehicle country	Importer vehicle country
Netherlands	Importer-exporter vehicle country	Importer-exporter vehicle country
New Zealand	Importer-exporter vehicle country	Importer-exporter vehicle country
Nicaragua	Importer vehicle country	Importer-exporter vehicle country
Niger	Importer vehicle country	Importer-exporter vehicle country
Nigeria	Importer vehicle country	Importer-exporter vehicle country
Niue	Importer vehicle country	Importer vehicle country
Norway	Importer-exporter vehicle country	Importer-exporter vehicle country
Oman	Importer vehicle country	Importer vehicle country
Pakistan	Importer vehicle country	Importer-exporter vehicle country
Palau	Importer vehicle country	Importer-exporter vehicle country
Panama	Importer vehicle country	Importer vehicle country
Papua New Guinea	Importer vehicle country	Importer-exporter vehicle country
Paraguay	Importer vehicle country	Importer-exporter vehicle country
Peru	Importer vehicle country	Importer-exporter vehicle country

Philippines	Importer vehicle country	Importer-exporter vehicle country
Poland	Importer-exporter vehicle country	Exporter vehicle country
Portugal	Importer-exporter vehicle country	Exporter vehicle country
Qatar	Importer vehicle country	Importer-exporter vehicle country
Republic of Korea	Exporter vehicle country	Exporter vehicle country
Republic of Moldova	Importer vehicle country	Importer-exporter vehicle country
Romania	Importer vehicle country	Exporter vehicle country
Russian Federation	Importer vehicle country	Importer-exporter vehicle country
Rwanda	Importer vehicle country	Importer-exporter vehicle country
Saint Kitts and Nevis	Importer vehicle country	Importer vehicle country
Saint Lucia	Importer vehicle country	Importer vehicle country
Saint Vincent and the Grenadines	Importer vehicle country	Importer-exporter vehicle country
Samoa	Importer vehicle country	Importer-exporter vehicle country
San Marino	Importer vehicle country	Importer vehicle country
Sao Tome and Principe	Importer vehicle country	Importer-exporter vehicle country
Saudi Arabia	Importer vehicle country	Importer-exporter vehicle country
Senegal	Importer-exporter vehicle country	Importer-exporter vehicle country
Serbia	Importer vehicle country	Importer-exporter vehicle country
Seychelles	Importer vehicle country	Importer vehicle country
Sierra Leone	Importer vehicle country	Importer vehicle country
Singapore	Importer vehicle country	Importer-exporter vehicle country
Slovakia	Importer vehicle country	Exporter vehicle country
Slovenia	Exporter vehicle country	Exporter vehicle country
Solomon Islands	Importer vehicle country	Importer vehicle country
South Africa	Importer vehicle country	Importer-exporter vehicle country
Spain	Exporter vehicle country	Exporter vehicle country
Sri Lanka	Importer vehicle country	Importer-exporter vehicle country
Sudan	Importer vehicle country	Importer-exporter vehicle country
Suriname	Importer vehicle country	Importer vehicle country
Swaziland	Importer vehicle country	Importer vehicle country
Sweden	Exporter vehicle country	Importer-exporter vehicle country
Switzerland	Importer-exporter vehicle country	Importer-exporter vehicle country
Syrian Arab Republic	Importer vehicle country	Importer vehicle country
Taiwan	Importer vehicle country	Importer vehicle country
Tajikistan	Importer vehicle country	Importer vehicle country
Thailand	Importer vehicle country	Exporter vehicle country
The former Yugoslav Republic of Macedonia	Importer-exporter vehicle country	Importer-exporter vehicle country
Timor-Leste	Importer vehicle country	Importer vehicle country
Togo	Importer vehicle country	Importer-exporter vehicle country
Tonga	Importer vehicle country	Importer-exporter vehicle country
Trinidad and Tobago	Importer vehicle country	Importer vehicle country
Tunisia	Importer vehicle country	Importer-exporter vehicle country

Turkey	Importer-exporter vehicle country	Importer-exporter vehicle country
Uganda	Importer-exporter vehicle country	Importer-exporter vehicle country
Ukraine	Importer vehicle country	Importer-exporter vehicle country
United Arab Emirates	Importer vehicle country	Importer vehicle country
United Kingdom	Importer-exporter vehicle country	Importer-exporter vehicle country
United Republic of Tanzania	Importer vehicle country	Importer-exporter vehicle country
United States of America	Importer-exporter vehicle country	Importer-exporter vehicle country
Uruguay	Importer vehicle country	Importer-exporter vehicle country
Uzbekistan	Importer vehicle country	Importer vehicle country
Vanuatu	Importer vehicle country	Importer vehicle country
Venezuela (Bolivarian Republic of)	Importer-exporter vehicle country	Importer vehicle country
Viet Nam	Importer vehicle country	Importer-exporter vehicle country
Yemen	Importer vehicle country	Importer-exporter vehicle country
Zambia	Importer vehicle country	Importer-exporter vehicle country
Zimbabwe	Importer vehicle country	Importer-exporter vehicle country

Source: United Nations Commodity Trade Statistics Database (2014)

Appendix 2

Table A2 'Two-Stage Least-Squares Analyses with Instrumental Variables' for the effect of Road Safety Agency on traffic injuries in OECD countries

	Traffic injuries		
	(Model 1)	**(Model 2)**	**(Model 3)**
Presence of RSA	0.032 (0.025)		
Years of RSA		-0.000 (0.001)	0.002 (0.002)
Years of RSA squared			**-0.000**** **(0.000)**
Health expenditure	0.001 (0.006)	-0.002 (0.006)	**0.003*** **(0.006)**
Health expenditure squared			
Traffic injuries (lagged)	**0.838***** **(0.027)**	**0.842***** **(0.026)**	**0.832***** **(0.026)**
Traffic severity (lagged)			
GDP per capita (ln)	-0.286† (0.159)	-0.253 (0.157)	**-0.397**** **(0.179)**
GDP per capita (ln) squared	0.014† (0.008)	0.012 (0.008)	**0.019**** **(0.008)**
Unemployment	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)
Alcohol consumption (ln)	**-0.085*** **(0.040)**	**-0.095*** **(0.038)**	**-0.074†** **(0.039)**
Urban population	**-0.005*** **(0.002)**	**-0.007*** **(0.002)**	**-0.005†** **(0.002)**
Population (ln)	**-0.246†** **(0.149)**	-0.174 (0.138)	**-0.312*** **(0.151)**
Constant	**6.935*** **(2.933)**	**5.781*** **(2.844)**	**8.643**** **(3.125)**
Years fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
N (country-year observations)	460	460	460
N (countries)	29	29	29
R^2 overall	0.431	0.618	0.151
ρ	0.980	0.971	0.992
Wald X^2	3450000	3840000	3870000
Df	25	25	27

Note: Standard errors in parentheses.
All 'Road safety agency' variables are instrumented using GDP; Urban population; three cubic splines; country's relative position in the automobile exporting-importing market; and fixed effects for time.
Traffic severity events are traffic fatalities divided by the sum up of traffic injuries and traffic fatalities.
†<.1; *p < .05; **p < .01; ***p < .001 (two-tailed tests).

Appendix 3

Chile's Traffic law reform

While this the traffic law reform of 2005 is indeed a very complex legal instrument, since it regulated various dimensions of traffic, not all linked to traffic safety, here we present a summary with some of the most important norms associated to the regulation of road users' risky behavior.

Table A3 Summary of Chile's traffic law refomr

Norm	Description	Article	Sanction
Introduction of child restraints	Drivers will be responsible of installing child restrains for children under 4 years old who travel with them. Taxi drivers are excepted to follow this norm	79.10	0,2 – 0,5 MUT*
Seat belts for all passengers	Passengers, of rear and front seat must wear seat-belts at all times. Passengers who ride with a Taxi driver will be held responsible for wearing their seat-belts.	79.10	1 -1,5 MUT
Seat belts for scholar buses	Scholar buses must have seat belts for every passenger, and seat-belt use will be mandatory in 2007 onwards	79.10	1 -1,5 MUT
Cell phone restriction	Drivers of any type of vehicle cannot use cell phone devices when they are driving.	36	1 -1,5 MUT
Helmets for motorcyclist and passengers	Motorcyclists and passengers of motorcyclist must wear helmets at all times	84	0,5- 1 MUT
Day running lights for motorcycles	Any type of motorcycle must have day-running lights	72	1 -1,5 MUT
Regulation of road intersections visibility	It is forbidden to installing on sidewalks, plazas, roadsides, in at least 20 meters from the intersection of projected imaginary lines from the edge of the pavement, kiosks, booths, posters, propaganda or vegetation, which impede drivers' and pedestrians' visibility.	97	8-16 MUT
Driving under the influence (DUI) of alcohol (0,5 – 0,1mlg)**	If a DUI driver has not caused any harm	196c	1-5 MUT Suspension of driver license for 1 month

	If a DUI driver is involved in crash in which there were individuals with minor injuries	196c	1-5 MUT Suspension of driver license from 2 to 4 months
	If a DUI driver is involved in crash in which there were individuals with middle injuries	196c	4-10 MUT OR Prison (1 to 20 days) Suspension of driver license from 2 to 4 months
	If a DUI driver is involved in crash in which there were individuals with injuries	196c	Prison (determined by the Penal Code) Suspension of driver license from 4 to 8 months
	If a DUI driver is involved in crash in which there were individuals with injuries established in the penal code or death	196c	8 – 15 MUT Prison (3 years and 1 day to 5 years) Suspension of driver license to be determined by the judged, which must be between 12 and 24 months.
Requirement to keep driver license	Drivers of light vehicles must take a driving exam every six years	14.5	0.5- 1 MUT
	Professional drivers must take an driving exam every four years	14.5	5 – 10 MUT

*A Monthly Unity Tax (MUT) is a monetary measure that varies monthly. Its current value is US$74.39.

** In Chile a BAC of over 0.1(g/dL) is regulated by two laws “Alcohol Law” and “Penal Law”. These laws were not reformed in 2005.

Appendix 4

Table A4.1 Autocorrelation test for the dependent variables including all variables

Variable	*F (1, 12)*	*p-value*
Traffic fatalities	0.289	0.600
Driver fatalities	6.746	0.023
Passenger fatalities	0.932	0.353
Pedestrian fatalities	0.590	0.457
Severe injuries	0.737	0.118
Number of crashes	4.875	0.047

Table A4.2 Levin–Lin–Chu (2002) test results to determine that the series of the lagged variables is stationary

Variable	*Statistic*	*p-value*
Traffic fatalities	*-7.850*	*0.000*
Driver fatalities	*-10.268*	*0.000*
Passenger fatalities	*-7.164*	*0.000*
Pedestrian fatalities	*-5.555*	*0.000*
Severe injuries	*-3.970*	*0.000*
Number of crashes	*-3.396*	*0.000*
Police enforcement	*-8.392*	*0.000*
Alcohol consumption	*-1.808*	*0.035*

Appendix 5
Equations used for the SEMs

Equations

$$y_{it} = \rho y_{it-1} + CRA_{it} + \eta_i + \varepsilon_{it} \quad (1)$$

Where:

$$CRA_{it} = \rho CRA_{it-1} + ALC_{it} + LAW_{it} + TRT_{it} + RII_{it} + UNE_{it} + OIL_{it} + \eta_i + \varepsilon_{it} \quad (2)$$

and

$$TRT_{it} = \rho TRT_{it-1} + LAW_{it} + \eta_i + \varepsilon_{ity} \quad (3)$$

and

$$ALC_{it} = \rho ALC_{it-1} + LAW_{it} + \eta_i + \varepsilon_{ity} \quad (4)$$

y: *FAT*: Fatality, or
DRI: Drivers-fatality, or
PAS: Passengers-fatality, or
PED: Pedestrians-fatality, or
SEV: Severe injuries

CRA: Crashes
LAW: Traffic law reform
TRT: Traffic tickets
RII: Road infrastructure investment
OIL: Oil price average
ALC: Alcohol consumption
UNE: Unemployment
MAL: Percentage of male population
ρy_{it-1}: *y* Lagged variable
i: region
t: year
η: Region as time invariant-variable
ε_{it}: the random disturbance for the *i*region case at the *t*th time period

Appendix 6

Table A6.1 Road Safety Agencies

Country	Created	Comments	Source	Online address
Afghanistan	No	Lead agency No	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/afghanistan.pdf?ua=1
Albania	Date unknown			
Angola	2013	Cria o Conselho Nacional de Viação e Ordenamento do Trânsito que tem como objectivo propor a participação das diferentes instituições na concepção dos programas e da política de viação e trânsito do Executivo, acompanhar e divulgar as medidas de política de viação e trânsito aprovadas pelo Executivo e promover a realização de acções de natureza preventiva de combate à sinistralidade rodoviária e aprova o seu Regulamento Luanda, aos 5 de Abril de 2013. O Presidente da República, José Eduardo dos Santos.	Government of Angola, Decreto Presidencial n.º 18/13 - Presidente da República, Diário da República Iª Série n.º 69 de 15 de Abril de 2013 (Pág. 906)	http://www.scm.gov.ao/diploma_texto_iframe.php?diplomaID=115908
Argentina	2008	a Agencia Nacional de Seguridad Vial es el organismo encargado de reducir la siniestralidad en la República Argentina. Fue creada el 9 de abril de 2008, a través de la ley 26.363. La Agencia trabaja permanentemente en conjunto, con diferentes organismos involucrados en materia de seguridad vial tales como: la Comisión Nacional de Regulación del Transporte (CNRT), Vialidad Nacional, el Órgano de Control de Concesiones Viales (OCCOVI), las diferentes Fuerzas de Seguridad, ONGs, entidades afines y fundamentalmente la colaboración de todas las provincias.	Government of Argentina, Ley 26.363, Abril 29 de 2008	http://www.seguridadvial.gov.ar/Institucional/misiones-y-funciones http://www.infoleg.gov.ar/infolegInternet/anexos/140000-144999/140098/norma.htm
Armenia	2010	Road Police of the Police of the Republic of Armenia National Road Safety Council of Armenia was established on 30 March, 2010 according to 211-A decree of the Prime Minister of RA. The NRSC has not only received government approval of five-year strategy, but also succeeded in the creation of a board including all government Ministers concerned with road safety issues.	Government of Armenia, Decree 211-A of the Prime Minister of RA, 30 March 2010	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/armenia.pdf?ua=1 http://www.roadsafety.am/council/council.php http://www.roadsafety.am/council/Decree211.pdf
Australia	1997	The Road Safety Council's long term vision is of a road transport system where crashes resulting in death or serious injury are virtually eliminated in WA. The Road Safety Council (the 'Council') was established on 1 February 1997 as a statutory body to coordinate the development and implementation of policy and strategies to improve road safety in Western Australia. Cabinet Minute: Road Safety Administration – Cabinet Decision Sheet 15/01/96.	Government of Australia, Road Safety Council Governance Charter. Available at	http://www.ors.wa.gov.au/Road-Safety-Council http://www.ors.wa.gov.au/Documents/RSC/ors-rsc-governance-charter.aspx
Austria	2006	As a result of the accident Investigation act (unfallunter-	Government	http://www.bmvit.

		suchungsgesetz) which came into force in 2006, bmvit established a Road Safety advisory Council as the forum for decision-makers in matters relating to road safety. the Road Safety advisory Council focuses, in particular, on the preparation, ongoing evaluation and development of road safety programmes for all modes of transport. Its members are made up of the transport spokespersons for the parliamentary political parties, safety experts for all modes of transport and representatives of government ministries, local and regional authorities, automobile clubs, chambers of commerce and industry, trade and labour associations, interest groups and research institutions	of Austria, Road Safety in Austria Annual Report 2012, Federal Ministry for transport, Innovation and technology dept. Iv/St2 – Technology & Road Safety - Austrian Road Safety Fund, Vienna Austria.	gv.at/bmvit/en/service/publications/downloads/roadsafety_report2012.pdf
Azerbaijan	No	Azerbaijan participated in global reports on road safety in 2009 and 2012 (to be published in 2013). The country will also contribute to the upcoming global status report on violence prevention. The Ministry of Health appointed a National Coordinator for the Decade of Action for Road Safety, and the official launch of the Decade took place on 11 May 2011 under WHO leadership. A **road safety network** has also been established.	World Health Organization, Road Safety, Azerbaijan, Available at http://www.euro.who.int/en/countries/azerbaijan/areas-of-work/road-safety Accessed June 26, 2014 World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.euro.who.int/en/countries/azerbaijan/areas-of-work/road-safety http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/azerbaijan.pdf?ua=1
Bahamas	2013	Basic info Founded 3 May 2013 Location Nassau City, New Providence, Bahamas	Information from FB page perhaps not very reliable	https://www.facebook.com/NationalRoadSafety-Committee/info
Bahrain	No	Adopts the General Directorate of Traffic comprehensive strategy based on the use of the latest styles and provide better traffic services to the public and raise the level of traffic safety, we strive to create a spirit of initiative and self-confidence among the members of the traffic police and flexibility in dealing with the public and enjoy the individual the ability to take appropriate action to address the issues of traffic and the development of skills Effective communication with various segments of society, in the framework of the law, and we are working to achieve this through the foundations and principles of the following	Government of Bahrain, Ministry of Interior.	http://www.traffic.gov.bh/about-us/
Bangladesh	1995	The National Road Safety Council (NRSC) was established in 1995 under the auspices of the Ministry of Communications. Initially with support of WB funded road improvement project of RHD	Mahmud, SM Sohel, Md Shamsul Hoque, and Q. A. Shakur. "Road safety research in Bangladesh: constraints	http://www.buet.ac.bd/ari/Personal%20Websites/Sohel/Sohel%20Mahmud%20Web%20page/Publication_%20All%20paper%20and%20abstract%20for%20

			and requirements." The 4th Annual paper meet (APM) and the 1st Civil Engineering Congress, organized by Civil Engineering Division Institution of Engineers, Bangladesh (IEB), Session V: Transportation Engineering-II. 2011.	WEB/International%20Conferences/30b_Full%20Paper_Road%20Safety%20Research.pdf
Barbados	2012	Noting that the island had formally launched the Barbados National Road Safety Council in February 2012, the Chairperson stressed that this did not suggest road safety work was not happening prior to the existence of these entities, but now a more collaborative approach was being introduced to the matter." THE recently launched Barbados National Road Safety Council (BNRSC), through its various committees, is at present working to gather statistical data and information which will prove critical in any strategies embarked upon, to reduce the number of collisions on our roads. The Government of Barbados, through the Ministry of Transport and Works, has given its support to the United Nations Resolution on the "Decade of Action for Road Safety 2011-2020" in an effort to combat the growing trend in road traffic deaths and injuries. In fulfilment of this obligation, the BNRSC was launched in February of this year to pursue five pillars of action established under the UN Resolution, namely Road Traffic Safety, Traffic Safety and Infrastructure, Safe Vehicles and Transport, Road User Behaviour and Post-Crash Care.	Government of Barbados, Road Safety a Priority, 2013	http://www.gisbarbados.gov.bb/plugins/p2_news/printarticle.php?p2_articleid=10079 http://www.barbadosadvocate.com/newsitem.asp?more=local&NewsID=24193
Belarus	Date unknown			
Belgium	2001	In 2001, twobodies were created to take overall responsibility and provide guidance for road safety policy in Belgium; the Inter-Ministerial Committee for Road Safety and the Federal Commission on Road Safety. La sécurité routière relève de la compétence des autorités fédérales. Afin de combattre l'hécatombe routière, le gouvernement fédéral a créé en mai 2001 les Etats Généraux de la Sécurité Routière, qui ont proposé au gouvernement fédéral de fixer comme objectif une réduction de 50% du nombre annuel de tués sur les routes belges pour l'année 2010 par rapport à la moyenne des années 1998, 1999 et 2000. Cinq ans plus tard, grâce aux efforts de tous les intervenants en matière de sécurité routière au niveau fédéral, régional, provincial ou local, des progrès remarquables ont été enregistrés puisque le nombre de tués en 2005 est inférieur de 27,5% à la oyenne 1998-2000, ce qui représente sur la période la meilleure diminution à deux résultats près parmi les pays Européens. Suite aux Etats Généraux de la Sécurité routière de 2001, deux plate-formes de concertation furent créées: la Commission fédérale pour la Sécurité routière et le Comité interministériel pour la Sécurité routière	Fondation d'utilité publique and EuroSafe 2007, PROPOSITION POUR UN PLAN D'ACTION BELGE POUR LA SÉCURITÉ DES ENFANTS. Marc Vandercammen CRIOC. Bruxelles.	http://ec.europa.eu/transport/roadsafety_library/care/doc/profiles/pdf/countryprofile_be_en.pdf http://www.oivo-cri-oc.org/files/fr/3070Plandactionpour-lasecdesenfantsdef.pdf
Belize	2007	National consultations have identified insufficient information on traffic laws and proper driving practices,	Ministry of Natural	http://eprints.eriub.org/52/1/Bz_Repor

		inadequate enforcement and lack of proper traffic and safety signs as major contributors to what is now considered a major catastrophe. It is suggested that the Traffic Department embark on a major public information campaign on traffic laws and proper driving practices, that an improved signage system, using international signs, be installed countrywide, that the number of traffic wardens be substantially increased and that traffic patrols be instituted to enforce traffic laws on all the major roads and highways (2002) This decision was taken as recommended by the Belize National Road Safety Committee	Resources, Enviroment and Industry. Belize National Report To the World Summit On Sustainable Development. 2002 Pérez-Núñez, Ricardo, et al. "Economic impact of fatal and nonfatal road traffic injuries in Belize in 2007." Revista Panamericana de Salud Pública 28.5 (2010): 326-336.	t_on_Sustainable_Development.pdf http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S1020-49892010001100002
Benin	1987	Benin 1987	Assum, Terje (1998) Road Safety in Africa: Appraisal of Road Safety Initiatives in Five African Countries, World Bank (SSATP Working Paper No. 33), February	http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2003/11/21/000160016_20031121155112/Rendered/INDEX/272510ENGLISH01oad0Safety0in0Africa.txt
Bhutan	1999	ROAD SAFETY AND TRANSPORT ACT 1999 1. Act Title: Road Safety and Transport Act 1999. 2. Commencement: The Act comes into operation with effect from 21 July 1999 corresponding to 8th day of the 6th month of Earth Hare Year	Government of Bhutan, Road Safety and Transport Act 1999, July 21, 1999	http://www.rsta.gov.bt/download/rstaact.pdf
Bolivia (Plurinational State of)	2007	Bolivia: Comité Interinstitucional de Seguridad Vial (2007)	Pérez, Gabriel, 2009, Road Safety in Latin America and the Caribbean Countries. UNECE Seminar: Improving global road safety: setting regional and national road traffic casualty reduction targets	http://www.unece.org/fileadmin/DAM/trans/roadsafe/unda/Minsk_Pres12_Perez.pdf
Bosnia and Herzegovina	2010	Agency for Road Safety of the Republic of Srpskaa Only in the Republic of Srpska	World Health Organization. WHO global status report on road safety 2013: sup-	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_pro-

			porting a decade of action. World Health Organization, 2013.	files/bosnia_and_herze-govina.pdf?ua=1
Botswana	1975	Botswana's National Road Safety Committee is arguably one of the most successful in Africa and is very successful in terms of publicity and education initiatives. Established in 1975, it	Jacobs, G., and A. Aeron-Thomas. "Africa Road Safety Review", Final Report." Department of Transportation/Federal Highway Administration, TRL (Transport Research Laboratory) Limited. 2000.	https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/africa_road_safety_review/pdf/entire.pdf
Brazil	2005	Brazil: Comitê Nacional de Saúde, Segurança e Paz no Trânsito (2005)	Pérez, Gabrliel, 2009, Road Safety in Latin America and the Caribbean Countries. UNECE Seminar: Improving global road safety: setting regional and national road traffic casualty reduction targets	http://www.unece.org/fileadmin/DAM/trans/roadsafe/unda/Minsk_Pres12_Perez.pdf
Brunei Darussalam	1977	Introduction / History Brunei Darussalam Road Safety Council was established since 17th November 1977. The purpose is to maintain a highest level of road safety for Brunei Darussalam with the recognition that education plays a key part in maintaining these high standards of safety. The Council have undergo continuous training to be kept informed of new and improved safety standards, legislative changes and international best practices to reduce the incidence of death and serious injuries. Since it's establishment the Council and Committee activities are now much more organised and professional and recognises the need for each individual authority and organisation to understand and respect the role each one has to play. The Council has brought about changes that have seen the number of people killed on our roads each year to reduce.	Government of Brunei, Brunei Road Safety Council.	http://www.bruneiroadsafety.org.bn/index.php?option=com_content&view=article&id=46&Itemid=27 https://www.facebook.com/pages/Brunei-Road-Safety-Council/236770996346274?sk=info http://webcache.googleusercontent.com/search?q=cache:5s-Qfe_ASlwJ:www.bruneiroadsafety.org.bn/index.php%3Foption%3Dcom_content%26view%3Darticle%26id%3D46%26Itemid%3D27+&cd=3&hl=en&ct=clnk&gl=ca
Bulgaria	2002	Established at the Council of Ministers shall be a State –	Government	https://www.mvr.b

