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Joint Doctoral Program in Management
Ph.D. Dissertation

THREE ESSAYS ON INTERNATIONAL BUSINESS

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November 2002

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfilment of the requirements of the degree of Doctor of Philosophy (Ph.D.)

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Your file Votre référence
ISBN: 0-612-88588-7
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ISBN: 0-612-88588-7

To Júlia,
who deserves so much
but yet asks for so little.

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Abstract

This dissertation is presented in the form of three essays on International Business studies. The purpose of the dissertation is to address the interdependence between the macroeconomy and finance at three levels of analysis: the conceptual level, the economic policy level, and the corporate policy level. Each essay addresses one of these levels. The empirical focus is on developing countries in general – and Latin America in particular – because in recent history these countries have experienced large economic fluctuations and major regime shifts. The introduction surveys the literature on the relationship between the financial sector and economic growth. The first essay synthesizes the literature concerning the benefits, risks, and costs of financial liberalization in developing countries and presents illustrative data on its recent implementation and outcomes. The second essay investigates the causal relationships between real activity, inflation, and financial assets' returns in seven major Latin American economies (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela) over the period 1976-1999, using vector autoregression analysis to explore the puzzling negative relationship observed elsewhere between real stock returns and inflation. The third essay investigates whether macroeconomic factors are as important as traditional firm-specific and country-specific factors as determinants of capital structure for a sample of firms from the seven Latin American countries mentioned above in the period 1986-2000 using panel data analysis. Empirical comparisons are drawn with industrial economies: the G-7 economies in the second essay and a subset of United States firms in the third. The final chapter presents the conclusions of this dissertation. The main finding is that differences between advanced and emerging economies in the relationship among economic variables do not seem as clear-cut as often assumed by academicians, policymakers, and practitioners. The results of this dissertation indicate that future International Business research should focus on the development of sound universal theoretical models and their empirical application to a variety of country-specific situations with the objective of refining the theoretical models by sorting out what country-specific factors are indeed relevant, and how these factors can be incorporated back into universal theories. More attention to firm-specific factors is also needed.

Résumé

Cette thèse est constituée de trois essais dans le domaine des Affaires Internationales. Son propos est d'aborder l'interdépendance entre la macro-économie et la finance, et cela à trois niveaux d'analyse: le niveau conceptuel, le niveau de la politique économique et le niveau des politiques d'entreprises. Chaque essai traite de l'un de ces aspects. Les études empiriques présentées portent sur les pays en voie de développement en général, et l'Amérique Latine en particulier, en gardant à l'esprit que, récemment, ces pays ont connu de fortes fluctuations économiques et de profonds changements de régime. L'introduction de cette thèse est consacrée à une revue de la littérature sur la relation entre le secteur financier et la croissance économique. Ensuite, le premier essai propose une synthèse critique de la littérature sur les bénéfices, les risques et les coûts associés à la libéralisation financière dans les pays en voie de développement. C'est aussi l'occasion de présenter des données éclairantes sur la mise en place récente de la libéralisation financière et sur les résultats qui ont été enregistrés. Le deuxième essai examine les relations causales entre l'activité dans le secteur réel, l'inflation et les taux de rendement des actifs financiers dans les sept principales économies de l'Amérique Latine (Argentine, Brésil, Chili, Colombie, Mexique, Pérou, Venezuela) sur la période 1976-1999; la recherche empirique est principalement menée à l'aide de la technique d'analyse vectorielle autorégressive (VAR) pour évaluer à sa juste valeur la relation négative entre le taux de rendement réel d'actions et l'inflation observée dans d'autres pays. Le troisième essai vérifie si les facteurs macro-économiques sont aussi importants que des facteurs spécifiques des entreprises et des facteurs spécifiques des pays comme facteurs déterminants de la structure de capital. On a travaillé à l'aide d'un échantillon d'entreprises des 7 pays latino-américains mentionnés ci-dessus, sur la période 1986-2002; la recherche a été menée en ayant recours à une analyse de données de panel. Les résultats sont comparés à ceux obtenus pour des économies avancées (les économies du G-7 dans le deuxième essai et un sous-échantillon d'entreprises des États Unis dans le troisième essai). La principale conclusion auquel on arrive c'est que les différences entre les économies avancées et émergentes en ce qui concerne la relation entre les variables économiques ne semblent pas aussi clairement établie que ce qui généralement avancé dans les

études académiques ou par les autorités gouvernementales et les gestionnaires professionnels. Les résultats de cette thèse indiquent que des recherches futures en Affaires Internationales doivent porter sur le développement de modèles théoriques solides à portée universelle et sur leur application à des situations spécifiques pays par pays; il devrait en résulter un raffinement des modèles théoriques qui tiendraient compte des facteurs spécifiques associés aux pays ou associés aux entreprises quand la recherche porte à ce niveau.

Acknowledgements

In order to prepare this dissertation I have received the support of several people:

- Chapters I and II are largely based on sections of my doctoral theory paper submitted to McGill University in 2000, I am therefore thankful to Prof. Jan J. Jorgensen, Prof. François Leroux (HEC), Prof. Omar Toulan, and Prof. Richard W. Wright for their comments and suggestions;
- Chapter III's topic of study was first suggested to me by Prof. Kate Phylaktis in 1994. Prof. Kris Jacobs suggested that I set up the essay in a causality framework in 1997. I also profited from Prof. Luis Rivera-Batiz's comments on an earlier version of this essay. I am thankful to them for their generous contributions. I am also thankful to participants of the Northern Financial Association Meeting in Toronto and of the Doctoral Seminar in International Money and Banking at the Aarhus Graduate Business School (both in 1998) for their comments on an early version of that chapter. I am also thankful to Mr. Hyunchul Chung and Mr. Marcelo dos Santos for helping with the collection of data for that chapter;
- Chapter IV was suggested to me by Prof. Jan J. Jorgensen in 2000. I am thankful to him for his valuable contributions. I am also thankful to Ms. Genessa Robinson for helping with the collection of data for that chapter;
- Ms. Magda Donia-Soussa and Mr. Anwar Soussa helped with the grammar review of this dissertation, I am thankful to them for that and for being such good friends;
- I am thankful to CAPES (Brazilian Research Council) for the doctoral scholarship awarded to me;
- I am thankful to Universidade do Vale do Rio dos Sinos (Unisinos) for the support provided throughout my doctoral studies, in special during the elaboration of this dissertation;
- I am thankful to former Ph.D. Program Directors at McGill University, Prof. Richard Loulou and Prof. Allen S. Lee for their helpful advice;

- I am thankful to my Phase II and Phase III committee members for their input on various stages of my theory paper, comprehensive exam, dissertation proposal, and Ph.D. dissertation (in alphabetical order): Prof. John W. Galbraith, Prof. Jan J. Jorgensen, Prof. François Leroux (HEC), Prof. Omar Toulan, and Prof. Richard W. Wright;
- I am thankful to the professors who gave me helpful advice during my doctoral studies (in alphabetical order): Prof. V. V. Baba (Concordia University), Prof. Alain Chanlat (HEC), Prof. Vihang Errunza, Prof. Hamid Etemad, Prof. Kedreth Hogan jr., Prof. Kris Jacobs, Prof. Luis Rivera-Batiz, and Prof. Alex Whitmore;
- I owe thanks to McGill's secretaries that provided valuable administrative assistance during my studies, in particular Stella Scalia, Karen Robertson, Pina Lanni, and Susan Lovasik;
- I am thankful to my friends, colleagues at the Joint Doctoral Program, and colleagues at Unisinos, for their support and helpful feedback (in alphabetical order): Anthony Aboagye, Matthew Aharonian, Tiago W. Alves, José A. G. de Azevedo, Marcos Balbinotti, Aloísio Bohnen, Hyunchul Chung, Glória M. Comerlato, Claudio Damacena, Alceu Fernandes, Denise L. Fleck, Tripat Gill, Pedro G. Gomes, Sudheer Gupta, Ludger T. Herzog, Clóvis Kronbauer, Jordan Le Bel, Xiaofei Li, Sujata Madan, Basma Majerbi, Alan Mkumgu, Kamal Munir, Carlton-James Osakwe, Alan O'Sullivan, Ernani Ott, Ely L. Paiva, Emmanuel Raufflet, Davide Ravasi, Charlene Ryan, Emi M. Saft, Marcelo dos Santos, Nestor Saul, Dagmar R. Sordi, Amadou Sy, Adolfo A. Vanti, Daniela Wiethaeuper, Célio P. Wolfarth, Alexandre P. Wolffenbüttel, Fernando Zanella, and João Zani;
- I am thankful to my wife, Deise, to my daughter Júlia, to my parents, Lafaiete and Nadir, to my sister Renata, and to my grandmothers, Angelina and Sofia (*in memoriam*), for their affection, support, and for being so understanding with the long hours I spent away from their company while studying for this degree;

- I owe special thanks to my teacher, colleague and friend Jairo L. Procianoy for spending countless hours reading my manuscripts and providing me with helpful comments and discussions that very much improved my research and the way I think of the world;
- Finally, I am extremely thankful to my supervisor and chairperson of my Phase III committee, Prof. Jan J. Jorgensen, for being a constant source of inspiration and motivation that drove me to the conclusion of this dissertation. I would have never gotten this far without his expertise, professionalism, support, and dedication.

Any remaining errors in this dissertation are my responsibility.

CHAPTER I

1. Introduction

1.1. The Interdependence between the Macroeconomy and Finance

This dissertation is presented in the form of three essays on International Business studies. The dissertation is designed to address the interdependence between the macroeconomy and finance at three levels of analysis: the conceptual level, the economic policy level, and the corporate policy level. Figure 1.1 presents a simple diagram of the interrelationship of the three essays.

International Business is a multidisciplinary field of study by nature. The understanding of business on an international scale usually requires from the professional analyst the mastering of several disciplines: marketing, economics, finance, operations management, intercultural studies, among other social and human sciences. It is tempting – in such a diverse field of study – to attribute great importance to conditions particular of a single country, such as its history, the culture of its people, its institutional arrangements, and its particular economic environment. However, as any basic science course teaches, a theoretical model must be an accurate description of the real world and yet parsimonious enough to be implemented with a finite number of variables. In my point of view, this fact poses one of the central research problems in International Business: are universal theories suitable to understand economic agents' behavior under particular business conditions in different countries? It is within this broad framework that this dissertation is developed.

The main objective is to explore the interdependence between the macroeconomic environment and the financial sector and how the interactions between them affect the business conditions of firms. The empirical investigation focuses on Latin America because the countries of this region have experienced in recent history large economic fluctuations and major regime shifts.[1] Also, such economies have many decades of tradition in market entrepreneurship coexisting with strong state enterprise. If one sought an ideal laboratory for studying such interdependence, then the emerging economies of Latin America certainly approximate such

conditions. Comparison of the findings for this region to some advanced economies, when appropriate, is offered in order to highlight the differences and similarities between countries at distinct levels of development. The dissertation's ultimate purpose is to derive a few lessons regarding the interdependence between the macroeconomic environment and finance that may be useful to researchers, policymakers, and practicing managers interested in developing countries.

The structure of the dissertation includes a common introduction of the topic of study, followed by the three essays – each of which concentrates on one level of analysis – and closes with a common conclusion. The conclusion of the dissertation summarizes the findings of each essay and derives the main lessons from this research in terms of research, policymaking, and practicing management in the public and corporate sectors. The results of this dissertation are of interest to a variety of parties such as economic policymakers in developing countries, managers of local and multinational private corporations, executives of international financial institutions, managers of the investment fund industry, and the staff of multilateral organizations.

The remainder of this introductory chapter is structured as follows. The next section presents an overall literature review for the dissertation in the topic that is at the core of the remaining chapters' interests: the relationship between economic growth and the financial sector. It presents a theoretical overview, the main empirical evidence, and a synthesis of this literature. From this synthesis I suggest several prospective research topics, three of which I develop in more detail in the following chapters. The third section outlines the remainder of this dissertation.

1.2. Economic Growth and the Financial Sector

1.2.1. Theoretical Overview

The relationship between the financial and the real sector of the economy and its potential effects on growth were largely ignored until the late 1960s. It was with the breakthrough works of Goldsmith [1969], McKinnon [1973] and Shaw [1973] that financial markets come to occupy a major role in the growth literature. These authors argue that the development of the financial sector is not simply a

byproduct of overall economic growth, but rather leverages the growth process. It can assist in the breakaway from sluggish economic performance to accelerated growth, mainly through incentives to save and invest.

