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Transactions and institutions:
Exploring the link between asset-specificity, contract enforcement and development

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Abstracts

The thesis is a two-part work examining the mutual influence of different types of economic transactions and social institutions. The first chapter provides an overview of recent economic literature arguing that 'rule of law' is not a prerequisite for economic transactions and that its absence is not expected to negatively impact a country's development outlooks. I then offer a counterargument from classical sociology and criminology emphasizing the importance of formal law and the consequences of so-called 'lawless' contracting. This discussion allows me to present the argument that different types of transactions can be expected to be responsive to different 'rule of law' contexts, and to have different consequences for a country's development outlooks.

The second chapter empirically assesses whether transaction types are associated with different institutions. Using cross-national export data covering a 15 year period, I use a recently proposed indicator of asset-specificity to differentiate between transactions and examine whether the prevalence of certain transaction types are associated with a variety of institutional outcomes. I find that high asset specificity transactions are associated with 'developed country' status, with higher per capita income, with membership in international contract enforcement institutions and higher education enrolment.

La présente thèse est un travail en deux parties, proposant d'évaluer l'influence mutuelle de différents types transactionnels économiques et des institutions sociales. Le premier chapitre consiste en une revue d'une littérature économique récente arguant que l'absence de 'loi et ordre' n'est pas problématique en ce qui a trait aux transactions économiques. L'absence de loi n'empêche pas les transactions, et n'est pas considérée comme un obstacle au développement pour un pays donné. Prenant appui sur certains œuvres de sociologie classique et de criminologie, j'offre un contre-argument à cette proposition; je conclu en proposant mon propre argument, soit que différents types de transactions sont différemment affectés par l'absence de 'loi et ordre', et que ces différents types transactionnels ont un impact différent sur les perspectives de développement d'un pays.

Le second chapitre propose de vérifier empiriquement le lien entre différent types transactionnels et différentes institutions sociales. Avec l'aide de données internationales d'exportations couvrant une période de 15 ans, et d'une méthode récemment proposée de classification des transactions, j'examine le lien entre la prévalence de certaines transaction et différents résultats institutionnels, et ce, pour la plupart des pays du monde. Les données me permettent de conclure à l'existence d'un lien entre type de transactions et développement, revenu, participation aux institutions internationales de protection de contrat et enrôlement scolaire.

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"If [justice] is removed, the great, the immense fabric of human society, that fabric which to raise and support seems in this world if I may say so has the peculiar and darling care of Nature, must in a moment crumble into atoms."

– Adam Smith, *The Theory of Moral Sentiments* (Part II Section II Chapter III, p. 86)

What is the link between justice, the market, and society? Recent examples of repressive regimes having enjoyed great economic prosperity (South Korea comes to mind) suggest that the progression from lack of justice to societal collapse might not be as clear as Adam Smith posited. My interest in this paper is to examine the link between formal mechanisms of contract enforcement, market transaction, and social institutions. When Adam Smith wrote on justice and society, he presumably had a broader conception of justice in mind than just contract enforcement. But the question still remains. In the absence of mechanisms through which actors can seek redress for cheating, what happens to economic transactions, and to '*the immense fabric of human society*'?

A recent literature emerging from Economics has argued that *nothing* happens. In the absence of those formal rules, the '*immense fabric*' takes over. Informal social mechanisms kick in and solve the problems brought about by self-interest and opportunism. The goal of my thesis is twofold: to give a critical overview of these arguments and present a counterargument, and to try to uncover empirical paths through which answers to such questions can be found.

First, I will introduce the recent neo-institutional economic literature that makes the argument that formal contract enforcement is not a necessary pre-requisite to trading. Authors in this field, known as the 'Lawlessness and Economics' school, argue that informal social mechanisms are just as efficient as formal ones in deterring cheating and opportunism. In a sense, this literature offers to broaden economists' traditional horizons, and proposes to include social factors, especially group dynamics, in its analytical toolkit. This is an interesting development, and I think sociologists should take this opportunity and bring their specialized knowledge to the debate. I firmly believe that bringing in a

sociological perspective will challenge some of the more extreme conclusions reached by the 'Lawlessness and Economics' people, and help bring the debate forward.

Of course, economists are not the only ones who could benefit from crossing boundary lines. In the second section of this paper, I propose to empirically examine some of the questions raised by the 'Lawlessness' debate by introducing to sociology some of the important concepts used in Transaction Cost Economics (TCE). Using international trade data from Feenstra et al. (2008) and contract intensity data from Nunn (2007), I examine the possibility that different *types* of transactions are affected in different ways by various institutional settings. This second section is mainly exploratory, and offers preliminary evidence on the possibility of using TCE concepts at the macrolevel, and for broader social scientific questions than they are usually used for.

The empirical section should be understood as exploratory work. The broader questions posed by 'Lawlessness and Economics' deserve thorough research and substantial efforts. My section's goal is to show that different types of transactions are associated with, and facilitated by, different institutional characteristics. It is my hope that by using TCE concepts, I can offer a new way to look at development questions, offer new policy considerations and add to the debate on the relationship between market and society; I hope that this thesis will become a first step in a longer and more thorough research project addressing these issues.

Chapter I

The literature on the relationship between the possibility of trade and the broader institutional framework is divided in roughly two sides, one claiming that trade can occur under almost any circumstance and preserve its virtues, the other claiming that trade will be impossible under deficient institutional structures, or will lead to pathological results. As a rule of thumb, economists (and their various neo-institutional varieties) fall in the first category, while sociologists, anthropologists and political scientists fall in the second. In the following section, I will examine some of the important arguments made by each, starting with the former.

The Economists

Avner Greif, a central figure in neo-institutional economics, has studied long-distance trade and the enforcement of contracts in settings where formal legal systems do not exist. Most of his work has been characterized by his use of a combination of game theory and historical evidence. One of his early contributions (Greif 1989) focused on solutions to the principal-agent problem in a context of high information asymmetry and prohibitively high monitoring costs. Using the example of the eleventh-century Maghribi merchants and their long-distance trading agents, Greif identifies two theoretically important mechanisms that 'solve' the trust issue. Agents can send a 'hard-to-fake' signal of honesty and visibly limit their own opportunities for cheating, or principals can make threats to discontinue association with the agent, were the latter to engage in cheating behavior. These two constitute *reputation mechanisms*, and, under certain circumstances, act to change the expected pay-offs for the agent such that any long-term gains of honest agents exceed the short-term gains acquired through cheating.

The qualifier 'under certain circumstances' is important here. As Greif points out (1989: 867-8), reputation mechanisms depend on *nonanonymous* settings, where the identity of agents and principal can be known and information on their past record is easily obtainable by all relevant parties. Interchangeability

of agents is also a prerequisite. Principals who punish agents by withdrawing their business need to be able to easily find equivalent agents if reputation mechanisms are to work; otherwise, the possibility of hold-up and a small number bargaining situation will arise (on this, see Williamson 1975: Chap. 2). Another problem, akin to the 'last round' problem in Prisoner's Dilemma games, arises when the time horizon for either principal or agents is short. If an agent does not plan to keep transacting on a given market, the value of a reputation for 'honesty' is severely discounted. Agents will cheat if the benefits to be derived from doing so are high enough. Reputation mechanisms only work in markets where time horizons are long enough.

Greif's original article helped spawn a whole literature of 'history flavored' analyses of economic transactions in the absence of State institutions. Milgrom et al. (1990) for instance have used game theory to explain how medieval European non-state institutions, such as the *Law Merchant* and the Champagne fairs, could be used to ensure 'fair' trading, even when the number of actors engaged in trade was too high to make nonanonymity feasible. Greif himself has been one of the most prolific authors in this literature. Much of his subsequent work has aimed to identify other market structures in which contract enforcement is possible, even in the absence of the State. Greif et al. (1994) examine the role of various private organizations in solving trust and opportunism problems. Medieval merchant guilds (British, German, Jewish and Italian) are the prime examples invoked. A more recent contribution (Greif 2006) examines how impersonal, anonymous transactions can develop through mutual responsibility systems, which often amount to the emergence of micro 'states', which provide enforcement over limited territories often found at the center of more extensive trade networks (such as the venetian city-state). It is important to keep in mind that such systems prove effective only to the extent that trade occurs in well-defined geographic clusters, and communication between the authorities in charge of each cluster is easy. A recent monograph (Greif 2006), collects a series of such historical (most early-medieval) case studies, and draws "*Lessons from Medieval Trade*" for current institutional economic analysis.

Unfortunately, the usefulness of Greif and similar authors' contribution to the understanding of *current* problems of trust and asymmetry in settings where formal legal contractual enforcement does not prevail is not clear. While the theoretical expositions are clear, elegant and informative, the examples used suggest that an application of Greif's conclusion to problems faced by current economic actors might not be wise. A series of strong assumptions must hold for reputation mechanisms to work, such as non-anonymity and reasonably low information asymmetries. While these assumptions may very well hold for long-distance trade in 12th century Genoa, they should not be held to automatically be true of, say, Hong Kong's export sector in the 21rst century.

A fairly substantial literature has emerged which tries to update the argument, and apply an analysis similar to Greif's to more recent examples of non-state contract enforcement. McMillan & Woodruff (1999), for example, have conducted survey research in Vietnam on a related issue, covering the 1995-97 period. Vietnam at the time was well-known for its poor legal system, especially with regard to contract law. Taking a business dispute to court was considered useless, and would not usually amount to anything but a loss of one's time. The authors' findings are very interesting. Contrary to expectations, so-called 'repeated games' incentives did not seem to play a major role in contract enforcement. Reputation mechanisms, for example, were simply not resorted to by cheated business owners. Denial of future business was *not* the preferred method of dealing with opportunistic customers. Managers were "reluctant to sanction trading partners. If a customer renege[d] on a debt they often allow payment to be delayed and forgive part of the debt." (1999: 638) Even when *business* relations were cut, *social* relations were carefully maintained. Social relations were even used to try and recover part of the money, with varying success.

Another interesting finding is that business dealings involving a higher potential for hold-up (either because of asset-specificity, high transaction costs or monopsony power) were accompanied by more attempts at minimizing *ex post* risk. For example, more contracts were drafted in those cases, which despite the lack of enforcing authorities, the authors considered to be a significant safeguard

against opportunistic behavior, and a way to ensure all parties clearly understood their mutual obligations. Contracts allow clear definitions of obligations, making it easier to identify which party is at fault in case of breach, regardless of whether the party is legally sanctioned or not. Other mechanisms uncovered by the authors included community sanctions, advanced payments, dealing only with people within one's social network, and using trustworthy middlemen. These mechanisms were resorted to in less than half of the transactions, and were not used differentially according to whether the transaction had significant *ex post* risk. We have here a hint that the clean and straightforward story told by Grief might not apply so well to contemporary contexts, but the authors nevertheless argue that by recourse to broader *community sanctions*, rather than threats of denying further business, normal trading is still possible, even under very poor legal systems.

Another example comes from Gow & Swinnen (2001), who approach the problem at the firm level. The authors have looked at a number of arrangements for 'internal' enforcement made by a variety of agroindustry firms doing business with farm subsidiaries in a number of former Communist Eastern European countries where "public institutions are ineffective in enforcing contracts" (2001: 686). Among the strategies used, the firm could require subsidiary farms to pay in advance for all inputs to be delivered (a strategy employed by Interbrew/Boortmalt in Croatia and by Land'O Lakes in Poland), give bonuses/sanctions for respecting quality and volume requirements, offer technical and managerial support (which allows a degree of monitoring) and directly provide downstream services for the subsidiaries, such as marketing (a strategy followed by Monsanto in Bulgaria). Evidence of success, however, remains mixed. The strategies employed seemed to have worked very well for some firms, but to have failed to produce results for others, enough so that the strategies had to be abandoned (Gow & Swinnen 2001: 690).

A case study of the Slovakian sugar-processing firm Juhocukor provides an example of a successful firm (Gow et al. 2000). Following political reforms in 1989, the central government proved unable to provide contract enforcement as a public good. Juhocukor breached contract with suppliers, holding up payments for

already delivered beets. In the context of high inflation, the delays proved very costly to the suppliers. Beet farmers understandably denied Juhocukor their future business. Juhocukor was eventually bought by UK firm Tate & Lyle and French firm Saint-Louis Sucre, who faced the problem of restoring trust in a weak contract enforcement environment. The strategy involved cash premiums in the form of paying higher than market beet prices, technical services offered to the farms and providing farmers with loans from Polnobanka (the main agricultural lending bank in Slovakia) for which Johucukor would be held liable, were the farmers to default due to another payment hold-up from the firm (2000: 259-263). It would be wise to note, however, that while Juhocukor was transacting in a weak enforcement environment, its majority shareholders (Tate & Lyle and SL Sucre) were not. Failure to repay the loans to Polnobanka would likely have led to legal problems for the two firms.

Also important to note is that while it is undoubtedly true that the collapse of the Communist regimes in Eastern Europe did indeed lead to weak contractual enforcement environments, the economic restructuring and the transition from large state owned, vertically integrated farms to privately owned, small scale farms proved extremely disruptive, and was a significant source of liquidation of assets and reduced output (Gow & Swinnen 1998). Based on the evidence presented, the success of post-transition firms could just as well be attributed to improving economic conditions, adaptation to the restructured environment and growth in foreign direct investment (Dries & Swinnen 2004) as they are to 'internal' contract enforcement. In any case, it would be safe to conclude that more evidence is needed before generalizations on 'internal' enforcement are drawn.

Dixit (2004), in the foundational text of the (jestingly christened) field of 'Lawlessness and Economics', gives the formal and systematic version on the argument developed by the preceding authors. Whereas 'Law and Economics' brought the tools of economic analysis to the courtroom in the hope of thereby obtaining a guide that could be used to rigorously analyze the impact and efficiency of legal rulings, 'Lawlessness and Economics' sets out to analyze the

impact of the absence of law (or of clearly defined and enforceable 'rules of the game') on economic transactions. As such, it carries forward the project initiated by Greif, and sets out to determine in general terms the rules that govern 'lawless' transactions. Dixit's contribution is heavily mathematical, and presents three game theoretical models that analyze, in the context of lawlessness, the conditions that lead to success (and failure) of relational contracting, profit-motivated (elsewhere called 'self-enforcing', see Gow & Swinnen 2001) contracting and of 'private' protection of property rights. Another section examines the conditions under which informal contracting will be preferred, *even* when recourse to a formal legal system is possible (also known as contracting 'under the shadow of the law'). The general conclusion offered is that contracting under lawless settings is feasible, can be profitable, and can (eventually) lead to sustainable growth, whether it be in 11th century London, in 19th century Texas, or in 21st century Vietnam. Developing countries and problems of establishing 'good governance' are pointed to as directly relevant to policy applications by the 'Lawlessness and Economics' tradition.

This explicit claim made by Dixit's formalization is important. Up to that point, the development of the argument is fairly easy to follow. Early work, of which Greif was cited as the leading example, aimed to show that even *prior* to the appearance of 'rational' states (in the Weberian sense, more on this in the next section), 'fair' economic transactions were possible. A variety of organizational or social arrangements could be made which acted to greatly reduce the incidence of 'opportunism and guile'. The next theoretical step has been to take the argument made by Greif, and apply it to contemporary settings, such as low-capacity developing countries, corrupt states and post-Soviet transition economies. Distancing itself more and more from game theoretic treatments, this scholarship relies more and more on empirical case studies. The results of this second wave of scholarship are mixed, but can still be said to point in the same general direction; enforceable transactions are possible, even in adverse institutional settings. As a third step, a synthesis and formalization of the argument, chiefly by Dixit (2004), provides a clear picture of the field. Contract 'realization' (i.e. the proper fulfilling

of all stipulated contractual obligations by all parties) is deemed possible even in the absence of overarching formal and impartial (i.e. state) enforcing entities; a Hobbesian state of all against all will *not* necessarily arise where legal systems are weak (not in the economic sphere, at least).

With Dixit's conclusions, some authors have felt comfortable enough to venture into the more treacherous realm of policy implications. Before closing this section and moving on, let us have a look at a few such contributors, as a reminder of what the broader implications of this research can be. Bohnet et al. (2001) have looked at the impact of different levels of contract enforcement on both trust and contract realization. Using game theory, the authors set up a situation where cooperation between the players will lead to the creation of a surplus. A Stackelberg (i.e. sequentially played) game is played, where the first player must decide whether or not to enter a contract, and the second player then decides whether or not to breach. Of course, the second player receives a higher pay-off if he or she breaches, but there is a risk that the pay-off be taken away, a penalty be imposed on the cheating player and some of the value be restored to the first player, although less than would have been, had player 2 not breached. In other words, breaching is never Kaldor-Hicks efficient (i.e. the total utility gain realized from breaching is never high enough for the breaching player to be able to compensate the cheated player for his or her losses). In low-enforcement settings the probability of enforcement is 0; no breaches get punished. In high enforcement settings the likelihood is 1; all breaching gets punished. In middle enforcement regimes the probability of enforcement is somewhere between 0 and 1, and the breaching player cannot know in advance whether or not he will be held liable and suffer sanctions.