		public consultative commission for the issues of the traffic safety; (2) (new – SG 43/02) The commission of para 1 shall: 1. assist the Council of Ministers in taking decisions, connected with the traffic safety on roads; 2. give statements and develop drafts of laws and by-law normative acts, having relation with the traffic safety on roads;	of Bulgaria, Traffic Law SG. 43/26 Apr 2002	g/NR/rdonlyres/8714091D-3F2D-4C6E-9544-90BA1F8D2C9C/0/04_Law_Trafic_EN.pdf
Burkina Faso	2011	Les membres du Conseil national de la Sécurité routière (CNSR) ont été officiellement installés le 26 juillet 2011 par le Premier Ministre Luc Adolphe Road Safety has been included as a core element of the National Policy of Sustainable Development of Burkina Faso. A National Road Safety Policy document has been elaborated: a lead body has been created, the National Council of Road Safety (Conseil National de la Sécurité routière)	Economic Commission for Africa, The Second African Road Safety Conference. Report, Addis Ababa, Ethiopia 2011	http://www.irfnet.ch/files-upload/pdf-files/272607e4561770e59c14f466a9bd0584_The_2nd_African_Road_Safety_Conference_Report.pdf
Burundi	No	Concernant la sécurité routière - Ordonnance ministérielle ORU n°660/206 du 11 septembre 1958 portant règlement de la police de roulage et de la circulation - Décret-loi n°1/18 du 29 juin 1977 instaurant l'assurance obligatoire de la responsabilité civile en matière de véhicules automobile Décret-loi n°1/26 du 26 juin 1980 relatif au permis de conduire - Ordonnance ministérielle n°540/181 du 17 juillet 1980 fixant le montant des redevances dues à l'occasion de la délivrance d'un permis de conduire - Loi n°1/04 du 17 février 2009 portant sur les transports intérieurs routiers (!) - Décret n°100/08 du 13/09/2010 portant sur la structure, le fonctionnement et les missions du Gouvernement de la République du Burundi Article 31 : Le Ministère des Transports, des Travaux Publics et de l'Equipement a pour missions principales de (...)Promouvoir la prévention en matière de sécurité routière en collaboration avec les autres ministères concernés	Gouvernement du Burundi, Plan Stratégique du Ministère de la Sécurité Publique , 2013 Government du Burundi, DECRET N°100/ 323 DU 27 DECEMBRE 2011 PORTANT STRUCTURE, FONCTIONNEMENT ET MISSIONS DU GOUVERNEMENT DE LA REPUBLIQUE DU BURUNDI.	http://www.burundiconference.gov.bi/IMG/pdf/Plan_Strategique_du_Ministere_de_la_Securite_Publique.pdf http://www.presidence.bi/spip.php?article2244
Cote d'Ivoire	1995	(…) Cote d'Ivoire 1995	Assum, Terje (1998) Road Safety in Africa: Appraisal of Road Safety Initiatives in Five African Countries, World Bank (SSATP Working Paper No. 33), February	http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2003/11/21/000160016_20031121155112/Rendered/INDEX/272510ENGLISH01oad0Safety0in0Africa.txt
Cabo Verde	2005	A Direcção-Geral dos Transportes Rodoviários deve assegurar a existência de um registo de infracções, d! scalização do cumprimento das disposições do Código da Estrada e legislação complementar incumbe: a) À Direcção-Geral dos Transportes Rodoviários, por intermédio do seu pessoal técnico ou da polícia, em todas as vias públicas;	Governo du Cabo Verde, Decreto-Legislativo nº /2007 de 11 de Maio	http://www.mai.gov.cv/images/stories/legislacao/DL1-2007_11_Mai.pdf?phpMyAdmin=6f357626be398c3f03af8634274f78df
Cambodia	2005	National Road Safety Committee (legally est.2005)	Pisith VONG,	http://www.grspasi

		tasked with overall coordination of RS in Cambodia. In 2005, the National Road Safety Committee (NRSC) was officially created by the Royal Government of Cambodia Subdecree 77. The NRSC is an inter-ministerial body and is chaired by the Minister of Public Works and Transport. The committee has high level representation from all government ministries most notably Public Works and Transport, Interior, Education, Youth and Sports, and Health. To address the traffic safety issue, the government approved in 2004 a National Road Safety Action Plan, which covers important topics such as road accident data systems, road safety audits, road safety education for children, law enforcement, vehicle inspections, and driver training. The government also established in 2005 a National Road Safety Council with the aim of combining forces of all concerned ministries to create cooperation, collaboration and to facilitate measures to prevent and reduce road traffic accidents to the lowest level.	Country Report on Road Safety Initiatives in CAMBODIA, 2009 Asian Develop-men Bank, 2009 Performance Evaluation Report. Cambodia: Primary Roads Restoration Project.	a.org/pdf/Cambodia.pdf http://www.oecd.org/derec/adb/47145261.pdf
Cameroon	1999	Décret n° 99/724/PM du 25 aout 1999 portant création du comité national de sécurité routière. Le Premier Ministre, Chef du Gouvernement, Vu la Constitution ; Vu la loi n° 96/07 du 08 Avril 1996 portant protection du patrimoine routier national, modifiée par la loi n° 98/11 du 14 Juillet 1998 ; Vu le décret n° 79/341 du 3 Septembre 1979 portant réglementation de la circulation routière, modifié et complété par le décret n° 86/818 du 30 Juin 1986 ; Vu le décret n° 92/089 du 4 Mai 1992 précisant les attributions du Premier Ministre, modifié et complété par le décret n° 95/145 bis du 4 Août 1995. Vu le décret n° 97/205 du 7 Décembre 1997 portant organisation du Gouvernement ; modifié et complété par le décret n° 98/067 du 28 Avril 1998 ; Vu le décret n° 97/206 du 7 Décembre 1997 portant nomination d'un Premier Ministre ; Vu le décret n° 97/207 du 7 Décembre 1997 portant formation du Gouvernement ; Vu le décret n° 98/152 du 24 juillet 1998 portant organisation du Ministère des Transports ; Vu le décret n° 98/162 du 26 Août 1998 fixant les modalités de fonctionnement du Fonds Routier. DECRETE : CHAPITRE I : DES DISPOSITIONS GENERALES Article premier : Il est créé auprès du Ministre chargé des Transports un Comité national de sécurité routière, ci-après désigné le « Comité ».	Government de Cameroon, Décret n° 99/724/PM du 25 aout 1999 portant création du comité national de sécurité routière	http://www.logistiqueconseil.org/Articles/Transport-routier/Comite-securite-routiere.htm
Canada	1995	Minister of Transport The Minister of Transport has responsibility for the administration of the MVSA. The Minister must act in accordance with the legislation and is accountable to Parliament for his or her actions. Transport Canada Motor Vehicle Safety Directorate The Motor Vehicle Safety Directorate is the organization within Transport Canada assigned the tasks of administering the MVSA. The Directorate conducts research, develops, incorporates into regulations, promulgates, and enforces standards, and also carries out safety programs.	Government of Canada, THE Motor Vehicle Safety Act, November 1995	http://www.tc.gc.ca/eng/motorvehiclesafety/tp-tp12957-menu-173.htm#transport
Central African Republic	No	La prise en compte de la sécurité routière dans la conception et la mise œuvre des projets routiers est assurée par	Organisation Mondial Du	http://www.comcec.org/UserFiles/Fil

		la Cellule Environnement et Sécurité Routière de la Direction générale des Routes qui appuie notamment les directions techniques dans 4.114. Selon les autorités, les principales réformes engagées dans le secteur depuis 2007 sont la révision du Code de la route. Le réseau routier compte environ 9 300 km de routes classées (mais pas praticables en toute saison, voir ci-dessous) et 700 km de voies bitumées (soit un taux de revêtement de 7%). L'axe reliant Bangui à Douala (Cameroun), sur lequel transite l'essentiel des importations et exportations de la RCA, n'est bitumé que sur 392 km, pour une distance totale de 138 Décret n° 09.036 du 23 janvier 2009 portant réglementation du transport aérien commercial en RCA. 139 Organisation internationale de l'aviation civile (2013). WT/TPR/S/285 • RCA - 372 - 1 500 km. L'insécurité routière, les tracasseries administratives et le banditisme demeurent les trois préoccupations majeures. Parmi les efforts récents figurent: • le recensement des "points noirs de sécurité" sur les axes routiers prioritaires du pays; • la réactivation de la commission nationale de suspension et de retrait de permis de conduire; • la finalisation de l'étude d'élaboration du plan d'actions de la sécurité routière en RCA assortie d'un plan d'investissement sur financement de la Banque mondiale; **• l'élaboration du projet de loi portant création de l'Agence nationale de sécurité routière en RCA;**	Commerce. EXAMEN DES POLITIQUES COMMERCIALES RAPPORT DU SECRETARIAT PAYS DE LA COMMUNAUTE ECONOMIQUE ET MONETAIRE DE L'AFRIQUE CENTRALE (CEMAC) .WT/TPR/S/285	e/ulastirma/%C3%9CLKE%20RAPORLARI/Chad.pdf http://www.wto.org/french/tratop_f/tpr_f/s285-03_f.pdf
Chad	No	Le Ministère des Infrastructures (MI) pilote la mise en œuvre de la politique du pays en matière de transports. Le MI dispose de plusieurs directions générales dont la Direction Générale des Routes (DGR). Depuis 2005, il a été créé au sein de celle-ci une Cellule Environnement et de Sécurité Routière (CESR)	Republique du Tchad, Ministere des Infrastructures et Equipments, RESEAUX DES TRANSPORTS EN REPUBLIQUE DU TCHAD. 2011	http://www.afdb.org/fileadmin/uploads/afdb/Documents/Environmental-and-Social-Assessments/30776511-EN-TCHAD-RESUME-EIES-KOUMRA-SARH.PDF
Chile	1993	Artículo primero: Créase una Comisión asesora del Presidente de la República, denominada Comisión Nacional de Seguridad de Tránsito, de carácter interministerial, en adelante, la Comisión, cuyos objetivos, composición, organización y funciones se especifican en los artículos siguientes.	Gobierno de Chile, Ministerio de Transportes y Telecomunicaciones. Decreto 223, 27 de Diciembre 1993	http://www.conaset.cl/wp-content/uploads/2013/12/dto_223_22-MAR-1994.pdf
China	2003	Road safety fall under he Ministr of Public Security p 18 In October 2003, the State Coundil founded the Inter-Ministey Joint Conference on Road Traffic Safety which was made up by 15 ministeries and dperamrnets	International Association of Traffic and Safety Sciences, 2002.Changes in Traffic Safety Policies and Regulations in 7 countries (1950-2010)	http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safe-work/documents/policy/wcms_186991.pdf http://www.iatss.or.jp/common/pdf/en/iatss/composition/7CountriesReport_en_Full.pdf
Colombia	2013	Artículo 1. Creación de la Agencia ·Nacional de Seguridad Vial. Créase la Unidad Administrativa Especial	Gobierno de Colombia,	http://wsp.presidencia.gov.co/Normati

		denominada Agencia Nacional de Seguridad Vial (ANSV), entidad descentralizada, del orden nacional, que forma parte de la Rama Ejecutiva, con personería jurídica, autonomía administrativa, financiera y patrimonio propio, adscrita al Ministerio de Transporte	Ley 1702 27 Diciembre 2013 "Por la Cual se Crea la Agencia Nacional de Seguridad Vial y se dictan otras disposiciones"	va/Leyes/Documents/2013/LEY%201702%20DEL%2027%20DE%20DICIEMBRE%20DE%202013.pdf
Comoros	2008	"Je demande aussi à la Direction de la sécurité routière en partenariat avec la Brigade routière de redoubler d'efforts pour prévenir les accidents et assurer, ainsi, la sécurité sur nos routes" Speech from the president Le Ministère des Transports et de l'Aménagement du Territoire, de l'Urbanisme et de l'Habitat assurera la maîtrise d'ouvrage déléguée. Il est composé en son sein d'une Direction Nationale de l'Equipement et de l'Aménagement du Territoire (DNEAT). Cette direction a pour attributions de concevoir, superviser, appuyer et coordonner la mise en œuvre des programmes d'investissements arrêtés par le Gouvernement. Elle est constituée comme suit : · La Direction des Travaux Publics et du Bâtiment ; · La Direction de la Réglementation de la Sécurité routiè		http://www.beit-sa-lam.km/article.php3?id_article=2366 http://ec.europa.eu/euro-peaid/documents/aap/2009/af_aap_2009_com.pdf
Congo	No	Le directeur général des transports terrestres, Placide Mpan, a suggéré, le 17 novembre 2013 à Brazzaville, au département des transports d'aller vers des solutions innovantes en matière de sécurité routière, en mettant prochainement en place, un Comité interministériel, en vue de gagner le pari de la gestion durable de ce domaine sur l'ensemble du territoire national. Cette suggestion a été faite lors d'une conférence de presse animée à l'occasion de la 2ème journée africaine de la sécurité routière, célébrée au plan national sur le thème: «Contrôle Technique des véhicules automobiles, une exigence nationale pour contribuer à l'amélioration de la sécurité routière ». Lead agency Directorate General for Land Transports Globar road safety report 2013	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.journaldebraz-za.com/article.php?aid=3772
Cook Islands	No	Lead agency Ministry of Police	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/cook_islands.pdf?ua=1
Costa Rica	1979	El Consejo de Seguridad Vial es la institución rectora en materia de Seguridad Vial, creado mediante la Ley de Administración Vial, Ley 6324, publicada en el alcance Nº 4 de la Gaceta Nº 97 del 24 de mayo de 1979, como dependencia del Ministerio de Obras Públicas y Transportes el cual tendrá independencia en su funcionamiento administrativo y personalidad jurídica propi	Gobierno de Costa Rica, COSEVI. Quienes Somos	http://www.csv.go.cr/web/cosevi/quienes-somos
Croatia	No	Lead agency No	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Or-	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/croatia.pdf?ua=1

			ganization, 2013.	
Cuba	2010	Articulo 308. Se constitutye una Comision Nacional de Seguridad vial, que en los sucesivo se denomina Comisiona Naiocnal, la cual tiene caracter permanente, esta subordinada al Consejo de Ministros	Gobierno de Cuba, Gaceta Oficial No. 040 Ordinaria de 17 de septiembre de 2010	http://www.cubadebate.cu/wp-content/uploads/2010/10/gacetaoficial-cuba-40-2010-ley109-transito.pdf
Cyprus	2006	The Cyprus Road Safety Council is a national council advising the Ministry of Communications and Works on road safety issues. The Council is chaired by the Minister of Communications and Works and has as its members representatives of all involved authorities in road safety: the Chief of Police, the Attorney General, the Directors of the Departments of Public Works and Road Transport, the General Directors of the Ministry of Health, the Ministry of Education, the Ministry of Finance and the Cyprus Radio Foundation The Road Safety Unit of the Ministry of Communications and Works was established in 2004 and comprises today of the head of the unit, who is a civil engineer with long experience and training in the field of road safety, a traffic engineer and an administrative office	Manoli, Irene (Road Safety Unit Ministry of communications and Works)(2014), Personal Communication edited by Jose Ignacio Nazif	http://www.mcw.gov.cy/mcw/mcw.nsf/mcw18_en/mcw18_en?OpenDocument
Czech Republic	2004	The Czech Governmental Council for Road Safety, which consists of representatives of both governmental and non-governmental bodies and is chaired by the Minister of Transport, is the main co-ordinating body for road safety at government level. The Council was created in 2004 and replaced the co-ordination Council of the Minister of Transport for Road Safety	European Commission, Česká Republika Rioad Safety Country Profile	http://ec.europa.eu/transport/roadsafety_library/care/doc/profiles/pdf/countryprofile_cz_en.pdf
Democratic People's Republic of Korea	No	Lead agency Department of Land Management, Cabinet Eight countries in the Region have a lead agency for road safety, and these are predominantly interministerial committees, apart from Democratic People's Republic of Korea (Cabinet).	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. World Health Organization. Road Safety Status in the WHO Soutn-East Asia Region, 2013. Fact Sheet.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/democratic_peoples_republic_of_korea.pdf?ua=1 http://www.searo.who.int/entity/disabilities_injury_rehabilitation/topics/fact_sheet_road_safety_final.pdf
Democratic Republic of the Congo	Date unknown	To this end, it supervises the activities of the National Road Safety Commission (CNPR) that is responsible for road safety and the implementation of transport regulations		http://siteresources.worldbank.org/INTDEBTDEPT/Resources/468980-1316457581843/CaseStudy_DRC_2_V3.pdf
Denmark	1966	On May 18, 1966 Minister for Justice set one Road Safety Commission, tasked partly to clarify the traffic safety problems and to make proposals for a determined and systematic efforts against the growing number of traffic accidents. After the Road Safety Commission, 1966 from December 1983 to August 1985 had been quiet, was 3 December 1985 submitted a proposal for a parliamentary resolution on the establishment of a new - and expanded - Road	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Or-	http://www.faerdselssikkerhedskommissionen.dk/

		Safety Commission. The motion was referred for further treatment in the Legal Affairs Committee. On 3 June 1986 the Minister of Justice to reduce the Road Safety Commission, as we know it today, consisting of representatives from political parties, authorities and organizations as well as of fixed experts. Den 18. maj 1966 nedsatte justitsministeren en Færdselssikkerhedskommission, der havde til opgave dels at klarlægge trafiksikkerhedens problemer, dels at fremkomme med forslag til en beslutsom og systematisk indsats mod det voksende antal trafikulykker. Efter at Færdselssikkerhedskommissionen af 1966 i perioden fra december 1983 til august 1985 havde ligget stille, blev der den 3. december 1985 fremsat et forslag til folketingsbeslutning om nedsættelse af en ny – og udvidet – Færdselssikkerhedskommission. Beslutningsforslaget blev henvist til videre behandling i Folketingets Retsudvalg. Den 3. juni 1986 besluttede justitsministeren at nedsætte Færdselssikkerhedskommissionen, som vi kender den i dag, bestående af repræsentanter fra politiske partier, myndigheder og organisationer såvel som af faste sagkyndige.	ganization, 2013.	
Dominica	No	Transport board	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/dominica.pdf?ua=1
Dominican Republic	No	Lead agency No	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/dominican_republic.pdf?ua=1
Ecuador	2011	La Agencia Nacional de Regulación y Control del Transporte Terrestre, Tránsito y Seguridad Vial, es el ente encargado de la regulación, planificación y control del transporte terrestre, tránsito y seguridad vial en el territorio nacional, en el ámbito de sus competencias, con sujeción a las políticas emanadas del Ministerio del Sector; así como del control del tránsito en las vías de la red estatal-troncales nacionales, en coordinación con los GAD'S y tendrá su domicilio en el Distrito Metropolitano de Quito. La Agencia Nacional de Regulación y Control del Transporte Terrestre, Tránsito y Seguridad Vial es una entidad autónoma de derecho público, con personería jurídica, jurisdicción nacional, presupuesto, patrimonio y régimen administrativo y financiero propios	Gobierno de Ecuador, Ley Organica Reformatoria a la Ley Organica de Transporte Terrestre, Transito y Seguridad Vial, 22 de Marzo 2011	http://www.soatecuador.com/wp-content/uploads/2012/06/ley-de-transito.pdf
Egypt	2003	The presence of the National Road Safety Board (NRSB) can be interpreted as a vital sign of road safety awareness at authority level in Egypt. The NRSB was established in 2003, according to Ministerial Decree no 13426/2003 ("Establishing	European Union. The EU-Twinning Expertise for Enhancing	http://www.svpt.uni-wuppertal.de/fileadmin/bauing/svpt/Publikati

		the National Road Safety Board").	Road Safety in Egypt Decade of Action on the way to Vision Zero in Egypt. Twinning Project Number EG08/AA/TP 13 Germany / Austria / Egypt 2008 – 2011	onen/The_Twinning_Expertise_for_Enhanc-ing_Road_Safety_in_Egypt_01.pdf
El Salvador	2005	Desde el año 2005 su misión es desarrollar el Plan Estratégico de Seguridad Vial de El Salvador 2004 – 2009, con el objetivo de reducir los índices de accidentalidad vial en el país, priorizando las responsabilidades entre las instituciones miembros del comité en la ejecución de acciones y evaluación de resultados. El Salvador tiene desde 2005 el Comité nacional de seguridad vial con la función de desarrollar el Plan estratégico de seguridad vial de El Salvador 2004-2009. Dicho plan es multidisciplinario y con establecimiento de objetivos. Se contempla la reeducación de conductores como un elemento fundamental para lograr una mejora de la seguridad vial mediante la corrección de los comportamientos no adecuados de los conductores. Sin embargo, no ontempla la incorporación de criterios de seguridad vial en el diseño de nueva infraestructura, lo que constituye uno de los principales desafíos para los próximos planes.	Nazif, José Ignacio, and Gabriel Pérez. "La necesidad de establecer medidas coordinadas para la reducción de siniestros viales en América Latina y el Caribe." Boletín FAL (2009).	http://www.iadb.org/es/temas/transporte/guia-bid-de-seguridad-vial/conasevi-comite-nacional-de-seguridad-vial-el-salvador,4662.html
Equatorial Guinea	Date unknown			
Estonia	1992	Enactment of the Government 10.06.92 No 170: Confirmation of the Statute of the Traffic Commission of the Government of the Republic of Estonia. The Traffic Commission is a permanent consulting and coordinating organ of the Government. Its main task is to collaborate on the development of traffic management policy, to guarantee traffic safety, to improve traffic conditions and vehicle movement without disturbances and to decrease environmental damage caused by traffic. The Road Safety Committee of the Government of the Republic of Estonia	Economic Commission for Europe. National Legal Instruments on Road Safety. Working Party on Road Traffic Safety. 2000	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/estonia.pdf?ua=1 http://www.unece.org/fileadmin/DAM/trans/main/wp1/wp1fdoc/wp1-73e.pdf
Ethiopia	2011	Ethiopia, previously renowned to have one of the highest road fatality rates in the world, has taken several steps to improve the situation in recent years but has a long way to go. A National Road Safety Council (NRSC) was established by Act of Parliament in 2011 within the Ministry of Transport, to spearhead and facilitate road safety improvements on a federal level.	World Bank, Africa Trasnport Policy Program. Road safety lead agencies in Cameroon, Ethiopia and Zambia.	http://www4.worldbank.org/afr/ssatp/activity2-1.aspx?id=2
Fiji	1994-2010	In 1992, as part of efforts to establish an NRSC, discussions were held with the insurance industry and Commissioner of Insurance. Agreement was reached that as part of the next review of premiums, a "voluntary" levy of about 10 percent of third party motor insurance premiums would be passed over to the proposed NRSC To dissolve the National Road Safety Council and merge it with the Land Transport Authority The National Road Safety Council Act 1994 is repealed	Asian Development Bank, Road Safety Guidelines for the Asian and Pacific Region. 2003. Manila, Philippnies Government of Fiji, Land Transport Amendment	http://www.adb.org/sites/default/files/road-safety-guidelines.pdf http://www.fiji.gov.fj/getattachment/07136e9d-64aa-4385-bd5d-a7368b619916/Decree-No-41---Land-Transport-(Amendment)-Decree-2.aspx