Based on quantitative comparative analysis of the financial structure of between half to three dozen countries, Goldsmith [1969] tries to answer the following questions: who finances whom at different stages of financial development; to what extent; through which instruments; and with what effects on economic development. He concludes that (1) financial superstructure grows more rapidly than the infrastructure of national product and wealth (the ratio of aggregate market value of all financial instruments to the value of tangible net national wealth increases); (2) this increase is bounded upwards (between 1 and 1½); (3) LDCs have much smaller ratios than Europe and North America; (4) the main determinant of the financial superstructure is the separation of the saving and investment functions among different economic units; (5) the share of financial institutions in the issuance and ownership of financial assets increases considerably with economic development; (6) this institutionalization of saving and ownership has affected the main types of financial instruments differently: more progress on claims than on equity securities; (7) financial development started everywhere with the banking system and has been dependent on the diffusion of scriptural money through the economy; (8) the share of the banking system in the assets of all financial institutions has declined with economic development; (9) foreign financing has played a substantial role in some phase of the development of most countries; (10) transfers of technology and entrepreneurship have been easier to accomplish, and on the whole more successful, with respect to financial instruments and institutions than in many other fields; (11) the cost of financing is distinctly lower in financially developed countries than in LDCs; and (12) as real income and wealth increase, in the aggregate and per head of the population, the size and complexity of the financial superstructure grow, although the direction of causation could not be established.

McKinnon [1973] focuses on the extraordinary distortions commonly found in the domestic capital markets of developing countries. He finds that the impact of

monetary and financial policies on LDCs capital markets is much greater than is generally supposed, and that policies often stifle incentives to save and invest. Repression of the financial sector is paralleled by the use of tariffs and quotas in an effort to promote development by manipulating the foreign trade sector. The author suggests that a more effective strategy for economic growth would proceed from a thorough liberalization of domestic financial markets, the liberalization of the foreign exchange market, and the lifting of restraints on foreign trade. This strategy, which he calls a "bootstrap" approach for development, aims at securing a country's own economic development without having to rely on foreign aid, foreign capital investment, and multinationals' direct investment, technology, and managerial skills.

Shaw [1973] argues that the financial sector of an economy does matter in economic development. It can assist in the break from plodding repetition of repressed economic performance to accelerated growth. Numerous economies with low levels of per capita income and wealth have been attracted at times to a development strategy that results in "shallow" finance. By distorting financial prices including real money balances, interest rates and foreign exchange rates, it has reduced the real rate of growth and the size of the financial system relative to non-financial activity. The author elaborates on the classical approach of money, finance and capital accumulation by introducing uncertainty and rigidities in output and financial decisions. Also, his model diverges from the Keynesian Liquidity Trap by considering money not as wealth but as debt of the monetary system. After outlining the principles of his model, the author discusses financial repression, its negative impact on growth, and its interrelations with the monetary system, fiscal policy and international trade and finance. As a subsidiary result of his analysis, the author argues that financially repressed economies not only sacrifice the leverage for growth that could be realized from financial deepening, improved fiscal performance and closer integration with external markets, but also suffer from a higher degree of short-term instability in the growth process. The author concludes that financial deepening along with compatible reforms in the

fiscal and international sectors may make growth paths both steeper and smoother.

In traditional growth theory, it was believed that financial intermediation could have an effect on the levels of the capital stock per worker or to the level of productivity, but not on growth rates. The breakthrough work of Romer [1986], however, allowed the emergence of endogenous growth models in which institutional arrangements influence the growth rate endogenously, thus providing the theoretical basis for a relationship between financial markets and economic growth.

Pagano [1993] provides a simple example of how the financial structure can affect growth. Assume a competitive economy where N identical firms produce output y_t with individual capital stock k_t according to:

$$y_t = Bk_t^{\alpha} \qquad \text{[Eq. 1.1]}$$

Where B is the average capital stock in the economy, given by:

$$B = Ak_t^{1-\alpha} \qquad \text{[Eq. 1.2]}$$

B it is taken as a parameter by the individual firm and A is regarded as the social marginal productivity of capital. Aggregate output is then given by:

$$Y_t = Ny_t = NBk_t^{\alpha} = AK_t \qquad \text{[Eq. 1.3]}$$

Aggregate investment is given by:

$$I_t = K_{t+1} - (1-\delta)K_t \qquad \text{[Eq. 1.4]}$$

Where δ is the rate of depreciation of capital. For simplicity, assume a constant population and a closed economy with no government sector. This implies that in capital market equilibrium, savings must equal investment. However, let's consider that a fraction $1 - \phi$ of savings is captured by the financial sector in the form of fees and spreads (it is assumed that these rents are totally consumed instead of reinvested). Therefore:

$$\phi S_t = I_t \qquad \text{[Eq. 1.5]}$$

Using Eq. 1.3, Eq. 1.4, and Eq. 1.5, the growth rate g at $t + 1$ is given by:

$$g_{t+1} = \frac{Y_{t+1}}{Y_t} - 1 = \frac{AK_{t+1}}{Y_t} - 1 = \frac{A(I_t + (1-\delta)K_t)}{Y_t} - 1 =$$

$$= \frac{A\phi S_t}{Y_t} + \frac{(1-\delta)AK_t}{Y_t} - 1 = A\phi s_t - \delta \qquad \text{[Eq. 1.6]}$$

Where s_t denotes the gross savings rate. Dropping the time subscripts, the steady state growth rate becomes:

$$g = A\phi s - \delta \qquad \text{[Eq. 1.7]}$$

In short, financial markets may affect the growth rate directly through the portion $1 - \phi$ of savings that are consumed in the financial intermediation process. There are, however, other plausible ways in which the financial sector may influence growth. Pagano [1993] makes the distinction between positive effects of financial development on growth and ambiguous effects.

Positive effects of a developed financial sector refer to the channeling of savings to firms and the improvement of the allocation of capital. As the financial sector becomes more developed, the proportion of savings consumed by financial intermediaries ($1 - \phi$) tends to be competed away, and the total resources available for investment increases, therefore increasing the growth rate g (Bencivenga, Smith, and Starr [1996]). Besides fees and spreads, the size of ϕ can also be affected by government specific policies such as restrictive regulations, taxation, and reserve requirements (Amable and Chatelain [1996]). Another way financial markets can positively affect the growth rate is by providing efficient allocation of capital. Financial intermediaries help investment in projects with the highest marginal product of capital by collecting and disseminating information on alternative projects, and by encouraging individuals to invest in riskier – and usually more productive – projects by providing portfolio diversification (Atje and Jovanovic [1993], Levine and Zervos [1996], Obstfeld [1994]). This risk sharing role of the financial sector affects the marginal productivity of capital (A) by pooling resources and permitting the funding of less liquid projects, preventing

inefficient bankruptcy, as well as creating the conditions for diversification of volatility risks. Finally, productivity may be increased by technological specialization of firms, once these higher idiosyncratic risks can be shared efficiently via the stock market.

More ambiguous effects of the financial sector over growth refer to its impact on the saving rate and the interest rate. The existence of a financial market may actually reduce s – and therefore g – for several reasons. By providing risk-sharing technology, the financial sector reduces the need for precautionary savings of households. Also, portfolio diversification may lead to a negative effect on the saving rate if the (constant) risk-aversion coefficient is bigger than unity (Pagano [1993], Devereux and Smith [1994]). The financial sector also extends credit for households under the form of mortgages and loans and this too reduces the needs for precautionary savings.[2] Finally, besides the effects of the direct financial sector cost ϕ on growth, there are interest rate effects to be considered. The effect of the real interest rate on the savings rate is theoretically ambiguous and definite empirical evidence has not been presented. If the development of the financial sector helps to narrow the spread and therefore raises the interest rate paid to savers, it is still unclear what the impact should be on growth.

An interesting question however is not whether the existence of a financial sector contributes to growth but how the development of such a sector relates to economic development. In order to do so, it is essential that financial development be precisely defined. Arestis and Demetriades [1996] list three problems that financial sectors are expected to resolve: informational problems, principal/agent problems, and uncertainty problems. Informational problems refer to problems such as adverse selection. Principal/agent problems address problems such as moral hazard and incentive mechanisms. Finally, uncertainty problems relate to risk sharing technologies such as insurance and portfolio diversification. The degree of development of the financial sector would be ideally measured by how well it resolves these problems. Of course, this is not an easy task, and most empirical work in this area has chosen proxies related more to the size of financial indicators relative to aggregate output or per capita output. As a matter of fact,

these indicators are more measures of depth and scope of the financial market rather than strict measures of its degree of development, but this is a typical shortcoming of empirical research.

It is easy to identify a typology of financial systems. There are two basic types often mentioned in the literature: *bank-based* financial systems and *market-based* financial systems. Bank-based systems rely on the involvement of the banking firm with industrial firms as the main way to transfer resources into production. Banks collect the savings of the households and invest such funds according to its valuation techniques and private information of the firms they work with. In such a system, the industrial firm's ownership is concentrated in a small number of shareholders, each with a large stake in the company. Banks participate actively in the board of directors, management performance is evaluated by the small group of shareholders, and changes in management are decided usually within the scope of the firm. The market for corporate control is small, and mergers and acquisitions are rare. Firms rely heavily on bank loans for their financing and not so much on equity. Banks exercise an important role in monitoring corporate performance and providing liquidity transformation technology for the economy. Germany and Japan are usually mentioned as examples of a bank-based financial system.

The market-based system on the other hand, relies on capital markets as the main source of funds for long-term investment, either as debt or equity. Banks do not get closely involved with industrial firms, corporate ownership is dispersed among a large number of small shareholders, and the market for corporate control is very active. Management performance is monitored by marked-based mechanisms such as hostile takeovers. Examples of such system are the United States and the United Kingdom. Besides these two "pure" types of financial systems, there is a continuum of intermediary possibilities in between. Also, one cannot underestimate the role of banks in market-based systems: investment banks provide much of the financing for hostile takeovers in the United States.

With respect to the three problems that financial systems should resolve, it is generally accepted that – under appropriate incentives – bank-based systems are more capable of addressing those problems than market-based systems (Arestis and Demetriades [1996]). However, one cannot really establish that one system is *a priori* more developed than the other. Moreover, one can observe countries with similar types of financial systems but at different stages of financial development. Finally, some empirical evidence exists for a complementary role between the capital market and the banking system (Boyd and Smith [1996], Demirgüç-Kunt and Levine [1996b]).

In this sense, it is useful to introduce yet another dimension of financial development: the government's role in administering prices and quantities in the financial sector, as in the case for interest rate controls, capital rationing, and directed lending. A financial system is said to be repressed when such kinds of government intervention are common. Liberalized financial systems, on the other hand, are those in which the economic agents decide the allocation of capital based on market rates. The effects of repression on growth, in a government-administered framework like the one discussed above, can occur in three ways: firstly, interest rate controls, taxation, and capital requirements all depress ϕ which in turn reduces growth. Secondly, directed lending may allocate investment to sub-optimal projects, reducing the marginal product of capital.[3] Finally, repressive policies may artificially reduce the real interest rate, which in turn may have an ambiguous effect on the saving rate. One can observe that bank-based financial systems allow for a more active role of the government in implementing repressive policies. Under a specific set of conditions, however, it can be shown that government intervention on the financial market may indeed boost growth. Hellmann, Murdock, and Stiglitz [1996] focus on interventionist policies to enhance deposit mobilization, while Levine [1996] contends that intervention and/or regulation may be growth enhancing in the presence of pervasive market failures, but admits that interventions themselves may at times cause or aggravate other market failures. Finally, Amable and Chatelain [1996] suggest that

government policies that reduce the problem of asymmetric information are likely to have a positive effect on growth.

So far the financial sector as a whole has been discussed. One important element of a financial system is the stock market. That is particularly true not only for market-based financial systems but also for many emerging economies, which observed a great increase in international portfolio investment in their domestic markets since the early 1990s. Demirgüç-Kunt and Levine [1996c] summarize the role of stock markets in economic growth under four topics: creation of liquidity, risk diversification, incentives to governance, and price discovery.

Stock markets provide liquidity for equity investment and therefore create incentives for longer-term investment. The liquidity generated by a stock market reduces the transaction costs associated with holding equity and therefore improves the allocation of capital towards higher productivity projects. The positive effects of improved liquidity are twofold: first, it allows the economy to grow faster because of an improvement in marginal returns (Boyd and Smith [1996]); second, because investment in equity can be cheaply reversed by selling shares in the market, higher volumes of savings are allocated in such projects (Bencivenga, Smith, and Starr [1996]). However, one can list at least three potentially negative effects of liquidity on growth: by reducing the savings rate through income and substitution effects generated by higher average returns, by reducing the need for precautionary savings, and by encouraging investor myopia and therefore relaxing monitoring (Demirgüç-Kunt and Levine [1996b]). Although there is theoretical research on these effects, the empirical evidence is still scarce.

The technology to diversify risks of specialized projects through the stock market affects growth by shifting a higher proportion of savings towards riskier, higher return investment projects. This boosts economic growth provided that the effects on the savings rate (income and substitution effects, reduction of precautionary savings) do not offset the higher productivity of capital.