The author's conclusion is that "the worst legal regime is not one in which contracts cannot be enforced but one with medium levels of enforceability" (2001: 136). First movers have an expectation that over the long run, contracting will lead to higher returns than not contracting, and second movers expect that breaching will lead to higher returns than not breaching. The proportion of dishonest players is highest, and total utility lowest. High levels of enforcement

produce, as would be expected, low breaching and high overall utility. Somewhat counter-intuitively however, low enforcement *also* produces low breaching and high overall utility. The argument is that as more and more rounds of the game are played, first movers will be reluctant to enter into contracts with players known to have previously breached. Low enforcement 'crowds in' honesty, and, in the longer run, provides the same result as high enforcement. The authors cautiously point out that they "do not wish to make any judgment about what is the better policy", but do alert the reader to the fact that "Less law, however, is less costly; […] decreasing *p* [the level of enforcement] saves resources" (2001: 137). While emphatically not offering policy advice, Bohnet et al. certainly point a giant flashing arrow in its direction: no enforcement is better than intermediate enforcement; and if you are pressed on resources, low enforcement will eventually give the same result as high enforcement, but will be much cheaper!

Other scholars have been even more explicit than Bohnet et al. in their recommendations. Richard Posner (1998) [to be distinguished from Eric Posner, who argues no such thing; the confusion is not helped by the fact that both teach Law and Economics at the University of Chicago!] makes the point that full-fledged rule of law could be outright counterproductive for developing countries. The costs associated with keeping a level of high-quality law enforcement similar to that in developed countries, and to keeping the associated bureaucratic structure in place, is simply too high for developing societies to bear. Posner does not, thankfully, "propose to abandon entirely the task of improving legal institutions" (1998: 7). His advice is that policy makers should aim at providing a minimal set of legal guarantees, of which private property is the most important. Other legal provisions (read: civil rights) can wait, and are more or less optional until further resources are available. After all, says Posner, "India has not been economically more progressive than the nondemocratic nations of Asia", and "rights make it harder to convict the guilty as well as the innocents. Sophisticated police forces and prosecutors can apprehend and convict the guilty without trampling on rights; but sophisticated law enforcement is costly." (1998: 9). Who in their right mind could want justice when growth is just around the corner?

In effect, scholars like Posner have taken the claim that enforcement in the absence of law is *feasible*, and transformed it into a claim that in some situations, it is *better*. This is an extreme example, but indicative of a larger trend in the field. As Calliess & Renner (2009) have pointed out, a major problem of this whole literature is that "various types of social, i.e., non-legal, norms are considered to be equally efficient as (international and state) law when it comes to securing the compliance of economic actors". The two are *not* the same thing. Social norms and formal law undoubtedly share some characteristics, but cannot be reduced to a common identity. 'Lawlessness and Economics' makes an important contribution in that it brings back the social. Transactions are not considered through the abstracted "offer and demand" lens of neo-classical economics, but are rightly understood as a conflict-based social phenomenon involving real world individuals and all the social resources they carry with them. This is a welcome development on the part of economists, but it needs to be much better theorized. Economists could use a reminder that the study of social interactions is a science of its own, and they might want to see what it has to say.

The Sociologists

Now that we turn to this science, sociology, readers may at first wonder how much it actually has to say on the issue of contractual enforcement. The topic can appear rather narrow, and well outside the realm of mainstream sociological thought. On closer inspection, it turns out that nothing could be further from the truth. Issues of contractual enforcement were not only a major part, but the very core of much classical sociological scholarship. I will first offer an overview of this classical literature, and then turn to more recent work.

One of the early German sociologists, Ferdinand Tönnies (1964 [1887]) draws a distinction between two fundamentally different and antithetical types of human communities, the *Gemeinschaft* and the *Gesellschaft*. The *Gemeinschaft* is the meaningful, intrinsically rewarding, "truly human and supreme form of community" formed through kinship, neighborhood, friendship or common purpose. Its most common form is the autarkic patriarchal household, but *Gemeinschaft* is in no way limited to it. Through physical proximity and frequent

intercourse, it extends between households and encompasses whole villages; through trade and exchange, it extends between villages and surrounding towns. Through it all "a brotherly spirit of give and take will remain alive in the relationship between town and country, which, outside of those barter activities, is fostered by the manifold bonds of friendship and kinship" (1964: 56). The guiding principle of action in *Gemeinschaften* is not self-interest, but shared norms and values. Tönnies notes "how little significance and influence is attached to the concepts of exchange and purchase, of contracts and regulations" because "the relationship between the community […] and its members is based not on contracts, but upon understanding, like that within the family".

The second type of human community is the *Gesellschaft*., an "artificial construction of an aggregate of human beings which superficially resembles the *Gemeinschaft*" (1964*:* 64-65). Individuals in *Gesellschaft* live as atomistic, disunited elements. No common set of values and orientations, no *Verstehen* serves to pull individuals together into meaningful and integrated units. "Nobody wants to grant and produce anything for any other individual, nor will he be inclined to give ungrudgingly to another individual, if it be not in exchange for a gift or labor equivalent that he considers at least equal to what he has given" (1964: 65). Whereas in *Gemeinschaft*, people where united by reciprocal feelings of obligation and brotherly love, Tönnies stresses that *gesellschaftlich* human relations rest on the *contract*, the rational and self-interested setting of mutual exchange obligations between two isolated individuals. Says Tönnies: "the *Gesellschaft* can be imagined to be in reality composed of such separate individuals all of whom are busy for the general Gesellschaft inasmuch as they seem to be active in their own interest" (1964: 69), an obvious allusion to Adam Smith's invisible hand analogy.

In short, on the one hand we find a situation in which economic relationships are embedded in a series of personalized social relationships. The values and norms of the community dictate what is acceptable and what is not. Behavior is policed by family members, neighbors and friends; opportunism towards group members is threatened with expulsion and loss of access to the

group's resources. Opportunism and guile directed to non-members however is absolutely fine. On the other hand, we find economic relationships that rely strictly on self-interest. No norms and values come into play. Opportunism is expected, but is hedged against through careful contracting. This is the key distinction here, and one made by Tönnies himself. *Gesellschaft* is only possible because of contractual relations. Breaching is punished through impersonal and formal mechanisms. In other words, economic relationships under *Gemeinschaft* settings are close approximates of relational and informal contracting and are framed by social institutions, while under *Gesellschaft*, they fall under the law and are framed by formal rules that apply to everyone, regardless of group membership. We have here two very different, and according to Tönnies antithetical, ways of framing economic transactions, with very different sanctions for cheaters, and very different expectations about the source of individual's motivations. Why this distinction is important becomes obvious when we look at the work of the other, better known, founders of sociology.

Similarly, French sociologist Émile Durkheim (1991 [1893]) distinguishes between two types of social solidarity: mechanical and organic. Social solidarity is to be understood as the manner in which the different parts of society function together in a well-integrated manner. In mechanical solidarity communities, social cohesion derives from *similarity*. Society is understood as a juxtaposition of quasi-identical groups that are organized in very similar ways, have very similar normative structures and produce very similar resources. Interaction between members of different groups is not problematic, because they share similar symbolic and normative landscapes. The household, understood as the place of production and consumption of most goods, is the prime example of such a group. In this context, opportunism and guile becomes virtually impossible. The groups being so similar, individuals that go against the norms prevalent in their own group are also deviating against the norms held by most other groups. Interpersonal interactions are aimed at maintaining the normative order, not at furthering one's individual interests (see 1991: 35-78).

The other type of solidarity, organic solidarity, is characterized by a *functional* integration of groups. The building blocks of society are not identical segments with shared normative landscapes, but *differentiated* segments that need each other and need to exchange with each other in order to survive. Groups do not produce the same goods and services, and do not produce a great enough variety to insure autarkic survival. Interaction between members of different group cannot rest on shared society-wide social scripts, because these do not exist anymore. The basis of interaction becomes the capacity of the individual to trade goods and services that are necessary for other people's survival, in exchange for goods and services necessary to one's own. Again, in the absence of overarching, commonly held norms, the safeguard against opportunism becomes the formal contract and its impartial enforcement by a third party (see 1991: 79-102).

The parallel to Tönnies is immediately obvious, but Durkheim's treatment adds something new. An extensive division of labour and the associated productivity and living standard gains, urbanization and higher individual freedom are understood as a direct consequence of organic solidarity, and impossible without it. In slightly updated terms, 'development' depends on a transformation of social intercourse possible only through contractual relationships and their impartial enforcement. Reliance on community mechanisms can only strengthen existing power structures and foster parochialism, intolerance and autarkic tendencies that ultimately hurt living standards.

The classic author whose works bear most on the topic, however, is undoubtedly Max Weber. Weber draws a distinction between 'traditional' and 'capitalist' society, similar to that drawn by Tönnies and Durkheim. But unlike those authors, Weber stresses the importance of self-interest and the profit motive in *both* societies. The main difference is in *how* profit is sought and used. In traditional societies, profits are sought through speculative means, through the use political power, force and exploitation, and are consumed for pleasure, enjoyment and the consolidation of one's own position in the community. Much as in Durkheim's 'mechanical' solidarity, community-specific ethical considerations

govern both acquisition and consumption of wealth. Solidarity with 'in-group' members is generally expected, and there is a higher preference for leisure over work. Foreigners, on the other hand, can be treated in a most inhumane and barbaric way, without any second thoughts (Bendix 1960: 49-55).

'Capitalist' societies are different. The organizing principle of economic activity is 'rationality'. Profit is sought rationally, rather than through speculative means, or through the use of force and fraud. In-group members do not get a preferential treatment; out-group members are not discriminated against, or at least not in the economic sphere. Gain is pursued through "continuous trading on a market in which exchanges are formally free (*and subject only to the rule of law*)" (1960: 53). Weber's (2009) tangential discussion of the 'elective-affinities' of Calvinist Protestantism and capitalism is well known, but of little relevance here. More important to us is his discussion of 'rationalization'. With the appearance of the free market, especially the free market in capital goods and financial instruments, the volume and complexity of economic transactions brings with it a necessity for hierarchically organized and centrally administered organizations. While all types of social organization bring about 'laws', the defining characteristic of 'modern' law is its rationality and impartiality. Unlike charismatic law, dictated by a charismatic leader and enforced by group members on one another, 'modern' law is set through known bureaucratic procedures and its enforcement is a specialized function of the state. Award of law enforcement and law making office is regulated through known rules, and depends on technical expertise (Bendix 1960: 55-60, 285-298 and 417-430).

The main consequence of the 'rational' legal order is to create known and fair rules of the game which allow economic players to accurately know in advance the consequences of certain courses of action, to more accurately predict the course of action to be held by other economic actors, and to reduce uncertainties with regards to certain transactions, especially long-term transactions involving high amounts of sunk capital. Weber's work highlights one of the crucial differences between socially enforced transactions (i.e. *Gemeinschaft*, mechanical solidarity, reputation mechanisms, informal

contracting, etc.) and legally enforced transactions. Socially enforced transactions involve high uncertainty and rest on considerations of power. In such cases, gains (or part of them at least) can be appropriated by actors with the highest social power (whether 'symbolic' power, *à la* Goffman, Bourdieu or Veblen, 'group solidarity' *à la* Hechter or outright use of force). By contrast, legal enforcement provides economic actors with clearly defined boundaries within which investments are safe, where higher gains can be derived from pursuing higher efficiency and 'time and place' knowledge can be put to good use (Hayek, 1945). In short, all of the oft-cited benefits of the market become available, without fear of losing one's hard labor to the hands of armed thugs, the local landlord, a greedy transnational corporation or untrustworthy local suppliers. This is the clearest restatement of Caliess & Renner's point: law and social norms are *not* the same thing, and they have different consequences for overall utility.

The last two classical authors I want to discuss come from a different analytical tradition. Their work is more polemical, and frames the problem in a slightly different way. They stress conflict and fractures, rather than continuity and evolution, but the argument is similar. At any rate, it would have been difficult to leave them out (especially the first one) of a discussion of classical sociology. The first of the authors is Marx. While not dealing with contractual enforcement *per se*, Marx's work makes the argument that framing economic transactions through social relations is antithetical to capitalist and market production. The core of Marx's argument is as follows: starting in the 16th century, England went through a process whereby access to and control of the means of production came to be monopolized by a small fraction of the population (the bourgeoisie) and removed from the control of the traditional household, leaving peasants dispossessed of their former means of livelihood and forced to make themselves available for hire on the newly created labor market. Lacking access to their traditional means of subsistence, peasants become vagabonds, or swell the ranks of the urban destitute, while facing harsh repression by the state, which operates with the hope of preserving social order. When monopolization of capital by the bourgeois has reached a certain point, a budding capitalist system of production is

put in place. The masses of displaced rural surplus labor have little choice but to sell their labor power if they are to survive. The sheer number of them ensure that this newly created labor market is highly competitive and in favor of the *bourgeois*. Low salaries insure high profit rates, and, for a while at least, help further the concentration of the means of production into few hands. By the time the process is over, self-sufficiency has basically disappeared from the English countryside, and selling one's labor becomes the *only* viable option for the vast majority of the population, including women and children of all ages. By having been cut-off from the means of production, the peasant must now rely on manufactured goods to fill various needs that had hitherto been addressed through self-production. Capitalist relations of production have "drowned the most heavenly ecstasies of religious fervour, of chivalrous enthusiasm, of philistine sentimentalism, in the icy water of egotistical calculation. It has resolved personal worth into exchange value, and in place of the numberless indefeasible chartered freedoms, has set up that single, unconscionable freedom — Free Trade" (Marx 2004 [1848]: chapter 1 for quote and Marx 1969 [1867]: 529-542 and 565-567 for general descriptions; 543-549 for repression by the state; 552-555 for creation of market for industrial goods; 568-575 for a discussion of primitive accumulation in the colonial context).

A variation on the same theme is given by Karl Polanyi (2001 [1944]). According to him, in pre-market societies "[man's] economy, as a rule, is submerged in his social relationships. He does not act so as to safeguard his individual interest in the possession of material goods; he acts so as to safeguard his social standing, his social claims, his social assets." (2001: 48). *Homo economicus* did not exist. Economic production and exchange rested instead on three principles of behavior, *reciprocity*, *redistribution* and *householding* (i.e. autarkic production). What the Industrial Revolution brought about was a completely new form of social organization: the self-regulating market, which "implies a change in the motive of action on the part of the members of society; for the motive of subsistence that of gain must be substituted" (2001: 43-44). Economic interactions come to rest on the contract, while "the non-contractual

organizations of kinship, neighborhood, profession and creed were to be liquidated" (2001: 171).

Taken together, Marx and Polanyi's contributions offer a twist on the story already told. While Durkheim, Tönnies and Weber focus on the importance of contract enforcement, 'rational' law, and the many advantages of living in a modern society, Polanyi focuses on the joys of an idealized and mystical lost peasant paradise that needed to be crushed and obliterated in order to create the capitalist economy. Marx's view is more balanced, and recognizes the downfalls of feudalism and (some) of the advantages of a capitalist society. The larger point is still the same however. In order to enjoy the benefits of modernity, such as electricity, running water and bountiful consumer goods, economic relationships had to be forcefully removed from the shackles of the social, and thrust under the impersonal (but certainly not *impartial*) laws of the market. This is again the same story, told in a different way. The bottom line for all of these classical scholars is that formal, legal-based contract enforcement mechanisms and informal, social-based ones are *not* equivalent ways of ensuring realization and curbing opportunism and guile. Caliess & Renner's (2009) reminder should always be kept in mind. The manner in economic transactions are regulated – that is, either through social norms or formal law – should have *immensely* different consequences on the broader social context, whatever Avinash Dixit, Richard Posner and Bohnet et al. may think about it. I now turn to some recent empirical work supporting this view.

A more recent sociological literature dealing with the problems of transacting in lawless settings comes, somewhat surprisingly, from criminology. A group of economically oriented criminologists from the University of Oxford, led by Diego Gambetta, has produced an important literature on the enforcement of both 'legitimate' transactions in lawless (or 'extralegal', to follow the Oxford School's terminology) settings, and 'illegitimate' transactions in settings where the legal system is strong. While the early classical sociologists argued that modern economic relationships were simply impossible without contracts, this

'Oxford School' argues that they are possible, but lead to extreme pathological consequences for a significant portion of actors involved.