			Decree 2010 Decre N 41 of 2010	
Finland	1974	Liikenneturva as an association governed by public law and established by a government decree began its operations at the start of 1974. Operations started as early as 1929 when Liikennekulttuurikomitea was found. After that the operations were named such as Talja and Liikenneturva ry.	Larsen L, Vavakos V and Zaidel D. Comparison and analysis of traffic enforcement chains across EU Member States and in relation to EU policies. SIXTH FRAMEWORK PROGRAMME Priority 1.6 Sustainable Development, Global Change and Ecosystem 1.6.2: Sustainable Surface Transport. Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006), 2008	https://liikenneturva.fi/en/liikenneturva/history http://www.vtt.fi/files/sites/pepper/pepper_d6_wp1.pdf
France	1972 and then 2001	Depuis le décret du 5 juillet 1972, instituant le Comité interministériel à la sécurité routière et le délégué interministériel à la sécurité routière, la politique de sécurité routière de l'Etat privilégie l'action interministérielle. Décret n°2001-784 du 28 août 2001 portant création du Conseil national de la sécurité routière et modifiant le décret n° 75-360 du 15 mai 1975 relatif au comité interministériel de la sécurité routière.	Gouvernement du France, La politique de la route et de sécurité routière jusqu'en 2005, Les acteurs,	http://www.vie-publique.fr/politiques-publiques/politique-route-securite-routiere/acteurs/#Les_organismes_rattachés_au_Premier_ministre
Gabon	Date unknown			
Gambia	2009	The Gambia government is in the process of establishing a national road safety commission, and as such it will collaborate with the relevant regional commissions of the UN, WHO and local stakeholders to facilitate this process. So it was not formed beacuase the WHO report of 2009 notices that the lead agency is the "National Roads Authority" and then in 2013 "Ministry of Works, Construction and Infrastructure" There is a presentation in 2013 that suggests that road safety agency is not established "The Gambia National Roads Authority moves to be a Lead Agency in road safety"	World Health Organization, The Gambia observed second anniversary of UN Road Safety Week. Health Matters. Electronic Bulleting of World Health Or-	http://www.afro.who.int/en/downloads/doc_download/1308-health-matters-30-april-2008-the-gambia-observed-second-anniversary-of-un-road-safety-week.html http://www.ssatp.org/sites/ssatp/files/publica-

			ganization of the Gambia, April 2008. Ramoni, LInstitutional Road Safety Management; The West African Experience. West African Road Safety Organization	tions/HTML/Conference-en-ces/Dakar13/Presentations/Dec-10/Dec%2010-PM-Lateef%20Ramoni-EN.pdf http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/gambia.pdf?ua=1
Georgia	No	Both reports from WHO have diffeent names for the lead agency 2013 "Georgian Transport and Communication Policy Development Commission" and for 2009 "Transport Commission"	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/georgia.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/georgia.pdf?ua=1
Germany	1969	The German Federal Ministry for Transport, Housing and Building (BMVBW) is responsible for the implementation and evaluation of the road safety programme. The German Road Safety Council was founded in 1969. Objective The objective of this organisation is to support the measures that aim at improving traffic safety of all road users. DVR co-ordinates all wide range of activities of its members, develops programmes and continuously adapts them to new challenges and new research findings. One of DVR's pivotal tasks is that of bundling the efforts of all parties involved in road safety in order to achieve joint and efficient action (co-ordinating function). DVR strongly supports positions aiming to save lives and avoid severe injuries and does so particularly when dealing with representatives from politics, the social sectors, the media, as well as institutions at Federal or European level, and other national and international institutions.	European Commission, Deutschland Road Safety Country Profile Available at German Road Safety Council (DVR) http://www.dvr.de/dvr/aufbau/kurzdarstellung_20.htm	http://ec.europa.eu/transport/roadsafety_library/care/doc/profiles/pdf/countryprofile_de_en.pdf http://www.dvr.de/dvr/aufbau/kurzdarstellung_20.htm
Ghana	1999	A National Road Safety Committee was established in 1974 under the Ministry of Transport and Communications. It was handicapped by the lack of a full-time executive although the situation should be changed now due to recent legislation which upgraded it to a National Road Safety Commission. A review of the activities undertaken by the previous Committee and the constraints it faced, including a lack of funding, were presented at the 1997 Third African Road Safety Congress Consequently, the Government established the National Road Safety Commission (NRSC) in 1999 to develop programmes to promote road safety in the country and to coordinate policies related to safety on the roads	Jacobs, G., and A. Aeron-Thomas. "Africa Road Safety Review", Final Report." Department of Transportation/Federal Highway Administration, TRL (Transport Research Laboratory) Limited. 2000.	https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/africa_road_safety_review/pdf/entire.pdf file:///C:/Users/jnazif/Downloads/20.pdf

			Government of Ghana, Auditor--General. Performance Audit Rerpot of the Auditor--Generla on Road Safety in Ghana, Ref No.AG.01/109/Vol.2/29, 2010	
Greece	1999	The authority responsible for the coordination of the implementation of the National Road Safety Strategic Plan is the Inter-ministerial Committee on Road Safety (ICRF) established in 1999, which monitors and coordinates all efforts, decisions and actions for the improvement of road safety at national level	European Commission, Elláda Road Safety Country Profile	http://ec.europa.eu/transport/roadsafety_library/care/doc/profiles/pdf/countryprofile_gr_en.pdf
Guatemala	No	World report 2009 "Ministry of the Interior, Department of Transit of the National Civil Police" World report 2013 "Ministry of the Interior, Department of Transit of the National Civil Police"	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/guatamala.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/guatemala.pdf?ua=1
Guinea	No	Global report 2013 National Program on Trauma Care	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/guinea.pdf
Guinea-Bissau	Date unknown			
Guyana	2009	Report 2009 lead agency Ministry of Home Affairs Table 1 Presence of leading agency Guyana Guyana National Road Safety Council Report 2013 Lead agency Guyana National Road Safety Council	Nazif, José Ignacio, and Gabriel Pérez. "La necesidad de establecer medidas coordinadas para la reducción de siniestros viales en América Latina y el Caribe." Boletín FAL (2009). World Health Organization. WHO global status report on road safety	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/guyana.pdf?ua=1 http://www.cepal.org/transporte/noticias/bolfall/3/38363/fal_275_roadsafety_lac.pdf http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/guyana.pdf?ua=1

			2013: supporting a decade of action. World Health Organization, 2013.	
Honduras	2006	ARTÍCULO 5.- Créase el Consejo Nacional de Seguridad Vial (CNSV), en adelante denominado el Consejo, quien tendrá a su cargo la función de asesora en la preparación de los planes, proyectos y programas tendentes a reducir los accidentes de tránsito	Gobierno de Honduras Decretp 205-2005 Ley de Transito. Publicado en el diario oficial "La Gaceta" Nº 30, 892 de 3 de enero 2006 entrando en vigencia el 23 de enero del mismo año	http://direccionnacionaldetransito.gob.hn/artisistem/images/macimages/files/PDF/otros-pdf/Ley-de-Transito.pdf
Hungary	No	No lead agency	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/hungary.pdf?ua=1
Iceland	2002	The Road Traffic Directorate was established on October 1st 2002. However, it's predecessor in terms of traffic safety, The Icelandic Traffic Council, was established in 1966.	Personal communication with Gunnar Geir Gunnarsson Director of Road Traffic division, Icelandic Transport Authority	
India	No	The legislation was introduced in May 2010 and sought to create separate national and state boards to address road safety issues, including road engineering, awareness campaigns to reduce accidents on national and state highways, and coordination with different agencies on safety issues. Two years after it was rejected by a parliamentary standing committee with a stinging critique, the Ministry of Road Transport and Highways has decided to give another push to National Road Safety and Traffic Management Board Bill in the current financial year	Gopalakrishnan, S. "A Public Health Perspective of Road Traffic Accidents." Journal of family medicine and primary care 1.2 (2012): 144.	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3893966/
Indonesia	No	Lead agency No	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/indonesia.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_st

				atus/country_profiles/indonesia.pdf?ua=1 http://www.iatss.or.jp/common/pdf/en/iatss/composition/7CountriesReport_en_Full.pdf
Iran (Islamic Republic of)	2006	In 2009 the name is Headquarter for Transportation and Fuel Management In 2013 Agency Road Safety Commission The growth of road accidents has developed into a major transportation challenge. The Government and its agencies are now taking actions to remedy this poor performance. In the Third FYDP, covering **2000-05**, the promotion of road safety officially became a strategic policy, and the emphasis was put on the creation of the National Road Safety Commission (NRSC) as the policy maker and coordinator of road safety programs and initiatives in the country	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. World Bank, Road Safety Project Region Middle East and North Africa Sector , 2006. Washington, D.C. 20433.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/iran.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/iran.pdf
Iraq	Date unknown			
Ireland	2006	The Road Safety Authority is a statutory agency established under the Road Safety Authority Act 2006 and vested on 1 September 2006.	MacCarthaigh, Muiris, and Paul Turpin. "When, Why and How to Set Up a State Agency: The Case of the Road Safety Authority." Irish Journal of Public Policy 3.2 (2011).	http://publish.ucc.ie/ijpp/2011/02/MacCarthaigh/02/en
Israel	2006	In 2006, the government of Israel adopted the Public Committee Report for the Preparation of a Multiyear National Plan for Road Safety (the Sheinin Report), and the Knesset passed .The 2006 National Road Safety Authority Law (Temporary Order The decision to establish an independent national road safety authority signifies the Israeli, government's acknowledgement of the fact that road safety requires in-depth attention and that a practical strategic plan is necessary to improve the safety of road users in. Israel – drivers, passengers, pedestrians, motorcyclists and bicyclists	Government of Israel, Israel National Road Safety Authority. Establishment of the NRSA. Jerusalem 96510 Government of Israel, Israel National Road Safety Authority. About	http://www.rsa.gov.il/meidamechkar/knasim/Documents/HOVERET_ZEHUT_english11.pdf
Italy	2000	La Consulta è prevista nei Principi generali del Piano Nazionale per la sicurezza stradale, adottato con Decreto del Ministro dei Lavori Pubblici del 29 marzo 2000.	Republica Italiana, CONSULTA NAZIONALE PER LA SICUREZZA STRADALE	http://www.cnel.it/329?shadow_organiconsiliari=45430

Jamaica	1993	Jamaica: National Road Safety Council (1993) El National Road Safety Council (Consejo Nacional de Seguridad Vial) fue establecido por Ley parlamentaria en 1993 como una organización sin fines de lucro constituida por los grupos interesados de sector público y privado, con el objeto de facilitar la implantación de una política Nacional de Seguridad Vial, mediante:	Inter-American Development Bank, 2014, Creación del national road safety council (Jamaica)	http://www.unece.org/fileadmin/DAM/trans/roadsafe/unda/Minsk_Pres12_Perez.pdf http://www.iadb.org/es/temas/transporte/guia-bid-de-seguridad-vial/creacion-del-national-road-safety-council-jamaica,4646.html
Japan	1970	Traffic Safety Policies Law (Law No. 110 of June 1, 1970) (Excerpt) Date of Final Revision: December 22, 1999 (Law No. 160) Chapter II Traffic Safety Policy Council, etc. (Establishment of the Central Traffic Safety Policy Council and Work Administered) Article 14 The Central Traffic Safety Policy Council shall be established inside the Cabinet Office. 2. The Central Traffic Safety Policy Council shall administer the work stipulated in the following Items: i. Create the Fundamental Traffic Safety Program and promote its implementation, ii. In addition to the preceding Item, the Central Traffic Safety Policy Council shall discuss the planning of important comprehensive measures concerning traffic safety issues and promote the implementation of such measures. (Organization, etc. of the Central Traffic Safety Policy Council) Under the provisions of the Traffic Safety Polcies Basica Act, which passed into law in 1970, the Prime Minister's Office established a Central Traffic Safety Policy Counciel, which was later moved to the jurisdiction of the Cabinet Office in 2001	International Association of Traffic and Safety Sciences, 2002.Changes in Traffic Safety Policies and Regulations in 7 countries (1950-2010)	http://japan.kantei.go.jp/policy/index/traffic/konkyo_e.html http://www.iatss.or.jp/common/pdf/en/iatss/composition/7CountriesReport_en_07Japan.pdf
Jordan	At least from 2007	Lead agency Road Safety Council		http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/jordan.pdf?ua=1
Kazakhstan		Road Police Department	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. World Bank, Road Safety Project Region Middle East and North Africa Sector, 2006. Washington, D.C. 20433.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/kazakhstan.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/kazakhstan.pdf?ua=1
Kenya	1981-1983 and then 2013	1981-1983 Formation of National Road Safety Council (NRSC) the collapsed in the 1980s Following the collapse of the National Road Safety		http://www.ssatp.org/sites/ssatp/files/publica-

		Council in the mid eighties, there has been very little formal co-ordination between various ministries, agencies and the private sector involved in road safety (2005). In 2009 the World report recognizes the Ministry of Transport and then in 2013 the world report re-recognizes the National Road Safety Council		tions/ConferenceWorkshopMaterials/RoadSafetyConf2007/DayThree/Magolo_RoadSafetyPoliciesKenya.pdf file:///C:/Users/jnazif/Downloads/roadsafetyaction-plan.pdf http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/kenya.pdf?ua=1
Kiribati	2003	The Kiribati Road Safety Taskforce, (KRST) was established in 2003 when an MoU was signed by the member organisations, namely, Ministry of Health, Kiribati Police Service, Ministry of Works, Ministry of Education, Teinainano Urban Council, (TUC), Betio Town Council, (BTC), Broadcasting and Publications Authority, Kiribati Red Cross Society and additional members	Republic of Kiribate DEVELOPMENT OF NATIONAL ROAD SAFETY STRATEGY DRIVER TRAINING & LICENSING. Report produced by Mike Goodge	http://www.mfed.gov.ki/wp-content/uploads/2014/02/Kiribati-Road-Rehabilitation-Project_-Road-Safety-National-Road-Safety-Strategy-Driver-Training-Licesing-Report_-November-2013.pdf
Kuwait	No	In 2009 the wrold report explicitly states that there was not a Road Safety lead agency. In 2013 a project between UNDP and the General Directorate of Traffic Project is established however, there is no mention of a road saety agency per se	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. World Bank, Road Safety Project Region Middle East and North Africa Sector, 2006. Washington, D.C. 20433.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/kuwait.pdf?ua=1 http://www.undp.org/content/dam/kuwait/documents/projectdocuments/Human%20Development/General%20Directorate%20of%20Traffic%20Project%202009-2013%20SIGNED.pdf http://www.moi.gov.kw/gdt/TrafficLaw.pdf
Kyrgyzstan	Date unknown			
Lao People's Democratic Republic	2007	A new emphasis is to be given to road safety through the establishment of a Counicl and Committee for Road Safety to be supported bu a newle developed Road Traffic Safety Fund (World Bank report 2007) In 2007, the National Road Safety Committee with a supporting secretariat in the Department of Transport was established as well as the Road Safety Fund.	World Bank, Paving the Road For Better Capacity. Prepared by Ken Gwilliams, June 2007. The World Bank Lao PDR Country Office Patouxay	http://siteresources.worldbank.org/INTLAOPRD/Resources/293582-1218682481138/paving_the_road_for_better_capacity_in_lao_pdr.pdf http://www.gms-cbta.org/uploads/resources/15/attachment/transport-assessment-

			Nehru Road	Lao.pdf
Latvia	1991	CSDD celebrated its 20th anniversary in November 2011. The company was established soon after the regaining of independence of Latvia. First years were quite difficult as providing of many services had to be established in a short time and number of urgent road traffic safety issues had to be solved. However, the company has been founded on values and principles which ensured success up to now, and, we are certain, will ensure it in the future. CSDD has become modern, socially responsible company which is open to new technologies, innovations, and is client and society oriented.	Government of Latvia, Road Traffic Safety Directorate (Latvian abbreviation – CSDD), About	http://www.csdd.lv/eng/about_csdd/
Lebanon	No	No lead agency	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	
Lesotho	2003	The department which was formed in 2003 is responsible for coordination of activities concerning road safety. The main objective of the department is to reduce the rapid increase in road accidents and to create public and political awareness, and improve institutional capacity and knowledge of road safety interventions.	Government of Lesotho, Ministry of Public Works and Transport, Road Safety Department, Available at http://www.gov.ls/mopwt/mpt-web/departments/road_safety.php Accessed June 27, 2014	http://www.gov.ls/mopwt/mptweb/departments/road_safety.php
Liberia	No	No lead agency	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	
Lithuania	2000	1.The Government shall form the State policy in the sphere of safeguarding of traffic safety. The Commission of Traffic Safety (hereinafter, Commission) operating continuously, shall control the implementation of this policy. 2.The Government shall establish a Commission comprised of the entities of State administration and municipal administration, and representatives of non-government organisations and approve its regulations and the State programme of traffic safety. When necessary, other natural persons or legal persons and representatives of enterprises not having the rights of a legal person, may also be included in this Commission.	Government of Lithuania, Law on Road Traffic Safety. October 12, 2000. No. VIII – 2043	http://policy.mofcom.gov.cn/GlobalLaw/english/flaw!fetch.action?id=4A20A7B5-55B8-425A-8FD1-5EDDB71BF177&pager.pageNo=1#c2ia1i
Luxembourg	No	The Ministry of Sustainable Development and Infrastructure (Department of Transport): overall responsibility for road safety	European Commission. Transport.	http://safetyknowssys.swov.nl/Countries/Country_overvi

			Road Safety Country Overview-Luxembourg. Available at http://safetyknowsys.swov.nl/Countries/Country_overviews/DaCoTA%20country%20overview_LU_def.pdf Accessed June 27 2014	ews/DaCoTA%20country%20overview_LU_def.pdf
Madagascar	2010 or 2013	In 1999 the law LOI N° 98-026 states that Les dispositions relatives à la sécurité routière, à la police générale de la route et au contrôle de l'intégrité de l'emprise d'une route provinciale et communale sont prises dans des textes réglementaires. 2009 Lead agency No	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. Government du Madagascar Loi n° 98-026 du 20 janvier 1999 portant refonte de la Charte routière	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/madagascar.pdf?ua=1 http://www.justice.gov.mg/wp-content/uploads/textes/1TEXTES%20NATIONAUX/DROIT%20PUBLIC/Transports/ttf/L98-026.pdf
Malawi	1978	The National Road Safety Council of Malawi was established by an Act of Parliament on 15th September, 1978 under Chapter 69.09 of the Laws of Malawi. The mandate of the Council is to promote road safety in Malawi, to promote and provide financial support for research in the field of road safety and report to the Minister of Transport on all road safety issues. The Council undertakes the dissemination of road safety publicity materials and education to all road user groups in Malawi in a bid to reduce road traffic accidents.	Automobile Club of Malawi, National Road Safety Council of Malawi.	http://www.aamalawi.com/national-road-safety-council-of-malawi.html
Malaysia	2004	JKJR was established on 15 September 2004 as a leader in road safety advocacy to increase the awareness of road users on the importance of road safety and ultimately reduce deaths and injuries caused by road traffic crashes. JKJR is also the Secretariat to the Road Safety Council of Malaysia (NGO).	Government of Malaysia. Road Safety Department of Malaysia. Background. Available at http://www.jkjr.gov.my/en/mengenai_kami/latarbelakang.html accessed June 27 2014	http://www.jkjr.gov.my/en/mengenai_kami/latarbelakang.html
Maldives	No	In 2009 the Police in 2013 the Transport Authority	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/maldives.pdf?ua=1 http://www.who.int/violence_injury_

			Health Organization, 2013.	prevention/road_safety_status/2013/country_profiles/maldives.pdf?ua=1
Mali	2009	ORDONNANCE N009- O CI 3 IP-RM DU ~9 FEV 2009. PORTANT CREATION DE L'AGENCE NATIONALE DE LA SECURITE ROUTIERE Article le': Il est créé un Etablissement Public National à caractèrc Administratif dénonmlé Agence Nationale de la Sécurité Routière, en abrégé ANASER. Article 2 : L'Agence Nationale de la Sélciirité Routière. a pour mission de promouvoir et renforcer la sécurité routière et de contribuer à l'amélioration des conditions d'exploitation du réseau routier.	Republique du Mali Ordonnace N 09-003, 9 Fev 2009. Portant Creation de L'agence National de la Securite Routiere	http://anasermali.net/index.php/docs-public?download=2:ordonance-n-09-003-du-09-fev-2009-portant-creation-de-l-anaser
Malta	No	Within its different strategies, Transport Malta has one which is Road Safety, which is subdivided into Road Safety Education, Speed management and Road Safety Ranking "The directive sets out four areas of analysis in relation to existing roads and new roads. Network Safety Ranking and Road Safety Inspections are targeted at the existing TEN-T road network whilst Road Safety Impact Assessments and Road Safety Audits are targeted at new TEN-T roads."	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. Transport Malta, Road Safety.	http://www.transport.gov.mt/transport-strategies/road-safety http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/malta.pdf?ua=1
Marshall Islands	No	2009 Lead agency Department of Public Safety 2013 Lead agency Department of Public Safety	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. Transport Malta, Road Safety. Available at http://www.transport.gov.mt/transport-strategies/road-safety Accessed July 27, 2014	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/marshall_islands.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/marshall_islands.pdf?ua=1
Mauritania	Date unknown			
Mauritius	2006	The National Road Safety Council has been set up under section 178A of the Road Traffic Act. The functions of the council are: (a) to advise the Minister on- (i) the introduction of appropriate road safety measures; (ii) appropriate methods to promote the education of road users and the organisation of road safety campaigns;	Ministry of Public Infrastructure, National Development Unit, Land Trasnport and Shipping. National Road Safety	http://publicinfrastructure.gov.mu/English/Land%20Transport%20Division/Board-Council/Pages/National-Road-Safety-

		(iii) proper law enforcement methods, introduction of appropriate legislation and the need for amendment of existing legislation with regard to road safety; (iv) the condition and maintenance of vehicles and on driver training;... The Council was reconstituted under the Chairmanship of Mr Y Abdullatiff in January 2006. The first meeting was held on 20 January and since then the Council is meeting every three weeks.	Council. At http://publicinfrastructure.gov.mu/English/Land%20Transport%20Division/Board-Council/Pages/National-Road-Safety-Council.aspx Accessed June 27 2014	Council.aspx
Mexico	**1987**-1998 then recess and begins again in 2006	Centro Nacional para la Prevención de Siniestros (CENAPRA) (creado en 2002) es la unidad administrativa de la Secretaría de Salud responsable de dirigir la política nacional en materia de prevención de lesiones ocasionadas por siniestros. Dispone de recursos propios. En este contexto, conforme a la información disponible, el 20 de marzo de 1987 se publicó en el Diario Oficial de la Federación el Decreto por el que se crea el Consejo Nacional para la Prevención de Accidentes (CONAPRA), con objeto de proponer y desarrollar las acciones en materia de prevención y control de accidentes a que se refiere el Artículo 163 de la Ley General de Salud. Después de un período de receso en sus actividades, en marzo de 1998 se lleva a efecto un proceso de reinstalación del mismo, renovando y fortaleciendo el Secretario Ejecutivo, con la visión de que con sus acciones se tenga un mayor impacto en la prevención y tratamiento de accidentes, así como en el desarrollo de la legislación e investigación y, el aprovechamiento de una manera más eficiente de los recursos en salud existentes para enfrentar este problema de salud pública. En congruencia con el Plan Nacional de Salud correspondiente y como resultado de las modificaciones hechas al Reglamento Interior de la Secretaría de Salud publicado el 5 de julio de 2001 en el Diario Oficial de la Federación, se crea el Centro Nacional para la Prevención de Accidentes (CENAPRA), con nivel de Dirección General Adjunta dependiente del Centro Nacional de Vigilancia Epidemiológica y Control de Enfermedades (CENAVECE). Como consecuencia de las modificaciones del CENAVECE, el 19 de enero del 2004 a través de la publicación del nuevo Reglamento Interior de la Secretaría de Salud, el CENAPRA cambia de adscripción, conforme al Artículo 28 fracción XIV, por lo que pasa a depender de la Dirección General de Promoción de la Salud (DGPS) y absorbe las funciones que realizaba el Consejo Nacional para la Prevención de Accidentes. Dadas sus atribuciones y con la finalidad de contar con mayor independencia operativa, conforme al Decreto que reforma, adiciona y deroga diversas disposiciones del Reglamento Interior de la Secretaría de Salud, publicado en el D.O.F. el 29 de noviembre de 2006, el CENAPRA se desincorpora del tramo de control de la Dirección General de Promoción de la Salud (DGPS)	Gobierno de Mexico, Secretaria de Salud, Manual de Organizacion especifico de Secretariado Tecnico del Consejo Nacional para la Prevencion de Accidentes. Ciudad de Mexico, Agosto 2012.	http://conapra.salud.gob.mx/Nosotros/manual2012.pdf http://www.iadb.org/es/temas/transporte/guia-bid-de-seguridad-vial/cenapra-centro-nacional-para-la-prevencion-de-accidentes-mexico,4647.html
Micronesia (Federated States of)	No	Lead agency no 2009 Lead agency no 2013	World Health Organization. WHO global status report	http://www.who.int/violence_injury_prevention/road_safety_st

			on road safety 2013: supporting a decade of action. World Health Organization, 2013.	atus/country_profiles/micronesia.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/micronesia.pdf?ua=1
Mongolia	Date unknown			
Montenegro	2010	Lead agency NO (2009) "The Government of Montenegro will form a coordination body for the safety in road traffic in order to coordinate the work of all relevant entities, i.e. authorities competent for a road transportation safety, implementation of the traffic safety policy in Montenegro and monitoring of implementation of the Strategy for improving safety in road traffic for the period 2010 – 2020," (2009) Lead agency Yes 2013	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. Government of Montenegro. Ministry of Interior and Public Administration – Department for administrative internal affairs . 2009. Strategy Road Transport Safety Improvement	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/montenegro.pdf?ua=1 http://www.mup.gov.me/ResourceManager/FileDownload.aspx?rid=41602&rType=2&file=1264511610.doc http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/montenegro.pdf?ua=1
Morocco	1993	MAROC 1993 • Création d'un Comité Interministériel sur la Sécurité Routière, directement relié au Premier Ministre	OECD Statistical Report on Road Accidents 1997. European Conference of Ministers of Transports. ECMT 1998	http://www.oecd-ilibrary.org/docserver/download/7598023e.pdf?expires=1403040176&id=id&accname=ocid195496&checksum=06483317ECAC5A22F1EE1C2706AF9464
Mozambique	1993	Com a introdução da Política de Economia de Mercado que conferiu o inicio da participação do sector privado tanto nacional como estrangeiro nas actividades do Sector, foram criadas várias instituições subordinadas ao MTC, tais como: • Instituto Nacional de Meteorologia – INAM (Decreto nº 30/89, de 10 de Outubro); • Instituto Nacional de Hidrografia e Navegação – INAHINA (Decreto nº 40/89, de 5 de Dezembro); • Instituto Nacional das Comunicações de Moçambique – INCM (Decreto nº 22/92, de 10 de Setembro); **• Instituto Nacional de Viação – INAV (Decreto nº 5/93, de 15 de Abril);**	Ministério dos Transportes e Comunicações, EVOLUÇÃO DA ESTRUTURAÇÃO DO MINISTÉRIO DOS TRANSPORTES E COMUNICAÇÕES.	http://www.mtc.gov.mz/index.php?view=article&catid=24%3Asobre-o-mtc&id=5%3Aministerio-dos-transportes-e-comunicacoes&format=pdf&option=com_content&Itemid=90
Myanmar	No	In 1989, a committee named " Traffic Rules Enforcement	Zaw, Thein Present	http://www.unescap.org/sites/default/