Large and more liquid stock markets may provide incentives that reduce the principal/agent problem between management and shareholders. The creation of an active market for corporate control is an effective incentive to keep management's interests aligned with shareholder interests. Moreover, the development of the stock market and the creation of new financial instruments such as derivatives help in the design of incentive mechanisms for managers to maximize shareholders' wealth.

Finally, the price discovery function of the stock market may affect growth in two ways. In relatively inefficient markets, it pays investors to research firms carefully before making their investment decisions, since they can profitably trade using their better information. This leads to an improvement of the quality of the projects to be executed. In efficient markets, all information is quickly revealed in prices, again contributing to the quality of projects. However, this may lead to the free-rider problem: investors will not spend resources collecting information about firms if they cannot profit from it.[4]

1.2.2. Empirical Evidence

Despite the obvious implications that the relationship between financial development and economic growth may suggest, the empirical literature in this field is not as comprehensive as one might expect. Beyond the early studies of Goldsmith [1969] and McKinnon [1973], empirical tests of such relationship are in general recent. In a well-known paper, King and Levine [1993] study the empirical link between a range of indicators of financial development and economic growth. They find that indicators of the level of financial development (the size of the formal financial intermediary sector relative to GDP, the importance of banks relative to the central bank, the percentage of credit allocate to private firms, and the ratio of credit issued to private firms to GDP) are strongly and robustly correlated with growth, the rate of physical capital accumulation, and improvements in the efficiency of capital allocation. Also, the predetermined components of these financial development indicators significantly predict subsequent values of the growth indicators. The data are consistent with

the view that financial services stimulate economic growth by increasing the rate of capital accumulation and by improving the efficiency with which economies use that capital. The authors concluded that Schumpeter might have been right about the importance of finance for economic development.

Similarly, Atje and Jovanovic [1993] empirically test whether financial development (especially stock market development) affects the level and/or the growth rate of economic activity, and they find a substantial effect on both. They find no effect when the financial development proxy used is credit extended by private and government banks as a ratio to gross domestic product (GDP). However, when the proxy is the ratio of annual value of all stock market trades to GDP, the data strongly supports the model. As for level effects, the authors also find significant coefficients, although the estimates do not seem fully consistent with the tendency for intermediation's share in income to rise with the level of development.

Murinde [1996] estimates an endogenous growth model in which growth derives from the behavior of economic agents in markets for credit, bonds and shares using the Zellner [1962] procedure for a group of seven Pacific Basin countries. The empirical investigation is further extended by using growth accounting exercises and by extending the analysis of the role of stock markets as suggested by Atje & Jovanovic (1993). In particular, the empirical analysis indicates that stock market development is significantly linked to economic growth.

Odedokun [1996] provides an in-depth empirical analysis of the relationship between financial development and the efficiency of investment, proxied by the incremental output-capital ratio. For his analysis, the author constructs a wide range of alternative indicators for financial intermediation, government intervention in the financial sector, interest rates, exchange rates, and inflation. His findings show that financial intermediation (measured in terms of flow variables) is positively related to investment efficiency. By contrast, government intervention appears to be negatively related to efficiency. He also finds that policies of real exchange rate appreciation, as well as high inflation are adversely

related to investment efficiency. The relation between interest rates and efficiency remains undetermined in his analysis however.

Fry [1996] investigates the role financial conditions have played in producing the virtuous circles of high saving, investment, output growth and export growth in a sample of Pacific Basin countries during the past few decades. High saving and investment stimulate output growth and export growth. In turn high growth raises saving and investment levels. The author finds that the relatively undistorted nature of both financial and foreign exchange markets in these countries has been important to raise their saving, investment, output and export levels over a long period of time.

Levine and Zervos [1996] examine whether there is a strong empirical association between stock market development and long-term growth. The authors use cross-country regressions to examine the association between stock market development and economic growth. Using data of forty-one countries over the period from 1976 to 1993, they split the sample period so that each country has two observations with data averaged over each subperiod. The authors regress the growth rate of GDP per capita on a variety of variables designed to control for initial conditions, political stability, investment in human capital, and macroeconomic conditions. Then, they include the composite index of stock market development. Thus they evaluate whether there is a relationship between economic growth and stock market development that is independent of other variables associated with economic growth. They find a strong correlation between overall stock market development and long-run economic growth. After controlling for the initial level of GDP per capita, initial investment in human capital, political instability, and measures of monetary, fiscal, and exchange rate policy, stock market development remains positively and significantly correlated with long-run economic growth.

Studies such as the one mentioned above generally assume that financial development causes economic growth. However, the direction of causality between financial development and economic growth has been a controversial

issue in economics. Arestis and Demetriades [1996] challenge the causal interpretation of previous empirical work that is based on a fragile statistical basis. Once contemporaneous correlation between the financial indicator and economic growth has been accounted for, there is no longer any evidence of causality from financial development to economic growth. The second goal of the authors is to demonstrate that cross section data sets cannot address the question of causality in a satisfactory way. The authors conduct cointegration and causality tests using time series data for twelve representative countries. The results in all cases tend to justify their claim for the importance of institutional considerations and policy differences. The results depends very much on the institutional characteristics, including the type of financial system and the type of financial policies followed, as well as the efficiency in implementing such policies. Also, the authors find that the definition of the financial indicator used in the analysis also has considerable importance for the results.

The empirical definition of "stock market development" is the main concern of Demirgüç-Kunt and Levine [1996b]. They contribute to the literature by collecting and comparing a broader array of empirical indicators of stock market development than any previous study. Using data on forty-four developing and industrial countries from 1986 to 1993, the authors examine different measures of stock market size, market liquidity, market concentration, market volatility, institutional development, and integration with world capital markets. The goal is to produce a set of stylized facts about various indicators of stock market development that facilitates and stimulates research into the links among stock markets, economic development, and corporate financing decisions.

These authors find enormous cross-country variations in stock market indicators and attractive correlations among the indicators. Although many stock market development indicators are significantly correlated in an intuitively plausible fashion, the individual indicators produce different country rankings. Although richer countries generally have more developed stock markets than pioneer countries, many markets labeled emerging are more developed than those in France, the Netherlands, Australia, Canada, Sweden, and Norway. Using

measures of size, liquidity, and international integration, the authors evaluate which markets have been developing fastest over the years. The article documents the relationship between the various stock market indicators and measures of financial intermediary development. Since debt and equity are frequently viewed as alternative sources of corporate finance, stock markets and banks are sometimes viewed as alternative vehicles for financing corporate investments. The authors document the cross-country ties between stock market development and financial intermediary development using measures of the size of the banking system, the amount of credit going to private firms, the size of non-bank financial corporations, and the size of private insurance and pension companies. They find that most stock market indicators are highly correlated with the development and efficient functioning of banks, non-bank financial corporations, and private insurance companies and pension funds. Countries with well-developed stock markets tend to have well-developed financial intermediaries. Also, developing countries with well-developed financial systems are growing faster than developing countries with under-developed financial sectors.[5]

Demirgüç-Kunt and Maksimovic [1996] empirically explore the effect of financial market development, particularly stock market development, on financing choices of firms. The authors use aggregated firm-level data for a sample of thirty countries from 1980 to 1991. They measure stock market development by the ratio of market capitalization to GDP, the ratio of total value of shares traded to GDP, and the ratio of total value of shares traded to market capitalization. Taking all the countries in the sample together, the authors find that there is a statistically significant negative correlation between stock market development, as measured by market capitalization to GDP, and the ratios of both long-term and short-term debt to total equity of firms. There is also a statistically significant positive relationship between the size of the banking sector and leverage. The relationship between leverage and stock market development loses significance when they control for variables that have been identified in the corporate finance literature as determining firms' financial structures.[6] An interesting pattern emerges when the full sample is broken down into sub-

samples. In developed markets, further development leads to a substitution of equity for debt financing, especially for long-term debt. In developing markets, large firms become more levered as the stock market develops, but small firms do not appear to be significantly affected by market development. These findings suggest that the development of a stock market initially affects directly the financial policies of only the largest firms. This may be because diversification of ownership and the aggregation of information provided by the development of stock markets initially benefits the larger firms more because of the need to spread fixed issuance costs and traders' costs of information acquisition.

Demirgüç-Kunt and Levine [1996a] discuss the relationship between the initial state and reform of the financial system on the one hand and public enterprise reform on the other hand. Based on detailed information of nine country case studies, they find that private enterprise reform is more successful in countries with initially relatively well-developed financial systems. Moreover, they find that private enterprise reform is implemented much more successfully if such a reform is supplemented by substantial and well-designed financial sector reforms. However, they underline the fact that the causal relationship between the two kinds of reforms runs in both directions, and that exogenous factors are important in determining the ultimate outcome of both reforms.

Berthélemy and Varoudakis [1996] empirically test an endogenous growth model, which exhibits multiple steady state equilibria due to reciprocal interactions between the financial and real sectors in the economy. The model shows that depending on the nature of steady state, there may exist a poverty trap in which the financial sector "disappears" and where the economy stagnates, or endogenous economic growth may be positive and financial intermediation follows a normal development path. They support their model by testing empirically the existence of multiple steady states linked to the initial state of financial development in a cross-section of 95 developed and developing countries. Their results show that while education is a pre-condition for growth, financial under-development may become a major obstacle in countries where the educational pre-condition is satisfied. Moreover, they show that the optimality of other policies such as trade

policy and government expenditure policy depend on a reasonably well-developed financial system. This result leads to the conclusion that second-best policies in countries that have not succeeded in developing a financial system might be quite different from the policies usually advocated in a first-best framework.

1.2.3. Synthesis

In summary, there is a vast theoretical literature going back three decades explaining the linkages of financial sector development and economic growth. Under competitive markets the role of the financial system in channeling savings towards the highest return projects is beneficial to welfare and allows faster growth. Moreover, as the financial market develops and becomes more competitive, transaction costs tend to fall and the net savings directed to investment increase. Therefore, given these conditions, the financial sector plays an important role as a catalyst for growth. More recent literature, however, questions the direction of the impact of financial development on aggregate savings because of income and substitution effects. Also, improvements in risk diversification may induce investors to become reckless in their research for projects because of the free-rider problem, which may in the aggregate lead to less efficient resource allocation.

The available empirical evidence in general supports the view that overall financial development has a positive effect on economic growth and that stock market development in particular has an even more substantial impact than banking development. There is however plenty of evidence on the complementary roles between banking system and stock market development as the financial system becomes more developed. Government intervention on the financial sector has been shown to be in general adverse to development, except in the presence of very specific market failures. Finally, the evidence on the effect of financial integration with the global market is as yet ambiguous.

A few aspects are not explored in the literature and should deserve more detailed investigation. For instance, how do different financial intermediation systems (market-based versus bank-based) compare in terms of their contribution to

growth? Is competition policy in the banking sector a major element of financial development and therefore economic growth? Given different initial conditions (income, deposits, liquidity, etc), what are the policies that developing countries should address in order to develop their financial sectors? Similarly, given imperfect competition in the banking sector and incompleteness in capital markets that characterize developing countries, how should policymakers proceed in order to develop the financial sector in a sustainable fashion? Is there an optimal sequence of measures? How does the recent experience of developing countries contrast to theory with respect to financial liberalization? What are the causality linkages between the real sector and the financial sector of the economy? To what extent do macroeconomic factors influence the degree of indebtedness of households and firms?

These are all interesting questions whose answers will greatly contribute to our understanding of the subtler interrelations between finance and growth. Of course, addressing all of them at once in a single piece of research is a near impossible task. Therefore, in this dissertation I choose the last three of the above topics to develop in more depth. The other topics are then left as suggestions for future research initiatives.

1.3. Outline of the Dissertation

This dissertation is organized as follows:

Chapter II reviews the theoretical and empirical literature on financial liberalization and discusses a few stylized facts observed from the recent economic record of developing countries in general and Latin America in particular. In this chapter, I address financial liberalization with a special focus on developing countries. My aim is to synthesize this literature, highlighting the main points of convergence and debate, as well as those topics that lack theoretical and empirical investigation. The paper first discusses the liberalization of the financial sector. I divide liberalization in two categories: the internal or domestic liberalization, and the external or international liberalization. The arguments for internal liberalization focus on the improvement in resource allocation once the

market freely determines prices and quantities in the financial sector. External liberalization, on the other hand, does not meet a clear consensus in the literature. Empirical evidence suggests that financial liberalization is a widespread practice all over the world, despite frequent episodes of turmoil. Although many believe that external financial liberalization has the same potential benefits as trade liberalization, the recent empirical record of some prominent emerging economies raises concerns that its costs may be substantial, in particular the instability that has been observed following liberalization and the disappointing economic performance over the past decade.