Gambetta (1993) identifies one of the key mechanisms when it comes (to paraphrase the optimistic Bohnet et al.) to 'crowding in' trust in low enforcement setting: threats (and use) of violence. In his study of the Sicilian Mafia, Gambetta argues that the Mafia's distinguishing characteristic is its role in enforcing transactions and providing a substitute for 'trust' where other institutions fail to do so. This is a view of the mafia as the ultimate 'reputation mechanism'. Following from unique historical circumstances, in the late 18th century, the early Sicilian state apparatus proved unable to adequately enforce contracts, leading to the emergence of thug-like groups that would offer to privately police transactions, and punish cheating parties. These groups progressively became more organized and commanded greater and greater resources, and actively worked to keep their relevance in Sicily's economy by keeping legal contractual enforcement inadequate (through bribes of statesmen, police forces, etc.). Sicilian mafia groups eventually engaged in what could be called a form of horizontal integration, and also began enforcing illegal transactions (drug production and distribution, gambling, etc.) that, by nature, would not be enforced by courts. This switch to enforcing illegal transactions is especially prevalent in mafia-like groups that do *not* operate in societies with poor institutional frameworks. The American mafia is a well-known example. The Japanese *yakuza* could arguably be another case in point (see Kaplan & Dubro 2003).

The work of some of Gambetta's former students makes the relevance of studies of organized crime even more obvious. Volkov (2002) for example studies how groups that have developed an expertise in the use of physical force (mainly members of the former Soviet sports clubs and their now jobless instructors) slowly evolved into mafia-like groups that would offer (sometimes rather persuasively) to protect businesses and transactions (providing a 'roof', in the criminal vocabulary) when the Soviet state collapsed and Russia moved towards a market economy. These groups slowly became integrated with (and probably

helped revive) the *vory-z-zakone*, Russia's prison-based criminal fraternity and its closest equivalent to a 'classical' mafia.

Varese (2001), another of Gambetta's students, also studied these Russian 'violent entrepreneurs', and comes to the same conclusions as Volkov. These groups emerged because of Russia's weak judiciary and acted to provide economic actors with private contract enforcement through 'force and fraud' (a euphemistic way to put it to be sure). As these groups became more and more organized and powerful, some integration with the existing weak State apparatus began to take place. For instance, *Vory-z-zakone* have started occupying functions in the Liberal Democratic Party of Russia (LDPR) and have become more and more prominent on the political scene (Varese 2001: 183). Large, formerly state owned monopolies have started employing more permanent security forces to protect their business interests. Some have used those private 'armies' to offer informal state protection to other actors, much like the 'violent entrepreneurs'. This is not so much the emergence of state enforcement as the use of state resources to compete with criminal groups for the highly profitable 'protection' business (Volkov 2002: 167-173), and business entrepreneurs have been known to turn to state agencies (such as the police and the KGB) as competitors to violent entrepreneurs (2002: 145). In another example, the presidential security force (SBP), 'violent entrepreneurs' attached to the state, managed to get control of the distribution of the state's oil quotas (SBP also owns an oil producing firm, Rostoplivo) and of the state's precious metal exporting firm (Roskomdragmet) (2002: 170-71).

The conclusion to be drawn from Gambetta, Volkov and Varese is clear. The absence of reliable, formal and impartial mechanisms of contractual enforcement creates an environment where opportunities to turn to violence and raw power to extract rent from economic actors are high. The critically important right to sue and be sued (Schelling 1967) is replaced by a right to beat to a pulp, and to be beaten to a pulp. Who gets to use that 'right' becomes a function of actors' power. There is also a danger that state organs will join in, and turn to predatory activities and themselves become providers of 'roof'. Comparing the

previous with North & Thomas' (1973) analysis of tax-farming and the role of private armies in the economic life of medieval Europe quickly makes it obvious that Sicily and Russia's situations are in no way unique in history, and seem to be characteristic of most pre-modern economies. While in the highly abstracted world of game theoretic economics lack of legal enforcement does not seem like much of an issue, empirical studies show that 'crowding trust in' can mean sending 'dishonest' players to sleep with the fishes and providing a lucrative outlet for the widespread use of violence, corruption and fear.

But the preceding discussion can be misleading. Clearly, some transacting is still possible. As Volkov rightly points out, even in Russia "informal 'peaceful' settlements remained the most important mechanism of tension management in business relations" (2002: 179). Varese also raises some interesting secondary points. It seems that the need to rely on violent entrepreneurs is a positive function of "the variety of interactions and the number of people one has to deal with" (2001: 26). The need for enforcement also increased with the amount of risk and uncertainty in transactions, and decreased along with the size of business firms (2001: 52). Greif has already emphasized that the success of relational contracting depends on a series of strong assumptions, and MacMillan & Woodruff have shown that different informal mechanisms were used in different cases. Clearly, not all transactions are equal. Some transactions go more or less smoothly, even when legal systems are deficient. Some do not. This is the issue we turn to next.

Reconciling both: different types of transactions

With all the evidence given up to now, how do we account for the fact that on the one hand, transactions in a lawless setting appear to work, and, to a degree, even be a matter of routine, while on the other hand, we see that transactions in lawless settings provide opportunity for rent seeking of the worst kind, accompanied by the use of violence, extortion, bribery and other unpalatable practices?

The strategy adopted here is to focus on transactions, and discriminate between their different *types*. Transactions, being defined as the bilateral exchange of valued resources from one actor to the other under varying conditions of power

imbalances, are an eminently *social* fact. They occur between actors embedded in social structures. The possibilities open to an actor depend on the context he or she is embedded in, the context of the other party, and the relationship between them. These contexts have consequences for, among other things, the realization of transactions, on the distribution of the spoils generated through the transaction, on the conditions of exchange, and on the possibility for opportunism and rent-seeking. Just what is being exchanged also affects the transaction. Buying a bag of rice from the producer at the local market is not the same as buying airplane components from a producing firm in a different country; the underlying transactions will have to be organized differently.

There are many ways one can study transactions and their social implications and prerequisites. One can look at the microlevel exchanges between actors, and the power differentials that their respective situations entail. Goffman (1959, 1967, 1969) does this for *interactions* at large (i.e. not just transactions), a tradition Collins (2004) follows. A more systematic approach, 'exchange' theory, has tried to recast all social interactions as transactions, and looks at the impact of social factors on the outcome of such 'transactions', and on the distribution of power. Prime examples of this are Homans (1950, 1958) and Blau (1964). While these traditions are very interesting in their own right, the approach chosen here, transaction cost economics (TCE) comes from a different perspective altogether. TCE is the study of the inefficiencies associated with different types of transactions, in a context of strategic (opportunistic) actors, and the organizational solutions that arise to palliate those inefficiencies. As such, the main analytical focus of TCE is on the transaction itself, and on the variety of factors that come and influence its realization. There have been recent efforts to apply some of the concepts emerging from TCE to sociology, notably by Goldthorpe (2000), but their impact has remained limited.

Williamson (2005: 6), following Ronald Coase as one of the founders of TCE, identifies three main axes along which transactions can be differentiated: their degree of *asset specificity*, their *uncertainty* and their *frequency*. The cost of ensuring that transactions are realized and that no cheating occurs is directly

related to where within this classification a given transactions falls. *Asset specificity* is the extent to which a given asset is more valuable in a given transaction, as compared to all other potential transactions. An asset is specific to a given transaction if it could not profitably be used in a different transaction. The opposite concept is *asset fungibility*. Dies that can only be used to make one car model, for instance, are asset specific. These dies could not be sold to another car producing firm, or be used in any other type of industry. A fungible asset would be a sewing machine. Not only could it be employed by almost any apparel firm, but it could also be employed in shoe making, upholstery, etc. A failing carmaker is stuck with its dies, but a failing apparel firm could sell its sewing machines to a competitor. *Frequency* is the extent to which the parties engaged in the transactions can be expected to transact with each other again in the future. A pineapple producer that has a contract to supply a given chain of supermarket with pineapples every week for 12 months is party to a high frequency transaction. An airplane manufacturer that has a contract to supply one airplane, in one shipment, to a given national government is not. *Uncertainty* refers to the non-quantifiable probability that, for whatever reason, the transaction will not come to be realized; uncertainty is the non-quantifiable counterpart of risk. Opportunism and information asymmetries are some of the major sources of uncertainty in transactions.

One of Williamson's (1975) well-known arguments is that these different characteristics will lead parties to a transaction to organize them in different ways and invest differing amounts of resources into mechanisms geared towards successful realization. These sums are the *transaction costs*, and are a direct positive function of the degree of asset specificity and uncertainty, and a negative function of frequency. Low transaction costs generally allow one to resort to simple market governance. Whatever commodity or service is being transacted can simply be bought (or sold) on the market, without further ado. As transaction costs rise however, market governance becomes a comparatively less and less efficient way to organize transactions. The solutions are varied, ranging from contingent contracting (and recourse to courts in case of breach), to relational

contracting (with threat of discontinuing business in case of breach), and eventually full integration in a formal organization, such as a firm. Given that transaction costs are highly influenced by transaction type, this amounts to an argument that certain types of transactions require certain types of governance for 'successful' exchange (i.e. very infrequent breaching and cheating, leading to higher returns on investment than would have been the case without those governance provisions).

In a similar vein, sociologist of law Macaulay (1963) explores the different strategies that parties to a transaction use in order to ensure fair realization, short of resorting to the legal system, which is argued to be costly and detrimental to future business climate. The strategies identified fall into two categories, being informal/relational contracting and contingent contracting. Contingent contracting is resorted to "where there is a likelihood that significant problems will arise" (1963: 65). The idea is the same as that in Williamson (1975), but less fleshed out: as the costs associated with ensuring realization for a given transaction rise, parties will be more likely to carefully draft formal, lengthy (and expensive) contracts where all contingencies are considered.

While most work using Williamson's type of transaction framework has focused on questions at the firm level, some cross-national work bearing on the issue has begun to emerge. Nunn (2007), for instance, has examined the impact of the quality of legal contract enforcement, at the national level, on asset-specific transacting in the export sector. Using contract and trade data from Rauch (1999) and Feenstra (2000), and judiciary quality data from Kaufmann, Kraay & Mastruzzi (2003), Nunn measures asset-specificity as the percentage of inputs necessary to the production of a final good that had to be acquired through one-on-one contracting, rather than through the market (I will come back to this in the methodology section). From the evidence, Nunn concludes not only that asset-specific exports constitute a higher percentage of total exports for countries with adequate contract enforcement (63%, compared to 40% for countries with poor judiciary institutions), but that "contract enforcement explains more of the global

pattern of trade than countries' endowments of physical capital and skilled labor combined" (2007: 594).

Using trade data for the World Bank, Leeson (2008) has also looked at the impact of contract enforcement on country-to-country trade, but unlike Nunn, he does not distinguish between types of transactions, and examines *international* contract enforcement institutions, rather than national ones. According to Leeson, membership in international contract enforcement institutions, here the UN's New York Convention (NYC), has a positive impact on trade in general (an increase of about 38% when both countries are members of the NYC). Leeson interprets this as a weak effect, and discounts the role of international contract enforcement institutions in international trade, but one need not agree with him. In any case, while it is unfortunate that the study does not differentiate between transaction types, it does at least provide an independent sample test of the hypothesis that contract enforcement positively impacts the realization of transactions.

In a similar vein, Moenius & Berkowitz (2010) study the impact of adequate contract enforcement on trade in complex (differentiated) and simple (commoditized) products. This classification of transactions is not equivalent to Williamson's, but to some degree trade in complex goods is comparable to high uncertainty, high asset specific transactions, while trade in simple goods can be identified with low uncertainty and low asset-specificity. Using trade data from Statistics Canada's World Trade database, and quality of enforcement data from the International Country Risk Guide, the authors arrive at conclusions similar to Nunn's. Improvements in institutional quality are accompanied by a shift in the export structure in favor of complex exports, a finding they attribute to the role of proper institutions in lowering predation (bribes, etc.) at the border, lowering production costs for complex goods and lowering transaction costs at the international trade level. Interestingly, the authors also note that the positive effect of quality institutions on complex goods trade is *smaller* for developing countries than for developed ones, indicating that *more* institutional reform may be necessary in the former than in the latter for a comparable change in the export structure.

Chapter II

While the previous comparative studies inspired by TCE provide interesting and compelling evidence that quality of contractual enforcement matters, and impacts different types of transactions in different manners, they all focus on a single outcome: volume of trade. While this is an important first step, we must do more, and shift the discussion back towards social and institutional issues. It is important to assess the broader social impacts that changes in market forces can have for a given country. Surely, large scale qualitative change in the type of transactions most prevalent in a given economy will have an impact on more than just trade figures. With this in mind, I return to the question of informal contract enforcement, the conditions for its success, and its consequences. The hypotheses that need to be explored are the following.

a) In the absence of a formal legal system, *high frequency*, *low uncertainty* and *low asset specificity* transactions will have a high probability of realization while *low frequency*, *high uncertainty* and *high asset specificity* transactions will not, or will require prohibitively high 'protection' costs. This means that standardized, low quality, goods produced by an easily replaceable unskilled workforce using non-specific capital equipment is possible where formal law is weak, but not the production of higher quality goods by skilled labor, using specialized equipment.

b) The production of high quality goods using skilled labor and specialized equipment, i.e. *low frequency*, *high uncertainty* and *high asset specificity* transactions, is much more likely to help promote development. If true, this could have interesting implications for development policy, and provide a strong counterargument to "who needs a legal system?" type arguments like those seen above. For example, the payoff to investments in human capital through education and training (a popular development strategy, see Kumssa and McGee 2001) may be much higher where contracts can be enforced. Secure contracts would provide an incentive for actors to incur the costs of education, for governments to invest in educational institutions and for employers to invest in training programs. Similarly, where contract enforcement is poor, investments in education might be

outright problematic for development. A study by Lange & Dawson (2010) on the effect of education on the incidence of ethnic violence shows, for instance, that education is *positively* related to ethnic violence in non-wealthy and ethnically diverse countries. One of the mechanisms that the authors posit is the lack of opportunities for graduates in the local economy. The extent to which this finding could be tied to poor contract enforcement is of interest.

As a first step in the investigation of those hypotheses, this section attempts to show that different types of transactions are related to different institutional classifications. Most studies using Williamson's type of transaction framework have focused on individual or firm level data (see thorough review by David & Han 2004), without exploring the broader macrolevel consequence. There is, of course a good reason for this. Comparable, reliable and consistent cross-national data on transaction costs for the economy as a whole are very hard to come by. Standard sources, such as the IMF's Direction of Trade Statistics, do not allow differentiating between high and low transaction cost industries. The tasks of this section, therefore, are twofold. First, I will construct an indicator that will allow me to measure transaction costs at the national level (or serve as an adequate proxy). A strategy used by Nunn (2007) will be employed, and is discussed below. Second, I include a series of indicators on development-related institutions, and explore whether there is a link between them and the asset specificity[1] indicator. The work reported here provides an attempt to explore the uses and limits of available data. It is my hope that this exercise will raise interesting questions and point to interesting directions on which to build further work involving the collection of more appropriate data and measures.

The indicators used for the analysis are as follows. First, I compare asset specificity across geographical regions to try and establish whether or not we can observe significant differences in the transaction cost composition of their industries. This is a crucial step; if no differences can be observed, the hypotheses

[1] Throughout the text, 'high transaction costs' and 'high asset specificity' will be used interchangeably. Properly speaking, high transaction costs are associated not only with high asset specificity, but with high uncertainty and low frequency of transactions as well. In order not to overburden the text, only 'asset specificity' is used.

fall flat. Dicken (2003, chapter 3) argues that the global economy is organized around three core regions which are responsible for most of the export oriented production in the world: North America, Europe and Asia. Following Dicken, I expect to find higher asset specificity in those three regions, while Oceania, Latin America and Africa should show lower scores. Within those three regions, in Asia, East Asia (China, Japan, the Koreas, Mongolia, Taiwan and Hong Kong) should have the highest score, while within Europe, Western Europe (France, Germany, the Netherlands, Switzerland, Belgium and others) and Northern Europe (England, Scotland, Ireland, the Scandinavian countries, the Baltic countries and a few others) should have the higher scores.

I also posit that development will be related to asset specificity. Developed countries should, on average, have more high transaction costs industries than developing countries. Developing countries, of course, are not homogeneous in their composition. To account for the variation, I coded developing countries into four different categories. The 'Least Developed Countries' (LDCs) face severe structural problems. Many are plagued by civil war, corrupt governments and ineffective (or inexistent) legal systems, making for very few high transaction costs industries. I expect LDCs to have the lowest asset specificity scores of all development categories. 'Transition' countries, transitioning from centralized communist economies towards market-based economic systems, are also expected to have low asset-pecificity scores. In the years following the collapse of the Soviet regime, these countries did not have in place the market framing institutions, such as enforceable business laws and arbitration tribunals (see Volkov 2002), that I posit to be necessary for high transaction costs industries. Not all developing countries are expected to be low scorers however. Some developing countries have tried implementing 'developmental state' growth models through which the more or less authoritarian states tried to promote development through their export sectors (see Rapley 2007). The best known such states are undoubtedly the so-called 'Asian Tigers' (Hong Kong, South Korea, Taiwan and Singapore). To lump these four developmental states together with the other developing economies would be misleading. Therefore, I have included the

Asian Tigers as their own category, and would expect to see them score much better than their other developing counterparts. All other developing countries (i.e. the non-LDCs, non-Asian Tigers, non-Transition economies) where coded as the 'developing' countries, and are expected to score between the Asian Tigers and the LDCs and post-Soviet countries.