		Supervisory Committee (TRESC) headed by local Authority and membership with concerned departments and organizations was given the authority to handle all road traffic issues. (Key player: Public Works, Health Department, Myanmar Police Force, RTAD, Cities Development Committees, Education Department, Myanmar Insurance etc.) BUT There is no separate reserved budget for road safety. But concerned Departments carried out road safety activities with their own funding. **National Road Safety Committee is needed** to be established for guiding principally and a Dept/Org fully authorized and staffed with proficient personnel for implementing National Road Safety Measures.To introduce Road Safety Audit System To establish Road Safety Research Centre	Situation of Road Safety in Myanmar. Experts Group Meeting for Road Safety Improvement Seoul , Republic of Korea 6-12 May, 2013.	files/2.16.Myanmar.pdf
Namibia	1996	The NRSC is a statutory body that was created in 1996 by section 2 of the National Road Safety Act, Act 9 of 1972. The Act was made applicable to an independent Namibia by virtue of article 140 of the Namibian Constitution. Though semi-autonomous, the NRSC operates at an arm's length from Government. Its day to day administrative and executive duties are undertaken by a Secretariat provided by the Ministry of Works and Transport in terms of section 4 of the enabling Act. Council is funded through a levy on fuel sold for on-road consumption by the Ministry of Mines and Energy. Collected levies, which fluctuate month by month on account of the actual fuel consumption levels, are paid on a monthly basis into the Central Road Safety Fund created by section 15 (1) of the Act.	National Road Safety Council. An Overview of the NRSC.	http://www.nrsc.org.na/about-us/
Nepal	No	Lead agency No 2013 Ministry of Physical Planning and Works, Department of Road 2009	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/nepal.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/nepal.pdf?ua=1
Netherlands	No	Ministry of Transport, Public Works and Water Management Directorate-General Passenger Transport, Road Safety Division The Ministry of Transportis responsible for road safety policy and legislation, although the actual implementation of legislation and policy decisions is decentralised; the provinces draft regional plans in order to support achievement of the national targets. The Ministry of Transport is the organisation with overall responsibility for road safety legislation and responsibility for the provision, operation and maintenance of the highway network (3 200 km). Regional Road Safety Agencies (ROV) have been established since 1994	European Commission, Nederland Road Safety Country Profile	http://ec.europa.eu/transport/roadsafety_library/care/doc/profiles/pdf/countryprofile_nl_en.pdf
New Zealand	1993	Lead agency Ministry of Transport 2009 Lead agency Ministry of Transport 2013 The Land Transport Safety Authority (LTSA) was set up in 1993 as a stand-alone authority responsible for promoting safety in land transport at reasonable cost National Road Safety Committee (NRSC). Chaired by theLTSA to 2004, the NRSC brings together the Chief Executives of the main government stakeholders of the Road Safety to 2010 strategy and is the Minister of	Bliss, Tony, and Jeanne Breen. "Country guidelines for the conduct of road safety management capacity reviews and	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/new_zealand.pdf?ua=1 http://www.who.int/violence_injury_preven-

		Transport's highest-level road safety advisory group. The National Road Safety Committee (NRSC) established in 1993, chaired by the Secretary of Transport, connects the agencies with significant responsibility for road safety, through a Memorandum of Understanding, to work together to achieve the Government's goals for road safety. It is the principal inter-agency forum, made up of the Chief Executives of the key agencies with responsibility for road safety. This forum communicates and coordinates top level strategy between the participating agencies. The core members include the Ministry of Transport, the NZ Transport Agency, NZ Police, the Accident Compensation Corporation (ACC) and Local Government NZ. The Health, Education and Justice Ministries as well as MBIE/Work Safe NZ are associate members. The NRSC meets quarterly and reports to the Minister of Transport.	the specification of lead agency reforms, investment strategies and safe system projects." (2009). World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	tion/road_safety_status/2013/country_profiles/new_zealand.pdf?ua=1 http://www.ki.se/csp/pdf/Publications/WBGRSF_guidelines.pdf
Nicaragua	2003	With regards to Nicaragua, the **National Road Safety and Education Council was created in 2003. It is an autonomous agency, its composition is part public and part private, and it acts in an advisory capacity**. The National Road Safety Strategy covers five years (2005-2010), with a 70% reduction in fatalities established as a target for that period. The controlling authority is the National Police, which also issues driving licenses. This institution is also active in road education and, in cooperation with the Ministry of Education; it is currently involved in the process of changing the respective curriculum	Nazif, José Ignacio, and Gabriel Pérez. "La necesidad de establecer medidas coordinadas para la reducción de siniestros viales en América Latina y el Caribe." Boletín FAL (2009).	http://www.cepal.org/transporte/noticias/bolfall/3/38363/fal_275_roadsafety_lac.pdf
Niger	2011	BILAN DES 3 ANS DE MISE EN OEUVRE DU PROGRAMME DE RENAISSANCE AVRIL 2011 – MARS 2014 En vue de réduire davantage les accidents de la route et promouvoir la sécurité routière, le Gouvernement a adopté la loi portant Code de la route. Dans le cadre de la mise en œuvre de cette loi, un décret sur l'interdiction de l'usage du téléphone portable au volant a été adopté. Le Gouvernement a, en outre, créé l'Agence Nigérienne de la Sécurité Routière (ANISER) et restauré le respect de la réglementation en matière de l'immatriculation des véhicules automobiles	République du Niger. Cabinet du Premier Ministre. Bilan des 2 Ans de Mise en Oeuvre de programme de renaissance. Niamey, Avril 2013.	http://www.gouv.ne/docpdf/BILAN_3ANS_PRN_01_04_2014_Programme_de_Renaissance.pdf
Nigeria	1988	This led to the establishment of a Federal Road Safety Commission (FRSC) in 1998, which has been described as operating a 3 tier system In February 1988, the Federal Government created the Federal Road Safety Commission through Decree No. 45 of the 1988 as amended by Decree 35 of 1992 referred to in the statute books as the FRSC Act cap 141 Laws of the Federation of Nigeria (LFN). Passed by the National Assembly as Federal Road Safety Commission (establishment) Act 2007. The traffic situation before the establishment of the Federal Road Safety Commission in Nigeria could best be described as chaotic, unpredictable and indeed dangerous as it was characterized by unprecedented wave of road traffic accidents with attendant colossal human and material losses. Within this era, public awareness and interest in Road Safety was minimal. There was uncoordinated and haphazard licensing of drivers and vehicles as	Jacobs, G., and A. Aeron-Thomas. "Africa Road Safety Review", Final Report." Department of Transportation/Federal Highway Administration, TRL (Transport Research Laboratory) Limited. 2000.	https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/africa_road_safety_review/pdf/entire.pdf http://frsc.gov.ng/ http://www.uiplus.com/test/frsc/about_history.php

		well as absence of good driving culture. Deliberate policies and concerted effort at enforcing regulations was lacking. Quantitatively, road traffic accidents fatality index as at 1987 was 302 at 16 death per 1,000 vehicles. As a specific response to the Road Safety question, the then Federal Military Government established the Federal Road Safety Commission in 1988 vide Decree 45 of 1988 as amended by Decree 35 of 1992 (FRSC Act Cap 141, Laws of the Federation of Nigeria 1990). The critical mandate of the Commission was accident prevention and loss reduction on all public roads across the country. This paper, is an attempt to x-ray the activities of the Commission vis-a-vis its corporate mandate after 18 years of existence.		
Niue	No	Niue Police	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/niue.pdf?ua=1
Norway	1956	"The main actors behind the plan are the Norwegian Public Roads Administration, the police, the Directorate of Health, the Directorate of Education and Training and the Norwegian Council for Road Safety" Trygg Trafikk is an umbrella organization for the voluntary road safety work and serves as a link between voluntary associations and the road safety authorities. The organization shall due to its statutes promote the best possible road safety for all groups of road-users. Trygg Trafikk is given a special responsibility for promoting traffic education in kindergarten and school, and providing information and knowledge about road safety. Trygg Trafikk was established in 1956 after an initiative from the Ministry of Transport, the Ministry of Education, the Ministry of Justice, the Norwegian Insurance Association and the three motoring clubs. Trafikk consists of a central national administration placed in Oslo, and employed county secretaries in each county.	Norwegian Public Roads Administration. National Plan of Action for Road Traffic Safety.	http://www.vegvesen.no/_attachment/191024/binary/370917?fast_title=National+Plan+of+Action+for+Road+Traffic+Safety+2010%E2%80%932013.pdf http://www.tryggtrafikk.no/om-oss/norwegian-council-for-road-safety/
Oman	Date unknow			
Pakistan	2006	The only known effort to establish a dedicated road safety department was made in 2006 when the National Road Safety Secretariat (NRSS) was created under the auspices of the MOC with the assistance of the World Bank (Government of Pakistan 2007)	Batool, Zahara, Oliver Carsten, and Ann Jopson. "Road safety issues in Pakistan: a case study of Lahore." Transportation planning and technology 35.1 (2012): 31-48.	http://www.chinautc.com/usa/upfile/content/20120607103612454.pdf
Palau	No	Bureau of Public Safety, Ministry of Justice Global report 2013	World Health Organization. WHO global	http://www.who.int/violence_injury_preven-

			status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	tion/road_safety_status/2013/country_profiles/palau.pdf?ua=1
Panama	2006	CONSEJO NACIONAL DE TRÁNSITO Y SEGURIDAD VIAL Artículo 258. El Consejo Nacional de Tránsito y Seguridad Vial se constituye como un organismo consultor y asesor de la Autoridad del Tránsito y Transporte Terrestre, y está integrado por representes de los sectores públicos y privados, y las asociaciones cívicas y gremiales	Republica de Panama, Ministerio de Gobierno y Justicia. Decreto Ejecutivo N 640, 27 de Diciembre 2006	http://www.policia.gob.pa/file_Policia_5.html
Papua New Guinea	1997	In recognising the importance of the growing problem, in 1997, the Government of Papua New Guinea (GoPNG) took the step of creating a National Road Safety Council (NRSC) in order to advise the Minister of Transport on all matters relating to road safety and to coordinate road safety activities to address the growing road safety problem. Since that time, the NRSC has been operational and has undertaken a number of road safety activities and initiatives, particularly around Port Moresby which has the greatest urban population in PNG	National Road Safety Council, (Papua New Guinea), Executive Director's Message.	http://nrscpng.org/aboutus/executivdir/index.html
Paraguay	2009	El origen de lo que hoy llamamos Consejo Nacional de Seguridad Vial, se da con el Plan Nacional de Seguridad Vial aprobado por Decreto N° 560/08 del Poder Ejecutivo de 21 de octubre de 2008, que tuvo su origen en la necesidad de frenar el grave daño social y económico que surgen de los accidentes de tránsito a nivel país. El Consejo Nacional de Seguridad Vial (CNSV) es un cuerpo interministerial que ha sido creado conforme Decreto N° 2117/09 del Poder Ejecutivo del 26 de mayo de 2009.-	Ministerio de Obras Publicas y Comunicaciones. C.N.S.V.	http://www.mopc.gov.py/cnsv-u10
Peru	1996	DECRETO SUPREMO N° 010-96-MTC DECRETA: Artículo 1.- Créase el Consejo Nacional de Seguridad Vial (CNSV), como ente rector encargado de promover y coordinar las acciones vinculadas a la seguridad vial en el Perú, correspondiéndole: a. Proponer metas y objetivos en Seguridad Vial, proponiendo políticas de prevención de accidentes y coordinar la ejecución de planes de acción a mediano y largo plazo. b. Diseñar, impulsar y evaluar la realización de acciones, para la educación vial. c. Promover, organizar eventos tales como cursos, capacitación, estudio sobre prevención de accidentes de tránsito, realizando campañas que promuevan la Seguridad Vial. d. Evaluar y proponer normas legales y reglamentarias que conlleven el mejoramiento de la seguridad vial, así como al cumplimiento de las mismas.	Gobierno de Peru, Decreto Supremo N010-96-MTC. Lima viernes 23 de agosto de 1996	http://www.mtc.gob.pe/cnsv/area_legal/Normas%20Legales/1.-%20DECRETO%20SUPREMO%20N%C2%BA%20010-1996-MTC.pdf
Philippines	1991 or 1997	1991 – Presidential Administrative Order 222 - Creation of the Inter-agency Road Safety Committee (IRSC) ◦ Secretary of Department of Public Works and Highways as Chairman 1997 – Presidential Administrative Order 329 – Creation of National Road Safety Committee (NRSC) ◦ Secretary of Department of Transportation and Communications as Chairman	Lontoc, Annely, Country Report on Road Safety Initiatives in the Philippines. Deparment of Trasnportations and Communications.	http://www.grspasia.org/pdf/Phillipines.pdf
Poland	1993	In the early nineties, Poland established the National	European	http://archive.etsc.

		Road Safety Council (NRSC) as well as Regional Road Safety Councils (RRSC) in all sixteen regions to coordinate road safety efforts of national and regional authorities In Poland since 1993 the Road Safety Council, an inter-ministerial body, assists the Council of Ministers on road safety issues. The National Road Safety Council (NRSC) is chaired by the Infrastructure Minister.	Transport Safety Council, Vulnerable road users in Poland. Available at http://archive.etsc.eu/documents/Fact_Sheet_VOICE_Poland_EN.pdf Accessed June 27, 2014 European Commission, Polska Road Safety Country Profile	eu/documents/Fact_Sheet_VOICE_Poland_EN.pdf http://ec.europa.eu/transport/roadsafety_library/care/doc/profiles/pdf/countryprofile_pl_en.pdf
Portugal	2007	No quadro das orientações definidas pelo Programa de Reestruturação da Administração Central do Estado (PRACE) e dos objectivos do Programa do Governo no tocante à modernização administrativa, à melhoria da qualidade dos serviços públicos com ganhos de eficiência, importa concretizar o esforço de racionalização estrutural consagrado no Decreto-Lei n.º 203/2006, de 27 de Outubro, que aprovou a lei orgânica do Ministério da Administração Interna, avançando na definição dos modelos organizacionais dos serviços que integram a respectiva estrutura. A nova orgânica do Ministério Administração Interna (MAI) contempla a criação, como órgão da Administração Directa do Estado, da Autoridade Nacional da Segurança Rodoviária, adiante designada abreviadamente por ANSR, organismo que concentrará las funções do Ministério no que respeita à prevenção e segurança rodoviárias.	Autoridade Nacional Segurança Rodoviária, Ministério de Administração Interna. Decreto-Lei n.º 77/2007 de 29 de Março	http://www.ansr.pt/Portals/0/aansr/dl_77_2007.pdf
Qatar	2010	The high concern given by the officials of the State for the issue of traffic safety has impelled the Council of Ministers to issue the decree No. 33/2010, ratified by HH the Deputy Emir and Heir Apparent was issued on 22 July 2010, to form the National Committee for Traffic Safety under the chairmanship of the Minister of State for Interior Affairs HE Sheikh Abdullah bin Nasser bin Khalifa Al Thani. The National Committee for Traffic Safety developed this Strategy for enhancing the commitment on traffic safety and to work on reducing the human suffering caused by traffic accidents	State of Qatar, Ministry of Interior. Qatar National Traffic Safety Strategy Launched.	http://www.moi.gov.qa/site/english/news/2013/01/14/27927.html
Republic of Korea	No	Ministry of Land, Transport and Maritime Affairs	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/republic_of_korea.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/republic_of_korea.pdf?ua=1
Republic of Moldova	2009	The Automobile Club of Moldova (ACM) is an NGO created in 1998 with the goal to develop motoring, technical road assistance service and motor tourism. Since 1999, the ACM has been a member of the Alliance Internationale de Tourisme (AIT) and Federation Internationale de l'Automobile (FIA) which includes more than 100 motor clubs and tourist associations around the world.	Easter Alliance for Safe and Sustainable Transport. Moldova. Partner: Automobile Club of	http://www.easst.co.uk/projects/countries/69/Moldova

		EASST's work in Moldova began in 2009 with the launch of a Make Roads Safe Campaign with the ACM, EASST Chairman Lord Dubs, and senior members of the Moldovan government hosted by the World Bank Country Office. This led to the creation of a new National Road Safety Council chaired by the Prime Minister and involving key ministers and the traffic police. The new Council produced a National 5-Year Plan to improve road safety in Moldova. Former President of the ACM, Serghei Diaconu, was appointed Deputy Minister of Internal Affairs in 2013. With Mr. Diaconu, the ACM is working to reduce the number of road deaths in Moldova and improve road safety across the country via a multitude of projects and campaigns. Website: http://www.acm.md/en/default.asp Facebook: Make Roads Safe Moldova Twitter: https://twitter.com/MRSMoldova Key Achievements Launch of Make Roads Safe Campaign (2009) Launch of www.saferoads.md (2009) Establishment of National Road Safety Council (2009)	Moldova (ACM). Available at	
Romania	1995	Council for Road Safety is the advisory body of the Government unincorporated ensuring conception and coordination of nationally based national road safety strategy and national program of priority actions to implement the strategy, activities to improve road safety carried out by the public administration bodies and other institutions and organizations with responsibilities in these areas, and evaluation of public policies on road safety, operating under Government Decision no. 437/1995 on the establishment of the Inter-Ministerial Council for Road Safety, bill amended by Government Decision no. 901 of 20 August 2008. Consiliul Interministerial pentru Siguranţă Rutieră este organul consultativ al Guvernului, fără personalitate juridică, care asigură concepţia de ansamblu şi coordonarea pe plan naţional, pe baza strategiei naţionale de siguranţă rutieră şi a programului naţional de acţiuni prioritare pentru implementarea strategiei, a activităţilor privind îmbunătăţirea siguranţei rutiere, desfăşurate de organele de specialitate ale administraţiei publice şi de alte instituţii şi organizaţii cu atribuţii în aceste domenii, şi evaluarea politicilor publice privind siguranţa rutieră, care funcţionează în baza Hotărârii Guvernului nr. 437/1995 privind înfiinţarea Consiliului Interministerial pentru Siguranţa Rutieră, act normativ modificat prin Hotărârea Guvernului nr. 901 din 20 august 2008.	Consiliul Interministerial pentru Siguranţă Rutieră. Înfiinţare şi organizare.	http://www.cisr.ro/document_65_CISR_pg_0.htm
Russian Federation	2006	In April 2006, a statutory multi-sectoral Government Commission for Road Safety was established and meets quarterly. Membership of the Commission includes high-ranking officials from the Russian Ministry of the Interior, the Russian Transport Ministry, the Russian Ministry for Emergency Situations, the Ministry of Public Health and Social Development, the Ministry of Education and Science, and other stakeholders from among the federal executive authorities, as well as public organisations and associations. The Commission is headed by First Vice-Premier of the Government of the Russian Federation	International Transport Forum, Road Safety Performance. National Peer review: Russian Federation. International Transport Forum 2 rue André Pascal 75775 Paris Cedex 16	http://www.internationaltransport-forum.org/pub/pdf/11Russia.pdf
Rwanda	Date unknown			
Saint Kitts and	No	Lead agency No	World Health	http://www.who.in

Nevis			Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	t/violence_injury_prevention/road_safety_status/2013/country_profiles/saint_kitts_and_nevis.pdf?ua=1
Saint Lucia	No	Ministry of Communications, Works, Transport and Public Utilities Report 2013	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/saint_lucia.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/saint_lucia.pdf?ua=1
Saint Vincent and the Grenadines	No	Royal St. Vincent and The Grenadines Police	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/saint_vincent_and_grenadines.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/saint_vincent_and_the_grenadines.pdf?ua=1
Samoa	2007	Road Safety Committee-(1) The Cabinet may appoint members to a Road Safety Committee to be part of the Ministry and which may include representatives of - (a) the Authority; (b) the Ministry of Education; (c) the Police Service; (d) the Accident Compensation Corporation constituted under the Accident Compensation Act 1989; (e) the Chamber of Commerce; (f) relevant non-government organisations; and (g) any other Ministry, organization or agency which the Minister considers appropriate. (2) The members appointed under subsection (1) shall hold office in accordance with any terms and conditions approved by the Cabinet. (3) Each member of the Road Safety Committee shall be paid from the funds of the Ministry, such remuneration and allowances as are approved by Cabinet from time to time for members of government Boards and Committees	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. Government of Samoa, Act of the Land Transport Autority, 2007	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/samoa.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/samoa.pdf?ua=1 http://samoa.parliament.gov.ws/documents/acts/Land%20Transport%20Authority%20Act%202007%20-%20%20English1.pdf
San Marino	2008	DECRETO DELEGATO 26 maggio 2008 n.81 (Ratifica Decreto Delegato 28 aprile 2008 n.67)	DECRETO DELEGATO 26 maggio	http://www.consiglio grandeegenerale.sm/contents/inst