Chapter III studies the causality among inflation, real activity, and asset returns for seven Latin American countries. Different explanations have been suggested for the puzzling negative relationship observed between real stock returns and inflation. The most popular ones have been the Tax-Effects Hypothesis (Feldstein [1980]), the Proxy Hypothesis (Fama [1981]), and the Reverse Causality Hypothesis (Geske and Roll [1983]). The causal chain between the variables is crucial to sort out which hypothesis best fits the data. This study extends this line of research to a sample of seven Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela). A Vector Autoregression (VAR) analysis is performed in order to investigate the causal relationships among real stock returns, real interest rates, real activity, and inflation. The same methodology is also conducted for the Group of Seven industrialized countries (Germany, Canada, France, Italy, Japan, the United Kingdom, and the United States), and their results are then compared. The results indicate that the differences between industrial and developing countries are not as sharp as one could initially presume. Also, the results do not in general support previous findings for the United States even among other industrial countries, which suggests that the U.S. evidence cannot be generalized worldwide.

Chapter IV studies the determinants of capital structure in Latin America. Capital structure is perhaps one of the most prolific areas of research in corporate finance. Yet, little is known about how managers should go about choosing between debt and equity in their everyday assignments. Also, most empirical work so far has

concentrated on developed countries, in particular the United States. Recent empirical evidence suggests that country-specific factors are major determinants of capital structure in emerging markets. These country-specific factors include institutional framework, legal and accounting practices, financial development, and the macroeconomic environment. Here, I investigate to what extent macroeconomic factors are determinants of capital structures in a sample of firms from seven Latin American countries: Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. These countries are particularly interesting because, besides being well-known examples of developing economies, they have gone through a variety of macroeconomic environments in a relatively short period of time. If the environment is somehow important for capital structure decisions, then it is likely that Latin American firms have experienced such effects. Also, it is an opportunity to verify the applicability of some of the most popular theories of capital structure in a multi-country setting. Using a Panel Data framework with several measures of leverage, my findings suggest that – contrary to previous studies – country-specific factors although important, are not decisive determinants of the leverage ratio. Moreover, idiosyncratic firm-specific factors emerge as major determinants of capital structure for the sample of firms studied. Indeed, traditional firm-specific factors of capital structure explain a great deal of the variation in a firm's leverage ratio, and the determinants of capital structure and their effects seem similar between Latin American countries and the United States. Finally, some support has been found in favor of Myers' [1984] Pecking Order Proposition.

Finally, Chapter V presents the conclusions of the dissertation and proposes some future research topics. My main findings are that distinctions in the relationship of economic variables between industrial and emerging economies do not seem so clearly cut as often assumed by academicians, policymakers, and practitioners. This fact has broad research implications. On the one hand, such conclusion reckons that theoretical generalization in International Business studies may be appropriate even for a set of different environments. On the other hand, several issues are left unexplained by current theory.

1.4. Endnotes

[1] More details on the economic environment of Latin American countries are given in chapters II and III of this dissertation.

[2] Notice however, that if households take loans to finance the accumulation of human capital, then the effect on growth may be ambiguous: a lower saving rate but perhaps a higher productivity of capital.

[3] Not to mention moral hazard and rent-seeking.

[4] One can argue that recent developments in the U.S. stock market (e.g. Tyco, Enron, Worldcom, etc) cast doubt on the depth of the financial analysis carried on. In this case, free-riders have been punished for complacent reliance on market-generated information. I am thankful to Prof. Jan J. Jorgensen for pointing this out.

[5] Demirgüç-Kunt and Levine's [1996b] data ends in 1993, before the Mexican and Asian crises. Thus, it would be interesting to test for the robustness of their results after these episodes.

[6] Such as the ratio of net fixed assets to total assets, the ratio of earnings to total assets, the ratio of net sales to total assets, and the ratio of total assets to firm size.

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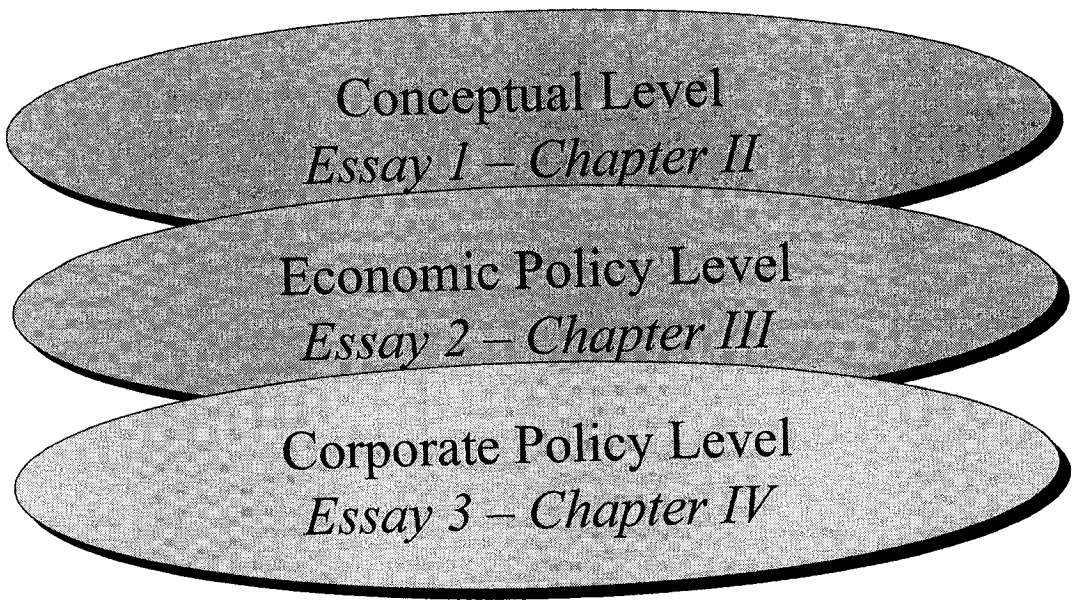
Figure 1.1. Concept of the Dissertation



CHAPTER II

2. Lessons from International Financial Liberalization in Developing Countries

2.1. Introduction[1]

The past couple of decades have witnessed an unprecedented liberalization of the financial sector all over the world. The removal of regulation on the activities of financial institutions, markets, and investors in domestic markets started in the industrial countries in the 1960s and 1970s and reached developing countries in the late 1980s and 1990s. Following domestic financial liberalization – and sometimes simultaneously with it – widespread international liberalization over capital flows gave rise to contemporaneous global finance.

The development of modern financial markets in many middle income developing countries – usually referred to as "emerging markets" – and their opening up to foreigners introduced a whole new dimension to the international financial markets, by greatly expanding the set of possibilities for international financial transactions. Emerging capital markets provide attractive investment alternatives to industrial countries and, simultaneously, potentially important financing sources to boost much-needed developing countries' economic growth. Also, for many developing countries, the liberalization of domestic financial markets was simultaneously linked to broader economic reforms and stabilization plans. In these countries however, the process of liberalization has been much faster in comparison to industrialized economies.

Recently, the magnitude and speed of capital flows around the world have mesmerized and worried the average person. Total net long-term capital flows to developing countries increased almost threefold from 1990 to 2000, after reaching a maximum of US$342.6 billion[2] in 1997 (World Bank [2001]). Numbers are yet more impressive when only emerging markets[3] are considered. According to the IMF's [2001b] database, total capital flows rose from US$30 billion in 1977 to US$233.3 billion in 1996, and then fell to only an estimated US$5.3 billion by 2000. Of these, private portfolio flows, just US$200 million in 1977, reached up to US$113.1 billion in 1994 and ended the decade with an estimated negative

US$4.3 billion. Therefore, not only the growth of private capital flows has been impressive, but also their volatility has been remarkable.

Alongside with the many advantages of financial liberalization, it has increased the fear that out-of-control capital flows would lead the world to the economic doomsday. These fears are not unfounded: financial crises have become a frequent headline in economic news, and they seem to become more frequent and damaging each time. Taking the past ten years alone, the world has experienced several episodes of financial turmoil: the 1992 European Exchange Rate Mechanism (ERM) crisis, the 1995 Mexican Peso crisis, the 1997 East Asian crisis, the 1998 Russian moratorium, the 1999 Brazilian devaluation, and the 2001 Argentine crisis. Of course, crises have happened frequently in the history of capitalism. The difference now is the virulence with which these crises have hit developing countries, the speed with which they spread around the world to far away regions, and the impact they have even on the biggest economies' own financial systems. As a result, it is unlikely that the causes and the resolution of such crises can be addressed by traditional domestic economic policies under the sovereignty of a single country, but they require more and more international coordination.

In this essay, I address the topic of financial liberalization, with a special focus on developing countries. My aim is to synthesize this literature, highlighting the main points of convergence and debate, as well as those topics that lack theoretical and empirical investigation. Also, I contribute to the debate by discussing a few stylized facts regarding financial liberalization in developing countries.

"Liberalization" may be understood in many ways. Recently, the opening up of a financial market, that is, the lifting of restrictions on the free movement of capital across national borders has been commonly referred to as "financial liberalization". Another view of liberalization is that it should also include, for instance, the elimination of restrictions on market mechanisms of the interest rate and private and foreign ownership of companies, especially in the financial sector. In order to provide a comprehensive perspective on the topic of liberalization of

the financial sector, I approach the topic in two parts: the *internal* liberalization, which discusses mainly aspects of government intervention in domestic financial markets, and the *external* liberalization, which concerns the opening up of domestic financial markets to the international financial market.[4]

The essay is structured as follows. The next section addresses internal or domestic financial liberalization. Section three details external or international liberalization and presents its benefits and costs for the various parties. The fourth section discusses stylized facts regarding financial liberalization in developing countries, and sketches a few lessons from this process. The final section summarizes and concludes the essay and suggests a few avenues for future research.

2.2. Internal Financial Liberalization

2.2.1. Benefits of Internal Financial Liberalization

The first point I want to clarify is the distinction between financial liberalization and financial deregulation. Financial sector regulation is widely employed all over the world, even among the more liberal economies. By financial regulation I mean the set of rules established by the government with the objective to guarantee the orderly and efficient functioning of the financial sector. According to Khoury [1990], regulation addresses issues such as protection of depositors, monetary stability, banking system efficiency, and consumer protection (or competition policy). These rules may be of two types: first, preventive measures such as deposit insurance, lender of last resort, and the right of the monetary authorities to intervene and liquidate insolvent institutions. The second type encompasses prudential measures and includes capital adequacy requirements, liquidity floors, diversification rules, restriction on certain business activities, restrictions on market entry, and official banking supervision. The question regarding deregulation is one more of degree than of principle: what is the optimal level of regulation that makes the financial sector sound without imposing excessive costs and hindering too much the achievement of its functions?

On the other hand, liberalization (in the context of this essay) refers to the abolition of government policies that aim at objectives – economic, political,

social, and ideological – other than the soundness and efficiency of the financial sector. Traditionally, a financial system is not liberalized if the government determines who gets and gives credit, at what levels, and at what price (McKinnon [1973]). Conversely, a liberalized system is that in which the market has the autonomy to determine those variables freely. In a recent paper, Williamson and Mahar [1998] define six distinct dimensions of liberalization: the elimination of credit controls, the deregulation of interest rates, freedom of entry in the banking sector, bank autonomy, private ownership of banks, and the liberalization of international capital flows. The latter dimension will be discussed in the next section.

Financial repression,[5] the opposite of the above dimensions, has traditionally been justified by a government desire to establish development priorities that differ from those determined by market forces. Then, it would be up to the government to direct a given amount of credit to priority industrial sectors, and to regulate interest rates at lower levels for some activities deemed as strategic.[6] Also, governments may establish direct limitations on the banking sector, in order to guarantee the fulfillment of their policies and also to protect the domestic market from "uncontrolled" competition. In this sense, access to the banking industry may be highly regulated, with the establishment of hefty franchise fees and capital requirements, bank ownership allowed only to strict criteria-complying parties (such as nationality), and outright interference on bank management, through government-controlled selection processes for the appointment of directors and senior management. Also, the banking sector may be regarded as too strategic to be left to the private enterprise alone, a situation in which the banking system is either wholly state-owned or substantially dominated by state-owned institutions.

The effects of such repressive measures on economic development vary widely depending on the case at hand, but in general repression leads to the creation of huge distortions which affect growth negatively (McKinnon [1973]). Also, the lack of competitiveness in the financial sector prompts for the kinds of effects mentioned in the previous chapter, such as discouraging savings and reducing investment in more profitable projects. Finally, the intervention of government

officials in potentially valuable decisions such as the awarding of bank franchises, the allocation of subsidized credit, and the appointment of bank management exposes the system to rent seeking behavior and outright corruption.