One of the interesting features of high asset specificity industries is that they are expected to yield higher returns than other types of industries. While this proposition is relatively un-controversial at the microlevel, it remains to be established whether this is the case at the macrolevel. To test for this, I use a four category measure of per capita income. This variable does not allow me to make any claims about the *distribution* of resources associated with different country wide levels of asset specificity, but it does allow testing whether overall income rises with asset specificity. My prediction is that it will.

Another variable I include is membership in the New York Convention. This United Nations' convention (formally the 'Convention on the Recognition and Enforcement of Foreign Arbitral Awards') allows citizens of signatory countries to include clauses in international business contracts which allow the parties to the contract to file for dispute arbitration in the courts of one of the parties' home country. In effect, it creates "state enforcement for private commercial agreements in the international arena" (Leeson 2008: 63). It is used as a measure of 'rule of law' in international trade for a given country. If legal systems make no difference for contract realization, as argued by Bohnet and others, membership in the convention should make no difference in a country's overall asset specificity. I posit that membership will make a difference. The final variable I included for testing is education. The straightforward argument is that an adequate educational system will generate the human capital needed by high asset specificity industries; education allows for high asset specificity by providing the general skills needed in such industries. The argument I wish to make, however, goes the other way. I have already briefly mentioned the negative impacts of education where no opportunities to use the acquired human capital are found (see Lange & Dawson 2010 for the full argument). I would go further, and

propose that the opportunities offered by high transaction cost industries change the 'rules of the games', making a positive return on investments in human capital more likely. Asset-specificity changes the 'rules of the game' and makes it more profitable for people to seek higher education, and for governments to invest in it. Unfortunately, the nature of our data does *not* allow testing the direction of causality; it only allows testing whether there is a link, which I posit there will be, with asset specificity and educational enrolment being positively correlated.

These few tests are only preliminary, but will give a sense of whether or not more research in this direction is warranted. In terms of my general hypotheses, the 'New York Convention' variable is a rough test of hypothesis a); the development, income and education variables are rough tests of hypothesis b).

Data description

The data used for this thesis is a cross-national dataset for each of three years 1982, 1987, and 1992, which I have compiled myself from international trade data provided by Feenstra et al. (2005) and contract intensity data made available by Nunn (personal communication), as well as various indicators detailed below. Data for a fourth year (1997) was taken directly from Nunn (2007, available on his Harvard faculty website), to which the indicators below were added. It is important to note that while it contains the same main theoretical variables, the 1997 data point was *not* put together in the same way, and adressed methodological imperatives different from my own. For instance, only a fixed and limited number of industries from Feenstra's dataset were included for 1997, whereas my own data years include all industry-level data provided by Feenstra (2005). One of the results is that actual *total* value of export is not available for 1997, but only the total over the 222 industries selected by Nunn. Given that the industries were selected to adequately represent export sectors, the broad conclusions should be the same. The 1997 data point should therefore be considered as a quasi-independent sample, and is used as a test that my results hold across different samples.

A summary of the variables used is given in Table 1.1. Regional classifications for my data are based on the United Nations' (2010) geographical classification, which can be found on their website. Countries were grouped into 23 sub-regions, which were in turn grouped into six continental regions. I have one more region than the UN classification, as I decided to split the "Americas" macro-region in two different categories, one for North America, and the other for Latin America and the Caribbean. Similarly, I have two more sub-regions because I decided to split the new 'Northern American' region into a "US/Canada" sub-region and a "Non-US/Canada" sub-region (following the UN, the countries in this sub region are the Bahamas and Greenland).

Population data are taken from the United Nations Population Division's 'United Nations World Population Prospects: The 2008 Revision', and are available from the UNdata online database. Data are available at five-year intervals starting with the year 1950. Population estimates for 1980 were used for my 1982 data, estimates for 1985 for my 1987 data, for 1990 for my 1992 data and for 1995 for my 1997 data. Data for Taiwan were not available through the World Population Prospects database. Data from the Statistical Yearbook of the Republic of China 2010 were used, and are available online from Taiwan's National Statistics agency. Gross domestic product (GDP) figures are taken from the World Development Indicators database, available online. Figures are available for years 1982, 1987, 1992 and 1997 and are reported in constant 2000 US$. GDP data are missing for about 25 countries in at least one of the years. Like the population data, GDP data for Taiwan was retrieved from the Republic of China's National Statistics website.

Development classifications from the United Nation's Statistics Division were used to classify countries into developed and developing countries. Developing countries were further broken down into 'Least Developed Countries' (LDC) and 'Transition Countries'. The list of LDCs was established following the second United Nations Conference on Trade and Development, and is available from the UN Development Policy and Analysis Division's website. A set of criteria based on a country's per capita Gross National Income (GNI), Human

Asset Index (HAI) and Economic Vulnerability Index (EVI) are used to determine membership in the LDC category. Details of the methodology as well as dates of inclusions for the specific countries are available from the UN. For the whole 1982-1997 period, I have 44 of LDC countries included in our sample (out of a total 49). Transition countries are those that are "in transition from centrally planned to market economies" (UN 2010). These include the former USSR and Eastern European communist countries. These countries were only coded as 'Soviet/Transition', given that the data spawns the pre- and post-soviet collapse periods. A final classification has been introduced for the so-called 'Asian Tigers'.

Income classifications are based on GNI calculations reported in per capita US$ equivalent, and are available from the World Bank. For each year 1987, 1992 and 1997, countries are assigned to one of four income categories, being Low Income, Lower Middle Income, Upper Middle Income, and High Income. Data for 1982 were unavailable. The cut off points of each category was readjusted each year to reflect the economic distribution current at the time. For 1987, Low Income included countries under 480$, Lower Middle Income included country between 480$ and 1,940$, Upper Middle Income had countries between 1,940$ and 6,000$ and High Income included all countries above 6,000$. For 1992, the respective cut off point were 675$, 2,695$ and 8,355$. For 1997, the cut offs were 785$, 3,125$ and 9,655$. Some countries did not have data for 1987. In these cases, totaling 25 observations, the data for 1992 was used as a proxy for 1987. One country (Cayman Islands) had income data for 1997 only. It was decided to leave this country out, and the data were accordingly reclassified as missing. Data were unavailable in all years for 18 countries, most of which are small island states, or sub-national units included in the Feenstra data, such as Monaco, or the Free Trade Zones of China. These 'countries' were dropped from the data set before running the analyses.

Data on membership in the Convention on the Recognition and Enforcement of Foreign Arbitral Awards, the so-called 'New York' Convention (NYC), was taken from the United Nations Commission on International Trade Law's (UNCITRAL) website. Countries were deemed members of the NYC if, for

Table 1.1 *Description of variables*

Variables	Mean	Std. Dev.	Min	Max	
Export value	219,208	1,440,539	0	153,000,000	Value of export per industry category (2000 $US)
Asset specificity	.475	.228	.001	.980	Fraction of inputs exchanged through contract
Development status	-	-	0	4	Development status
Region	-	-	-	-	World region
Sub-region	-	-	-	-	Sub-region
Income	1.570	1.126	0	3	Income category
NYC membership	.529	.499	0	1	Membership in New York Convention
Secondary enrolment	68.58	32.32	5.18	153.50	Gross secondary enrolment
Tertiary enrolment	22.68	19.26	0	97.97	Gross tertiary enrolment

any given benchmark year, the Convention had been in force there for at least one year. The 'entry into force' date for member countries is available directly from UNCITRAL. Details on the NYC are given in the analytic sections below.

Data on gross secondary and tertiary enrolment was taken from the World Bank's World Development Indicators (WDI), and was only available with a sufficiently low proportion of missing values for years 1992 and 1997. In those two cases, data from the years immediately preceding and following our reference point were also used when available to fill in missing data. Our education data for 1992, for example, includes 53 values from 1991 and 20 values from 1993. This should have no impact on our substantive findings. Both education variables were re-classified into five broad categories, detailed in table 1.1.

My measure of transaction costs is from Nunn (2007), and is described as a measure of "the importance of relationship-specific investments across industries". Using Input-Output data from the United States, Nunn first establishes the make-up of final goods in terms of their intermediate inputs and, with data from Rauch (1999), assigns a contract-intensity score to each input. An input is deemed 'contract intensive' if it is not traded on an organized exchange and is not reference priced in a trade publication. Goods that are traded on exchanges and reference priced are argued by Nunn to be characterized by a large number of buyers and sellers, to have 'thick' markets and not to be amenable to hold-up from either party, all of which are indicators of high fungibility, low

uncertainty and high frequency. The goods that are that are not traded on exchanges or reference-priced are instead traded between individual buyers and sellers on a contractual basis (hence the term 'contract intensity').

This use of contract intensity as an indicator of transaction costs relies on an argument by Rauch. Rauch (1999) argues that certain intermediate goods are too specific to see their trade organized through exchanges or their prices referenced. Because of their characteristics, these goods are only attractive for certain buyers, and buyers for them will be sought through the trader's network, rather than through an organized market. This is similar to Williamson's (1979) argument that "items that are unspecialized among users pose few hazards" and can easily be traded on the market. When a high degree of transaction-specific (or "nonmarketable") expenses is involved however, the transaction and information costs associated with setting up ordinary market exchanges become too high and move the exchange towards relational contract forms. The same holds of reference prices, although Williamson does not discuss them. In other words, costly 'relational contracting' is viable only when organizing generic market transactions is even more costly, which is the case when transaction costs are high. Nunn's "contract intensity" measure is used as a proxy for transaction costs in the absence of a more direct measure.

Of course, as Nunn himself notes, the contract intensity measure is not immune to criticism. First, it assumes either 1) that final goods are made up of the same inputs, wherever they are produced, or 2) that the make-up of final goods in the United States (from which these data are drawn) is representative of the make-up across the globe. By comparing the intermediate inputs of final goods in the United States with more aggregated world data from the Global Trade Analysis Project, Nunn finds that this is not an altogether unrealistic assumption. In any case, in the absence of detailed Input-Output data for all countries, it will have to do.

A further problem that had to be surmounted while putting together the dataset was that the transaction cost data and the trade flow data are reported in two different industry classifications. All trade flow data are taken from Feenstra

et al.'s (2005) *World Trade Flows: 1962-2000* database, available online, which uses the SITC classification (rev.2), at the four-digit level. The asset specificity data uses the U.S. Bureau of Economic Analysis (BEA)'s I-O classifications. Since no direct concordance between the two was available, a strategy similar to Nunn's (2007) had to be used to link them. Note, however, that Nunn's 1997 I-O to SITC concordance scheme could not be used directly for the 1982, 1987 and 1992 specificity measures. The BEA implemented a massive update of the I-O scheme for its 1997 benchmark, and no concordance is provided between pre- and post-1997 categories (personal communication with a BEA analyst). A pre-1997 I-O to SITC concordance needed to be constructed from scratch. The details of this procedure are given as an appendix.

The fully cleaned data set contains 127,243 observations over four years. The list of included countries and the number of observations for each is also given as an appendix.

Analysis

This section will attempt to empirically determine whether or not different types of transactions are associated with different institutional make-ups. It is my contention that the type of transactions that link a country to the rest of the world has a major impact on the incentive structure for local actors, and shapes the institutional environment in a way that favors development. If meaningful differences in the types of transactions seen across different development indicators fail to come up at the national level, we can consider the question settled, and the hypothesis can be shelved with the other also-rans of social science research.

As already mentioned, the data used for classifying transactions come from Nunn (2005). Table 2.1 lists the thirteen highest and thirteen lowest scorers for years 1987 and 1997. As we can see, most low score industry are in primary extraction industries, both in the mining and agricultural sectors. High scorers include, unsurprisingly, technologically sophisticated industries, such as consumer

Table 2.1 Lowest and highest contract intensity scores, by industry (1997, 1987)

1997		1987	
Industry Description	% of high transaction cost inputs	Industry Description	% of high transaction cost inputs
Low		Low	
Poultry processing	0.024	Cottonseed oil mills	0.002
Flour milling	0.024	Primary smelting and refining of copper	0.012
Petroleum refineries	0.036	Poultry slaughtering and processing	0.021
Wet corn milling	0.036	Rice milling	0.029
Aluminum sheet, plate, & foil	0.053	Rolling, drawing, and extruding of copper	0.037
Primary aluminum production	0.058	Petroleum refining	0.038
Nitrogenous fertilizer	0.087	Malt	0.051
Rice milling	0.099	Flour and other grain mill products	0.053
Primary nonferrous metal production	0.111	Vegetable oil mills	0.066
Tobacco stemming & redrying	0.132	Dairy farm products	0.067
Oilseed processing	0.144	Special product sawmills	0.080
Oil gas extraction	0.171	Poultry and eggs	0.083
Coffee & tea	0.173	Veneer and plywood	0.087
Fiber, yarn, & thread mills	0.180	Tobacco stemming and redrying	0.087
Synthetic dye & pigment	0.184	Clay refractories	0.090
High		High	
Packaging machinery	0.831	Paper industries machinery	0.822
Book publishers	0.840	Platemaking and related services	0.830
Breweries	0.851	Dolls and stuffed toys	0.833
Musical instrument	0.854	Guided missiles and space vehicles	0.837
Aircraft engine & engine parts	0.872	Electron tubes	0.846
Electricity & signal testing instruments	0.873	Computer peripheral equipment	0.848
Telephone apparatus	0.880	Canvas and related products	0.851
Search, detection, & navigation instruments	0.888	Ordnance and accessories	0.859
Broadcast & wireless communications	0.891	Household audio and video equipment	0.880
Aircrafts	0.893	Internal combustion engines	0.882
Computer peripheral equipment	0.901	Motorcycles, bicycles, and parts	0.891
Audio & video equipment	0.904	Electronic computers	0.895
Electronic computer	0.956	Apparel made from purchased materials	0.909
Heavy duty truck	0.977	Watches, clocks, watchcases, and parts	0.932
Automobile & light truck	0.980	Motor vehicles and passenger car bodies	0.969

electronics and automobile production. More puzzling is the presence of "Dolls and stuffed toys" as a high transaction costs industry for 1987. I suspect a coding error in the original dataset, but one should not discard the possibility that stuffed toys indeed involve high transaction costs. In any case, this should alert the reader that independent sample replication is always necessary before drawing more than tentative conclusions. The lists are fairly stable over the two year points, which suggest that the measure is otherwise fairly reliable. Poultry industries, grain milling, oilseed milling tobacco and primary mineral production all come up in the low end in both years, while electronics, transport and communications equipment are found in the high end for both years.

To facilitate comparison, I use a point estimate of asset specificity for each country, calculated as

$$AS = \sum_{i}^{n} Z_i(X_{ci})$$

X_{ci} = total exports by country *c* in industry *i* to all other countries (in 1,000 $US).
Z_i = percentage of inputs by industry *i* not traded on organized exchanges or reference priced.
n = industries by country *c*.

This measure gives the absolute value of asset-specific (or high transaction costs) exports for each country. Standardized versions of *AS* are also reported as controls, in an effort to insure that the results from the non-standardized measure are not statistical artifacts. The two standardized measures used are defined as

$$AS_{POP} = \sum_{i}^{n} \frac{Z_i(X_{ci})}{Y_c}$$

$$AS_{EXP} = \sum_{i}^{n} \frac{Z_i(X_{ci})}{X_c}$$

X_c = total exports by country *c* to all other countries.
Y_c = Population for country *c* (in 1,000).

These transformations amount to comparing asset-specific exports as a percentage of a country's population and total exports respectively. A measure weighted by GDP was originally computed, but proved useless when trying to draw meaningful patterns from the data. No coherent story appeared linking asset specificity and *any* of our independent variables when using an AS_{GDP} variable; the findings for this indicator are not reported.

Point estimates and analysis of variance

This first section will look at averages calculated using my three different estimates, conduct analysis of variance on groupings of countries along the lines of my variables, and try to establish whether patterns appear in the data. The three different estimators are used in order to demonstrate that any pattern uncovered is robust across indicators, and not a coding fluke. I will look at all of the variables in turn. It is important to remember that the values for 1997 are calculated from a different source than the data for the three previous year points (see the methodology section). While the regional *rankings* can be directly compared, cross-year comparisons that directly involve the numbers should be done across the 1982, 1987 and 1992 data points only.