		Noi Capitani Reggenti la Serenissima Repubblica di San Marino Visto il Decreto Delegato 28 aprile 2007 n.67 “Codice della Strada”, promulgato: Visto l’articolo 1 della Legge 20 marzo 2008 n.51;Art. 5 (Gruppo di lavoro per la sicurezza stradale) È istituito il Gruppo di lavoro per la sicurezza stradale, formato dal Coordinatore del Dipartimento del Territorio, che lo presiede, dal Direttore dell’Azienda Autonoma di Stato di Produzione (in seguito AASP), dai Dirigenti dell’Ufficio Progettazione, dell’Ufficio Registro Automezzi, dell’Ufficio Urbanistica e dai Comandanti delle Forze di Polizia. I componenti del Gruppo possono avvalersi del personale in forza presso i rispettivi Uffici e delegare un proprio dipendente a partecipare ai lavori del Gruppo in loro vece. Il Gruppo ha il compito di curare l’istruzione delle richieste di installazione delle opere e dei dispositivi più opportuni alla moderazione e regolamenta-zione del traffico, attivandosi: - di propria iniziativa, anche sulla base delle relazioni e delle statistiche annuali delle Forze di Polizia; - su proposta delle Giunte di Castello, le quali possono raccogliere e far proprie le istanze dei cittadini; - in accoglimento di quanto previsto all’interno di progetti di iniziativa pubblica e privata convenzionata; - in attuazione delle proposte del Congresso di Stato ai sensi del successivo articolo 6. Il Gruppo ha inoltre la competenza di svolgere funzioni consultive, propositive e formative per quanto riguarda il tema della sicurezza stradale e della circolazione stradale in generale. Per i programmi di educazione stradale nella scuola, il Gruppo è integrato da due rappresentanti degli insegnanti designati dal Segretario di Stato alla Pubblica Istruzione.	2008 n.81 (Ratifica Decreto Delegato 28 aprile 2008 n.67)	an-ce18/files/document/23725leggi_7336.pdf
Sao Tome and Principe	No	Department of Land Transport 2013 and 2009	World Health Organization. WHO global status report on road safety 2013: sup-porting a decade of action. World Health Or-ganization, 2013.	
Saudi Arabia	1977	: Efforts are undertaken through Conferences and Media coverage to promote public awareness of the impact of transport on the environment. Measures taken to educate the public on traffic safety include: the National Traffic Safety Committee (NTSC); School Educational programmes; the Ministry of Interior educational programmes; Media coverage; etc The National Committee for Traffic Safety: is one of the national committees created by KACST (King Abdulaziz City for Science and Technology, established in 1977) in line with its objectives, to address the problems & obsta-cles hindering development plans related to traffic safety.		http://www.un.org/esa/agenda21/natlinfo/wssd/saudiarabia.pdf
Senegal	No	Senegal The French Ministry for Cooperation and the French	World Health Organization. WHO global	http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/pub

		Ministry of Transport collaborated on the implementation of a road safety policy in West Africa. The French had already introduced a system of sharing information within the sub-region and were using pilot projects to demonstrate best practice. Starting with a national road safety seminar in 1993, Senegal was chosen for the road safety pilot project. Locally identified priorities included improving the crash data system, driver training, awareness raising activities, and vehicle inspection. The activities undertaken for each of these areas were described in a presentation (Bodon, 1997). After developing a standardised report form, a training programme in crash reporting procedures was undertaken in the 10 regional capitals. Two local computer analysts were trained in France and computerisation of crash data begun in 1994. (World Bank report of 2000) Then the world report of road safety 2009 and 2013 state that the lead agency is Directorate of Land Transport	status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. Jacobs, G., and A. Aeron-Thomas. "Africa Road Safety Review", Final Report." Department of Transportation/Federal Highway Administration, TRL (Transport Research Laboratory) Limited. 2000.	lications/africa_road_safety_review/pdf/entire.pdf http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/senegal.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/senegal.pdf?ua=1
Serbia	2009	In order to establish the road traffic safety system the purpose of which will primarily be prevention, and removal, of consequences incurred during the operation of that kind of traffic, the Government of the Republic of Serbia founded the Road Traffic Safety Agency on December 2009, which practically commenced its work on September 1, 2010	Republic of Serbia. Road Traffic Safety Agency of the Republic of Serbia.	http://abs.gov.rs/eng/index-e.html
Seychelles	No	Seychelles Land Transport Agency in 2000 and 2013	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/seychelles.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/seychelles.pdf?ua=1
Sierra Leone	1997	The Road Transport Authority will promote road safety through th establishment and dissemniation of a code of conduc to be nons as the Highway Cod for drivers	Government of Sierra Leone, The Road Trasnport Authority Act, 1996, Dated 9th January, 1997	http://www.sierra-leone.org/Laws/1996-4.pdf http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/sierra_leone.pdf?ua=1
Singapore	No	We are responsible for planning, operating, and maintaining Singapore's land transport infrastructure and systems. Our aim is to place our users—motorists and public transport commuters—at the heart of our transport system. Land Transport Authority/Traffic Police reports 2009 and 2013	Singapore Government. Land Transport and Authority. About LTA.	http://www.lta.gov.sg/content/ltaweb/en/about-lta.html Land Transport Authority/Traffic Police
Slovakia	2004	Road safety is treated as a problem for the entire society	European	http://ec.europa.eu/

		in Slovakia, linked to the economic and social areas of the state. In December 2004, the Government of the Slovak Republic approved the Decree of the Government of the Slovak Republic no. 1162 initiated by the Ministry of Transport, Post and Telecommunications. By this decree, the Council of the Government of the Slovak Republic for Road Safety (CGSRRS) was established. The Council members are as follows	Commission, Slovensko Road Safety Country Profile	transport/roadsafety_library/care/doc/pro-files/pdf/countryprofile_sk_en.pdf
Slovenia	1972	The Slovene Road Safety Council has been an independent organisation since 1972, although the first organised preventive actions already started in 1954	European Commission, Slovenija Road Safety Country Profile	http://ec.europa.eu/transport/roadsafety_library/care/doc/pro-files/pdf/countryprofile_si_en.pdf
Solomon Islands	No	Ministry of Infrastructure and Development 2013 Police – Traffic Division 2009	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/solomon_islands.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/solomon_islands.pdf?ua=1
South Africa	1999	The Road Traffic Management Corporation (RTMC) commenced its operations in April 2005 with the objective of pooling powers and resources to eliminate the fragmentation of responsibilities for all aspects of road traffic management across the various levels of government in South Africa,The RTMC was established in terms of Section 3 of the Road Traffic Management Corporation Act, No. 20 of 1999, for co-operative and coordinated strategic planning, regulation, facilitation and law enforcement in respect of road traffic matters by the national, provincial and local spheres of government.	Government of South Africa, Road Traffic Management Corporation. Welcome.	http://www.rtmc.co.za/
Spain	1990	El Organismo Autónomo Jefatura Central de Tráfico tiene personalidad jurídica pública diferenciada, patrimonio y tesorería propios, autonomía de gestión y plena capacidad jurídica y de obrar, y dentro de su esfera de competencias, le corresponden las potestades administrativas precisas para el cumplimiento de sus fines, en los términos previstos en las normas. Se rige por las disposiciones contenidas en el Real Decreto Legislativo 339/1990, de 2 de marzo, por el que se aprueba el texto articulado de la Ley sobre Tráfico, Circulación de Vehículos a Motor y Seguridad Vial y por todas las normas que resulten de aplicación, sin perjuicio de las peculiaridades contenidas en las normas que se vayan publicando. Está adscrito al Ministerio del Interior (antes denominado Gobernación), el cual podrá ejercer el control de eficacia en los términos previstos en el artículo 51 de la Ley 6/1997	Arroyo Gonzalez-Pintado, Milagro. La jefatura central de tráfico: origen, evolución y situación actual. La dirección general de tráfico y su organización periférica. Estructura orgánica y funcional. Las relaciones institucionales del organismo. ESTT - OEP 2013 Grupo de Materias Comunes de Movilidad Segura, 2011, Madrid Espanna.	https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CBwQFjAA&url=http%3A%2F%2Fwww.dgt.es%2FGalerias%2Fla-dgt%2Fempleo-publico%2Foposiciones%2Fdoc%2F2013%2FTEMA_14_Parte_Comun_mov_segura69g.doc&ei=Vs2tU97dB4qvyAT6soKQDw&usg=AFQjCNGqdSkNxMHZuKjJPWqd6owxq-_waQ&sig2=EXmZJTvWZjQSY-t3EOPKEw

Sri Lanka	1998	National Council for Road Safety operates under Ministry of Transport through Motor Traffic amendment act No. 05 of 1998. The only state institution which operates under the theme of creating a secured road system for all is the National Council for Road Safety. This council consists of a chairman and a team of 17 representatives from government and non-government institutions.	Government of Sri Lanka. National Council for Road Safety. Introduction.	http://www.gic.gov.lk/gic/index.php?option=com_info&id=653&task=info&lang=en
Sudan	2010 or after	2009 no and then in 2013 Council Coordination for Road Safety	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/sudan.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/sudan.pdf?ua=1
Suriname	No	Both reports indicate NO existence of Leading agency	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/suriname.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/suriname.pdf?ua=1
Swaziland	1983	The Composition of the Road Safety Stakeholders Alliance The Swaziland Road Safety Council is the lead agency on road safety matters in the country, as mandated by the Road Safety Act of 1983. The other organizations were singled out through an intensive study of the road accident statistics and hence the accident causes and likely interventions. On that note, the following organizations are founding members of the Safety Stakeholders Alliance: Sincephetelo Motor vehicle Accidents Fund (post crash care), Royal Swaziland Police Service (enforcement), Council of Smoking and Drugs –COSAD (drugs and alcohol abuse and driving), Swaziland Beverages (Drink Driving), Ministry of Health and Social Welfare	Sincephetelo. Motror Vehicle Accidents Fund. Stakeholders Alliance. Available at	http://www.mva.org.sz/alliance.htm
Sweden	1968	A stand agency for road safety was created in 1968--the National Road Safety Office--which had coordination responsibility but little executive responsibility and resource (Bliss) Traffic safety in Sweden has been highly influenced by the change from left to right hand traffic in September 1967. The period around the change meant a re-education of the population, a re-construction of the road network and new vehicles for public transport. Traffic safety had a high priority. The change was combined with very low speed limits and afterwards a lot of trials with different speed limit systems were tested and resulted in the speed limits of 50, 70, 90, and 110 km/h in 1972. The differentiated speed limit system has been about the same up to today. A new authority, the Road Safety Office, was established in **1968.** Motor vehicle inspection has been mandatory since 1965, originally required annually for every car over 2 years old.	Wegman, Fred, David Lynam, and Göran Nilsson. "SUNflower: a comparative study of the developments of road safety in Sweden, the United Kingdom, and the Netherlands." SWOV, Leidschendam (2002): 1-147.	http://ec.europa.eu/transport/roadsafety_library/publications/sunflower_report.pdf
Switzerland	1998	The Swiss Federal Roads Authority	Swiss Federal	http://www.piarc.o

		The Swiss Federal Roads Authority was formed in 1998 following the amalgamation of the Federal Office of Road Construction and the Road Traffic section of the Federal Office of Police. It therefore unites the most important competencies and duties in the area of road traffic.	Roads Office FEDRO. 2006 Roads and traffic 2006 - Facts and figures	rg/ressources/documents/10982,Suisse.PDF http://www.astra.admin.ch/dokumentation/00119/05558/05564/index.html?lang=en&download=NHzLpZeg7t,lnp6I0NTU042l2Z6ln1ad1IZn4Z2qZpnO2Yuq2Z6gpJCEd-IB8gWym162epYbg2c_JjKbNoKSn6A--
Syrian Arab Republic	2003	Public Establishment for Road Communications: - The Establishment was created on 23/6/2003 to undertake service & development tasks instead of the former Ministry of Communications, and was annexed to the Ministry of Transport. - Establishment's Personnel: 2 045 employees .... Road Safety : The Establishment has a Traffic Engineering Directorate responsible for road safety , and a National Committee for Road Safety headed by the Minister of Transport which includes members from concerned ministries & governmental institutions and domestic societies . The task of the said Committee is to set up the necessary strategies & policies for road safety . The Establishment set up the following objectives for road safety : - Ensuring traffic control devices in the whole Central Road Network including road marking , traffic signs , guard rails and other . - Studying the improvement of dangerous intersections & curves on roads . - Placing guard rails on the sides of motorways . - Lighting parts of the motorways close to cities .	World Road Association.The Public Establishment for Road Communications (PERC). It is very limited as road safety agency	http://www.piarc.org/ressources/documents/10983,syrie.PDF
Taiwan	1983	Taiwan has establsihed the National Road Traffic Safety Committee under the Ministry of Trasnportation and Communications in 1983	International Association of Traffic and Safety Sciences, 2002.Changes in Traffic Safety Policies and Regulations in 7 countries (1950-2010)	http://www.iatss.or.jp/common/pdf/en/iatss/composition/7CountriesReport_en_Full.pdf
Tajikistan	No	Ministry of Internal Affairs 2013 Department of the State Automobile Inspection 2009	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/tajikistan.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/tajikistan.pdf?ua=1
Thailand	2003	Thailands' Road Safety Operating Center has been in operation for less than two years (Publication of UN	The Task Force for	http://www.fiafounda-

		2004) The Thai government, realizing the gravity of this manmade problem, in 2003, set up the Centre for Road Safety Operation headed by the Deputy Prime Minister. Despite the government's efforts, the number of road deaths has remained relatively constant albeit high for the past decade	Child Survival and Development. Global Road Safety Crisis: We Should Do Much More. Georgia, USA.	tion.org/publications/Documents/grsun_report.pdf http://www.atransociety.com/2014/pdf/pdfResearch/Dr-Pichai_reformatted.pdf
The former Yugoslav Republic of Macedonia	2007	СОВЕТИ ЗА БЕЗБЕДНОСТ НА СООБРАЌАЈОТ НА ПАТИШТАТА Член 412 Заради развивање и унапредување на сообраќајното образование и воспитување на чесниците во сообраќајот, остварување на соработка и координација во развивањето на сообраќајно - превентивната работа и самозаштитата, унапредување на општата безбедност на сообраќајот на патиштата како работа од општествен интерес, како и заради иницирање и предлагање на потребни мерки за поголема безбедност на сообраќајот на патиштата, во Република Македонија функционира Републички совет за безбедност на сообраќајот на патиштата (во натамошниот текст: Републичкиот совет), а во општините и градот Скопје - општински совети за безбедност на сообраќајот на атиштата како посебни општински тела, односно совет за безбедност на сообраќајот на патиштата во градот Скопје.	Government of the Republic of Macedonia. Security Council Road Traffic Article 412, 2007	http://www.rsbsp.org.mk/mk/Zakon_za_soveti_za_BSP.pdf
Timor-Leste	No	The Directorate-General for Transport and Communications, hereinafter called the DGTC, is responsible for ensuring the integrated general direction and coordination of all services MINISTRY OF TRANSPORT AND COMMUNICATIONS with assignments in the areas of land and sea transport, the meteorological services and geophysics, postal services and networks of MINISTRY OF TRANSPORT AND COMMUNICATIONS and Government. 2. GENERAL DIRECTORATE OF TRANSPORT AND COMMUNICATIONS has the following tasks: a) Ensure the implementation and execution of integrated national policy for the areas of its activity in accordance with the program of the Government and the higher guidance of the Minister; b) Improve the legal and regulatory framework for land and sea transport, meteorological services, postal services and networks of communication, including the promotion and definition of technical standards and regulations in these areas; c) Collaborate with relevant government departments in preparing the national road plan; d) licensing and overseeing all activities of the land transport sector, including transport companies and licensing of private driving schools; e) Maintain and manage the national system for the registration of all vehicles, including the assignment of registration; f) Create and develop and manage, in collaboration with other services and competent public authorities, the International and National Register of ships and other vessels-tions under the law; g) Develop, in collaboration with other services and relevant entities, the necessary rules to the maritime transport sector, particularly on maritime search and rescue, global warning system and maritime safety and security of ships and ports systems in compliance the International Maritime Organisation (IMO) which East Timor is a member. h) To cooperate with law enforcement authorities in the supervision, implementation and enforcement of	Ministry of Transport & Communication Democratic Republic of Timor-Leste. Article 11. º General Directorate of Transport and Communications.	http://mtc.gov.tl/en/services-directorates/general-directorate-of-transport-and-communications

		traffic legislation; i) cooperate with the competent public services for the promotion and coordination of intermodal land transport with others and in particular with the Port Authority of Timor-Leste and the Administration of Airports and Air Navigation of East Timor modes of transport, EP ; j) Develop, in collaboration with other relevant governmental agencies, national and international information system and meteorological monitoring, climatology and seismology, as well as ensuring the provision of public services in this area; k) certify and inspect ships and other vessels, as well as licensing seafarers in accordance with applicable law; l) Develop, in collaboration with other relevant services and public entities, including the Ministry of Foreign Affairs, studies with international organizations and agencies in the context of maritime transport to international rules that are adopted domestic legislation in this area in accordance with the senior government decisions; m) Develop and manage, in collaboration with other relevant public services, the system of information technology and computer networks MINISTRY OF TRANSPORT AND COMMUNICATIONS and other public entities of the Government according to senior government decisions; n) Promote and ensure postal services throughout the territory, as well as supporting the implementation of national policies; o) Comply with and enforce the laws, regulations and other legal provisions in areas of their competence; p) Any other duties assigned by law.		
Togo	Date unknown			
Tonga	NO	Traffic Department, Ministry of Police	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/tonga.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/tonga.pdf?ua=1
Trinidad and Tobago	No	Lead agency No (2013)	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/trinidad_and_tobago.pdf?ua=1
Tunisia	2003	L'année 2003 a vécu la création de l'Observatoire National de l'information, Formation, Documentation et d'Etudes sur la sécurité routière en vertu du décret n°2003-2666 du 29 Décembre 2003 comme établissement public administratif sous tutelle de Ministère de l'Intérieur. L'Observatoire est chargé des missions suivantes : § Observer l'état de la sécurité routière et collecter les données et les informations afférentes sur le plan national	Chebil, Mahdi, Le Radar Feu Rouge MEMOIRE POUR OBTENIR LE DIPLÔME DE Master	http://giftsconcept.net/onsr/radar_feu_rouge.pdf

		et international, les analyser et les répertorier dans des banques ou bases de données crées à cet effet. § Réaliser des recherches et des études pour évaluer l'état de la sécurité routière à l'échelle nationale et prospecter ses horizons futurs. § Publier des revues périodiques et conjoncturelles concernant le domaine de la sécurité routière. § Coopérer avec des différents intervenants dans domaine de le la sécurité routière.	Professionnel en : « Logistique Internationale ». République Tunisienne Ministère de l'Enseignement Supérieur et de la Recherche Scientifique Université de Sousse, 2011	
Turkey	2002	In order to support and strengthen the existing national traffic safety organization, it is urgent to establish an effective Traffic Safety Secretariat. This Secretariat should serve the two safety Councils as well as the Parliament nd the government. It should have competent staff with experience from many fields of safety. The Secretariat should be established and start its work in late 2002. From the beginning, the Secretariat will have to recruit and probably borrow personnel from involved organizations and universities etc. After some years, traffic safety graduates from the university could be employed. As a second step, a study should be carried out to find out if it could be suitable to establish a special Traffic Safety Directorate. Although different ministires and organization share the responsabilities, in the present sitatuiomn the main actors are: The Gneral Directirate of Security under the MNinistr of Internal Affairs, the General Directoratye of Highways under the Minisrty of Public Worrks, and 81 municipalities	International Association of Traffic and Safety Sciences, 2002.Changes in Traffic Safety Policies and Regulations in 7 countries (1950-2010)	http://www.iatss.or.jp/common/pdf/en/iatss/composition/7CountriesReport_en_Full.pdf
Uganda	1998	Uganda The responsibilities of the National Road Safety Council in Uganda (as per the Traffic and Road Safety Act of 1998) are similar to that of Tanzania's as were the major constraints of funding and training. A 3 year Action Plan proposed for the country included the formation of a Road Safety Unit to provide technical support to the NRSC. The staff, office and administrative costs of such a unit were recommended to be met by a fixed annual budget (Phoenix, 2000).	Research and Innovative Technology Administration. Appendix C: Literature Review.	http://apps.bts.gov/publications/africa_road_safety_review/html/appendixC.html
Ukraine	No	State Automobile Inspectorate Ministry of Internal Affairs of Ukraine in the system of public authorities. Law of Ukraine "On Road Traffic" Article 2. "Public administration in the field of road safety and its security is carri ed out at the Cabinet of Ministers of Ukraine, specifically authorized by the central executive authorities, local executive authorities, local self-government. Road safety rests with the State Automobile Inspectorate, which is part of the Ministry of Internal Affairs of Ukraine. " but "The main functions of State Automonile Inspectorate are - In the framework of its competence, the state policy on road safety;- supervision of traffic; - State registration nd registration of vehicles;- State technical inspection of vehicles;-access of citizens to drive vehicles; - control of the condition and operation of the road network; -public accounting of accidents; - organization of advocacy in the field of traffic safety."	United Nations. Economic Commision Of Europe, Road Safety in Ukraine.	http://www.unece.org/fileadmin/DAM/trans/roadsafe/unda/Sweden_Ukraine.pdf
United Arab Emirates	2006	The National Transport Authority was established in accordance with: The Federal Law No. (1) of 2006- Article (4) "A public entity called the National Transport Authority of independent corporate personality and independent budget is established and it shall be liable to carry on the activities as entrusted to it by the Cabinet".	United Arab Emirates. National Transport Authority. It is not strictly a road	http://nta.gov.ae/~bomayed/EN/index.php?option=com_content&view=article&id=171&Itemid=110

		The Cabinet resolution No.(52) of 2006 delegating the following disciplines mentioned below to the Authority.Since Dubai is one of the fastest growing cities in today's world, making the provision of high quality infrastructure facilities absolutely imperative, and since providing an advanced transport network for the people of Dubai has been high on the government's agenda, which is evident from its initiatives to enhance the public transport facilities and improve roads across the emirate to make travel safer and smoother, the Roads and Transport Authority (RTA) was formed by the decree number 17 for the year 2005.	safety agency	
United Kingdom	1965	Lead agency No 2009 Road safety in Great Britain (England, Scotland and Wales) is a shared responsibility at governmental level between national and local government and the European Union (which has key responsibilities in areas such as vehicle safety and driver licensing). The Department for Transport (DfT) is the lead department for road safety in Great Britain. It works with its governmental partners in the Scottish Executive and National Assembly for Wales, the Home Office, the 52 regional police forces, Health Departments, the Health and Safety Executive and the Department for Education and Skills. Private sector, professional safety and user organizations and parliamentary groups are also actively involved in support of national and local road safety strategies. There is a long tradition of systematic road safety work in Great Britain which started in the mid-1960s against the background of increasing levels of road traffic and associated increases in road deaths and injuries.	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/united_kingdom.pdf?ua=1
United Republic of Tanzania	1973	Tanzania 1977 Establishment of the National Road Safety Council in 1973;	Assum, Terje (1998) Road Safety in Africa: Appraisal of Road Safety Initiatives in Five African Countries, World Bank (SSATP Working Paper No. 33), February	http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2003/11/21/000160016_20031121155112/Rendered/INDEX/272510ENGLISH01oad0Safety0in0Africa.txt http://www.uwaba.or.tz/National_Road_Safety_Policy_September_2009.pdf
United States of America	1970	The National Highway Traffic Safety Administration was officialy estbalished in 1970	International Association of Traffic and Safety Sciences, 2002.Changes in Traffic Safety Policies and Regulations in 7 countries (1950-2010)	http://www.iatss.or.jp/common/pdf/en/iatss/composition/7CountriesReport_en_Full.pdf
Uruguay	2007	Uruguay: Unidad Nacional Seguridad Vial (2007)	Pérez, Gabrliel, 2009, Road Safety in Latin America and the Caribbean Countries. UNECE	http://www.unece.org/fileadmin/DAM/trans/roadsafe/unda/Minsk_Pres12_Perez.pdf

			Seminar: Improving global road safety: setting regional and national road traffic casualty reduction targets	
Uzbekistan	1999	Central Administrative Board of Traffic Safety, Ministry of Internal Affairs		http://www.lex.uz/pages/GetAct.aspx?lact_id=24739
Vanuatu	No	Lead agency No 2009 and 2013	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/vanuatu.pdf?ua=1 http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/vanuatu.pdf?ua=1
Venezuela (Bolivarian Republic of)	No	In 2009 Lead agency People's Ministry of Infrastructure (MINFRA) In 2013 National Institute of Transportation and Ground Transit/People's Ministry of Justice and Internal Relations	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/venezuela.pdf?ua=1
Viet Nam	1995	To reduce deaths and injuries, protect property and contrubite to sustainable development, the Government of Viet nam established the National Committee on Traffi Safty in 1995	World Health Organization, ed. Global status report on road safety: time for action. World Health Organization, 2009.	http://teach-vip.edc.org/documents/RTI/World_report_on_road_traffic_injury_prevention.pdf
Yemen	Date unknown	Lead agency	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/yemen.pdf?ua=1
Zambia	1995	The present National Road Safety Council in Zambia was established by an Act of Parliament in December 1995	Jacobs, G., and A. Aeron-Thomas. "Africa Road Safety Review", Final Report." Department	https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/africa_road_safety_review/pdf/entire.pdf

			of Transportation/Federal Highway Administration, TRL (Transport Research Laboratory) Limited. 2000.	
Zimbabwe	1971	Established in 1971, the Zimbabwe Traffic Safety Board had 6 offices in 5 towns and was financed by a grant from the Ministry of Transportation	Jacobs, G., and A. Aeron-Thomas. "Africa Road Safety Review", Final Report." Department of Transportation/Federal Highway Administration, TRL (Transport Research Laboratory) Limited. 2000.	https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/africa_road_safety_review/pdf/entire.pdf