Given the potential objections to financial repression, it is not surprising to notice that in the last couple of decades, most countries (industrial and developing) decided to liberalize their financial systems. Nevertheless, the liberalization process brings about certain risks of its own.

2.2.2. Risks and Costs of Internal Financial Liberalization

There are two major risks in liberalizing the domestic financial sector. First, there is the risk of loss of control over economic policy, in particular monetary policy. Many countries resort to strict intervention over the banking system to keep inflation and interest rates aligned with governmental policy objectives. Such is the case of compulsory reserve requirements for instance. Moreover, in countries with underdeveloped fiscal systems, the financial sector performs an important quasi-fiscal role. The second risk of internal liberalization is the increased vulnerability to financial crises. Less government intervention may expose the system to banking crises, especially where adequate surveillance systems are not effective. Also, a repressed system may lack the competencies necessary to face an increased level of competition.

Liberalization of a repressed financial sector raises immediately the question of the pace and sequence of change. Chan-Lau and Chen [1998] propose a model of optimal sequencing path for countries liberalizing their financial sector. According to these authors, in order to avoid problems, liberalization has to be in tune with financial development – with the latter advancing at a higher rate than the former. The experience, again, has been mixed, but there seems to have some evidence that overnight liberalization tends to make the financial system more vulnerable to crises and bank runs (Demirgüç-Kunt and Detragiache [1998]). This is due to the lack of institutional arrangements, managerial expertise, and adequate surveillance and supervision schemes necessary for successful operation in a liberalized environment. Honohan [1997] also acknowledges the role of

liberalization in increasing the vulnerability of the financial sector, but notices that liberalization is only one of many major regime changes,[7] induced by policy or by external conditions, that render the financial sector more vulnerable to crises. Similarly, Goldstein and Turner [1996] mention the inadequate preparation for financial liberalization as one origin for banking crises in emerging economies. Williamson and Mahar [1998] report that both industrial and developing countries have tried different paces for their liberalization processes. According to the authors, Australia, New Zealand, Turkey, South Africa, and the Latin American countries have adopted a more aggressive approach, while France, Japan, and the Asian countries favored a more cautious course of action. It also should be noted that liberalization has not always been a steady process in many countries, where financial crises usually prompt the government to retreat in its financial reforms.

The effects of the recent financial liberalization experience yield important lessons for future policy formulation. Williamson and Mahar [1998] use a survey to contrast the situation of financial repression according to the previously mentioned criteria in 1996 with that during 1973 for a sample of thirty-four countries and economies. The main conclusions of their survey are that:

- There is evidence that financial liberalization is a widespread phenomenon;
- There is a wide variation in the pace and sequencing with which liberalization has been accomplished across countries;
- There is little evidence that liberalization increases savings;[8]
- There is more support for the claim that liberalization leads to financial deepening and that it fosters a more efficient allocation of investment; and,
- There is little evidence that liberalization leads to loss of monetary control (except perhaps in the short-run), but there is reason to believe that it can trigger the proliferation of financial crises.

In summary, internal liberalization offers substantial gains, but given the recent history of financial turmoil following liberalization – and the advances and

retreats in liberalizing initiatives – it is important to focus on two aspects before committing to it: the optimal sequencing of liberalization, and the speed with which to proceed from one step to the next. The lack of rigorous theoretical studies on these topics does not help the debate, and it is a major gap in the literature.

2.3. External Financial Liberalization

Reinhart and Reinhart [1998] observe that capital inflows provide support for building infrastructure, increasing physical and human capital, and harnessing natural resources. On the other hand, capital inflows may distort relative prices, exacerbate weaknesses in the financial sector, and feed asset price bubbles.[9] In this section, I address the potential benefits of the external liberalization of financial markets, its benefits, risks, and costs to the local economy as well as to the global economy. Here, I define external financial liberalization as the access of foreign investors and institutions to the domestic financial market, and, simultaneously, the access of domestic investors and institutions to foreign financial markets. Ideally, an externally liberalized financial market would be one which is border neutral – one with no quantitative or price restrictions on cross border financial transactions.

Although *de facto* external liberalization has been happening all over the world for the last couple of decades, the discussion became more intense with the initiative of the Interim Committee of the IMF's Board of Governors, in September 1997, to propose an amendment to the Fund's Articles of Agreement making the liberalization of the capital account one of the purposes of the IMF and extending its jurisdiction over capital movements (Camdessus [1998]).[10]

In addressing the benefits, risks, and costs of external liberalization of a given domestic financial market, one has to analyze two different angles: the perspective of the local economy and the perspective of the global economy as a whole.

2.3.1. Benefits of External Financial Liberalization

What has a country to gain by opening up its financial sector to foreigners? Here, I list six arguments frequently presented in the literature that help make the case for external financial liberalization: the incoming flow of investment, better allocation of resources, faster economic growth, technology spillovers, reduced favoritism and corruption, and the ineffectiveness of controlling capital movements.

– Incoming flow of investments: interest rate differentials and larger investment opportunity sets in many developing countries *vis-à-vis* industrial countries make it attractive for investors to direct capital to emerging markets. By reducing legal barriers or easing taxation, a developing economy may experience higher volumes of incoming capital, under the form of both debt and equity. These flows of capital are welcome in many countries where the domestic saving rate is small as a means of expanding employment and heating up the economy.

– Better resource allocation: barriers to financial flows may distort the relative prices of inputs in the production process, leading to sub-optimal allocation of resources. There is theoretical evidence that whenever the rate of interest in an autarky economy is different from the one in an open economy, the autarky economy gains by opening up (Obstfeld and Rogoff [1996]). Since barriers to capital artificially raise the cost of capital in the closed economy, its liberalization leads to a more efficient capital to labor ratio, thus improving the allocation of resources.[11]

– Faster economic growth: liberalizing the financial market increases the investment rate – and thus the growth rate – mainly in two ways. First, more funds for investment become available through the use of external savings. Second, higher flows of investment increase competition in the financial industry thus reducing the fraction of savings captured by the financial sector in the form of fees and spreads. Both effects increase the net investment in the economy thus boosting growth.

– Transference of technology usually embedded in capital investments: that is the case for foreign direct investment in subsidiaries but also in mergers and acquisitions of local firms by international corporations. In this case, the social marginal productivity of capital increases, thus accelerating growth. Also, the opening up of the domestic financial sector to foreign competition creates a channel for financial innovation and new managerial practices in the financial industry, which affect directly the magnitude of the share of savings consumed in the financial intermediation process.

– Reduced rent seeking behavior: as long as decision power over what types of capital are allowed to flow in and out of an economy is left to the discretion of government officials, there is a non-zero probability of favoritism and corruption in the process of allocating investment. Since the ownership of scarce concessions is valuable, politically articulated parties interested in the investment process may seek rents through the political process of concessions for inflows and outflows of capital, leading to sub-optimal social allocation of resources.

– Incapacity to control capital movements in practice: this is perhaps the most cynical argument for liberalization. Since there are channels available for private agents to circumvent official controls if they so choose, capital movements cannot be controlled anyway. The fact is that there are many ways corporations and investors can bypass controls over capital flows. Unless the economy is absolutely autarkic, corporations may evade capital controls through a series of expedients, such as under/over-invoicing foreign trade, the black market for foreign exchange, corruption, and outright tax evasion. In this sense, the imposition of controls may not only be ineffective in restraining capital flows, but also may lead to a series of undesirable side-effects such as the development of illegal networks and the undermining of the government's credibility. Such networks abet government corruption and may spread to other key areas of the government, such as bank surveillance and tax revenue, creating severe damage in the whole financial sector. Cooper [1998] notes that, although capital controls are indeed not perfect, the effects of their occasional circumvention are substantially different from their complete absence.

Apart from the benefits of external liberalization for individual countries, what are the benefits for the global economy as a whole? The three major potential benefits of global liberalization of the financial sector are the following: worldwide improvement in resource allocation, worldwide improvement in consumption risk-sharing, and faster worldwide growth.

– Worldwide improvement in resource allocation: in a world without restrictions on capital movements, international investors ideally seek investment opportunities that offer higher returns, increasing the overall allocation of resources (Cooper [1998]). Projects with higher expected rates of return are preferred to those with lower returns, independently of artificial conditions generated by capital restrictions. Under the assumption that the marginal product of capital is higher in capital-scarce countries, free capital flows should raise welfare in both donor and receiving countries alike (Eichengreen et al. [1998]).

– Gains in worldwide consumption risk-sharing: traditional models suggest that consumers try to insure consumption across uncertain states of the world, that is, consumers prefer to shield their consumption over time from the instability of income (i.e. stable consumption patterns). The opening up of a country's financial market offers a broader range of investment possibilities that are usually less correlated with returns in other countries. This improves the consumption risk-sharing among countries by diversifying away idiosyncratic risks associated to a closed economy, just like consumption is smoothed across different regions of the same country (Eichengreen [1999], Obstfeld [1994]). The result is a worldwide smoother consumption pattern.

– Faster worldwide growth: this argument is a consequence of the two previous ones. The possibility of better insuring consumption is an incentive for industries to specialize in each country, since the idiosyncratic risks associated with specialization can now be diversified away through the international capital market. As a result, external liberalization enables the achievement of higher risk-adjusted rates of return on average, increases the marginal productivity of capital,

and encourage saving and investment thus promoting faster worldwide growth[12] (Eichengreen et al. [1998]).

Empirical investigation of such hypotheses is a difficult task: since they deal with the global economy as a whole, there is no benchmark against which to compare. Theoretical (Stultz [1999]) and empirical work on a country level (for instance Atje and Jovanovic [1993], King and Levine [1993], Knight [1998], Levine and Zervos [1996], Murinde [1996]) have generally supported the main conclusions, although some debate still remains (Devereux and Smith [1994], Rodrik [1998]).

The benefits of external liberalization derive basically from an analogy to the benefits of free trade in goods. This hides the fact that financial flows are potentially much more destabilizing to a small open economy than flows in goods. Although shocks in world supply of goods have repercussions in the domestic economy, they are much more manageable in the short-run. The recent record of financial crises suggests that shocks in capital flows spillover rapidly to other countries. More objective research on the measurement of the benefits of external liberalization *vis-à-vis* its associated risks is thus opportune.

2.3.2. Risks and Costs of External Financial Liberalization

Despite its appealing potential benefits, in an imperfect economic environment financial liberalization may induce undesirable side effects. I list five often mentioned risks that external liberalization may bring about for the local economy: misallocation of resources due to other distortions, loss of control over domestic economic policy, domestic capital flight, increased market volatility, and exposure to speculative attacks.

– Misallocation of resources due to other distortions: although it is argued in the previous section that external liberalization improves the allocation of resources, there are theoretical arguments that trade distortions may lead to misallocation of resources (Cooper [1998]). Although trade liberalization preceded capital liberalization by many years, there is still a wide range of trade barriers in place nowadays, especially in developing countries. Hellmann, Murdock, and Stiglitz [1996] argue that under such distortions, unrestricted liberalization may lead to

inefficient allocation of resources. The authors argue that this is an example where capital controls are justified as a second-best policy.

– Loss of control over domestic economic policy: for a small economy, international capital flows may be sizeable relative to GDP. By opening up its capital account, a small economy loses discretionary power over most of the international components of its economic policy. The risk of large capital reversals requires that monetary policy be managed so that interest rates and exchange rates are broadly consistent with underlying fundamentals and market conditions (Fischer [1998]). As a result, there is less flexibility in policymaking, since the stability of the current account now reacts to market pressures. Monetary and fiscal policy, for instance, have to be formulated considering this market constraint (Rodrik [1998]). Quirk and Evans [1995] underscore that under fixed exchange rates, large movements in interest rates may be required to stem outflows in situations where markets test the sustainability of the exchange rate. Similarly, sharp and costly movements in exchange rates could result if monetary policy is out of line with market expectations in flexible exchange regimes. Although some argue that such restrictions are actually good incentives for governments to keep their house in order (Dornbusch [1998]), it is clear that the degree of flexibility of the government to deal with real shocks using traditional fiscal and monetary instruments is greatly reduced. Finally, flows that are large relative to the size of the economy can complicate macroeconomic management as well as the task of ensuring that excessive risk taking does not undermine the health of the financial system.

– Domestic capital flight to tax havens: a liberalized financial market may face competition for investment from tax havens that may stimulate domestic capital flight, resulting in tax evasion and export of domestic savings (Cooper [1998]). Especially in economies with less efficient tax collection and surveillance systems, massive evasion of income tax to havens abroad may pose a threat to fiscal balance, banking sector soundness, and to the balance of payments.