Regional differences

Table 2.2 gives broad regional averages in asset specific exports for all years, using the three measures. The first striking result is the mostly stable rank order of regions over the years, and over the different indicators. North America, Europe and Asia are always in the top three positions, while Latin America, Oceania and Africa are consistently in the bottom three. In terms of absolute value of asset-specific inputs of its import sector (*AS*), North America scores the top position in all years; Europe comes in second in all but one year (1992), and Asia comes in third in all years except 1992 (where it scores second). ANOVA techniques and Scheffé's multiple comparison test of means for unequal group sizes (see Scheffé 1959) reveal that in all years, the mean regional *AS* for North America, Europe and Asia are all significantly different from one another at or above the 0.05 level. Note that in table 2.2, as in all other tables of this section,

Table 2.2 *Point-estimates of value of high transaction cost export sector inputs, by world region*

AS (in US $1,000,000)

	all years		1982		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Africa	46,392	168,815	4,759	7,061	51,853	94,427	196,147	339,837	808	1,519
Asia	828,629	2,004,350	195,840	370,460	1,052,862	1,634,436	1,932,352	3,210,794	26,027	54,737
Europe	937,827	1,899,814	246,877	401,389	1,275,024	1,853,361	1,675,809	2,631,979	51,104	72,905
Latin America	78,830	206,392	24,786	53,956	89,379	155,246	213,263	351,948	4,782	13,588
North America	2,298,402	3,215,356	939,207	860,233	2,819,842	1,887,406	5,702,233	4,503,804	142,863	182,017
Oceania	69,339	120,652	23,792	34,170	99,247	98,863	177,763	183,662	5,453	9,163
F	*2637*		*1937*		*1115*		*1211*		*1862*	
p<	*0.001*		*0.001*		*0.001*		*0.001*		*0.001*	

AS_{POP} (in $US per capita)

	all years		1982		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Africa	6,392	34,598	723	1,664	10,744	37,686	23,484	69,103	331	1,454
Asia	71,334	244,900	23,676	62,473	102,148	270,466	149,388	375,684	1,778	4,817
Europe	52,631	70,312	12,434	10,716	70,127	54,482	96,242	90,648	2,960	2,549
Latin America	13,629	55,573	4,386	8,864	12,574	30,341	39,685	104,418	446	695
North America	28,546	28,274	15,690	8,830	41,111	25,883	58,856	25,474	2,992	1,011
Oceania	9,704	13,043	4,058	3,417	11,641	7,807	25,777	16,933	920	573
F	*962*		*467*		*339*		*325*		*907*	
p<	*0.001*		*0.001*		*0.001*		*0.001*		*0.001*	

AS_{EXP} (as % of total exports)

	all years		1982		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Africa	0.42	0.19	0.36	0.13	0.47	0.22	0.55	0.25	0.37	0.14
Asia	0.59	0.22	0.50	0.21	0.64	0.22	0.74	0.18	0.45	0.16
Europe	0.59	0.13	0.52	0.11	0.62	0.13	0.65	0.14	0.53	0.09
Latin America	0.50	0.21	0.44	0.18	0.55	0.20	0.63	0.22	0.39	0.11
North America	0.56	0.06	0.55	0.03	0.55	0.03	0.56	0.06	0.59	0.08
Oceania	0.43	0.11	0.36	0.06	0.43	0.10	0.52	0.15	0.41	0.07
F	*3607*		*1033*		*716*		*885*		*1524*	
p<	*0.001*		*0.001*		*0.001*		*0.001*		*0.001*	

standard errors for the means are reported at the 0.05 level. For the bottom three regions, we get a different story. While some more or less stable rank-ordering can be found, statistical testing reveals that the means for Latin America, Oceania and Africa are *not* significantly different from one another. The three regions are a more or less homogeneous block that produces imports mainly from low transaction costs industries. The difference between these three regions and the top scorers *is* statistically significant (above 0.05), lending support to this interpretation.

Average regional per capita values (AS_{pop}) give a similar story. Again, we see two distinct blocks emerge. North America, Asia and Europe score the top positions in all years, while Latin America, Africa and Oceania stay at the bottom. Interestingly, the "within-block" order for per capita values differs from the absolute value ranks. Averaging over the four years, we find top scorers ranked in the *reverse* order. Asia ranks first, Europe second and North America last. The ranking also changes from year to year. In 1997, North America and Europe's per capita export sector value of asset-specific input were not significantly different from one another, and were higher than Asia's; the same pattern is observed in 1987. In 1992 we see Europe taking the lead, with North America and Asia coming in second, not significantly different from one another. In 1982, Asia leads, with North America and Europe again not significantly different from one another, and coming in second. The bottom scorers are, again, rarely distinguishable from one another. When a difference does appear, as in 1987, Africa is the lowest scorer, and Latin America and Oceania manage to pull ahead of it a bit. The difference between the top scoring block and the low scoring block is strong in all years. Over the entire period, the low scorers' per capita contract intensity never reaches more than 30% of the top scorer's per capita value, and drops as low as 16% of it.

Also interesting is that, for comparable years (that is, excluding 1997), we see a large increase in average per capita high transaction costs exports. Over the 1982-1992 ten year period AS_{pop} increased 2751% for North America, 6740% for Europe, and 5310% for Asia, with most of the increase occurring between 1982

and 1987. Clearly, the growth rate for Europe and Asia is much higher than for North America. It would be interesting to obtain more recent data and see whether (and when) Asian and Europe's growth will be enough to allow them to overcome North America's supremacy in terms of *absolute* value.

For the bottom scorers, the increase is similar, and sometimes quite higher, although not high enough to catch up. Africa's AS_{pop} grew 3148%, Latin America and the Caribbean's increased 8050% and Oceania's increased 5353%. The bottom scorer's (Africa) per capita value represented only 3% of the top scorer's value (Asia) in 1982, but as much as 11% in 1997, which suggests that the gap is slowly decreasing. The data for 1992 gives a value of 15% however, showing that the decrease in the gap is by no means constant or straightforward.

The picture does not change much when asset-specificity of inputs is considered as a percentage of the total export value (AS_{exp}). North America, Europe and Asia vie for the top three positions, while Latin America, Oceania and Africa stay at the bottom. The only remarkable thing here are the rankings for 1992. Across all four years and all three indicators, the expected order does not hold. While Asia and Europe are still in their expected positions (first and second respectively), North America falls being Latin America and the Caribbean. Indeed, while 55% of inputs in North America's exports are contract intensive, the percentage for Latin America is as high as 63%, surprisingly close to Europe's 64%. The absolute and per capita values, however, are nowhere close (respectively 213,300,000$ and 39,685$ for Latin America versus 1,676,000,000$ and 96,242$ for Europe).

Overall, the three indicators give a consistent overall picture across our four year points. The six broad regions we have identified are significantly different from one another, and can be assigned to two broad groups. Asia, Europe and North America are consistently at the top of the distribution, and are usually significantly different from one another, but their position respective to one another is subject to change from year to year. The bottom group, Oceania, Latin America and the Caribbean and Africa, has much lower absolute and per capita values than the top scorers, and does not show a stable rank ordering amongst its

Table 2.3 *Point-estimates of value of high transaction cost export sector inputs, by New York Convention membership*

AS (in US $1,000,000)										
	all years		1982		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Non-members	251,249	823,491	75,083	216,842	517,262	1,129,741	507,003	1,221,583	1,732	5,307
Members	855,851	2,046,134	259,718	478,565	1,109,495	1,796,444	1,873,509	3,115,944	34,356	72,901
F	*4550*		*2296*		*1072*		*2246*		*2613*	
p<	*0.001*		*0.001*		*0.001*		*0.001*		*0.001*	
AS_{POP}(in $US per capita)										
	all years		1982		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Non-members	37,436	148,803	13,511	44,070	71,226	221,605	77,465	208,551	735	1,506
Members	40,412	131,994	7,867	8,548	47,346	57,421	95,205	227,480	1,671	3,585
F	*14*		*211*		*160*		*50*		*797*	
p<	*0.001*		*0.001*		*0.001*		*0.001*		*0.001*	
AS_{EXP}(as % of total exports)										
	all years		1982		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Non-members	0.51	0.22	0.45	0.18	0.58	0.22	0.67	0.22	0.40	0.15
Members	0.54	0.18	0.47	0.15	0.59	0.17	0.64	0.18	0.45	0.13
F	*607*		*106*		*28*		*110*		*1027*	
p<	*0.001*		*0.001*		*0.001*		*0.001*		*0.001*	

members. For all regions, both the absolute and the per capita asset specificity value has increased in the 1982-1992 period, but at different rates.

Membership in the New-York Convention

Using the same procedure, we turn to table 2.3 to examine whether membership in the New York Convention is associated with more or less asset specificity. This is a test of my hypothesis that contract enforcement affects asset specific transactions more than other types, and is a requisite for them. For all three indicators for the overall average figures, as well as for most year points, the average asset specificity value of exports for countries in which the New York Convention holds is higher than for non-members. While the difference is statistically significant in all cases, it is not very large and exceptions to the pattern emerge. For 1992 (for percent of exports) and both 1987 and 1982 (for per capita value), at least one of the indicators gives non-members the higher score. Using the per capita estimates, we find that non-member's asset specific export values represent about 40% of members' value for 1997, 80% for 1992, but 150% for 1987, and 170% for 1982. This clear trend towards higher inequalities between members and non-members could be explained by network externalities.

As more countries join the NYC, a higher percentage of member's international transactions fall under the rule of law. Any benefit to trade received from contracting under the rule of law would appear faster with the more members. Alternatively, we could be seeing selection bias. Members likely to be able to enforce contracts join the NYC, while members with deficient institutional structures presumably hold out. These competing interpretations have *very* different implications (one assumes that international law enforcement has a real and noticeable effect on national institutions, while the other assumes that national institutions are *prior* and determine membership in international law institutions), and deserve further study. It is important to note that the other tests, given below, indeed find that membership in the NYC has a positive effect on the value asset specific exports. Why this does not come up more clearly here is unclear, but could be attributed to the high influence of extreme values on

Table 2.4 *Point-estimates of value of high transaction cost export sector inputs, by development status*

AS (in US $1,000,000)										
	all years		1982		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Asian Tigers	2,258,000	2,026,000	803,500	386,400	3,090,000	1,412,000	4,121,000	1,814,000	84,182	17,887
Developed	1,455,000	2,413,000	416,500	566,000	1,802,000	2,089,000	3,111,000	3,416,000	84,095	112,600
Developing	245,400	1,154,000	32,201	75,684	255,000	704,800	719,000	2,144,000	6,448	16,210
Soviet/Transition	146,500	173,100	37,249	25,098	235,700	165,100	201,900	191,500	11,328	10,343
LDC	9,823	66,050	1,740	4,782	13,448	35,042	50,338	158,900	364	917
F	*5771*		*4367*		*3340*		*2468*		*3484*	
p<	*0.001*		*0.001*		*0.001*		*0.001*		*0.001*	
AS_{POP} (in $US per capita)										
	all years		1982		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Asian Tigers	268,243	337,837	101,843	87,913	342,041	288,060	507,474	428,459	11,774	9,566
Developed	61,216	71,211	15,316	9,638	78,951	50,122	129,803	82,348	3,584	2,183
Developing	25,238	148,796	6,690	31,732	34,364	173,580	62,899	242,373	454	661
Soviet/Transition	12,054	21,469	2,049	1,763	12,453	9,230	20,910	29,539	516	530
LDC	497	1,670	273	844	999	2,400	1,046	1,901	324	1,621
F	*4617*		*3237*		*1643*		*1982*		*8724*	
p<	*0.001*		*0.001*		*0.001*		*0.001*		*0.001*	
AS_{EXP} (as % of total exports)										
	all years		1982		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Asian Tigers	0.74	0.09	0.76	0.10	0.79	0.07	0.77	0.06	0.62	0.03
Developed	0.56	0.11	0.52	0.09	0.58	0.13	0.60	0.12	0.55	0.09
Developing	0.51	0.22	0.42	0.18	0.57	0.22	0.67	0.23	0.38	0.13
Soviet/Transition	0.61	0.17	0.48	0.14	0.64	0.13	0.69	0.16	0.49	0.08
LDC	0.44	0.19	0.38	0.14	0.48	0.23	0.55	0.24	0.43	0.16
F	*3345*		*1990*		*613*		*551*		*2662*	
p<	*0.001*		*0.001*		*0.001*		*0.001*		*0.001*	

averages; as we will see shortly, the distribution for NYC members is bimodal, which somewhat lessens the relevance of comparing means in this case.

Development

Regional differences exist, and are broadly stable from year to year. Contract enforcement seems partly responsible, although the relationship is not entirely clear at his point. This section will examine whether these differences are associated with other factors, and will try to determine whether development levels are correlated with differences in asset specificity. The yearly averages for AS, AS_{pop}, and AS_{exp} are given in Table 2.4. Again, direct comparisons should not be attempted with 1997.

As with regional comparisons, a fairly stable ranking of development categories emerges. Using absolute values as our starting point, the ranking for averages over each of my four data points has the Asian Tigers on top and developed countries coming in second. Developing countries and the Soviet countries exchanges places in the third and fourth position, with Soviet countries coming in the fourth place in 1987 and 1992, and in third place otherwise (and vice-versa for developing countries). Least developed countries (LDCs) rank last in all years. The same ranking holds for the pooled average of per capita asset specificity, with the Asian Tiger first in all years, the developed countries second, the developing countries third (except in 1997, where they come in second). Soviet countries come in fourth in all years (except for 1997, when they are third), and LDCs are always last. Broadly speaking, these two indicators show the same thing, that is, a rank order very close to what was expected. The only major surprise is the Asian Tigers' consistent top position, probably a reflection on their mostly export driven development strategy.

When calculating asset specificity as a percentage of the total export sector however, the rankings are more chaotic. For the overall average, Asian Tigers are still on top, but the Soviet/Transition countries come in second. Developed countries come in third, developing fourth and LDCs last. In short, the order is mostly the same, but Soviet countries score much higher than expected. For most individual year, values reported as a percentage of exports, however, are

not ranked in a manner consistent with my expectations, much like the regional classification results. This is puzzling, suggesting that percentage of export might not be of much use as an indicator.

Looking at the other indicators, we can see some trends. The gap between developed and developing countries seems to have been slowly shrinking between 1982-1992. The per capita asset specificity ratio of developed to developing countries is 2.5 in 1982, drops to 2.2 in 1987 and drops again in 1992, to 2.0. The ratio (again using per capita values) of developed to least developed countries however shows evidence of a dramatically increasing gap. In 1982 the ratio was 76.5, it increased to 93.9 in 1987, and to 129.6 in 1992. This increase can largely be attributed to LDCs' failure to keep pace with the developed economies. While LDCs' per capita asset specific exports increased about 284% in the 1982-1992 ten-year period, developed countries' asset specific imports increased almost 750%, over twice as much. The Asian Tigers growth in asset specific exports (again, per capita) is not as impressive as developed countries (398% over the period), suggesting declining marginal return for their development strategy. In 1982, Asian Tigers' asset specific exports were 6.7 times those of developed countries, 4.3 times in 1987, and 3.9 times in 1992. The gap is narrowing, and it would be very interesting to look at figures for today. It seems that the Tiger's aggressive export oriented development policies have had a clear effect on the relative asset specificity of their export sector, and has given them clear precedence over all others in this domain, but that the steam is slowly running out, and the four Tiger economies are moving towards levels comparable to developed nations.

Income Category

The income measure used is a four-category scheme based on the World Bank's GNI per capita measures. The data is given in table 2.4. The most striking feature here is that for most years, income categories do not line up with asset specificity in any meaningful manner when using the absolute measure, or the proportion of total exports. A pattern only emerges when using the per capita measure, and is stable across our three years (no income classification was

Table 2.5 *Point-estimates of value of high transaction cost export sector inputs, by income group*

AS (in US $1,000,000)								
	all years		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Low	431,800	1,987,182	498,497	1,254,711	1,201,996	3,494,526	948	2,353
Lower Middle	189,532	400,889	185,028	245,606	339,784	571,019	6,841	18,621
Upper Middle	395,657	822,742	426,540	858,431	678,298	984,302	9,778	16,006
High	1,698,335	2,607,007	1,813,991	2,099,078	2,994,370	3,352,551	70,698	100,465
F	4080		2481		2272		3350	
p<	0.001		0.001		0.001		0.001	
AS_{POP} (in $US per capita)								
	all years		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Low	1,748	4,734	1,750	2,994	4,566	7,665	264	1,410
Lower Middle	11,228	22,529	11,686	26,858	19,697	23,684	168	154
Upper Middle	80,302	271,474	89,916	269,652	135,922	353,511	838	854
High	99,873	175,587	108,031	152,668	175,751	227,597	4,118	4,650
F	2381		874		1341		4704	
p<	0.001		0.001		0.001		0.001	
AS_{EXP} (as % of total exports)								
	all years		1987		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Low	0.52	0.22	0.58	0.23	0.67	0.23	0.42	0.14
Lower Middle	0.58	0.21	0.62	0.17	0.69	0.21	0.39	0.11
Upper Middle	0.57	0.24	0.61	0.25	0.65	0.22	0.42	0.15
High	0.55	0.14	0.54	0.15	0.59	0.13	0.50	0.14
F	348		280		457		977	
p<	0.001		0.001		0.001		0.001	

available for 1982). All per capita means are significantly different from one another, except for 1997, where 'lower middle' and 'low' income countries did not differ significantly in their asset specificity. For 1997, the lowest income group's per capita asset specific exports represent only about 4% of the highest income group's. For 1992, this figure is around 2%; up from around 1% in 1987. While this is an indication that the gap is narrowing, we cannot say that much progress was made over the 5 year period.