Table A6.2 Child Restraint Legislation

Country	Created	Comments	Source	Online address
Afghanistan	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Albania	2011		United Nations, Economic and Social Council 2014. World Forum for Harmonization of Vehicle Regulations. Revision 22.	http://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/updates/ECE-TRANS-WP.29-343-Rev.22.pdf
Angola	2010		World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Argentina	2008		World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf http://www.mininterior.gov.ar/ansv/normativas/dec1716_08.pdf
Armenia	At least 2005			http://www.parliament.am/legislation.php?sel=show&ID=2375 http://www.mes.gov.ge/uploads/sagzao/ar/saleqcio%20ar.pdf
Australia	1976 2003 2009 (Victoria) 2009 (Tasmania) 2010	National child restraint laws were introduced in South Australia on 1 July 2010 to help protect children in the event of a crash. Enforcement penalties apply from 1 October 2010 Children and adults must be properly restrained to ensure their safety while travelling in motor vehicles.	Government of South Australia, Sout Australia's child restraint laws Queensland	https://www.sa.gov.au/topics/transport-travel-and-motoring/road-safety/seatbelts-and-child-restraints/south-

	(NSW) 2010 (South Australia) 2010 (Queens-land) 2010 (Western Australia)	From 11 March 2010, it's the law for all children up to seven years of age to be correctly restrained according to their size and age. It is important that the correct child restraint is chosen and installed. (Queensland) From 1 November 2012, changes to NSW Road Rules will come into effect. These law changes primarily consist of minor amend-ments, clarifications and tightening of existing road rules. They incorporate most of the Australian Road Rules 7th, 8th and 9th Amendment Packages (excluding child restraints, already implemented on 1 March 2010), as well as a number of NSW specific miscellaneous amendments. Yes. If you are travelling interstate with children under the age of 7 years, you will need to comply with the new nationally agreed child restraint laws: Victoria introduced the new child restraint laws on 9 November 2009. Tasmania introduced the new child restraint laws on 30 November 2009. NSW introduced the new child restraint laws on 1 March 2010. Queensland introduced the new child restraint laws on 11 March 2010. South Australia introduced the new child restraint laws on 1 July 2010. Western Australia introduced the new child restraint laws on 1 October 2010. If the passenger is under 1 year old, and not exempt from wearing a seatbelt under rule 267, the passenger must be restrained in a suitable approved child restraint that is properly fastened and adjusted, unless the driver is ex-empt from this subrule under subrule If the passenger is at least 1 year old but under 16 years old, and is not exempt from wearing a seatbelt under rule 267: (a) he or she must be restrained in a suitable approved child restraint that is properly adjusted and fastened; or (b) he or she: (i) must occupy a seating position that is fitted with a suitable seatbelt	Government, Department of Transport and Main Roads, Child restraints Government of New South Wales, Road and Maritime, Road Rules. National Transport Commission Act 2003. National Transport Commission (Road Transport Legislation — Australian Road Rules) Regulations 2006 Towner, Elizabeth, and J. Towner. "UNICEF's child injury league table. An analysis of legislation: more mixed messages." Injury Pre-vention 8.2 (2002): 97-100.	australia-s-child-restraint-laws http://www.tmr.qld.gov.au/childrestraints http://www.rms.nsw.gov.au/usingroads/roadrules/
Austria	1994	Compulsory use of child restraints	Government of Austria, Austrian Road Safety Program, 2011	http://apps.unece.org/NRSLegislation/ReportBySection.aspx http://injuryprevention.bmj.com/content/8/2/97.full.pdf+html
Azerbaijan	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: sup-porting a decade of action. World Health Or-ganization, 2013.	http://www.who.int/violence_injury_preven-tion/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Bahamas	2002	Where any passenger mentioned under this section is under the age of five years, such passenger shall be secured in a child passenger seat positioned in the rear	Government of Bahamas, Chapter 220,	http://laws.bahamas.gov.bs/cms/images/LEGISLATION

		passenger seat of the motor vehicle.	Road Traffic.	/PRINCIPAL/1958/1958-0057/RoadTrafficAct_1.pdf
Bahrain	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Bangladesh	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Barbados	2002	No child shall travel in a private motor car, private goods vehicle, hired car or self-driven car unless that child if under the age of 4 years, is seated in a child safety seat that is positioned in a back seat of the motor vehicle and is secured by a seat belt; or	Government of Barbados, Road Traffic Cap 295, L R O 2002	http://onlineseeker.net/roads/pt1.pdf
Belarus	1995		United Nations, Economic and Social Council 2014. World Forum for Harmonization of Vehicle Regulations. Revision 22.	http://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/updates/ECE-TRANS-WP.29-343-Rev.22.pdf
Belgium	1975	Les enfants de moins de 18 ans et dont la taille est inférieure à 135 cm doivent être transportés dans un dispositif de retenue pour enfants qui leur est adapté.	Government de Belgique, Arrêté royal portant règlement général sur la police de la circulation routière et de l'usage de la voie publique. Titre II. Règles d'usage de la voie publique	http://www.code-de-la-route.be/textes-legaux/sections/ar/code-de-la-route/205-art35
Belize	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Or-	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf

			ganization, 2013.	
Benin	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Bhutan	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Bolivia (Plurinational State of)	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Bosnia and Herzegovina	2006		Personal communication with Zenaida Mulaganović Viši stručni saradnik za putnu infrastrukturu Ministarstvo komunikacija i transporta Bosne i Hercegovine	
Botswana	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Brazil	2008	Los niños menores de 7 años y medio deben usar dispositivos de retención adecuados; los niños a partir de esa edad, el cinturón de seguridad, como el resto de ocupantes La referencia legal correspondiente es RESOLUÇÃO N.º 277 , DE 28 DE MAIO DE 2008, sobre o transporte de	RESOLUÇÃO N.º 277 , DE 28 DE MAIO DE 2008	http://www.seguridadvialinfantil.org/legislacion/brasil/ http://www.loc.gov/law/help/child-

		menores de 10 anos e a utilização do dispositivo de retenção para o transporte de crianças em veículos. The use of seat belts is mandatory in Brazil for the driver and passengers on all roads of the national territory, except when otherwise regulated by the National Council of Traffic (Conselho Nacional de Trânsito, CONTRAN).>[6 Children less than ten years of age must be transported in the rear seats, except when otherwise regulated by CONTRAN.[7] On May 28, 2008, CONTRAN issued Resolution No. 277, which regulates the transportation of children who are less than ten years of age and requires the use of restraint devices for the transportation of children in motor vehicle		restraint-and-seatbelt-regulations/index.php
Brunei Darussalam	2009	The revised version of the Road Traffic Act (Chapter) of 2007 does not state anything about child restrain regulation. The World Report states that Brunei has law. This report is dated on 2009	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.ltpcenter.com/documents/18/44987/ANNEX+7_23TFWG_Brunei+Road+Traffic+Regulations_2007+(ii).pdf http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://www.bruneiresources.com/pdf/gazette_28_2006.pdf
Bulgaria	2009	The law in 2004 does not state explicitly that children must use child restraint. A report from the World Bank of 2008 states the following..."In most EU countries seatbelts are also required by passengers, but this is not the case in Bulgaria. There appears also to be no legislation on child restraint systems on backseats for children in Bulgaria". Therefore considering the information from the World report of 2009, we can infere that child restrain law was approved in 2009.	World Bank, Review of Road Safety Management Capacity in Bulgaria Final Report, Mogens Wilbert, Alan Ross, Jesper Mertner. World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://siteresources.worldbank.org/BULGARIAEXTN/Resources/RoadsSafetyMamagmentCapacityfinalreportvers2.pdf
Burkina Faso	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Burundi	No	No Child restraint legislation	World Health Organization. WHO global status report	http://www.who.int/violence_injury_prevention/road_safety_st

			on road safety 2013: supporting a decade of action. World Health Organization, 2013.	atus/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Cote d'Ivoire	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Cabo Verde	2007	Sem prejuízo do disposto no número 1, o transporte de crianças deve ser efectuado no banco da retaguarda, com a utilização de um sistema de retenção devidamente adaptado ao seu tamanho e peso ou do cinto de segurança do veículo	Governo du Cabo Verde, Decreto-Legislativo nº /2007 de 11 de Maio	http://www.mai.gov.cv/images/stories/legislacao/DL1-2007_11_Mai.pdf?phpMyAdmin=6f357626be398c3f03af8634274f78df
Cambodia	2006	Babies under 10 months of age must put inside the baby seat and wear with the safety belt tied firmly to this baby seat with the car's backseat. 8. Children in the age of 10 months up to 4 years must sit in the baby seat with the safety belt tied up to this seat to the backseat of the car. The Cambodia traffic law has been officially approved by the National Assemble on December 20, 2006 and the Senate on January 16, 2007. Finally, signed and formally promulgated country-wide by the Royal Cambodian Country King His Majesty Norodom Sihamoni on February 8, 2007. Please get a copy of the traffic law below		http://scocambodia.org/cambodia-traffic-la/ http://scocambodia.org/wp-content/uploads/2013/08/Cambodia_Traffic-law-English.pdf
Cameroon	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Canada	1982 Newfoundland 1987 PIE 1985 NS 1985 QP 1984 NB 1982 ON 1984 MT 1983 SK 1984 AB 1985 BC 1987 YK 1988 NWT		Boase, Paul, Brian A. Jonah, and Nancy Dawson. "Occupant restraint use in Canada." Journal of safety research 35.2 (2004): 223-229.	http://www.sciencedirect.com/science/article/pii/S0022437504000271
Central African Republic	No	No Child restraint legislation	World Health Organization. WHO global status report	http://www.who.int/violence_injury_prevention/road_safety_st

			on road safety 2013: supporting a decade of action. World Health Organization, 2013.	atus/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Chad	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Chile	2007	Los conductores serán responsables del uso obligatorio de sillas para niños menores de 4 años que viajen en los asientos traseros de los vehículos livianos, de acuerdo a las exigencias y el calendario que fijará el reglamento.	DFL Nº 1.- Santiago, 27 de diciembre de 2007, con el texto refundido, coordinado y sistematizado de la Ley Nº 18.290	http://www.seguridadvialinfantil.org/legislacion/chile/
China	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Colombia	2002	Por razones de seguridad, los menores de 2 años solo podrán viajar en el asiento posterior haciendo uso de una silla que garantice su seguridad y que permita su fijación a él, siempre y cuando el menor viaje únicamente en compañía del conductor.	Gobierno de Colombia, Ley 769 de 2002, "Por la cual se expide el Código Nacional de Tránsito Terrestre y se dictan otras disposiciones"	http://www.seguridadvialinfantil.org/legislacion/colombia/ http://www.alcaldiabogota.gov.co/sisjur/normas/Norma1.jsp?i=5557
Comoros	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Congo	No	No Child restraint legislation	World Health Organization. WHO global status report	http://www.who.int/violence_injury_prevention/road_safety_st

			on road safety 2013: supporting a decade of action. World Health Organization, 2013.	atus/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Cook Islands	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Costa Rica	2012		Personal communication with Carlos Rivas, Director Juridico COSEVI	
Croatia	2008	1) Vozač i putnici tijekom vožnje u motornom vozilu na sjedalima na kojima su ugrađeni sigurnosni pojasevi, dužni su koristiti pojas na način koji je odredio proizvođač sigurnosnog pojasa. (2) Iznimno od odredbe stavka 1. ovoga članka, sigurnosni pojas ne moraju koristiti osobe koje imaju uvjerenje da iz zdravstvenih razloga ne mogu koristiti pojas. (3) Ministar nadležan za zdravstvo propisat će postupak, uvjete i način izdavanja uvjerenja iz stavka 2. ovoga članka. (4) Vozač motornog vozila može prevoziti dijete mlađe od 5 godina samo na stražnjim sjedalima i to u posebnoj sigurnosnoj sjedalici, koja je za vozilo pričvršćena sigurnosnim pojasom vozila ili posebnim kopčama u vozilu. (1) The driver and passengers while driving a motor vehicle on which the seats are fitted with safety belts are required to use a seat belt in the manner specified by the manufacturer of the safety belt. (2) Notwithstanding the provisions of paragraph 1 of this Article, the seat belt can not be used by people who have a belief that health reasons can not use a belt. (3) The Minister of Health shall prescribe the procedure, conditions and manner of issuing the certificate referred to in paragraph 2 of this Article. (4) The driver of a motor vehicle can transport a child younger than 5 years only in the rear seats, and in particular the safety seat, which is attached to the vehicle or the vehicle seat belt buckles in a special vehicle.	Zakon o sigurnosti prometa na cestama, 2008	http://www.zakon.hr/cms.htm?id=429
Cuba	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Cyprus	2007		Personal communication with Irene Manoli Road Safety	

			Unit	
Czech Republic	2006	Overall, Figure 9 shows that only three countries – Australia, Canada, and the United States – have legislated in six out of the seven test areas featured in the table.A further 16 countries have acted in four or five areas. Six countries – Belgium, the Czech Republic, Greece, Hungary, Korea and Switzerland – have acted in only three, Seat belt enforcement is one of the enforcement priorities in the Czech Republic. The new legislation will come into force in 2006 and will also include provisions for enforcing the use of child restraints		https://www.unicef.is/efni/report_card/UNICEF_report_card_2.pdf
Democratic People's Republic of Korea	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Democratic Republic of the Congo	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Denmark	1975		Personal communication with Jesper Jukic, Ingeniør, Trafikstyrelsen, Center for Biler og Grøn Transport Danish Transport Authority	
Dominica	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Dominican Republic	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Or-	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf

			ganization, 2013.	
Ecuador	2008		World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. Ley Orgánica de Transporte Terrestre, Tránsito y Seguridad Vial de agosto de 2008	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf http://www.seguridadvialinfantil.org/legislacion/ecuador/
Egypt	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
El Salvador	No	No information found	Gobierno de El Salvador, Asamblea Legislativa, Decreto 477, Ley de Transporte Terrestre, Tránsito y Seguridad Vial	http://www.asamblea.gob.sv/eparlamento/indice-legislativo/buscador-de-documentos-legislativos/ley-de-transporte-terrestre-transito-y-seguridad-social
Equatorial Guinea	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Estonia	1996	If a child is not tall enough to wear a seat belt as required, a child seat or an infant seat or another proper safety device corresponding to the height and weight of the child must be used when carrying the child by a motor vehicle. A child may be carried in the front seat of an automobile only if fixed properly by safety devices. Rear-facing safety devices must not be used on seats equipped with an operational airbag. The Release Date of entry into force: 09.03.2003	Government of Estonia, Traffic Act. And personal communication with Villu Vane, Traffic Expert of Traffic Safety Department Estonian Road Admin-	https://www.riigiteataja.ee/en/eli/ee/Riigikogu/act/510072014013/consolide https://www.riigiteataja.ee/akt/265273

			istration	
Ethiopia	2009		World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Fiji	2000	Provisions requiring the use of seat belts and child restraints are contained in Fiji's Land Transport (Traffic) Regulations 2000	Land Transport (Traffic) Regulations 2000, regs. 27 & 28 (12 July 2000), Supplement to the Fiji Government Gazette 166	http://www.loc.gov/law/help/child-restraint-and-seatbelt-regulations/index.php
Finland	1984		National Highway Traffic Safety Administration. Effectiveness of Safety Belt Use Laws: A Multinational Examination, 1986	http://books.google.ca/books?id=mV_ZAAAA-MAAJ&printsec=frontcover#v=onepage&q=Finland&f=false
France	1992	Use of approved child restraints is mandatory as of 1 January 1992. In France, new legislation for the differentiated use of child restraints and introduction of the rule of complying with new EU legislation of "one child, one place, one restraint system" has come into place on the 1st of January 2007. The French Prévention Routière has prepared material to inform parents about ensuring the correct child restraint for their child	UNECE Road Traffic Legislation Database European Transport Safety Council, Traffic Law Enforcement across the EU. Time for a Directive, 2006	http://archive.etsc.eu/documents/ETS%20001-07.pdf http://apps.unece.org/NRSLegislation/
Gabon	No	No Child restraint legislation		
Gambia	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. Traffic Law 2013 Road Traffic Safety Law of Georgia" (Legislative Gazette, №22 (29)	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf

Georgia	1997	გარდა ამ მუხლის მე-8 პუნქტით გათვალისწინებული შემთხვევებისა, 3 წლამდე ბავშვის მსუბუქი ავტომობილის უკანა სავარძლით გადაყვანისას გამოყენებული უნდა იქნეს სპეციალური საბავშვო ეტლი, სავარძელი ან დამჭერი მოწყობილობა, რომელიც შეესაბამება ბავშვის სიმაღლესა და წონას	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	https://matsne.gov.ge/index.php?option=com_ldmssearch&view=docView&id=2169396&publication=1&lang=en
Germany	1992	Child safety seats/restrains for children	Towner, Elizabeth, and J. Towner. "UNICEF's child injury league table. An analysis of legislation: more mixed messages." Injury Prevention 8.2 (2002): 97-100.	http://injuryprevention.bmj.com/content/8/2/97.full.pdf+html
Ghana	2004	Section 14-Carrying of children in motor vehicles (1) A person who drives a motor vehicle on a road when a child of five years or under five years is in the front seat of the motor vehicle commits an offence and is liable on summary conviction to a fine not exceeding 100 penalty units or to imprisonment for a term not exceeding 6 months or to both. (2) A person who drives a motor vehicle on a road, when a child between the ages of five and eighteen years who is sitting on the front seat of the vehicle is not wearing a seat belt commits an offence and is liable on summary conviction to a fine not exceeding 100 penalty units or to a term of imprisonment not exceeding 6 months or to both. (3) A person commits an offence if that person drives a motor vehicle on a road when (a) a child under the age of 18 years in the rear of the motor vehicle; and (b) the child is not wearing the seat belt. Section 15-Safety equipment for children in motor vehicles (1) The Minister may prescribe types of safety equipment that are recommended as conducive to the safety of children in the event of an accident to be fitted in such classes of motor vehicles as may be prescribed. (2) If a person sells or offers for sale equipment prescribed under subsection (1) and the equipment (a) is not of the prescribed type, or (b) is sold or offered for sale in contravention of Regulations made under this section that person commits an offence and is liable on summary conviction to a fine not exceeding 500 penalty units or to a term of imprisonment not exceeding 2 years or to both. (3) For the purposes of this section, safety equipment in respect of a motor vehicle includes (a) a restraining and safety device for a child or or for a carry-cot, or	Government of Ghana, Road Traffic Act, 2004	http://ghanalegal.com/?id=3&law=208&t=ghana-laws
Greece	1999	Child safety seats/restrains for children	Towner, Elizabeth, and J. Towner. "UNICEF's child injury league table. An analysis	http://injuryprevention.bmj.com/content/8/2/97.full.pdf+html

			of legislation: more mixed messages." Injury Prevention 8.2 (2002): 97-100.	
Guatemala	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Guinea	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Guinea-Bissau	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Guyana	2002		World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. Government of Guyana Chapter 51:02 Motor Vehicles and Road Traffic Act	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf http://guyaneselawyer.com/lawsofguyana/Laws/cap5102.pdf
Honduras	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563

			Health Organization, 2013.	840_eng.pdf
Hungary	2000	Child safety seats/restrains for children	Towner, Elizabeth, and J. Towner. "UNICEF's child injury league table. An analysis of legislation: more mixed messages." Injury Prevention 8.2 (2002): 97-100.	http://injuryprevention.bmj.com/content/8/2/97.full.pdf+html
Iceland	1991		Personal communication with Gunnar Geir Gunnarsson, Director of Road Traffic division	
India	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Indonesia	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Iran (Islamic Republic of)	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Iraq	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563

			Health Organization, 2013.	840_eng.pdf
Ireland	1993	Subject to the provisions of article 8 of these Regulations, the driver of a vehicle to which this article applies shall not, as and from the 1st day of January 1993, permit a person who is under 17 years of age to occupy a forward facing seat, not being a front seat, unless that person is— (a) 4 years of age or upwards and is wearing a safety belt, or (b) restrained by an appropriate child restraint.	Government of Ireland, Road Traffic (Construction, Equipment and Use of Vehicles) (Amendment) (No. 3) Regulations, 1991.	http://www.irishstatutebook.ie/1991/en/si/0359.html
Israel	2004	The Israeli law, enacted in 2004, is based on the NHTSA recommendations. The Israeli law requires rear-facing CRS until age 1, forward-facing CRS until age 3, and a booster seat until age 8.	Baron-Epel, Orna, et al. "Child restraint safety practices among Arab children in Israel." Traffic injury prevention 14.2 (2013): 194-197.	http://www.tandfonline.com/doi/full/10.1080/15389588.2012.698446#.U8A4n_ldXQh
Italy	2006	Seat belts: The new EU directive has been transposed and has been in force since May 2006. This includes compulsory seat belt wearing in buses and coaches in rural areas and on motorways. This also is extended for truck and taxi drivers in all areas. Exemptions for other services such as police, army, fi remen and ambulance drivers no longer exist apart from in emergencies, such as high speed pursuits. In the case of buses and coaches in rural areas and on the motorways the responsibility for seat belt use rests with the driver apart from if the vehicle is part of public transport. A problem has arisen with commuter buses forming part of the public transport network which travel on different roads from rural areas into the urban areas. Here it is unclear which law applies. The extension of child restraints has also been introduced according to the provisions of the EU directive. The responsibility lies with the parents.	European Transport Safety Council, Traffic Law Enforcement across the EU. Time for a Directive, 2006	http://archive.etsc.eu/documents/ETS%20001-07.pdf
Jamaica	1999	Child in motor vehicles to wear child restraint system 13/1999. 43 © Every drvier of a motro vehicle whichc conveys a child shall cause such child to wear or be conveyed in an appropiate child restrint system	Government of Jamaica, The Road Traffic Act	http://moj.gov.jm/sites/default/files/laws/Road%20Traffic%20Act_1.pdf
Japan	2000	Child safety seats/restrains for children	Towner, Elizabeth, and J. Towner. "UNICEF's child injury league table. An analysis of legislation: more mixed messages." Injury Prevention 8.2 (2002): 97-100.	http://injuryprevention.bmj.com/content/8/2/97.full.pdf+html
Jordan	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/

			action. World Health Organization, 2013.	2009/9789241563840_eng.pdf
Kazakhstan	No	However, this strategy requires that laws mandating child safety restraints in the back seat be added to the Traffic Code and that quality child safety restraints be widely available in the country.	Nugmanova, Zhamilya S., Gainel Ussatayeva, and Louise-Anne McNutt. "Seatbelt and child-restraint use in Kazakhstan: attitudes and behaviours of medical university students." Injury prevention (2014): injuryprev-2014.	http://injuryprevention.bmj.com/content/early/2014/06/25/injuryprev-2014-041198.full
Kenya	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Kiribati	2002	(5) If the passenger is under 1 year old, the driver must ensure that the passenger is safely held or restrained. (6) If the passenger is between 1 and 16, the driver must ensure that the passenger is sitting in a seat fitted with a suitable seatbelt and wears the seatbelt properly adjusted and fastened. (7) For this rule: (a) a seating position (whether or not fitted with a seatbelt) is available in the vehicle for a passenger if it is not occupied by someone else under 16 years old; and (b) a seatbelt is suitable for a passenger if it is suitable for restraining, or to be worn by, the passenger.	Republic of Kiribati, Traffic Act 2002	http://www.paclii.org/ki/legis/num_act/ta200277/
Kuwait	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Kyrgyzstan	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: sup-	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/

			porting a decade of action. World Health Organization, 2013.	http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Lao People's Democratic Republic	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Latvia	1998		Personal Communication with Agnese Korbe, Ceļu Satiksmes Drošības Direkcija	
Lebanon	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Lesotho	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Liberia	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Lithuania	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/

			action. World Health Organization, 2013.	2009/9789241563840_eng.pdf
Luxembourg	2006, or law 2008	The latest European Directive[1] on the compulsory use of seat belts has to be incorporated into law in the Member States by 9 May 2006. Under the existing European legislation it was compulsory to use seat belts in vehicles below 3.5 tonnes fitted with restraints. This obligation has now been extended to all categories of vehicles. The Directive also requires the use of restraint systems specially adapted for children. Jaunesnius kaip 3 metų vaikus leidžiama vežti ant galinės automobilio sėdynės tik specialiose jų ūgiui ir svoriui pritaikytose sėdynėse Younger than 3 years of age are allowed to carry in the back seat of a car only to the specific height and weight of their adapted seats	European Directive The Government of the Republic of Lithuania 2002, December 11 Resolution 1950 "On the Road Rules". In 2008. July 16th N 768	http://www.infolex.lt/lite/ta/88856
Madagascar	1993	In 1993 children were allowed to sit on front passengers seat – using a child restraint system Children on the rear seats had to use restraint systems too, but as 2 children could share one seat – there were exceptions.	Personal communication with Lydie Cruchten-Kaiffer, Association luxembourgeoise pour la prévention des accidents de la route.	
Malawi	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Malaysia	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Maldives	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Mali	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety	http://www.who.int/violence_injury_prevention/road_safety_status/country_profil