– Increased market volatility: incoming and outgoing flows of international capital may affect the volatility of local markets, specially the smaller ones. Since the magnitude of international resources is substantial in relation to the size of under-developed domestic financial markets, and a large portion of such flows is short-term portfolio investments, sudden surges and withdrawals of international capital may destabilize domestic asset prices, increasing overall volatility. Also, substantial capital flows may increase the volatility of the exchange rate, inducing macroeconomic volatility that feeds back into overall market volatility. There has been little empirical support in the literature for such a common claim. Claessens, Dooley, and Warner [1995] find that there is virtually no difference in volatility between long-term and short-term international capital flows. Moreover, Tesar and Werner [1995] and Claessens [1995] find that there is little evidence that equity markets become more volatile after external liberalization. However, a recent paper by Christoffersen, Chung, and Errunza [2001] finds evidence of increased volatility at the firm level following emerging stock market liberalization. Moreover, the authors document an asymmetric increase in volatility and cost of capital for smaller firms.

– Exposure to speculative attacks and currency manipulation: small economies with floating exchange rate regimes that open up their financial sector become an easy target for exchange rate manipulation and currency attacks from powerful international investors, unless they peg their currency to a major one through some scheme such as a currency board (Cooper [1998]). By rigidly pegging their currencies, these economies give up almost entirely the formulation of their own policy, with the undesirable effect of having a pro-cyclical monetary policy. Even in countries that firmly commit to peg their currencies, speculative attacks are not absolutely ruled out. On the contrary, depending on the government's credibility in sustaining the peg and the economic fundamentals, fixed exchange rate arrangements may lead to self-fulfilling currency crises. Even currency board arrangements, once thought to be robust to crises (especially in the Hong Kong experience), have been severely tested recently, with catastrophic economic consequences as seems to be the case in Argentina in 2001.

When considered as a whole, the global economy also faces risks and costs from liberalization of international financial markets. Here, I summarize two major risks and costs that liberalization may impose over the world economy: inadequate resource allocation under imperfect information and contagion effects.

– Asymmetric information effects: improved allocation of resources depends on adequate information and rational judgement from market participants (Eichengreen et al. [1998], Cooper [1998]). The gains from resource allocation that may be attained by the opening up of domestic capital markets depend in a large extent on two factors: accurate and timely supply of information and rational behavior. The former addresses a common problem in less developed capital markets. This refers not only to a problem of accuracy of financial reports from corporations, banks, and governments, but also refers to the timing in which such information is made available to investors. The latter factor addresses how investors actually make their investment decisions: based on their expectations of economic conditions or based on anticipation of other investors' course of action. Some degree of herd behavior seems to be present among international investors and, although empirical evidence on the consequences of such abnormality is scarce, its effects are predicted to be negative for worldwide welfare (Calvo and Mendoza [1998]).

– Contagion effects: in an integrated global capital market, shocks to a single economy can spillover to neighboring economies or economies in a similar stage of development. That phenomenon has been observed since the Mexican Peso Crisis of 1995 and became more pronounced in the Asian Crisis of 1997. Imbalances of a specific economy may raise fears that similar and/or closely connected economies may have the same problems and/or suffer the consequences of other's policy mismanagement, and thus prompt international investors to suddenly withdraw their investments. Although many regard contagion as a demonstration of market irrationality – since investors do not seem able to distinguish between actual economic conditions in different economies – simple global portfolio rebalancing after a deep fall in one market may actually trigger massive sales of assets in other markets included in the portfolio, thus

causing contagion effects (Garber [1998]). Moreover, under costly information gathering and processing, it is rational for smaller investors to follow the lead of bigger investors, assumed to be better informed because their stakes are higher (Calvo and Mendoza [1998]). Market rationality has been also questioned because sharp changes in expectations happen apparently without corresponding changes in fundamentals (Rodrik [1998]). However, this can be explained by changes in the market's perception of government credibility. Fear of withdrawal of implicit guarantees for instance, may sharply change markets expectations without having immediate impact on the fundamentals.

Related to the latter, the external liberalization of the financial market opens the door to challenges to government credibility. Since the capital account in a liberalized environment reflects much of the international financial market expectations, lack of government credibility in keeping up its debt payments, sustaining the exchange rate, conducting conservative monetary policy, or keeping fiscal balance translates into sudden capital flight and consequent currency and current account crisis. If the credibility of associated economies is challenged as well, a domino effect follows and contagion results.[13]

2.4. Discussion

The debate on financial liberalization is still an ongoing one. I think it is generally accepted by now – both theoretically and empirically – that internal liberalization of the financial sector is a desirable policy objective. There is empirical evidence on the relationship between financial development and economic growth and it is clear that less repression on the financial sector yields valuable gains in terms of growth (King and Levine [1993], Atje and Jovanovic [1993], Levine and Zervos [1996], Demirgüç-Kunt and Levine [1996]).

Empirically, the recent record of experiences in financial liberalization has not been homogeneous: almost each story of success like Australia (Drake [1997]), Chile (Phylaktis [1997]), Czech Republic and Poland (Grosfeld [1997]) can be paired with an example of failure such as Georgia and Ukraine (Conway [1997]), Ghana (Asem and Gupta [1997]), the Philippines (Vos [1997]), Senegal

(Berthélemy [1997]), and Turkey (Ekinci [1997]). Moreover, the road to financial liberalization has its own hardships: some countries go through episodes of turmoil before achieving liberalization *with* stability (e.g. Australia according to Drake [1997]). The reasons for failure are diverse and in great part depend on specific political developments in the specific country. All this makes policy prescriptions difficult.

Dooley [1997] posits an interesting relationship between internal liberalization and the liberalization of international capital flows. Internal financial liberalization offers advantages in terms of resource allocation, however it also implies constraints on government's behavior, since good policies are constantly evaluated by the private sector. In the short-run, it may be difficult to get all the conditions right, especially because of the stock of bad assets and liabilities inherited from the repressed system. In these circumstances, international capital flows come in handy to feed growth, often resulting in faster growth in financial intermediation than the financial sector is prepared to handle. Given the structural fragility of the newly liberalized financial sector, a sudden change in sentiment from international investors may trigger a full-blown crisis. In a fully liberalized economy prudential controls sort this out, but in the early phase of internal liberalization some residual control on international capital mobility might be useful.

This is an insightful assessment of a topic that has not been explored in depth in the recent literature: the linkages between economic stabilization, internal financial liberalization, and external financial liberalization in a cross section of countries. One can point to a number of cases in which these three reforms have been implemented at about the same time, but the causal links between these policies – or the simultaneity of them – have not been explicitly addressed in the literature.

Evidence is not so definite concerning external liberalization. There seems to be more appealing arguments for external liberalization than against it, but the recent series of international financial crises called into question the very way external

financial liberalization is conceived. Moreover, the net results to some developing countries that engaged in aggressive liberalization over the last decade are perceived by many as disappointing. It is of interest then to discuss some of the benefits and costs of external liberalization in light of the recent empirical evidence from developing countries in general and Latin America in particular.

Taking the past 30 years, a few stylized facts can be observed. Figure 2.1 presents a couple of aggregate indicators that help in picturing recent global economic trends. According to IMF [2001b], there was an impressive growth in world trade as a percentage of world gross domestic product (GDP), inflation – although reaching a record high in the mid-1990s – seems to have been tamed down in general, but output growth seems to have stabilized under 5% a year by the end of the century. According to World Bank [2001], developing countries slightly increased their share of world output throughout the decade by about 2.7 percentage points. Moreover, their share of global trade jumped to 33.4% from 26.5%, an indication of the integration of developing countries in the globalized economy. In contrast to the liberalization verified in trade, by 2001 most foreign exchange regimes continue to favor pegged or fixed currency regimes (PACIFIC [2002]). In investment flows, it is worth noting the growth in developing countries' share of world foreign direct investment (FDI) flows over the first half of the 1990s, followed by a sudden reversal by 1998 as a consequence of the Asian crisis and the subsequent outbreak of international financial crises in emerging markets. From these figures, it seems that external financial liberalization has been largely a success. A closer look at the data, however, reveals more subtle aspects of the process. In the following pages, I discuss a few aspects of the theoretical predictions and the stylized facts emerging from recent economic history.

A. **The theory suggests:** *External liberalization leads to a growing inflow of investments.*

   Stylized fact: *Foreign investment flows to developing countries have grown at remarkable rates, but flows have also become more volatile.*

Figure 2.2 presents the sources and uses of international funds, obtained from World Bank [2001]. Over the 1990s, net long-term resource flows accounted for the absolute majority of sources of funds. As a result of the succession of financial crises in some major emerging markets, such flows declined in the later half of the decade. Short-term inflows reversed and net outflows were recorded in 1998 and 1999. As for the uses of funds, although a substantial percentage was used to cover current account deficits and changes in reserves, there was a remarkable growth in capital outflows (plus errors and omissions). According to the World Bank [2001], this fact can be interpreted in two ways: greater financial integration is likely to boost not only capital flows but also capital outflows, even in developing countries. Such can be attributed to the internationalization of developing country-based firms and the need for currency hedging for instance. Another possible reason for the growth of outflows – and particularly errors and omission – is capital flight to offshore financial centers for tax avoidance purposes. It is revealing, however, that the growth in outflows increased post-1996, which also suggests that capital may have sought shelter in safer harbors during turbulent times.

An inspection on the components of net long-term capital flows to developing countries over the past decade reveals the recent structural changes in global finance. Figure 2.3 presents the evolution of such flows in the 1990s, according to World Bank [1999] and World Bank [2001]. The main trends can be summarized as follows:

- Private flows have surpassed official flows as the source for long-term capital to developing countries, with a remarkable growth in a relatively short period of time. Total long-term private flows almost tripled between 1990 and 2000, while official flows actually shrunk during this period;
- The growth of private flows was most impressive from capital markets, an indicator of the trend towards securitization in international finance, although FDI has also displayed a robust growth – and, despite its recent slowdown, a much more stable profile;

- Capital market flows were due to growth in both debt and equity flows, underscoring the trend towards portfolio investment. Their sharp retraction after the Asian crisis – in particular for debt flows – highlights one of the major vulnerabilities of developing countries that opened up their capital accounts;
- Although bond financing declined immediately after the Asian crisis, bank lending continued to grow through 1997 and 1998, but retracted sharply in 1999, reaching a net outflow of US$24.6 billion in 1999 (World Bank [2001]).

As a picture of the 1990s, such trends are very revealing. Capital poured abundantly to developing countries in the first half of the decade, but once some formerly promising emerging markets faced difficulties in the later years of the 1990s, capital market flows in general – and bank lending in particular – sought refuge back in the advanced economies. Official flows, which accounted for 56% of developing countries long-term funding in 1990, shrank to only US$38.6 billion, less than a third of its nominal amount in the beginning of the decade, perhaps in response to confidence about the sustainability of the surge in private flows. The performance of private long-term flows in the 1990s is better qualified as mixed. It was a success in terms of the remarkable growth that it showed over the decade, but by quickly reversing in periods of turbulence, it raised the question of whether their benefits were as concrete, or at least as sustainable, as expected.

The external debt of developing countries has been an ongoing issue for some time now. After the debt crisis of the early 1980s, and the restructuring of the late 1980s with the Brady Plan, the debate over external debt has somewhat quieted down. The surge in private capital flows of the following decade and the trend towards securitization, as discussed above, has much to do with it. However, the external debt increased as a percentage of both world's GDP and developing countries' GDP (IMF [2001b]). Figure 2.4 presents the evolution of the external debt and its associated service flows. The total debt service increased in the past two decades even though the change in total debt outstanding (a proxy for "new

money") did not keep up the pace. Also, international interest rates (proxied by the Eurodollar rate obtained from FED [2002]) decreased over the same period. The increase in the debt service flows can then be partially attributed to an increase in the sovereign spread. Indeed, the World Bank [2001] reports that the primary cost of market borrowing for developing countries increased to 9.6% and 8.8% from 8.0% and 6.7% respectively for bond financing and bank lending between 1996 and 2000. Moreover, the World Bank [2001] also reports a sharp deterioration of average credit ratings and a rise in the sovereign spread for developing countries in the same period.

The maturity of developing country debt, on the other hand, has improved between 1995 and 2000, despite the succession of crises in some major markets. Figure 2.5 presents the maturity and sectoral distribution of international bank claims. According to BIS [1995] and BIS [2002], the share of long-term bank claims in total international claims to developing countries has increased. In Latin America in particular, although the aggregate figure remained basically stable, it showed improvement for the major economies of the region, declining only in Venezuela. As for the allocation of such claims, between 1996 and 2000 the share of non-bank private sector claims increased for developing countries as a whole, and Latin American countries in particular. Moreover, the share of public sector financing declined over the same period. This is an indication that international bank lending has been more consistently directed for productive activities. The share of non-bank private sector increased from 43.2% to 52.5% in developing countries and, even more impressive, from 40.5% to 61.6% in Latin America. The case of Chile is particularly remarkable, with a share of 86.8% of international bank lending directed to the non-bank private sector.