While a trend is observable for per capita measures, no meaningful pattern emerges for absolute values and percent of export values. This lack of reliability across our indicators should raise doubts as to whether the pattern is meaningful. We must conclude here that while there does appear to be a meaningful relationship between per capita asset specificity and per capita income, the overall pattern is much less clear than for development. High transaction cost industries are much more obviously related to a countries' development status than to its income level. This is puzzling, given the link between income and development, and even more puzzling given that more rigorous testing (reported below) gives a different and more coherent story. This points to the problematic nature of means, especially in the presence of highly skewed data and large outliers as is the case in this data.

Education

Education is one of the development sectors for which I posit a strong positive association with high asset-specificity transactions. As I have done for the other indicators, I now examine whether contract intensity and education are linked in any significant way. Proceeding as with the other variables, I turn to gross secondary education enrollment ratios, given in table 2.6a. Data are only available for 1992 and 1997.

Overall, the expected pattern holds across all indicators. The only exception is for asset specificity as a percentage of total exports in 1992. This has already been commented upon earlier, and seems to be a function of export patterns in 1992, which deserve further exploration. In the other cases, the predicted relationship holds. In two cases, some adjacent categories are not

Table 2.6a *Point-estimates of value of high transaction cost export sector inputs, by gross secondary enrolment*

AS (in US $1,000,000)						
	all years		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.
0-25%	6,307	33,140	22,045	60,278	299	493
25-50%	887,746	2,749,451	1,723,932	3,640,904	1,877	3,228
50-75%	218,631	437,953	421,889	545,348	12,729	24,459
75-100%	1,074,317	2,529,080	1,757,957	3,063,840	27,710	83,575
>100%	1,221,669	2,317,511	2,498,286	2,872,586	75,485	88,973
F	*681*		*579*		*1476*	
p<	*0.001*		*0.001*		*0.001*	
AS_{POP}(in $US per capita)						
	all years		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.
0-25%	683	3,722	2,410	6,785	24	25
25-50%	10,812	20,829	20,435	25,468	618	2,084
50-75%	56,696	273,500	112,338	377,389	330	475
75-100%	64,866	181,010	106,236	223,225	1,532	3,221
>100%	67,488	90,676	138,528	88,295	3,707	2,356
F	*347*		*272*		*2623*	
p<	*0.001*		*0.001*		*0.001*	
AS_{EXP}(as % of total exports)						
	all years		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.
0-25%	0.40	0.18	0.49	0.21	0.37	0.15
25-50%	0.60	0.24	0.77	0.20	0.43	0.15
50-75%	0.54	0.24	0.67	0.24	0.41	0.14
75-100%	0.58	0.19	0.67	0.17	0.44	0.14
>100%	0.53	0.10	0.56	0.06	0.52	0.11
F	*1292*		*1173*		*827*	
p<	*0.001*		*0.001*		*0.001*	

Table 2.6b *Point-estimates of value of high transaction cost export sector inputs, by gross tertiary enrolment*

AS (in US $1,000,000)						
	all years		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.
0-20%	489,873	1,852,089	1,017,341	2,574,004	4,719	16,044
20-40%	1,074,107	2,431,292	1,700,683	2,886,293	9,493	13,342
40-60%	897,919	1,681,565	1,744,871	2,091,845	88,893	97,565
60-80%	2,325,673	4,339,808	10,760,912	0	96,541	157,011
80-100%	1,486,173	1,081,158	2,344,031	0	125,964	0
F	*438*		*1260*		*2676*	
p<	*0.001*		*0.001*		*0.001*	
AS_{POP}(in $US per capita)						
	all years		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.
0-20%	33,591	146,176	69,724	205,163	357	1,266
20-40%	80,630	248,724	127,491	303,888	1,008	1,380
40-60%	44,954	75,019	88,431	88,411	3,424	2,736
60-80%	10,693	16,247	42,222	0	2,361	1,190
80-100%	53,555	39,151	84,619	0	4,299	0
F	*199*		*88*		*3204*	
p<	*0.001*		*0.001*		*0.001*	
AS_{EXP}(as % of total exports)						
	all years		1992		1997 comparison	
	mean	s.d.	mean	s.d.	mean	s.d.
0-20%	0.53	0.25	0.69	0.23	0.39	0.15
20-40%	0.59	0.19	0.67	0.16	0.44	0.14
40-60%	0.51	0.12	0.50	0.11	0.52	0.12
60-80%	0.50	0.10	0.56	0.00	0.48	0.11
80-100%	0.58	0.01	0.59	0.00	0.56	0.00
F	*248*		*683*		*821*	
p<	*0.001*		*0.001*		*0.001*	

significantly different from each other (40%-60% and 60%-80% in the per capita measure for 1992, and the bottom two categories for the absolute measure in 1997), but this does not affect the general finding.

Looking at tertiary education for the same two years (table 2.6b), the pattern is much less clear. While the data for year 1997 shows (more or less) the expected pattern, the 1992 data shows no interpretable relationship. Per capita means for 1992 are not significantly different from each other, absolute values show no pattern, while percent export values show a relationship *inverse* to the expected one. Given how stable the pattern was for secondary education, this is somewhat surprising.

Logistic Regressions

The previous section showed that some patterns were discernible in the association between asset-specific exports and a variety of indicators. But these trends were not always clear, or very stable. Clearly, the indicators say *something* about asset-specificity, but skeptical readers will (fairly) ask whether this is meaningful or more the product of wishful interpretations. In this section, I will try to answer that question by examining whether *statistically significant* relationships exist between the share of high transaction cost industries in a country's export sector and the same six indicators already used in the previous section. The previous section's primary goal was mainly to describe the data; this section explicitly tests the direction and strength of the patterns uncovered.

To do so, I use logistic regression techniques to estimate the likelihood of a country having higher than average asset specificity, conditional on the membership in the categories of my independent variables. The results will be reported as odd ratios, meaning that the likelihood will be expressed as a comparison to a base category. More formally, the model used is:

$$\Omega(\mathbf{x_i}) = \frac{\Pr(y = 1 \mid \mathbf{x_i})}{\Pr(y = 0 \mid \mathbf{x_i})} = e^{\mathbf{x_i}\boldsymbol{\beta}}$$

where the $\mathbf{x_i}$ is the set of possible values for each of my variables *i*. For multinomial independent variable, odds ratios are reported as comparisons to a reference category. For categorical independent variables, if *n* is the reference category, then for category *m* the reported odds ratio will be $\Omega(n_i)/\Omega(m_i)$, and the reference group is reported as $\Omega(n_i)/\Omega(n_i)$, (i.e. 1.00). For more details on logit models used for binary dependent variables, see Long (1997, chapter 3).

For the logit regressions, I recoded transaction costs measure as a dichotomous variable, with a cutoff point at the mean. I used the per capita measure of asset specificity (AS_{pop}) for my calculations. For every year point, the mean per capita asset specificity is substantially higher than the median value and is in fact much closer to the 75th percentile. The per capita mean for 1982 was $13,814 (compared to median $3,517 and 75th percentile at $13,860); for 1987 the mean was $66,937 (median $18,351, 75th percentile $89,421); for 1992 $100,828 (median $31,819, 75th percentile $109,645) and for the 1997 comparison year $1,288 (median $208, 75th percentile $1,337). Using the mean as the cutoff point allows me to more adequately capture the highly unequal and polarized character of the distribution than using the median would. The mean was calculated yearly, rather than over the whole period, to reflect year-to-year growth. The unit of analysis is therefore the country-year.

Regressing my dummy asset specificity measure on year revealed a small positive correlation significant at the 0.05 level. A given country was slightly more likely to have higher than average asset specificity as time elapsed. Therefore, all reported odd ratios were corrected by including year of observation as an independent variable for each regression. Results obtained without correcting for year (not reported) did not differ significantly from the corrected results. Table 3.1 gives the (corrected) odds ratios.

Looking first at regional comparisons, we see a clear trend emerge. As before, countries in North America, Europe and Asia are much more likely to have above average asset specificity than countries in Oceania, Latin America and Africa, something we already knew from the mean comparisons in section 1. Looking at the odds ratios, we can see just how much more likely; I use the

Table 3.1 *Likelihood of higher than average asset specificity*

	Odds Ratio	χ^2	*Pseudo-R^2*
Year			
n=616			
5 year increase	1.03*	4.08*	0.006
Region[1]		143.43***	0.24
n=616			
Europe	62.42***		
North America	61.69***		
Asia	16.70***		
Oceania	7.02*		
Latin America	4.49*		
Africa	1.00		
NYC[1]		25.23***	0.04
n=605			
Members	2.68***		
Development[1]		202.83***	0.37
n=600			
Developed	294.88***		
Developing	12.42*		
Soviet/Transition	6.80		
LDCs	1.00		
Asian Tigers	$\emptyset^a$		
Income[1]		216.45***	0.47
n=454			
High	325.48***		
Upper-middle	48.27***		
Lower-middle	1.13		
Low	1.00		
Secondary enrolment[1]		105.63***	0.39
n=253			
25% increase	6.07***		
Tertiary enrolment[1]		56.19***	0.22
n=229			
20% increase	3.95***		

*p<0.05 **p<0.01 ***p<0.001

[1] Controlling for year

[a] Category predicts success perfectly, observations dropped from regression

Reference category indicated by odds ratio of 1.00

lowest scoring region as the reference category. European and North American countries are both about 60 times more likely than African countries to have higher than average asset specificity. Asia, while a top scorer, is only about 16 times more likely than Africa to have countries with higher than average specificity. Given the very high proportion of mass produced goods and the importance of textiles in Asia's imports (both of which have low to medium transaction costs), these results seem much more realistic than those reported in the previous section, where Asia's mean per capita asset specificity was higher than Europe and North America in most years; the earlier reported regional means for Asia could have been inflated by outliers (such as the Tigers). For the bottom scorers, Oceania is first, pushed up by Australia and New Zealand. Latin American and Africa come last. All reported differences in odds are significant at least at the 0.05 level. The overall effect of regional location is significant at the 0.001 level, and accounts for about 24% of the observed variation in outcomes.

For most regions, finer-grained geographical comparisons were not possible using logit models. For Africa, all but one sub-regional classifications perfectly predicted relative asset specificity. *All* Middle-, Northern-, Southern- and Western- African countries had below average asset specificity. The only region for which there was variation, East Africa, had 3 (out of 61) country-years (Mauritius in 1987 and 1992, and Comoros in 1997) with higher than average asset specificity. With so little variation, statistical procedures are pointless. The same goes for Latin America (no countries with above average asset specificity in Central and South America, and only 8 out of 21 with higher than average specificity in the Caribbean). Sub-regional comparisons for Oceania are very similar, where the only high scorers were Australia and New Zealand. North America is a rather special case. For the four North American countries (Canada, the United States, Bermuda and Greenland), all cell frequencies come out equal. Therefore, no statistical inference is possible.

This leaves only two sub-regions where internal variation was high enough to allow statistical analysis, Asia and Europe. Results for these two regions are given in table 3.2. As we can see, East Asia seems to be the driving

Table 3.2 *Likelihood of higher than average asset specificity, Europe and Asia*

	Odds Ratio	χ^2	*Pseudo-R^2*
Europe[1]		59.93***	0.36
Western	417.33***		
Northern	64.17***		
Southern	21.54**		
Eastern	1.00		
Asia[1]		14.62**	0.10
East	5.75***		
West	1.13		
South-East	1.00		
South	$\emptyset^a$		
Central	$\emptyset^x$		

*p<0.05 **p<0.01 ***p<0.001
[1] Controlling for year
[a] Category predicts failure perfectly
[x] No data
Reference category indicated by odds ratio of 1.00

force behind Asia's high asset specificity. By comparison to the lowest scoring region, South-East Asia, East Asian countries are over 5 times more likely to have higher than average asset specificity. Western Asia is not significantly different from South-East Asia (but is significantly different from East Asia, with p<0.001). All South Asian countries were low scorers, and no data was available for Central Asia.

Results for Europe put Eastern Europe at the bottom. Given the very low scores for Transition economies, this is not unexpected. Southern European countries were 21 times more likely than Eastern Europe to be above average in terms of asset specificity, Northern Europe 64 times and Western Europe over as much as 450 times more likely. The total variance explained by sub-regional membership in Europe is around 35%, much high than in Asia (about 10%), and higher than for world regions as a whole (24%). This suggests that geographical differences in economic structure are more marked in Europe than elsewhere.

Going back to the results in table 3.1, we can explore the possibility that these observed differences may be attributable to institutional factors. Membership in the New York Convention (NYC) doubles a country's odds of having higher than average asset specificity. The effect is significant at the 0.01

level, but accounts for a rather modest portion of the observed variance in outcomes (about 4%). This is evidence in favour of hypothesis a) that contract enforcement affects high cost transactions more than low cost transactions; the effect however is of a much smaller magnitude than might be expected. On closer examination, this might not be so relevant. The New York Convention is but one measure of contract enforcement, and an imperfect one at that. The capacity to sue an international business partner in his country's courts in case of breach is only useful to the extent that these courts are effective, and to the extent that enforcement authorities can actually enforce court ordered sanctions. In this context of information asymmetry, the possibility of actually establishing who is at fault in case of breach is not trivial. It is of little use to sue a cheating business partner if the cheating cannot be established in court, which in turn will be dependent on the quality of policing institutions. Thus, even for international transactions, national level legal and enforcement institutions should have a large impact, one not measured here. Further studies should account for this.

The results for the development variable are also clear (and significant at the 0.001 level). Using the least likely category as our comparison point, we see that developed countries are almost 295 times more likely than LDCs to have higher than average transaction costs in their export industries. Developing countries' performance is much less impressive, but they are still about 12 times more likely than LDCs to have a higher than average score. Soviet/Transition economies did not do as well as developing countries, and were only about 6 times more likely than LDCs to have above average specificity. This difference, however, is not statistically significant. No odds are reported for the Asian Tigers, because *all* 'Tiger' economies had higher than average asset specificity. It is interesting to note that development is a 'better' predictor than regional category (0.37 compared to 0.24). A model was run including both region and development (results not shows), from which the marginal gain in fit of adding the development variable was calculated to be about 0.16, or 16% extra explained variance. Development status is a more powerful predictor than region alone, suggesting it to be an important explanation for differences in asset specificity.

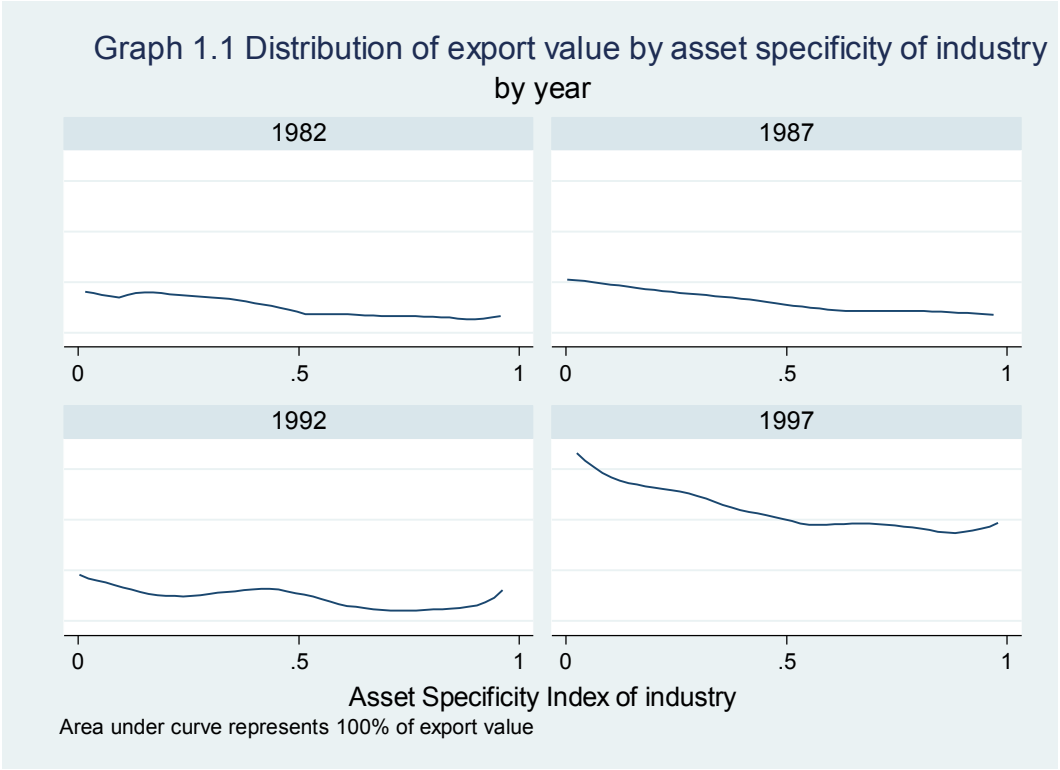
Income level is an even better predictor of asset specificity. Regressing asset specificity on income category (and year, as will be remembered) explains as much as 47% of the total observed variance. Comparing marginal increases in the *Pseudo-*R^2 across nested models (results not shown) shows that income category explains 13% more of the variance than development status alone, 27% more than regional membership, and 13% more than region and development status together. Thus, per capita income is significantly linked to asset specificity, over and above development status. This is *despite* development status and income level being strongly correlated themselves (*pseudo-*R^2 of 0.32 for an ordered logit regression between the two). The likelihood of a country having above average asset specificity in its export sectors grows exponentially with per capita income. While lower-middle income countries are as likely as low income countries to have above average scores, upper-middle countries' likelihood is 48 times that of low income countries, and high income countries' is an impressive 325 times higher than low income countries.