			2013: supporting a decade of action. World Health Organization, 2013.	es/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Malta	2004	New legislation extending compulsory seat belt use in the rear and proper child restraint use came into force in January 2004. The introduction of new legislation was preceded by an intensive information and education campaign in the media. This included the distribution of information leaflets to every household. A young child shall be carried in a child restra int when travelling in the rear seat of a motor vehicle fitted with a safety system.	Government of Malta, Subsidary Legislation 65.12, Motor Vehicles (Wearing of Seat Belts) Regulations European Commission, Slovenija Road Safety Country Profile Available at http://ec.europa.eu/transport/roadsafety_library/care/doc/profiles/pdf/countryprofile_si_en.pdf Accessed June 27, 2014	http://www.loc.gov/law/help/child-restraint-and-seatbelt-regulations/index.php#kiribati http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=9197&l=1 http://archive.etsc.eu/documents/Traffic_Law_Enforcement_in_the_EU_An_Overview_May_2006_ETSC.pdf
Marshall Islands	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Mauritania	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Mauritius	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Mexico	No	En México no existe una regulación o legislación nacio-	Fundación	http://www.segurid

		nal (federal) sobre el uso de asientos infantiles en los automóviles, pero sí un anteproyecto de legislación nacional que está en proceso pero no se ha publicado (a septiembre de 2011). Artículo 84.- El conductor y los pasajeros de un vehículo automotor deberán utilizar los cinturones de seguridad con los que éstos estén equipados; en los casos de los automóviles y vagonetas, los menores de 7 años deberán viajar en los asientos posteriores de los vehículos.	Mapfre, Legislación en México. REGLAMENTO DE TRÁNSITO EN CARRETERAS Y PUENTES DE JURISDICCIÓN FEDERAL	advialinfantil.org/legislacion/mexico/ http://www.diputados.gob.mx/LeyesBiblio/regla/n354.pdf
Micronesia (Federated States of)	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Mongolia	Date unknown			
Montenegro	2013		World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf http://podgorica.usembassy.gov/new_traffic_law_changes_wm.html
Morocco	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Mozambique	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Myanmar	No	No Child restraint legislation	World Health Organization. WHO global status report	http://www.who.int/violence_injury_prevention/road_safety_st

			on road safety 2013: supporting a decade of action. World Health Organization, 2013.	atus/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Namibia	2004	The driver of a motor vehicle operated on a public road must ensure that a child seated on a seat of the motor vehicle - where, if available, uses an appropiate child restraint; or if no child restraint is available, wears the seatbelt, if an unoccupied seat fitted with a seatbelt is available	Republic of Namibia, Road Traffic And Transport Act, 1999	http://www.who.int/violence_injury_prevention/road_safety_status/2009/laws/child_restraints_namibia.pdf
Nepal			World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Netherlands	1976	January 1976: Child on lap on front seatforbidden, children < 12 yrs must travel on rear seat, children between 6-12 yrs can travel onfront seat with lap belt A new law came into force in March 2006 for securing children in a car in line with the requirements of the EC Directive 2003/20. The fi xed fi ne for the non use of seat belts was increased from 45 EUR to 75 EUR. Intensifi ed checks are carried out. There is no follow-up of repeat offences. There were 370 000 offences in 2005 for not wearing seat belts. Seat belt wearing rates are at 92% for the driver and 64% in the rear	European Transport Safety Council, Traffic Law Enforcement across the EU. Time for a Directive, 2006 SWOV, Speeding and seat belt use:experiences from the Netherlands, Ankara Turkey, 2013	http://archive.etsc.eu/documents/ETS%20001-07.pdf https://www.academia.edu/attachments/31390901/download_file?st=MTQwNTAxN-DI3MSw3NC41OS4yMjMuMzMsNTIz-MTc5MQ%3D%3D&s=sidebar
New Zealand	1976	Children under 5 years to be restrained in approved child restraints	Government of New Zealand, Traffic Regulations 1976	http://www.legislation.govt.nz/regulation/public/1976/0227/latest/DLM51049.html http://www.legislation.govt.nz/regulation/public/1976/0227/1.0/096be8ed8009f23c.pdf
Nicaragua	2003		Ley N 431, Ley Para el re regimen de Circulacion Vehiclar e infracciones de Transito	http://www.oisevi.org/a/archivos/normativas/nicaragua/ley-431.pdf
Niger	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/

			action. World Health Organization, 2013.	2009/9789241563840_eng.pdf
Nigeria	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Niue	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Norway	1988		United Nations, Economic and Social Council 2014. World Forum for Harmonization of Vehicle Regulations. Revision 22.	http://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/updates/ECE-TRANS-WP.29-343-Rev.22.pdf
Oman	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Pakistan	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Palau	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.w

			decade of action. World Health Organization, 2013.	ho.int/publications/2009/9789241563840_eng.pdf
Panama	2007	Los pasajeros menores de cinco (5) años no podrán viajar en el asiento delantero del vehículo, excepto en vehículos de una sola cabina. En el caso de menores de dos (2) años que viajen solos en el asiento trasero, deben hacerlo utilizando una silla que garantice su seguridad y que permita su fijación a la misma	Republica de Panama, Decreto Ejecutivo N640 27 de diciembre 2006	http://www.policia.gob.pa/file_Policia_5.html
Papua New Guinea	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Paraguay	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Peru	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Philippines	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Poland	1997	3. In a motor vehicle equipped with seat belts, a child under 12 years of age and not more than 150 cm of height shall be carried in a child restrain seat or other equipment used for carrying children that are appropriate for their age, height and comply with technical requirements.		http://www.who.int/violence_injury_prevention/road_safety_status/2009/laws/child_restraints_poland.pdf
Portugal	1995	Child safety seats/restrains for children	Towner, Elizabeth, and	http://injuryprevention.bmj.com/cont

			J. Towner. "UNICEF's child injury league table. An analysis of legislation: more mixed messages." Injury Prevention 8.2 (2002): 97-100.	ent/8/2/97.full.pdf +html
Qatar	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Republic of Korea	1997	Child safety seats/restrains for children	Towner, Elizabeth, and J. Towner. "UNICEF's child injury league table. An analysis of legislation: more mixed messages." Injury Prevention 8.2 (2002): 97-100.	http://injuryprevention.bmj.com/content/8/2/97.full.pdf +html
Republic of Moldova	2010		World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Romania	2002	(1) Copiii cu vârsta sub 12 ani sau cu înălţimea sub 150 cm trebuie să poarte centuri de siguranţă adaptate greutăţii şi dimensiunilor lor, iar cei cu vârsta sub 3 ani se transportă numai în dispozitive de reţinere omologate. Art. 97 Regulament aplicare OUG 195/2002 Reguli generale Reguli de circulaţie	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013. Regulament pentru aplicarea OUG 195/2002 privind circulatia pe drumurile	http://legeaz.net/regulament-aplicare-oug-195-2002-actualizat/art-97-reguli-generale-reguli-de-circulatie

			publice	
Russian Federation	1993	In 1993, Russian Federation Government Decree #1090 23.10.1993 approved “Road traffic rules in Russian Federation,” which stated: “All drivers and passengers must fasten the seat-belts. It is obligatory for drivers, for occupants in front seats and in rear seats … child passengers less than 12 years old are to be transported in special seats attached in rear seats of vehicles”	Ma, Sai, et al. "Seat belt and child seat use in Lipetskaya Oblast, Russia: frequencies, attitudes, and perceptions." Traffic injury prevention 13.sup1 (2012): 76-81.	http://www.tandfonline.com/doi/abs/10.1080/15389588.2011.645382#.U8At5vldXQg
Rwanda	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Saint Kitts and Nevis	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	
Saint Lucia	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Saint Vincent and the Grenadines	2006	A driver of a motr vehicle which conveys a child shall cause the child to wear or be conveyed in a an appropiate child restraint system positioneed in a rear seat of the motor vehicle	WHO Region: AMRO / Saint Vincent and the Grenadines Child Restraints Legislation Submitted to GSRRS 2008	http://www.who.int/violence_injury_prevention/road_safety_status/2009/laws/child_restraints_st_vincent_grenadines_en.pdf
Samoa				
San Marino	2008	Children under 150 cm must use booster cushions or child restraints suitable to their weight and complying with the relevant European regulations	WHO Region: EURO / San Marino Seat-belt Legislation Submitted to GSRRS 2008	http://www.who.int/violence_injury_prevention/road_safety_status/2009/laws/seat_belt_san_marino.pdf

Sao Tome and Principe	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Saudi Arabia	1997		WHO Region: EMRO / Saudi Arabia Seat-belt Legislation Submitted to GSRRS 2008	http://www.who.int/violence_injury_prevention/road_safety_status/2009/laws/seat_belt_saudi_arabia_ar.pdf
Senegal	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Serbia	1992		United Nations, Economic and Social Council 2014. World Forum for Harmonization of Vehicle Regulations. Revision 22.	http://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/updates/ECE-TRANS-WP.29-343-Rev.22.pdf
Seychelles	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Sierra Leone	No	Articles 112 (1) (2) and (3)	WHO Region: AFRO / Sierra Leone Child Restraints Legislation Submitted to GSRRS 2008	http://www.who.int/violence_injury_prevention/road_safety_status/2009/laws/child_restraints_sierra_leone.pdf
Singapore	2012	Passenger below 1.35 metres in height to be properly secured by approved «child «restraint, etc. 8. —(1) Where a person below 1.35 metres in height is a passenger of a motor vehicle to which these Rules apply, no person shall use the motor vehicle unless the passenger is properly secured by — (a)	Government of Singapore, Road Traffic Act (Chapter 276), Road Traffic (Motor vehicles, wearing of	http://statutes.agc.gov.sg/aol/search/display/view.w3p;query=Status%3Acurinforce%20Type%3Aact,sl%20Content%3A%22child%22%20Content%

		an approved «child «restraint appropriate for a person of that height and weight; or (b) a body-restraining seat belt in the manner set out in rule 4(2) when seated on a booster seat cushion or when using a seat with an adjustable seat belt approved by the Registrar	seat belts) Rules 2011	3A%22restraint%22;rec=1;resUrl=http%3A%2F%2Fstatutes.agc.gov.sg%2Faol%2Fsearch%2Fsummary%2Fresults.w3p%3Bquery%3DStatus%253Acurinforce%2520Type%253Aact,sl%2520Content%253A%2522child%2522%2520Content%253A%2522restraint%2522;whole=no#pr8-he-.
Slovakia	After 2007	The following measurements are under legislative preparation: • stricter standards for vehicle inspection and obligatory technical controls • obligatory use of child restraint systems • enforcement checks for pedestrians.	European Commission, Slovenija Road Safety Country Profile Available at http://ec.europa.eu/transport/roadsafety_library/care/doc/profiles/pdf/countryprofile_si_en.pdf Accessed June 27, 2014	http://ec.europa.eu/transport/roadsafety_library/care/doc/profiles/pdf/countryprofile_sk_en.pdf
Slovenia	1976		United Nations, Economic and Social Council 2014. World Forum for Harmonization of Vehicle Regulations. Revision 22.	http://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/updates/ECE-TRANS-WP.29-343-Rev.22.pdf
Solomon Islands	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
South Africa	2000	The use of seat belts by children is required by the National Road Traffic Regulations,[45] subsidiary legislation to the National Road Traffic Act.[46] This Law states that the driver of a motor vehicle must ensure that a child (all persons between the ages of three and fourteen except those taller than “one comma five meters”) in the vehicle uses a child restraint if one is available, or wears a seat belt in a seat that is equipped with one.[47] If no seat belt is available and the vehicle is equipped with a rear seat, the driver must ensure that the child is seated in the rear seat.[48]	Government of South Africa, National Road Traffic Act 93 of 1996	http://www.lawsofsouthafrica.up.ac.za/index.php/browse/motor-vehicles/national-road-traffic-act-93-of-1996/regulations-and-notices/93-of-1996-national-road-traffic-act-regs-gnr-225-19-nov-2013-to-date-

				pdf/download
Spain	2004	La referencia legal correspondiente es la LEY 17/2005, de 19 de julio, por la que se regula el permiso y la licencia de conducción por puntos y se modifica el texto articulado de la ley sobre tráfico, circulación de vehículos a motor y seguridad vial (Ley sobre tráfico, circulación de vehículos a motor y seguridad vial, aprobado por el Real Decreto Legislativo 339/1990, Spain has reinforced its law on seat belt use, introducing an obligation for children of three years and under to use an approved restraint system. The new rule entered into force on 24 July 2004.	Gobierno de España, Ley 17/2005 European Trasnport Safety Council, Traffic Law Enforcement across the EU. An Overview	http://www.seguridadvialinfantil.org/legislacion-asientos-ninos-coches/legislacion-asientos-para-ninos-en-espana-2/ http://archive.etsc.eu/documents/Traffic_Law_Enforcement_in_the_EU_An_Overview_May_2006_ETSC.pdf
Sri Lanka	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Sudan	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Suriname	2005	Persons other than the driver referred to in paragraph 1 of this article shall also make use of the provided seatbelts; in case these persons are under the age of 10, they shall make use of an available and a proper child restraint. 3. In case there are no child restraints present, the persons under the age of 10 referred to in paragraph 2 of this article shall use the available seatbelts, in so far as the intended safety objective is herewith met.	http://www.who.int/violence_injury_prevention/road_safety_status/2009/laws/child_restraints_suriname_en.pdf	
Swaziland	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Sweden	1988	Child safety seats/restrains for children	Towner, Elizabeth, and J. Towner. "UNICEF's child injury league table. An analysis	http://injuryprevention.bmj.com/content/8/2/97.full.pdf+html

			of legislation: more mixed messages." Injury Prevention 8.2 (2002): 97-100.	
Switzerland	1981	Child safety seats/restrains for children	Towner, Elizabeth, and J. Towner. "UNICEF's child injury league table. An analysis of legislation: more mixed messages." Injury Prevention 8.2 (2002): 97-100.	http://injuryprevention.bmj.com/content/8/2/97.full.pdf+html
Syrian Arab Republic	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Taiwan	2004	The nation has already required children under the age of four to be placed in infant car seats since 2004. TAIWAN SEAT BELT LAW The Legislative Yuan passed an amendment to the Statute for Road Traffic Management and Penalties which requires that back-seat passengers buckle up while travelling on freeways or expressways in Taiwan. Drivers can be fined up to NT$6,000 (US$185) if their passengers do not comply with the rule, according to the amendment. The amendment was proposed by legislators in the wake of the serious injuries sustained by Shirley Shao, wife of Taichung Mayor Jason Hu, in a car accident in November. In another amendment to the statute, drivers can be fined up to NT$3,000 if they do not seat children under 4 years old in a child safety seat and fined NT$3,000 if they leave children under 6 years old or those requiring special care in a vehicle alone.	News and notes, Injury Prevention 2007, 13:10-12 Taipei times	http://www.taipeitimes.com/News/taiwan/archives/2012/07/13/2003537642
Tajikistan	2003		WHO Region: EURO / TajikistanChild Restraints Legislation Submitted to GSRRS 2008	http://www.who.int/violence_injury_prevention/road_safety_status/2009/laws/child_restraints_tajikistan_ru.pdf
Thailand	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf

The former Yugoslav Republic of Macedonia	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Timor-Leste	2003	– Carrying children under the age of 12 in the front seat is prohibited, unless: a) the vehicle does not have a back seat; b) such transportation is carried out by using a child restraint device duly approved and adapted to the size and weight of the child.	Democratic Republic of Timor-Leste Government	http://timor-leste.gov.tl/wp-content/uploads/2010/03/DL_2003_6_highway_code_.pdf
Togo	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Tonga	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Trinidad and Tobago	2010	(1) The driver of a motor vehicle referred to in section 43A(1) shall—(a) not, without reasonable excuse, drive his vehicle while there is in the front seat of the vehicle a child of five years of age and under; and (b) ensure that a child—(i) under six months of age, be restrained in a properly fastened and adjusted, rearward facing child restraint; (ii) over six months and under four years of age, be restrained in a properly fastened and adjusted, rearward facing child restraint or a forward facing child restraint that has an in-built harness; and (iii) over four years and under five years of age, be restrained in a properly fastened and adjusted, forward facing child restraint that has an in-built harness or an approved booster seat that is properly positioned and fastened.	Government of Trinidad and Tobago, Motor Vehicles and Road Traffic Act 1934 § 43D, cap. 48:50	http://rgd.legalaffairs.gov.tt/laws2/alphabetical_list/lawspdfs/48.50.pdf
Tunisia	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization,	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf

			2013.	
Turkey	2007	In Turkey, the law about the mandatory use of child safety seats was legislated in 2007	Carman, Kursat Bora, and Yılmaz Palancı. "The use of child safety seats: A survey on levels of knowledge and attitudes of university employees." J Clin Exp Invest www. clinexpinvest. org Vol 2.2 (2011).	http://clinexpinvest.net/dergiler/1/2011_0002_0002/0291/06_R.pdf
Uganda	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Ukraine	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
United Arab Emirates	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
United Kingdom	1983	The Secretary of State may make regulations prescribing (by reference to shape, construction or any other quality) types of equipment of any description to which this section applies that are recommended as conducive to the safety in the event of accident of prescribed classes of children in prescribed classes of motor vehicles.	United Kingdom, Road Traffic Act 1988, c. § 15 National Highway Traffic Safety Administration. Effectiveness of Safety Belt Use Laws: A Multinational Examination, 1986	http://www.loc.gov/law/help/child-restraint-and-seatbelt-regulations/index.php#_ftn24 http://books.google.ca/books?id=mV_ZAAAA-MAAJ&pg=PA41&lpg=PA41&dq=Oranen,+L.,+M.+Koivurova.+Seat+Belt+Use+and+Conditi

				on+and+Driver+Atti-tudes&source=bl&ots=Rt61wPonpj&sig=_GxcCCkVKe8GO1DgLsrGJfTfLos&hl=en&sa=X&ei=rN7HU7KSO8WuyASh2IGQDg&ved=0CCQQ6AEw-AQ#v=onepage&q&f=false
United Republic of Tanzania	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
United States of America	1985	In 1976, Dr Robert Sanders, a pediatrician in Tennessee, began the first successful effort to enact a child resistant device use law in the United States. In 1977, NHTSA Administrator Joan Claybrook actively supported legislative effort, and the law passed in 1978. Then, medical societies and associations across the nation led successful lobbying efforts for child restraint legislation. By mid-1985, all 50 states and the District of Columbia had enacted laws requiring restraints to be used for infants and young children.	Rosenberg, Mark L., Juan G. Rodriguez, and Terence L. Chorba. "Childhood injuries: where we are." Pediatrics 86.6 (1990): 1084-1091.	
Uruguay	2013	Artículo 1º.- Los niños de 0 a 12 años de edad estarán obligados a viajar en los asientos traseros de conformidad a los sistemas de sujeción y categorías establecidas en la reglamentación que el Poder Ejecutivo establezca. Las mismas obligaciones del inciso anterior regirán para los adolescentes hasta los 18 años de edad que midan menos de 1,50 metros de estatura. Artículo 2º.- Se prohíbe a los conductores de ciclomotores, motocicletas, motos y similares transportar niños o adolescentes de cualquier edad que no alcancen los posa pies de dichos vehículos. El Poder Ejecutivo reglamentará sistemas de posa pies alternativos. En los casos de motocicletas con sidecar y similares, se podrá transportar niños y adolescentes, de conformidad a los sistemas de sujeción y categorías establecidas en la reglamentación que el Poder Ejecutivo apruebe. Artículo 3º.- Las sillas y similares para el transporte de niños y adolescentes deberán cumplir con las normas que se adopten a tales efectos en el país, según la reglamentación que se dicte al respecto	Gobierno de Uruguay, Ley N 19061, Transito y Seguridad Vial en el Territorio Nacional	http://www.parlamento.gub.uy/leyes/AccesoTexto-Ley.asp?Ley=19061&Anchor=
Uzbekistan	Date unkown			
Vanuatu	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.w

			decade of action. World Health Organization, 2013.	ho.int/publications/2009/9789241563840_eng.pdf
Venezuela (Bolivarian Republic of)	2008	Asegurar que los niños o niñas menores de diez (10) años de edad, ocupen los asientos traseros del vehículo. Cuando se trate de infantes deben ser transportados, en todo caso, en asientos especiales para tal fin	Gobierno de Venezuela, Ley de Transporte Terrestre	http://www.oisevi.org/a/archivos/normativas/venezuela/venezuela_2.pdf
Viet Nam	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Yemen	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Zambia	2010		World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013.	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf
Zimbabwe	No	No Child restraint legislation	World Health Organization. WHO global status report on road safety 2013: supporting a decade of action. World Health Organization, 2013	http://www.who.int/violence_injury_prevention/road_safety_status/country_profiles/en/ http://whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf

Table A6.3 Day-time Running Lights

Country	Created	Source	Online address
Afghanistan	No	Afghanistan Investment Support Agency	http://www.aisa.org.af/olaws/484%20traffic%201360%20+%20regs.doc
Albania	No	Road Code of Albania	https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=9&cad=rja&uact=8&ved=0CEsQFjAI&url=http%3A%2F%2Flnweb90.worldbank.org%2FECA%2FTransport.nsf%2FExtECADocByUnid%2F6EBB420127698FA785256C47006ED646%2F%24file%2FRoad%2520Code%2520of%2520Albania.doc&ei=NpkhVI3nHJH3yQTGl4GYBg&usg=AFQjCNGMd58GZTSOuHPXLTkdox_DvNKwMg&sig2=o5Nfqv40Qicicn7O1YBDdg&bvm=bv.75775273,d.aWw
Angola	No	Novo Código da Estrada	http://www.info-angola.ao/index.php?view=article&catid=650%3Alegisla-outras&id=2559%3Anovo-co-da-estrada&format=pdf&option=com_content
Argentina	2014	Ministerio de Industria	http://www.industria.gob.ar/los-autos-0-km-que-se-venden-en-argentina-deberan-incorporar-progresivamente-cada-vez-mas-elementos-de-seguridad/
Armenia	Date un-known		
Australia	No	RACQ Australia	http://www.racq.com.au/~/media/pdf/racq%20pdfs/cars%20and%20driving/2014-07-daytime-running-lights.ashx
Austria	2011	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:257:0014:0015:en:PDF
Azerbaijan	No	Azerbaijan Police Traffic rules	http://www.dyp.gov.az/?/en/content/188/
Bahamas	No	Road Traffic Act of Bahamas	http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/1958/1958-0057/RoadTrafficAct_1.pdf
Bahrain	No	Road traffic code of Bahrain	http://www.moj.gov.bh/Print_pc633.html?printid=945
Bangladesh	No	The Motor Vehicle Ordi-nance 1983	http://bdlaws.minlaw.gov.bd/pdf_part.php?act_name=&vol=&id=654
Barbados	No	Road Traffic Act of Barba-dos	http://onlineseeker.net/roads/pt1.pdf
Belarus	No	National Center of Legal Information of the Republic of Belarus	http://law.by/main.aspx?guid=3871&p0=P30500551e
Belgium	2011	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:257:0014:0015:en:PDF
Belize	No	Road Traffic Act of Belize	http://owtc.bz/town-motor-vehicle-road-traffic-act-cpt-230/
Benin	Date un-known		
Bhutan	No	Road Safety and Transport Authority	http://www.rsta.gov.bt/?attachment_id=2929
Bolivia (Plurina-tional State of)	No	Código Nacional de Tránsito	http://bolivia.infoleyes.com/shownorm.php?id=978
Bosnia and Herze-govina	2005	SWOV Institute for Road Safety Research	http://www.swov.nl/rapport/Factsheets/UK/FS_DRL.pdf http://ipi.ba/dokumenti/pravilnicibih/Zakon%20o%20osnovama%20sigurnosti%20u%20BIH%20SGBiH%206_06.pdf
Botswana	Date un-known		
Brazil	No	Instituio Código de Trânsito Brasileiro	http://www.planalto.gov.br/ccivil_03/leis/l9503.htm
Brunei Darussalam			
Bulgaria	2011	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:257:0014:0015:en:PDF