B. The theory suggests: *External liberalization subjects the monetary discretion of local governments to the scrutiny of the international financial market.*

Stylized fact: *Inflation does seem to have been tamed in developing countries.*

Inflation seems to have been tamed all over the world, and especially in the hyper-inflationary economies of Latin America, as data from IMF [2001b] suggest in

Figure 2.6. This can be attributed to better economic policy management in developing countries and to widespread (mostly pro-market) economic reform. However, one of the cornerstones of economic reforms inspired by the Washington Consensus is trade and financial liberalization. Such liberalization imposed a toll on the external accounts of developing countries, as can be seen by increasing current account deficits and plunging reserves, simultaneously with the conquest of inflation.

C. The theory suggests: *Liberalization promotes gains in worldwide consumption risk-sharing.*

Stylized fact: *Integration between developed and emerging equity markets is fast increasing.*

Stock market data from MSCI [2002] presented in Figure 2.7 indicates that emerging equity markets indeed exhibited a remarkable gain in value over the past decades, although they have also gone through periods of intense volatility (in particular around periods of international financial crises such as 1994-95 and 1997-98). More interestingly, the correlations between emerging stock markets and developed stock markets of Europe and North America has increased remarkably in that period. Although this is not a strict measure of market integration[14], it is an empirical indication of greater integration between emerging and developed markets. Latin American equity markets, in particular, became more integrated with those of Europe and North America, although around periods of crises, these markets tend to present lower correlations.

D. The theory suggests: *Liberalization promotes faster economic growth.*

Stylized fact: *Growth in developing countries has been uneven.*

The performance of developing countries economies over the past three decades is presented in Figure 2.8. Data from IMF [2001b] show that developing countries' GDP grew at higher rates over the 1980s and 1990s. Over these years, there were three periods in which growth slowed down: over the debt crises of the early 1980s, in the late 1980s-early 1990s, and during the Asian crises in the late 1990s. It is remarkable that, over all this period, the seven biggest Latin American

economies – the "LA-7" (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela) – grew at disappointing real rates. Such fact can be partially attributed to the "lost decade" that followed the debt crisis after 1982, which hit hard in the major economies of the region (i.e. Argentina, Brazil, and Mexico). However, even during economic booms that benefited developing countries in general, these seven countries did not perform exceptionally well. The economic turbulence of these countries in the past two decades is well-known. High inflation, trade protectionism, corruption, social inequality, and political instability have long plagued the region, and may be listed among the causes for such sluggish growth.

The LA-7's slow average GDP growth combined with differences in population growth to produce the uneven trend in per head income, presented in Figure 2.9 based on IMF's [2001b] data. Although developing countries as a whole caught up with the advanced economies and the Group of Seven – the "G-7" (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States), for the LA-7 compared with the G-7 there was a gap in per capita income that widened from the early 1980s on. Even the improvement accomplished by economic reforms of the late 1980s-early 1990s was not sufficient to close the gap. International financial crises of the second half of the 1990s contributed to the pattern. Inspecting the bottom panel of the same figure it is clear that, besides having periods of contraction, the LA-7 also experienced a much higher volatility in real per capita income than any other group of countries over these three decades. Not only was growth small on average, but also it was unstable.

E. The theory suggests: *Liberalization helps control rent-seeking behavior.*
Stylized fact: *Corruption perceptions remain largely unchanged.*

Perceptions on corruption obtained from Transparency International [2002] presented in Figure 2.10 and in Table 1 indicate that corruption remained largely at the same level in developing countries (it actually deteriorated for Asia, Africa, and Eastern Europe). Although some improvement has been detected for Latin America, its "corruption gap" compared with advanced economies remained basically the same. The question then becomes what institutional improvements

have been proposed to accompany financial liberalization to improve governance in local and international financial systems.

2.5. Concluding Remarks

This essay deals with the liberalization of emerging markets. First, this essay discusses the liberalization of the financial sector. I divide liberalization in two categories: the internal or domestic liberalization, and the external or international liberalization. The arguments for internal liberalization hinge on the improvement of resource allocation once the market determines prices and quantities in the financial sector. This does not exempt the government from the role of regulating financial institutions with the goal of assuring the soundness of the system. Recent experiences in financial liberalization confirm that this is a widespread practice all over the world, despite frequent episodes of turmoil. External liberalization, on the other hand, does not enjoy a clear consensus in the literature. Although many believe that external financial liberalization has the same potential benefits as trade liberalization, the instability that has been observed following the removal of capital controls raises concerns that perhaps its costs and/or risks are substantial. Along these lines, some defend the sensible use of capital controls as a legitimate policy instrument for governments to prevent financial crises and to mitigate their aftermath effects.

Finally, I discuss a few stylized facts of the recent economic record of developing countries and contrast them to theoretic predictions. I conclude that capital flows to developing countries have indeed shown a remarkable increase over the past decade, but the sustainability of such flows is questionable. Inflation declined dramatically, and emerging equity markets experienced a boom and became more integrated with the world, but real economic effects are disappointing in many countries and corruption remains a problem.

What are then the lessons from the past decades regarding international financial liberalization? It has been shown that globalization in trade and in finance has been largely accomplished. Trade with and capital flows to developing countries increased, inflation has been tamed almost everywhere, emerging equity markets

soared and became more integrated with the world. However, there are doubts regarding the sustainability of globalization in developing countries because of chronic deficits in the current account, a growing debt burden and sluggish growth – despite recent improvements in economic policy management and in the maturity and allocation of external debt. Corruption, on the other hand, has not improved substantially with more liberalization. Even more worrying, the real economic effects of liberalization have been disappointing. Growth all but stagnated in Latin America, and the income gap between the region and industrial countries actually widened.

People expect to reap what they sow. After a decade of aggressive liberalization, the welfare results have been disappointing for Latin America. Such lack of results is worrying in a region prone to the appeals of populism and nationalism. Prolonged recession in Argentina led the country to political and social unrest by the end of 2001. The situation in Colombia and Venezuela is similar.[15]

In conclusion, there are appealing theoretic arguments in favor of financial liberalization, but the optimal mechanics of its implementation are still largely unknown. So far, some benefits have been accrued but there are a number of shortcomings that call into question the sustainability of the liberalization process in the future. Recalling Arestis and Demetriades [1996], there are three problems that the financial sector is expected to resolve: informational problems, principal/agent problems, and uncertainty problems. So far, the bulk of reform proposals have mainly addressed the informational problems (e.g. Goldstein [1998], Group of 22 [1998a], Group of 22 [1998b], Group of 22 [1998c], Eichengreen [1999], IMF [1999]). In order to achieve a more stable and better functioning international financial architecture, the other problems need to be addressed just as comprehensively. Focusing future discussion on the resolution of these problems may be a good point to start.

In the next chapter, I contribute to the discussion about the interdependence between the financial sector and the macroeconomy by focusing on the economic

policy level. In it, I empirically explore the relationship between real and financial variables in emerging and advanced economies.

2.6. Endnotes

[1] This chapter is largely based upon sections of my doctoral theory paper submitted to McGill University in 2000. As such, I profited from comments and suggestions from Prof. Jan J. Jorgensen, Prof. Omar Toulan, Prof. Richard W. Wright, and Prof. François Leroux. Any remaining errors are nevertheless my responsibility.

[2] One billion is a thousand million.

[3] For more details on country group composition please refer to IMF [2001a].

[4] The latter has often been referred to in the literature as "the opening of the capital account". Here I use the terminology "external liberalization" as a synonym.

[5] "Financial repression" is the terminology coined by McKinnon [1973] to summarize the different kinds of government interventions and institutional shortcomings in opposition to more liberalized financial systems. This terminology is perhaps not the best but it has been widely adopted in the literature ever since. I use the same expression here for practicality.

[6] The classical example is agriculture.

[7] Other regime changes mentioned are the quasi-fiscal financial repression, macroeconomic instability, structural economic transformation, political developments, privatization, and technological innovation and globalization in finance.

[8] According to Williamson and Mahar [1998], the positive effect on savings occurs mostly among countries that practice negative real interest rates prior to liberalization. Countries that present a sharp jump in real interest rates following liberalization, on the other hand, do not show a parallel increase in savings.

[9] Hence they are "mixed blessings", according to the authors.

[10] As of 2002, the International Monetary and Financial Committee (which replaced the Interim Committee in 1999) has not pursued such proposal further. Under the present IMF administration, the debate of an amendment regarding capital account liberalization has somewhat lost its importance in face of other proposals spurred by the succession of financial crises of the late 1990s, such as "sovereign bankruptcy" (for instance, see Krueger [2002]).

[11] Notice however that McKinnon [1973] suggests that such distortions are not always undesirable, because the highest marginal product of capital in a financially closed but unrepressed economy would stimulate domestic savings, investment, and formation of capital, which are desirable features for the economy in the long-run. Hence his suggestion for developing countries of internally liberalizing the financial sector, and stimulate competition and intermediation efficiency long before externally liberalizing it.

[12] The specialization in production is a clear analogy to the case for free trade in goods. However, one might ask to what extent capital flows have the same impact as merchandise flows. More in-depth theoretical approaches of such question have not been found in the literature, surprisingly. I am thankful to Prof. François Leroux for pointing this out.

[13] The most famous episodes of contagion are the Mexican Peso Crisis of 1994 and the Asian Crisis of 1997. Contagion also seemed to occur, to a lesser extent, during the Russian Moratorium of 1998 and the Brazilian Devaluation of 1999. More recently, the effects of Argentina's crisis following the abolition of its currency board in late 2001 has been felt across Latin America, in particular in Uruguay and Brazil. Contagion effects seem more manageable and less devastating – although still troublesome – in recent times, perhaps suggesting that public and private economic agents are climbing up the learning curve regarding this phenomenon.

[14] See for instance Errunza and Losq [1985] and more recently Carrieri, Errunza, and Hogan [2002].

[15] Of course, due to causes and circumstances particular to each country.