The last two variables included examine the link between school enrolment and asset specificity in the export sector. Both secondary and tertiary enrolment are significantly linked with a higher likelihood for a country of having higher than average asset specificity in the export sector ($p<0.001$). To test for the relationships, I used the same ordered categorical variables as in the previous section. Using a continuous measure of both secondary and tertiary enrolment did not change the significance, magnitude or direction of the results. For every 25% increase in gross secondary enrolment, a country's likelihood of having higher than average asset specificity is multiplied by about 6. For tertiary enrolment, every 20% increase in gross enrolment (rather than 25%) multiplies a country's odds by almost 4. In short, increases in educational enrolment are associated with large increases in a country's likelihood of having higher than average asset specificity. Secondary enrolment explains more of the observed variance than tertiary enrolment (39% versus 22%), but the explained variance for both is large, and comparable to the effect of development status, or of regional differences.

The overall results of the logistic regressions are much clearer than what could be found by looking at means alone. Europe and North America are the most likely to have high asset specificity, followed at a considerable distance by Asia. Oceania, Latin America and Africa are at the bottom of the distribution, with Africa the least likely of all to have high specificity. Developed countries have the highest likelihood, and developed countries are very far behind them. LDCs' probability of having high transaction cost industries is virtually nil. All Asian Tigers had high asset specificity, while no Soviet country did. The likelihood of high asset specificity also went up with income, and both secondary and tertiary education enrolment. All of these findings support hypothesis b) that high transactions costs are positively related with development outcomes. New York Convention members are also more likely to have high asset specificity, but national level measures of adequacy of contract enforcement should be included in further studies.

Smoothed value curves

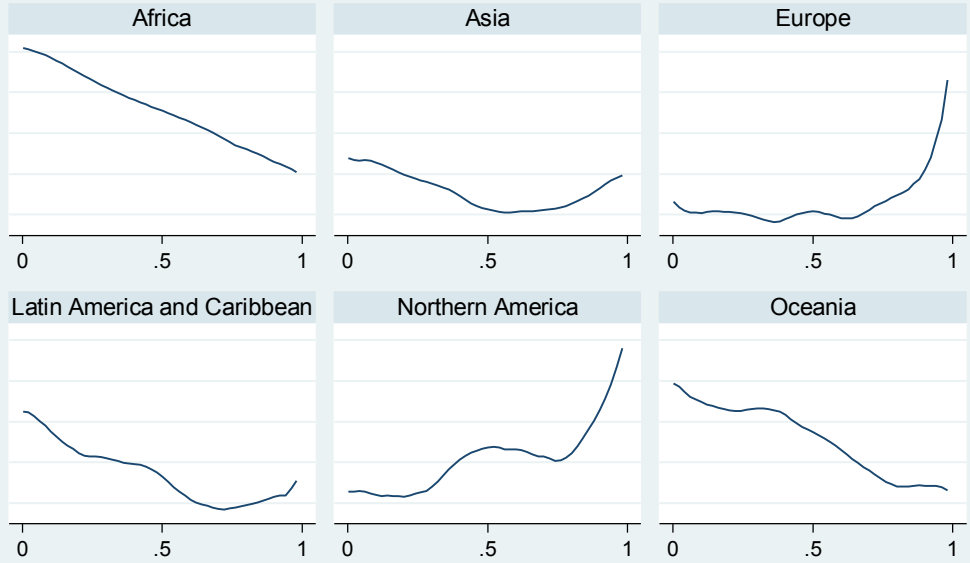
While the previous two sections looked at point estimates only, this last section will look at the distribution of value in the export sector, with reference to the asset specificity of industry inputs. To do so, I will give smoothed distribution curves graphing the percentage of value exported over our continuous contract intensity index. In each graph, the element of interest is the *shape* of the curve, rather than its height. All curves have been drawn so that the total *area* under them represents total export value. The relative sizes of export sectors, or in other words the actual dollar value of the total export sector, are *not* represented in the graphs. The height of the curve is determined by the number of observations used to draw it; the smaller the number, the higher the curve. It does *not* reflect the size of total export value. Sizes and rankings were discussed in section one, to which the reader should refer for additional information. Again, the now usual variables will be used to examine the relationship between export values and different institutional settings. Each graph is drawn using the within group average values, averaged over the four year points. For each graph, the y-coordinates give export



values as percent of total exports while the x-coordinates give contract intensity by industry as a continuous measure running from 0 to 1. Contract intensity, it will be remembered, serves as a proxy for transaction costs. The more contract intensive, the more costly the transaction. While high transaction costs are an indicator of high asset specificity, high uncertainty and low frequency, I refer to only asset specificity in an effort to alleviate the text.

Graph 1.1 shows the asset specificity distribution for each of the four years. As can be seen, very little change is observable over the twenty year period. The curves for 1982, 1987 and 1992 are, to all practical purposes, flat, while the curve for 1997 is downward sloping between 0 and 0.5, and then stable, indicating that a slightly larger percentage of export value clusters in low specificity industries than in previous years. The most noticeable feature is the lack of polarization over the period, which would be indicated by a U-shaped curve with the bottom centered on the middle. Again, because of this lack of major substantive difference amongst the years, I will use all years pooled together for the graphs presented below.

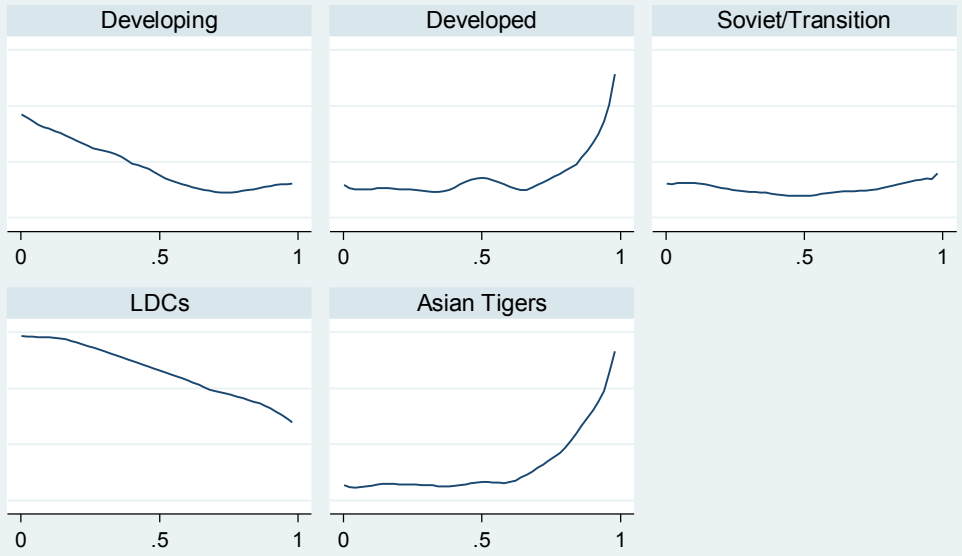
Graph 1.2 Distribution of export value by asset specificity of industry by region



Area under curve represents 100% of export value

Regional value distribution curves, given in graph 1.2, add interesting information to the that already obtained in the previous two sections. The curve for Africa is a straight, constant downward slope. The value generated by a given industry steadily declines as industries' transaction costs rise. What value is generated comes mostly from low specificity industries. Asia's value curve comes closest of all regional curves to a U-shaped, bimodal distribution curve, consistent with the polarization among its sub-regions found in section 2. The curve is negatively sloped until about the middle of the graph, which represents the middle-range specificity industries. The curve then starts rising steadily, and keeps rising to the end; export sector value clusters at both ends of the asset specificity spectrum, with a relatively empty middle, clearly showing the internal dynamics already observed in section 2, where East Asia (China, Hong Kong, Taiwan, Japan and South Korea) leads the way with higher than average asset specificity of exports. Europe's curve shows a large proportion of the value originating in high transaction cost industries. Of all the regional curves, Europe's is the closest to an ideal-typical high specificity exporter curve. North America's

Graph 1.3 Distribution of export value by asset specificity of industry
by development status

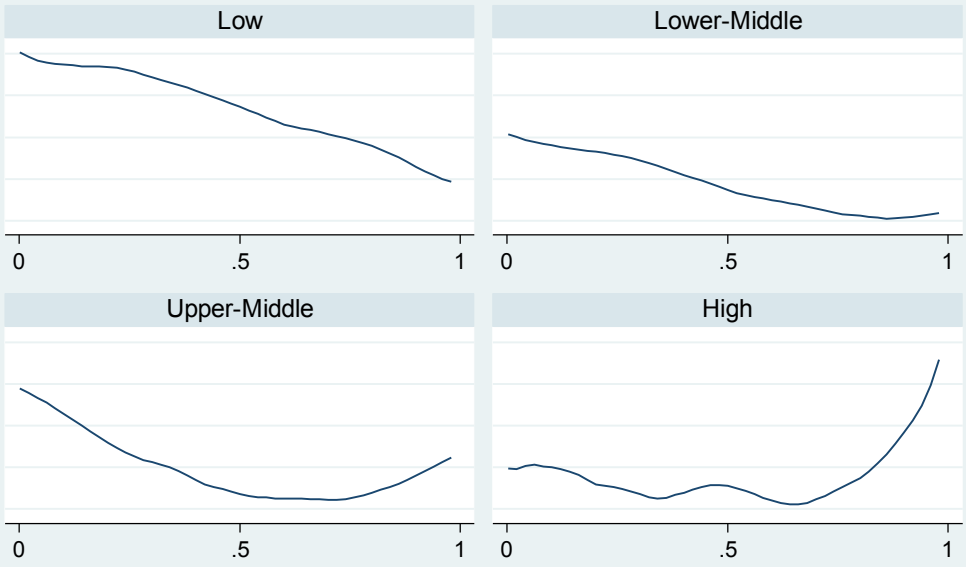


Area under curve represents 100% of export value

curve offers an interesting comparison. Like Europe, a large portion of its export value is found at the higher specificity range, making North America a clear 'high specificity' case. But unlike Europe's, the North American curve has a large 'bump' right in the middle, indicating a large portion of export value originating in middle–range specificity industries. Latin America's curve is mostly downwards, like Africa's, but it curls up at the end, indicating the presence of a small but non-negligible high asset specificity sector. The curve for Oceania is downward sloping also, with slight 'bumps' in value in the lower-middle range, and at the higher end, reflecting the very different economies in the region.

Graph 1.3 gives the smoothed frequency distributions for each development category. Looking at the curves, we can immediately see an obvious difference in the distributions for developed countries on the one hand, and developing on the other. Developed countries have a clear positive curve, with a substantial portion of the export value clustering in the higher asset specificity industries. The same goes for the four Asian Tigers, for which the value clustering in the higher asset specificity industries is even more marked. For these two groups, asset specific industries are obviously a very important source of export

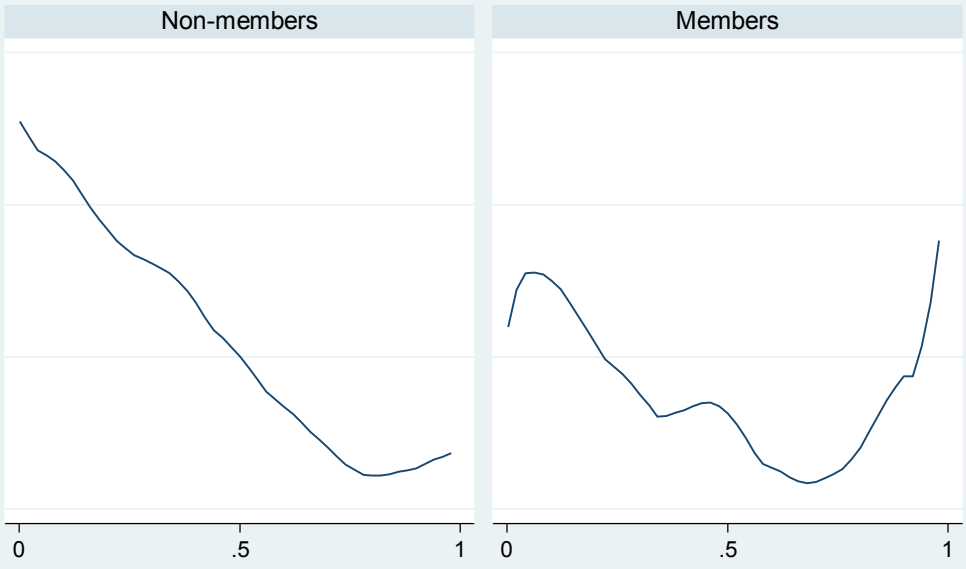
Graph 1.4 Distribution of export value by asset specificity of industry
by income category



revenue. Developing countries have curves that suggest an almost exactly opposite interpretation. The value distribution curve is negatively sloped, and stabilizes in the high asset specific industries. The vast majority of export value clusters in the least asset-specific industries, and value goes down as asset specificity goes up. For the 'Least Developed Countries' (LDCs), the picture is the same, with the exception that export values do not stabilize in the higher specificity industries. The value keeps falling as asset specificity increases. The Soviet countries are an intermediate case, with a somewhat larger, albeit small, portion of the value originating in low and high asset specificity industries, giving a very ‘low-peaked’ bimodal distribution. This is again a clear indication that types of transactions are not evenly distributed across the globe. High transaction cost transactions are clearly associated with developed countries.

Graph 1.4 gives export values by industry for the World Bank's four income groups. Whereas a clear relationship between asset specificity and income group could not be uncovered in the first section, the graphs reveal a clear progression in curves as income goes up. For low-income countries, we have a curve very similar to LDCs. Value contributed by export industries goes down as

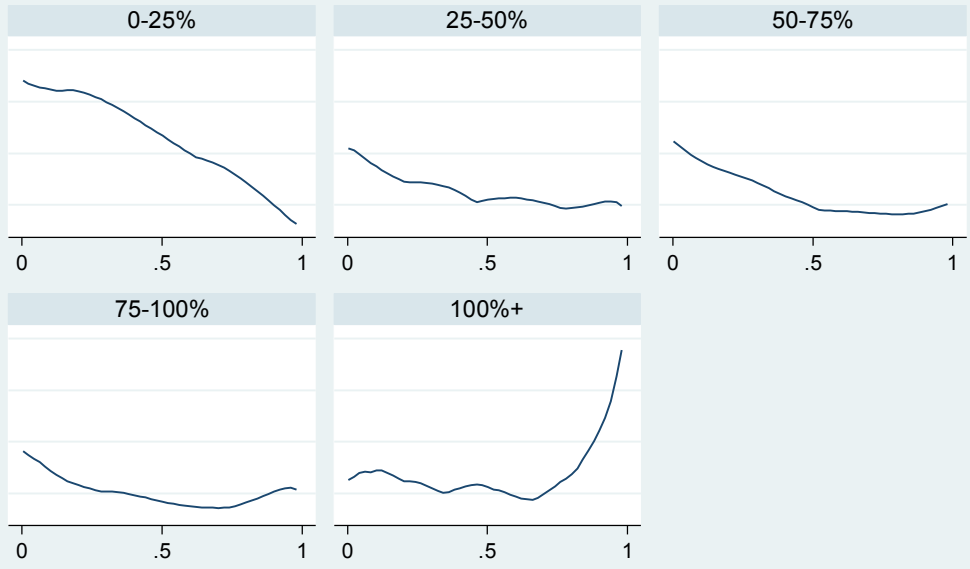
Graph 1.5 Distribution of export value by asset specificity of industry
by New York Convention membership



asset specificity goes up. For lower middle-income countries, the relationship is close to the one observed for developing countries. Value goes down as asset specificity goes up, but stabilizes for industries with the highest specificity levels. In both cases however, only a very small portion of exports are from high asset specificity industries, and the vast majority of the value originates from low specificity industries. The upper turn in the lower specificity industries becomes more pronounced for upper middle countries, where a more substantial portion of export value is found than previously. The turn is complete for high-income group, where a substantial portion of value comes from high asset specific industries, and the share of low specificity industries is greatly reduced. The progression could not be clearer. From almost no value coming from high transaction cost industries to a majority of the value clustering there, we can clearly observe the relationship between per capita GDP and asset specificity.