Burkina Faso	No	ONASER	http://www.onaser.bf/images/stories/Regles/codedelaroute.pdf
Burundi	No	Code de la Circulation Routière de République Du Burundi	http://www.assemblee.bi/IMG/pdf/code_circuration_routiere.pdf
Cote d'Ivoire	No	Commerce Sans Frontières en Afrique d L'Ouest	http://www.borderlesswa.com/sites/default/files/resources/apr13/The%20Truck%20Drivers%20Guide%20to%20C%C3%B4te%20d'Ivoire%20FRENCH%201-UP.pdf
Cabo Verde	2005	Decreto-Legislativo nº /2007 da Republica de Cabo Verde	http://www.mai.gov.cv/images/stories/legislacao/DL1-2007_11_Mai.pdf?phpMyAdmin=6f357626be398c3f03af8634274f78df
Cambodia	No	Cambodia Traffic Law	http://scocambodia.org/wp-content/uploads/2013/08/Cambodia_Traffic-law-English.pdf
Cameroon	Date unknown		
Canada	1989	Tofflemire, Troy C., and Paul C. Whitehead. "An evaluation of the impact of daytime running lights on traffic safety in Canada." Journal of Safety Research 28.4 (1998): 257-272.	
Central African Republic	No	Code de la Route de RCA	http://ddata.over-blog.com/4/97/53/54//CODE-DE-LA-ROUTE-RCA-1988/CODE-DE-LA-ROUTE-RCA-1988-GB-2.pdf
Chad	Date unknown		
Chile	No	OISEVI	http://www.oisevi.org/a/archivos/normativas/chile/dfl-1_29-oct-2009.pdf
China	No	Zhang, Wei, et al. "Road safety in China: analysis of current challenges." Journal of safety research 41.1 (2010): 25-30.	
Colombia	2004-2011	Alcadia de Bogota	http://www.alcaldiabogota.gov.co/sisjur/normas/Norma1.jsp?i=43799
Comoros	Date unknown		
Congo	Date unknown		
Cook Islands	No	Cook Islands Sessional Legislation Trasnport Act 1966	http://www.paclii.org/cgi-bin/sinodisp/ck/legis/num_act/ta1966153/ta1966153.html?stem=&synonyms=&query=traffic%20and%20cook%20and%20islands
Costa Rica	No	Ley de Transito de Costa Rica	http://www.tse.go.cr/pdf/normativa/leydetransito.pdf
Croatia	No	ZAKON O SIGURNOSTI PROMETA NA CESTAMA	http://www.zakon.hr/cms.htm?id=429
Cuba	No	Ministerio de Justicia	http://www.cubadebate.cu/wp-content/uploads/2010/10/gacetaoficial-cuba-40-2010-ley109-transito.pdf
Cyprus	2011	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008
Czech Republic	2001	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf
Democratic People's Republic of Korea	Date unknown		
Democratic Republic of the Congo	No	Nouveau code de la route de la République Démocratique du Congo	http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CB8QFjAA&url=http%3A%2F%2Fwww.leganet.cd%2FLegislation%2FDroitPenal%2FRoulage%2FLoi.078.022.30.08.1978.pdf&ei=k0wmVK3gLI-tyATK7IL4BQ&usg=AFQjCNErcuB6u6KQhB91AB2M28OMnRqNJA&bvm=bv.76247554,d.aWw
Denmark	1990	Koornstra, Matthijs, Frederik Deodaat Bijleveld, and Marjan Hagenzieker. The safety effects of daytime running lights. SWOV Institute for Road Safety Research, The Netherlands, 1997.	

Dominica	No	Vehicles and Road Traffic Act	http://www.dominica.gov.dm/laws/chapters/chap46-50.pdf
Dominican Republic	No	OISEVI	http://www.oisevi.org/a/archivos/normativas/republica-dominicana/ley-n-241-transito-de-vehiculos-republica-dominicana.pdf
Ecuador	No	Ley Orgánica de Transporte Terrestre, Tránsito y Seguridad Vial	http://www.derecho-ambiental.org/Derecho/Legislacion/Ley-Transporte-Terrestre-Transito-Seguridad-Vial-3.html
Egypt	No	State Information Service (SIS)	http://www.sis.gov.eg/Ar/Templates/Articles/tmpArticles.aspx?CatID=937#.VCSK3PldVz6
El Salvador	No	Parlamento de El Salvador	http://asamblea.gob.sv/eparlamento/indice-legislativo/buscador-de-documentos-legislativos/ley-de-transporte-terrestre-transito-y-seguridad-social
Equatorial Guinea	Date unknown		
Estonia	1995		Personal communication with Villu Vane Traffic Expert of Traffic Safety Department Estonian Road Administration
Ethiopia	Date unknown		
Fiji	No	Pacific Island Legal Information Institute	http://www.paclii.org/fj/legis/consol_act/tap3128/
Finland	1972	Koornstra, Matthijs, Frederik Deodaat Bijleveld, and Marjan Hagenzieker. The safety effects of daytime running lights. SWOV Institute for Road Safety Research, The Netherlands, 1997.	
France	2011	Boutcher Louise, 2008. Motor vehicles: daytime running lights. House of Commons Library and	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008
Gabon	Date unknown		
Gambia	Date unknown		
Georgia	1997	Legislative Herald of Georgia	https://matsne.gov.ge/index.php?option=com_ldmssearch&view=docView&id=29890&Itemid=0&lang=ge
Germany	2011	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf
Ghana	Date unknown		
Greece	2011	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008
Guatemala	No	Policia Nacional de Guatemala	http://uip.mingob.gob.gt/images/documentos/dgpnc/numeral1/POLICIANACION-AL_REGLAMENTO_DE_TRANSITO_ACUERDO_GUBERNATIVO_273-98_ENERO_2013.pdf
Guinea	Date unknown		
Guinea-Bissau	Date unknown		
Guyana	No	Traffic law of Guyana	http://guyaneselawyer.com/lawsofguyana/Laws/cap5102.pdf
Honduras	No	Ley de Transito	http://www.lafise.com/Portals/11/Documentos/LEY_TRANSITO_HONDURAS.pdf
Hungary	1994	Holló, Péter. "Changes in the legislation on the use of daytime running lights by motor vehicles and their effect on road safety in Hungary." Accident Analysis & Prevention 30.2 (1998): 183-199.	
Iceland	1993		Personal communication with Gunnar Geir Gunnarsson Director of Road Traffic division
India	No	Automotive Vehicles –	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&

		Installation Requirements of Lighting and Light-Signalling Devices for L Category Vehicles, their Trailers and Semi-Trailers	cd=1&ved=0CB0QFjAA&url=https%3A%2F%2Faraiindia.com%2Fhmr%2FControl%2FAIS%2FPUB_10~3~2012~5~34~47~PM~AIS-009_Rev_1_F_with_amd_1.pdf&ei=3VMmVIOwCoqvyATypIKoDw&usg=AFQjCNFgMc7ooKMPAu1EKK0UyOyvPt0n_w&bvm=bv.76247554,d.aWw&cad=rja
Indonesia	No	Presidency of the republic of Indonesia	http://kemhubri.dephub.go.id/perundangan/images/stories/doc/uu/uu_no.22_tahun_2009.pdf
Iran (Islamic Republic of)	Date unknown		
Iraq	No	National Police of Iraq	http://www.itp.gov.iq/law.htm
Ireland	2011	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008
Israel	No		
Italy	2002	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf
Jamaica	No	Road Traffic Law of Jamaica	http://moj.gov.jm/sites/default/files/laws/Road%20Traffic%20Act_1.pdf
Japan	No (2008)	Boutcher Louise, 2008. Motor vehicles: daytime running lights. House of Commons Library and http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf Williams, C. (2005). Blinded by the lights. New Scientist, 187(2511), 38-39.	
Jordan	No	World Health Organization	http://www.who.int/fctc/reporting/party_reports/jordan_annex7_traffic_law_2008_en.pdf
Kazakhstan	No	Traffic Rules of the Republic of Kazakhstan	http://zarul.kz/pdd/19
Kenya	No	Traffic Act of Kenya	http://www.kenyalaw.org:8181/exist/rest//db/kenyalex/Kenya/Legislation/English/Acts+and+Regulations/T/Traffic+Act+Cap.+403+-+No.+39+of+1953/docs/TrafficAct39of1953.pdf http://ri.search.yahoo.com/_ylt=A86.JyM7yilUIy8AnAAXFwx.;_ylu=X3oDMTByaDNhc2JxBHNlYwNzcgRwb3MDMQRjb2xvA2dxMQR2dGlkAw--/RV=2/RE=1412053691/RO=10/RU=http%3a%2f%2fwww.kenyalaw.org%3a8181%2fexist%2frest%2f%2fdb%2fkenyalex%2fKenya%2fLegislation%2fEnglish%2fActs%2520and%2520Regulations%2fT%2fTraffic%2520Act%2520Cap.%2520403%2520-%2520No.%252039%2520of%25201953%2fdocs%2fTrafficAct39of1953.pdf/RK=0/RS=6KwWg4t1nwK4O4Rdl4QTn7OopsU-
Kiribati	No	Pacific Islands Legal Information Institute	http://www.paclii.org/cgi-bin/sinodisp/ki/legis/num_act/ta200277/ta200277.html?stem=&synonyms=&query=traffic%20and%20kiribati
Kuwait	No	Traffic Law of Kuwait	http://www.moi.gov.kw/gdt/TrafficLaw.pdf
Kyrgyzstan	No	Общественного объединения «Дорожная безопасность»	http://www.drive2.kg/%D0%BF%D0%B4%D0%B4-%D0%BA%D1%80 http://www.db.kg/pddkr/19-vneshniesvetovuepriboru.html
Lao People's Democratic Republic	Date unknown		
Latvia	1996		Personal communication with Ar cieņu, VAS „Ceļu satiksmes drošības direkcija”
Lebanon	No	Traffic Law of Lebanon	http://www.arabruleoflaw.org/Files/PDF2014/Lebanesetrafficlaw.pdf
Lesotho	No	Road Traffic Act 1981 of Leshoto	http://www.lesothotradeportal.org.ls/index.php?r=site/display&id=36#1.
Liberia	No	Traffic Law of Liberia	http://johnetherton.com/2009/07/05/liberian-traffic-law/
Lithuania	2011	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008
Luxembourg	2011	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008
Madagascar	Date unknown		

Malawi	No	Road Traffic Act of Malawi	http://www.malawilii.org/files/mw/legislation/consolidated-act/69:01/road_traffic_act_pdf_12284.pdf
Malaysia	No		http://www.agc.gov.my/Akta/Vol.%207/Act%20333.pdf
Maldives	Date unknown		
Mali	Date unknown		
Malta	2011	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008
Marshall Islands	No	Pacific Islands Legal Information Institute	http://www.paclii.org/mh/legis/consol_act/mta1986153.pdf
Mauritania	No	Ministry of Transports	www.transports.gov.mr/NR/.../0/CodeRouteAr.doc
Mauritius	No	Road Traffic Act of Mauritius	http://fsd.gov.mu/English/Documents/Legislation/21%20Road%20Traffic%20ACT.doc
Mexico	No	OISEVI REGLAMENTO DE TRÁNSITO EN CARRETERAS Y PUENTES DE JURISDICCIÓN FEDERAL Artículo 131.- Durante la noche o cuando las circunstancias ambientales que prevalezcan no permitan que haya suficiente visibilidad, los conductores de los vehículos deberán utilizar sus lámparas, de acuerdo con las reglas siguientes:	http://www.oisevi.org/a/archivos/normativas/mexico/mx-reglamento-de-transito-metropolitano.pdf http://www.diputados.gob.mx/LeyesBiblio/regla/n354.pdf
Micronesia (Federated States of)	Date unknown		
Mongolia	Date unknown		
Montenegro	Yes	SWOV Institute for Road Safety Research, The Netherlands	http://www.swov.nl/rapport/Factsheets/UK/FS_DRL.pdf
Morocco	No	Code de la Route	http://www.leseco.ma/documents/category/2-codes?download=3:code-de-la-route-2010
Mozambique	No	Codigo de Estrada	http://www.portaldogoverno.gov.mz/Legisla/legisSectores/comunicacoes/Decreto-Lei_No_1_2011_Codigo_de_Estrada.pdf
Myanmar	Date unknown		
Namibia	No	Government Gazatte of The Republic of Namibia	http://www.saflii.org/na/other/NAGovGaz/2001/37.pdf http://www.saflii.org/na/legis/num_act/rtataa2008339.pdf
Nepal	Date unknown	Department of Transport Management, Government of Nepal	http://www.dotm.gov.np/act-regulationdirectives/
Netherlands	2011	European Union	COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:257:0014:0015:en:PDF
New Zealand	No	Government of New Zealand	http://www.nzta.govt.nz/resources/get-your-lights-right/docs/get-your-lights-right.pdf
Nicaragua	No	Ley de transito de Nicaragua	http://www.tramitesnicaragua.gob.ni/media/ley431.pdf
Niger			
Nigeria	No	Federal Highway Act of Nigeria	http://resourcedat.com/wp-content/uploads/2012/11/Federal-Highways-Act-Nigeria.pdf
Niue	No	Pacific Islands Legal Information Institute	http://www.paclii.org/cgi-bin/sinodisp/nu/legis/consol_act/ta1965153/ta1965153.html?stem=&synonyms=&query=niue%20and%20traffic%20and%20law
Norway	1988	Elvik, Rune. "The effects on accidents of compulsory use of daytime running lights for cars in Norway." Accident Analysis & Prevention 25.4 (1993): 383-398.	

Oman	No		http://www.traffic.gov.om/index.php/permalink/6762.html
Pakistan	No		http://punjablaws.gov.pk/laws/189.html
Palau	Date unknown		
Panama	No	Policia Nacional de Panama	http://www.policia.gob.pa/file_Policia_5.html
Papua New Guinea	No	Pacific Islands Legal Information Institute	http://www.paclii.org/cgi-bin/sinodisp/pg/legis/consol_act/mtr1967244/mtr1967244.html?stem=&synonyms=&query=papua%20and%20traffic%20and%20act
Paraguay	No	OISEVI	http://www.oisevi.org/a/archivos/normativas/paraguay/ley_paraguay.pdf
Peru	No	OISEVI	http://www.oisevi.org/a/archivos/normativas/peru/norma_peru_4.pdf
Philippines	No	Pacific Islands Legal Information Institute	http://www.lawphil.net/statutes/repacts/ra1964/ra_4136_1964.html
Poland	2011	European Union	COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:257:0014:0015:en:PDF
Portugal	2011	European Union	COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:257:0014:0015:en:PDF
Qatar	No	Traffic Police	http://www.moi.gov.qa/site/arabic/departments/TrafficPolice/news/2008/07/29/19559.html
Republic of Korea	No	Road Traffic Act of Korea	http://www.law.go.kr/%EB%B2%95%EB%A0%B9/%EB%8F%84%EB%A1%9C%EA%B5%90%ED%86%B5%EB%B2%95
Republic of Moldova	No	Regulamentului circulaţiei rutiere	http://lex.justice.md/md/331491/
Romania	No	Codul rutier	http://www.codulrutier.net/capitolul-5-reguli-de-circulatie/
Russian Federation	2016	Постановлением Правительства РФ от 10 февраля 2015 г. N 109 настоящее постановление признано утратившим силу. См. ТР ТС 018/2011 Технический регламент Таможенного союза. The mandatory use of daytime running lights in cars in urban areas (supplementing existing requirement for inter-urban and rural roads) has been proposed in draft legislation.	http://6pl.ru/gost2/pprf_720-1.htm http://www.jsae.or.jp/e07pub/yearbook_e/docu/02_automobile_technical_regulations.pdf http://www.internationaltransportforum.org/pub/pdf/11Russia.pdf
Rwanda	No		http://lip.alfa-xp.com/lip/AmategekoDB.aspx?Mode=r&pid=7727&iid=1196&rid=30692409
Saint Kitts and Nevis	Date unknown		
Saint Lucia	No	Motor Vehicle Act	http://www.rslpf.com/site/Motor%20Vehicles%20and%20Road%20Traffic%20Act%202003.pdf
Saint Vincent and the Grenadines			
Samoa	No	Pacific Islands Legal Information Institute	http://www.paclii.org/ws/legis/consol_act_2012/rto1960164/
San Marino	No	Codice della Strada	http://www.consigliograndeegenerale.sm/contents/instance18/files/document/23725leggi_7336.pdf
Sao Tome and Principe	2013	Assembleia Nacional de S. Tomé Príncipe	http://www2.camara.leg.br/saotomeeprincipe/diarios-da-an/ii-serie/5.a-sessao/DAN09-IIS.pdf/at_download/file
Saudi Arabia	No	Traffic law of Saudi Ara	http://www.rt.gov.sa/files/rt_policy.pdf
Senegal	No	Code de la route de Senegal	http://www.gouv.sn/IMG/pdf/decret-code-route-senegal.pdf
Serbia	2009	Road Traffic Agency of Serbia.	www.abs.gov.rs/eng/doc/TRAFFIC%20SAFETY%20SITUATION%20IN%20SERBIA.pps
Seychelles	No	Road Transport Act	http://www.seylii.org/sc/legislation/consolidated-act/206
Sierra Leone	No	Road Traffic Act	http://www.sierra-leone.org/Laws/2007-5p.pdf
Singapore	Date unknown		

Slovakia	2011	European Union	COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:257:0014:0015:en:PDF
Slovenia	2011	European Union	COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:257:0014:0015:en:PDF
Solomon Islands	No	Pacific Islands Legal Information Institute	http://www.paclii.org/cgi-bin/sinodisp/sb/legis/consol_act/ta77/ta77.html?stem=&synonyms=&query=traffic#disp10
South Africa	No	University of Pretoria	http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CCYQFjAB&url=http%3A%2F%2Fwww.lawsofsouthafrica.up.ac.za%2Findex.php%2Fbrowse%2Fmotor-vehicles%2Fnational-road-traffic-act-93-of-1996%2Fregulations-and-notices%2F93-of-1996-national-road-traffic-act-regs-gnr-225-19-nov-2013-to-date-pdf%2Fdownload&ei=-igjVNXUKMu1yAS5zICwAw&usg=AFQjCNEkqCd30t_OcgR6JSJVG2ycGblxoA&sig2=1ReS8ez13KWUerivORpzSw&bvm=bv.76180860,d.cWc&cad=rja
Spain	2011	European Union	COMMISSION DIRECTIVE 2008/89/EC, of 24 September 2008 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:257:0014:0015:en:PDF
Sri Lanka	No	Motor Traffic Act	http://www.motortraffic.gov.lk/web/images/stories/document/act_no%2008of2009_en.pdf
Sudan	No	Traffic Police	http://trafficpolice.gov.sd/pages/detaillaw.php?id=1
Suriname	No		Contact to Yves Blufpand Suriname Engineering Consultants - SUNECON
Swaziland	No	Road Traffic Act	http://www.osall.org.za/docs/2011/03/Swaziland-Road-Traffic-Act-6-of-2007-Part-3.pdf
Sweden	1977	Theeuwes, Jan, and Johan Riemersma. "Daytime running lights as a vehicle collision countermeasure: the Swedish evidence reconsidered." Accident Analysis & Prevention 27.5 (1995): 633-642.	
Switzerland	2014	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf http://www.swov.nl/rapport/Factsheets/UK/FS_DRL.pdf https://cds.cern.ch/journal/CERNBulletin/2013/52/Announcements/1636190?ln=en
Syrian Arab Republic	No	Ministry of Interior	http://www.syriamoi.gov.sy/new/index.php?req=553&cat=39
Taiwan	No	Road Traffic Safety Rules	http://law.moj.gov.tw/LawClass/LawSingle.aspx?Pcode=K0040013&FLNO=109
Tajikistan	No	Traffic Law of Tajikistan	http://www.transcontrol.tj/ru/laws-and-decrees/pravila-dorozhnogo-dvizheniya
Thailand	No	Road Transport Act	http://www.agc.gov.my/Akta/Vol.%207/Act%20333.pdf
The former Yugoslav Republic of Macedonia	2007	Macedonia Police	http://www.mvr.gov.mk/Uploads/ZBSP-%20neoficijalen%20precisten%20tekst%20od%2020.11.2012.doc.pdf http://vecer.mk/ekonomija/upotrebata-na-dnevno-svetlo-vo-soobrakjajot-chini-5-milioni-evra
Timor-Leste	No	Jornal da Republica Codigo Da Estrada	http://timor-leste.gov.tl/wp-content/uploads/2010/03/DL_2003_6_codigo_estrada_1.pdf
Togo	Date unknown		
Tonga	No	Traffic Act	http://legislation.to/Tonga/DATA/PRIN/1988-156/TrafficAct.pdf
Trinidad and Tobago	No	Motor Vechicles and Road Traffic Act	http://rgd.legalaffairs.gov.tt/laws2/alphabetical_list/lawspdfs/48.50.pdf
Tunisia	No	Code de la Route De Republiqe Tunisienne	http://www.droit-afrique.com/images/textes/Tunisie/Tunisie%20-%20Code%20de%20la%20route%202008.pdf http://amendes.finances.tn/jsp/amende/cadre_jur.jsp http://amendes.finances.tn/jsp/amende/pdf/decret_262_francais.pdf
Turkey	No	Türkiye Büyük Millet Meclisi	http://www2.tbmm.gov.tr/d24/2/2-0407.pdf

Uganda	No	Traffic and Road Safety Act 1998	http://www.ulii.org/ug/legislation/consolidated-act/361
Ukraine	No		http://online.vodiy.kiev.ua/pdr/19/ (Information from a Driving School)
United Arab Emirates	No	Ministry of Interior	http://www.uaetraffic.ae/ar/portal/pl.aspx
United Kingdom	2011	Boutcher Louise, 2008. Motor vehicles: daytime running lights. House of Commons Library	
United Republic of Tanzania	No	The Highway Code of Tanzania	http://www.tanroads.org/Highway%20Code.pdf
United States of America	No	European Union	http://ec.europa.eu/transport/roadsafety_library/publications/IR1_oct_2004.pdf http://www.gpo.gov/fdsys/pkg/FR-2009-06-29/pdf/E9-15314.pdf
Uruguay	1999	Reglamento Nacional de Circulación Vial	http://www.mtop.gub.uy/c/document_library/get_file?uuid=c7487d1b-9346-4a57-9030-294998388618&groupId=12377
Uzbekistan			
Vanuatu	No	Pacific Islands Legal Information Institute	http://www.paclii.org/vu/legis/consol_act/rta201/
Venezuela (Bolivarian Republic of)	No	OISEVI	http://www.oisevi.org/a/archivos/normativas/venezuela/venezuela_1.pdf
Viet Nam	No	Law on Road Traffic	http://vbqppl.moj.gov.vn/vbpq/en/Lists/Vn%20bn%20php%20lut/View_Detail.aspx?ItemID=10506
Yemen	No		http://www.presidentsaleh.gov.ye/showlaws.php?_lwbkno=2&_lwptno=1&_lwnmid=349
Zambia	No	National Assembly of Zambia	http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CCwQFjAC&url=http%3A%2F%2Fwww.parliament.gov.zm%2Fdownloads%2FVOLUME%252026.pdf&ei=lWYjVLX4H_eJsQTB2YDACw&usg=AFQjCNHCqr-InSyh-ZnVoQmBxjU_oW6zYg&bvm=bv.76247554,d.cWc&cad=rja
Zimbabwe	No	Road Traffic Act	http://www.parlzim.gov.zw/attachments/article/99/ROAD_TRAFFIC_ACT_13_11.pdf