Looking at membership in the New York Convention, graph 1.5, we again observe two vastly different curves. For non-members, the value of exports largely clusters in low asset specificity industries. As we look at more and more specific industries, the value curves drops steeply until it reaches a turning point

Graph 1.6a Distribution of export value by asset specificity of industry
by gross secondary enrollment

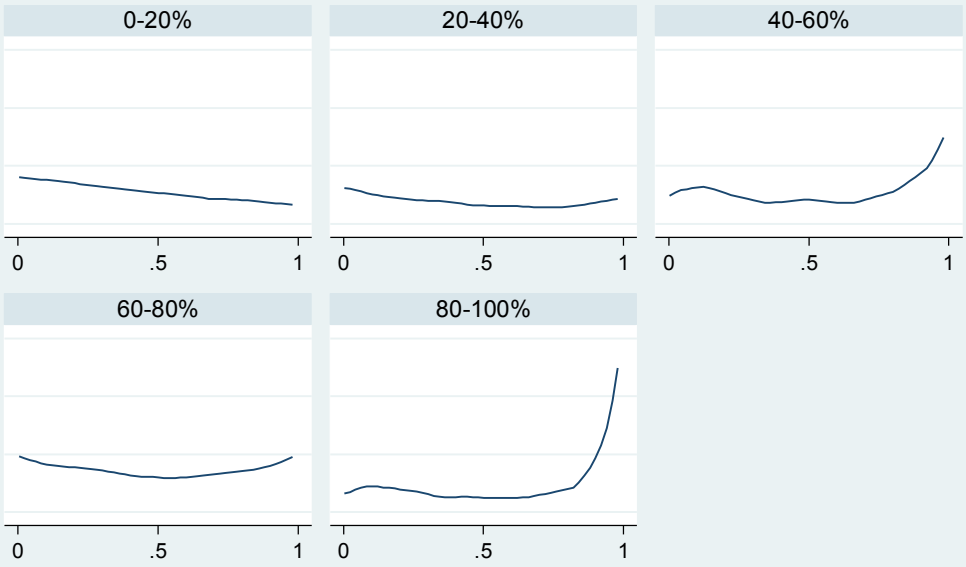


Area under curve represents 100% of export value

at around 0.75, after which there is a very small upturn. Countries that cannot enforce international contracts clearly have an export sector in which high transaction cost industries play a very small part. For member countries, the story is somewhat less straightforward. Export value for members has a bimodal distribution, with peaks in the low and high end of the curve. For non-members, value goes down with asset specificity, until a turning point is reached and the curve stabilizes. For member countries, the curve continues to climb. Asset specific industries are the source for a much higher percentage of the exports for member countries than for non-members. What this graph shows yet again is that the capacity to enforce contracts has a clear impact on the relative success of transaction types.

The last two graphs give the smoothed value curves for gross enrolment in the secondary and the tertiary sector. Graph 1.6a gives the curves for my secondary enrolment categories. For countries with enrolment between 0 and 25%, most of the export value comes from low specificity industries, and each industry's share steadily declines as they increase in specificity, with the higher portion of the spectrum contributing almost nothing to export value. Looking at

Graph 1.6b Distribution of export value by asset specificity of industry
by gross tertiary enrollment



Area under curve represents 100% of export value

the 25 to 50% group, we see the curve becoming flatter. Low asset specificity industries still contribute a relatively larger portion of export value, but the distribution is much more balanced. The curve for countries with enrolment between 50 and 75% is very similar. As we move to the 75 to 100% enrolment group, the upper portion of the curve starts to rise very slightly. The asset specific industries are beginning to account for an important percentage of export value. For countries with above 100% enrolment, the transition is complete. High asset specificity industries contribute a disproportionately large share of export value. Overall, as secondary enrolment rises, we see the value curves slowly shift from downward sloping, to straight, to exponentially increasing. Graph 1.6b gives the curves for gross tertiary enrolment. The results are the same as with secondary enrolment, but the transition is quicker. From 0 to 20% and from 20 to 40% enrolment, the curves are mostly flat. Looking at 40 to 60% and 60 to 80% enrolment, we see the higher portion inflate, although the increase is more marked for the lower of the two groups. Finally, as we reach 80 to 100% tertiary enrolment, the same exponentially increasing curve emerges, indicating a very large share of export value emanating from the higher specificity industries.

Discussion and concluding remarks

What can we conclude from the evidence? First, there is a substantial difference across the different regions of the world in the prevalence of high transaction costs industries in their export sectors. Dicken's (2003) three economic cores, North America, Asia and Europe, have the higher average asset specificity in their export sectors when measured as an absolute or a per capita value. Oceania, Latin America and Africa have the lowest scores. Logistic regressions models evaluating the impact of regional category on the likelihood of a country having higher than average asset specificity in its export sector gives similar result, putting Europe and North America on top, followed by Asia, followed by Oceania, Latin America and Africa coming in last. Distribution measures show a high share of high transaction costs exports for North America, Europe and Asia, but relatively flat distributions for the other three regions.

Second, membership in an international contract enforcement institution, the New York Convention, increases the likelihood of a country having higher than average specificity. Distribution curves show that non-member countries have a higher proportion of their exports in low specificity industries, while the distribution is bimodal (peaks at low and high specificity) for member; in short, formal mechanisms of enforcement do make a difference. While simple, low transaction cost industries do indeed seem not to depend on a formal legal system, high transaction cost industries do. This is an important qualification to the 'Lawlessness and Economics' argument, and could have important policy implications for the future. This is preliminary evidence in favour of hypothesis a), and is in line with evidence uncovered by Nunn (2007), Leeson (2008) and Moenius & Berkowitz (2010).

Third, differences in transaction costs are related to a variety of institutional indicators. Developed countries are inevitably home to much more high transaction cost export industries than developing countries, among which the so-called 'Least Developed Countries' are clearly to be found at the bottom. This is true using both ANOVA comparisons and logistic regression models. High income and high educational enrolment (both secondary and primary) are also

both associated with a higher than expected number of high transaction cost industries. These relationships are only a first step along the way, but they do provide evidence that the transactional make up of a countries export sector is related to its development performance. However, which is prior to which remains an unsolved question. The evidence presented is equally compatible with an interpretation giving high transaction cost industries as a motor of development, as with an interpretation giving developed country institutions as a prerequisite for setting up successful high transaction cost sectors. But putting aside causal order, this is good evidence in favour of hypothesis b). There does exist a link between high transaction costs in export industries and development related institutions.

The evidence is not unproblematic however. Some inconsistencies emerged, and need to be considered seriously before the conclusions drawn can be considered solid. First and perhaps most importantly, any sort of meaningful ranking order disappeared when comparing mean asset specificity values *standardized by GDP*. There could be theoretical reasons why this is be the case. For instance, some of the processes posited might be argued to be much more responsive to asset specificity relative to *population* rather than GDP. But this argument remains a *post hoc* attempt to explain an unexpected finding. Future research should address this issue directly.

A second problem emerges when comparing average values across different indicators. North America, Europe and Asia always come on top, but the rank order among them changes from year to year, and from indicator to indicator. This is problematic. That the structure of these regions' economies would change that much in a 5 year period is highly unlikely. That Asia should pull ahead of Europe and North America in a few places is also surprising. The same thing goes for income categories. In most years, average absolute values per income category show essentially no pattern. Per capita values are better behaved, but the highest income countries still score lower than upper-middle ones. This is all the more surprising given that logistic regressions using the same data show a clear increase with income of a country's likelihood of having higher than average asset

specificity in its export sector, and a clear rank-order for geographical region. This could be indicative of the problematic nature of using means (they hide distribution issues, and given the highly skewed nature of the data, might provide unreasonable central tendency estimates), but could also be a problem with data collection and comparability across countries.

Hopefully, further research will be able to circumvent some of these problems. I feel confident that the patterns uncovered are indicative of an actual relationship between contract enforcement, types of transactions and development outcomes, but I must also point out that better adapted data will be necessary before proceeding forward. This may involve focusing on smaller geographic scales, such as continents, regions, countries or even sub-country units like states or provinces; one will have to trade scope for depth.

Appendix I

Asset specificity data, available from Nunn (2007) and trade flows data from Feenstra *et al*. (2005) were not reported in the same industry classification code. To run the analyses, a concordance scheme had to be devised in order to match the two datasets.

First, the I-O industry categories were transferred to their equivalent 1987 SIC categories. An I-O to SIC concordance is available from BEA, and included in the documentation for the 1992 benchmark Input-Output Accounts. In the tables given, a few SIC categories match more than one I-O category, meaning that the value reported for some of the SIC category are captured by more than one category in the I-O classification. In those cases, the categories were matched manually, based on the category definitions provided by the US Census bureau (for SIC) and by BEA (for I-O). Care was taken to match definitions as closely as possible. The vast majority of these overlaps were in agricultural and food industries. For example, the total value reported under SIC category 0259 "Poultry and Eggs, not elsewhere specified" was reported under I-O categories 10100 "Dairy Farm Products", 10200 "Poultry and Eggs", 10301 "Meat Animals", 10302 "Miscellaneous Livestock", etc. It was matched to I-O category 10200. Most overlaps were similar, and "not elsewhere classified" SIC industries were always assigned to their equivalent I-O master category.

Some I-O categories pertaining to the construction industry do not have an associated specificity score. The relevant SIC categories were classified under other I-O categories when overlap made it feasible (for example, SIC 1380s which deal with Oil and Gas fields were classified under I-O 80001 "Crude Petroleum and Natural Gas"), or were dropped altogether when no alternative match was available. No 'forced' fits were made just for the sake of including observations. Leaving some SIC categories out was preferred over inflating the value of some I-O categories with data from industries that plainly did not fit the I-O category definition. In the end, only SIC categories 15 "General Building Contractor", 16 "Heavy Construction Contractor" and 17 "Special Trades Contractors" were dropped. The value of exports in these cases is expected to

have been low anyway. The extra information they would have provided is not worth the risk of skewing the values of our other categories.

Once all I-O categories were tied to their equivalent SIC categories, the SIC categories were converted to their SITC equivalent using the concordances given by Feenstra (1996) and available online from the Center for International Data at UC Davis. I use the "Concordance for Harmonized System Imports, 1989-2001" data which ties SITC rev.2 five-digit level categories to SIC four-digit categories. The SITC data was aggregated at the four-digit level before proceeding. The final result is country-by-country total value of exports, at the industry level using I-O classifications. This is the data used throughout this paper, at various levels of aggregation. The 1982 benchmark includes 321 I-O categories, the 1987 benchmark includes 354, the 1992 benchmark includes 352. By comparison, Nunn's 1997 data includes 222.

This method produced satisfactory results. In the 1992 and 1987 benchmark years, over 95% of the trade data in SITC rev.2 form found a match in the I-O classification contract intensity data. For the year 1992 for example, only 1,091 observations from the Feenstra dataset could not be matched with the Nunn contract intensity dataset (out of 119,722 observations, for a meager total of 0.91% observations without a match). 'Orphan' observations for the 1987 benchmark rose to only 2.48%. The 1982 benchmark has more orphaned observations, for a total of 10.26 %; the dataset still contains over 100,000 observations. By way of comparison, Nunn's data, which we directly used for the year 1997, contains 35,520 observations.

At this point, the data were cleaned. To allow for comparisons over time, data for some countries had to be aggregated. For instance, 1997 data for Czechoslovakia was (with good reason) not available, while earlier data disaggregated as the Czech Republic and the Slovak Republic could not be obtained either. As a consequence, it was decided to include only the Czech Republic's data for 1997, and report it as "Czechoslovakia", in order to allow comparison with the previous years. Similarly, data for the former Yugoslav republics are reported together as Yugoslavia. Data for the two Germanys is

available for 1982 and 1987, but not for 1992 and 1997. When “Germany” is used without qualifications for 1982 and 1987, it refers to the Federal Republic (West Germany). Yemen presented a similar problem, but given the small number of observations for this country, it was decided to omit it entirely. Countries for which too few observations were available were dropped from the dataset. For instance, only 13 observations were available for Armenia over the 4 years, versus an average well in the thousands for other countries. Consequently, Armenia was dropped. The general rule followed was to drop all countries for which less than 250 observations were available. A total of 18 countries were dropped for this reason. The fully cleaned data set contains 127,243 observations over four years.

Appendix II

Table 1.2 *Number of observations (industries) for each country*

Country	*n*	Country	*n*
Afghanistan	517	*Kiribati*	527
Albania	705	*North Korea*	947
Algeria	799	*South Korea*	1,223
Angola	463	*Kuwait*	1,012
Argentina	1,176	*Laos*	374
Australia	1,229	*Latvia*	203
Austria	1,234	*Lebanon*	1,009
Bahamas	618	*Liberia*	511
Bahrain	865	*Libya*	591
Bangladesh	703	*Lithuania*	226
Barbados	646	*Madagascar*	541
Belarus	221	*Malawi*	445
Belgium	1,240	*Malaysia*	1,212
Belize	464	*Mali*	486
Benin	416	*Malta*	929
Bermuda	469	*Mauritania*	365
Bolivia	609	*Mauritius*	749
Bosnia Herzegovina	209	*Mexico*	1,214
Brazil	1,230	*Mongolia*	455
Bulgaria	1,123	*Morocco*	1,059
Burkina Faso	437	*Mozambique*	604
Burundi	382	*Myanmar*	638
Cambodia	385	*Nepal*	607
Cameroon	686	*Netherland Antilles*	743
Canada	1,247	*Netherlands*	1,240
Central African Republic	386	*New Caledonia*	516
Chad	315	*New Zealand*	1,186
Chile	1,077	*Nicaragua*	563
China	1,224	*Niger*	506
China (Free Trade Zones)	210	*Nigeria*	784
Hong Kong	1,218	*Norway*	1,208
Macao	721	*Oman*	863
Colombia	1,125	*Pakistan*	1,030
Comoros	222	*Panama*	1,021
Congo	446	*Papua New Guinea*	565
Costa Rica	929	*Paraguay*	614
Côte D'Ivoire	822	*Peru*	1,009
Croatia	333	*Philippines*	1,159
Cuba	747	*Poland*	1,186
Cyprus	1,007	*Portugal*	1,208

Czechoslovakia	1,186	*Qatar*	716
Democratic Republic of Congo	339	*Republic of Moldova*	177
Denmark	1,232	*Romania*	1,119
Djibouti	394	*Russia*	1,169
Dominican Republic	642	*Rwanda*	366
Ecuador	888	*Samoa*	189
Egypt	1,033	*Saudi Arabia*	1,078
El Salvador	720	*Senegal*	623
Equatorial Guinea	381	*Seychelles*	404
Estonia	199	*Sierra Leone*	435
Ethiopia	551	*Singapore*	1,224
Fiji	694	*Slovenia*	342
Finland	1,214	*Somalia*	405
German Democratic Republic	626	*South Africa*	1,194
France	1,243	*Spain*	1,241
Gabon	533	*Sri Lanka*	941
Gambia	352	*Saint Kitts and Nevis*	825
Germany	1,248	*Sudan*	544
Ghana	646	*Suriname*	502
Gibraltar	576	*Sweden*	1,236
Greece	1,173	*Switzerland*	1,235
Greenland	460	*Syria*	817
Guatemala	830	*Taiwan*	1,228
Guinea	396	*Tanzania*	575
Guinea-Bissau	449	*Thailand*	1,178
Guyana	497	*Togo*	451
Haiti	693	*Trinidad and Tobago*	764
Honduras	700	*Tunisia*	1,055
Hungary	1,199	*Turkey*	1,186
Iceland	861	*United Kingdom*	1,244
India	1,210	*United States of America*	1,247
Indonesia	1,138	*Uganda*	420
Iran	908	*Ukraine*	287
Iraq	651	*United Arab Emirates*	1,128
Ireland	1,224	*Uruguay*	1,022
Israel	1,174	*Venezuela*	1,092
Italy	1,242	*Viet Nam*	898
Jamaica	831	*Yugoslavia*	1,219
Japan	1,242	*Zambia*	488
Jordan	917	*Zimbabwe*	854
Kenya	832		

N=127,243

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