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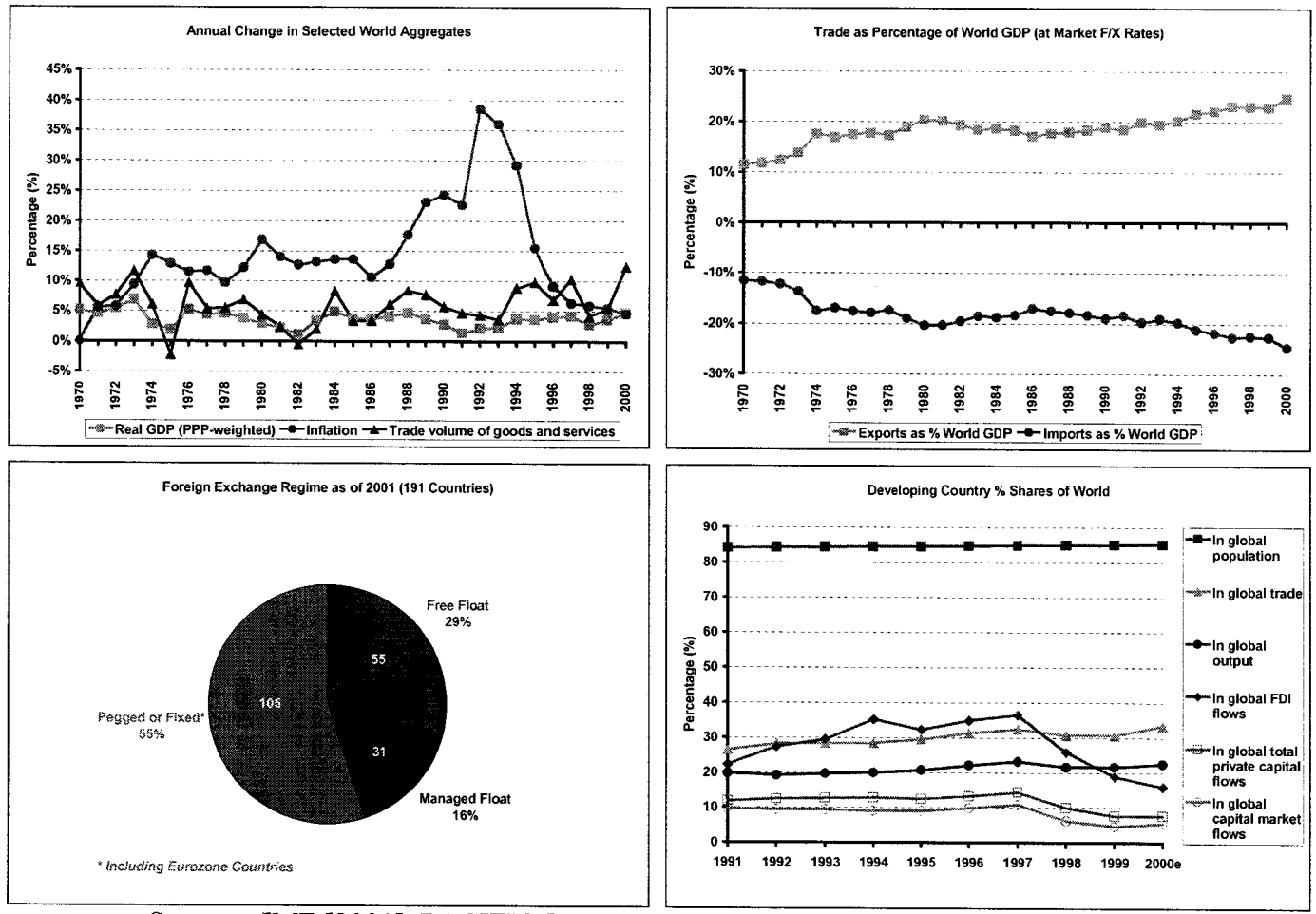
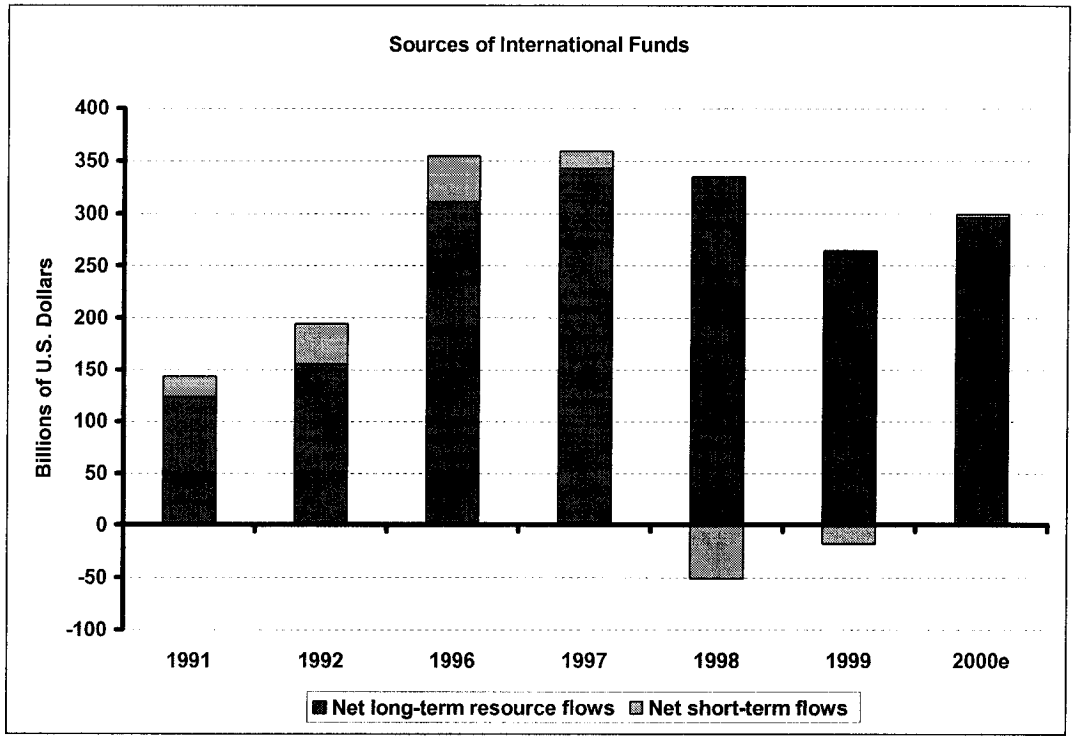
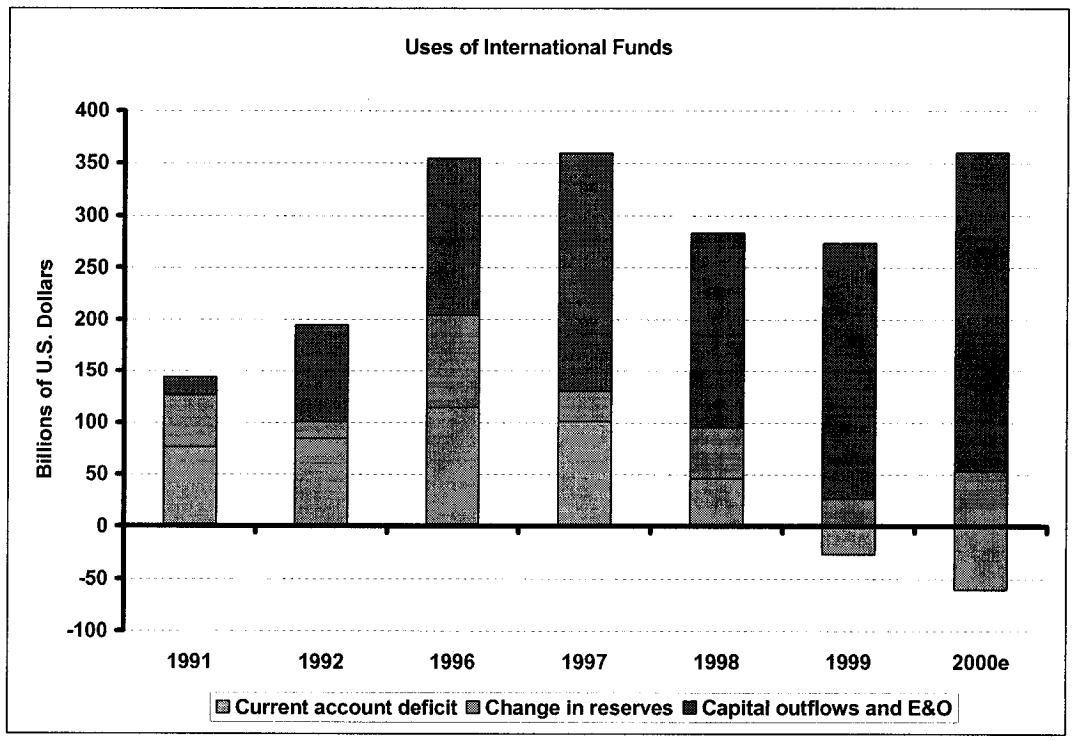
Figure 2.1. Overview of World Aggregates



Sources: IMF [2001], PACIFIC [2002], World Bank [2001], Author's calculations.

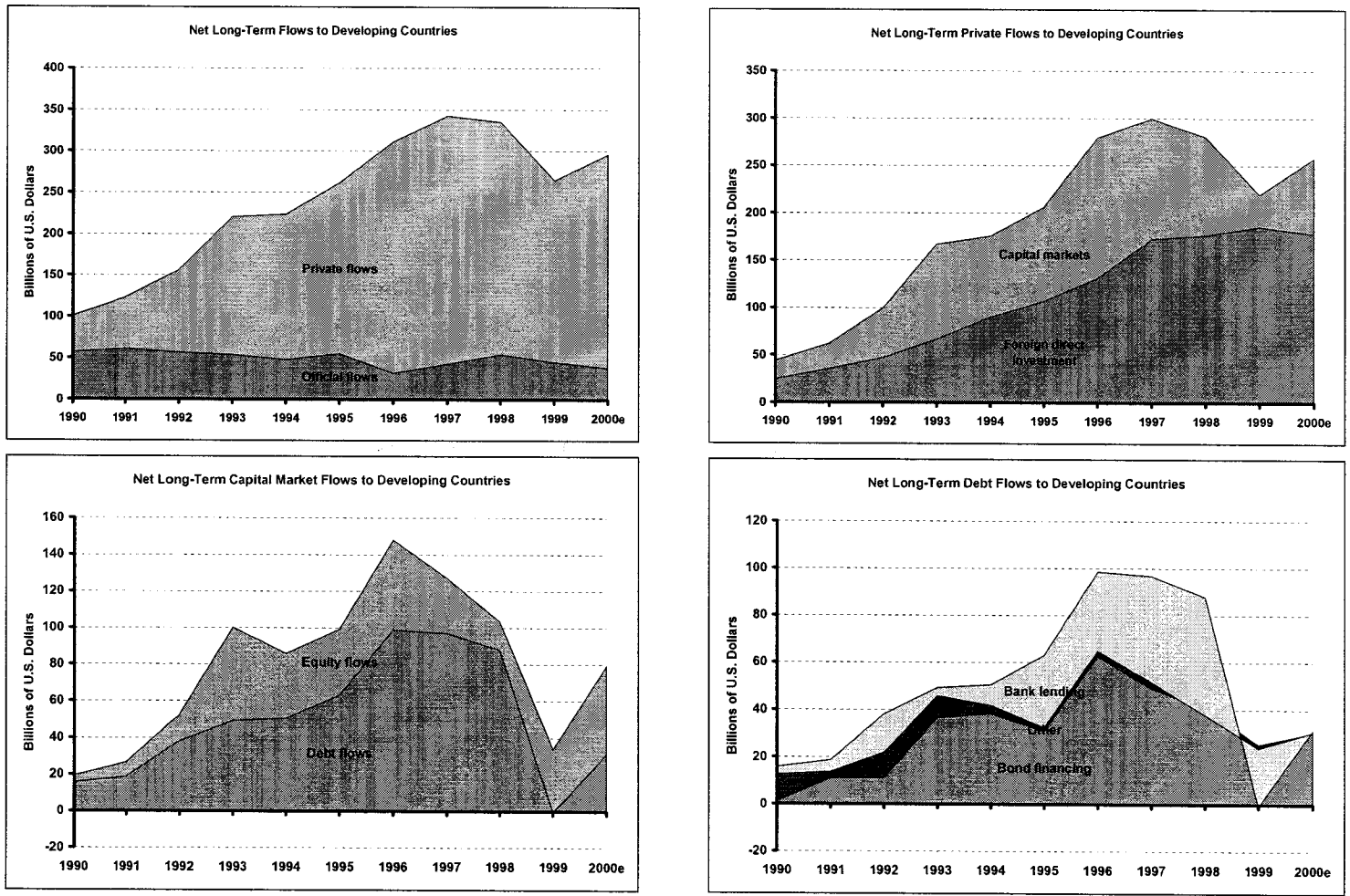
Figure 2.2. Sources and Uses of International Funds





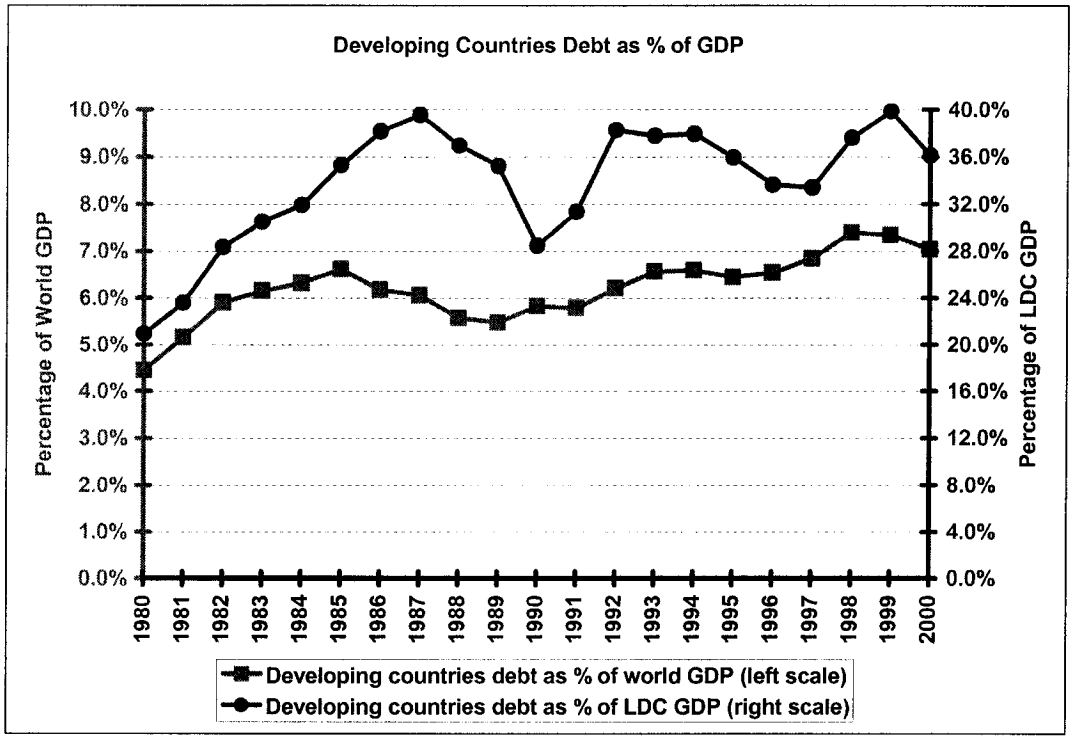
Source: World Bank [2001].

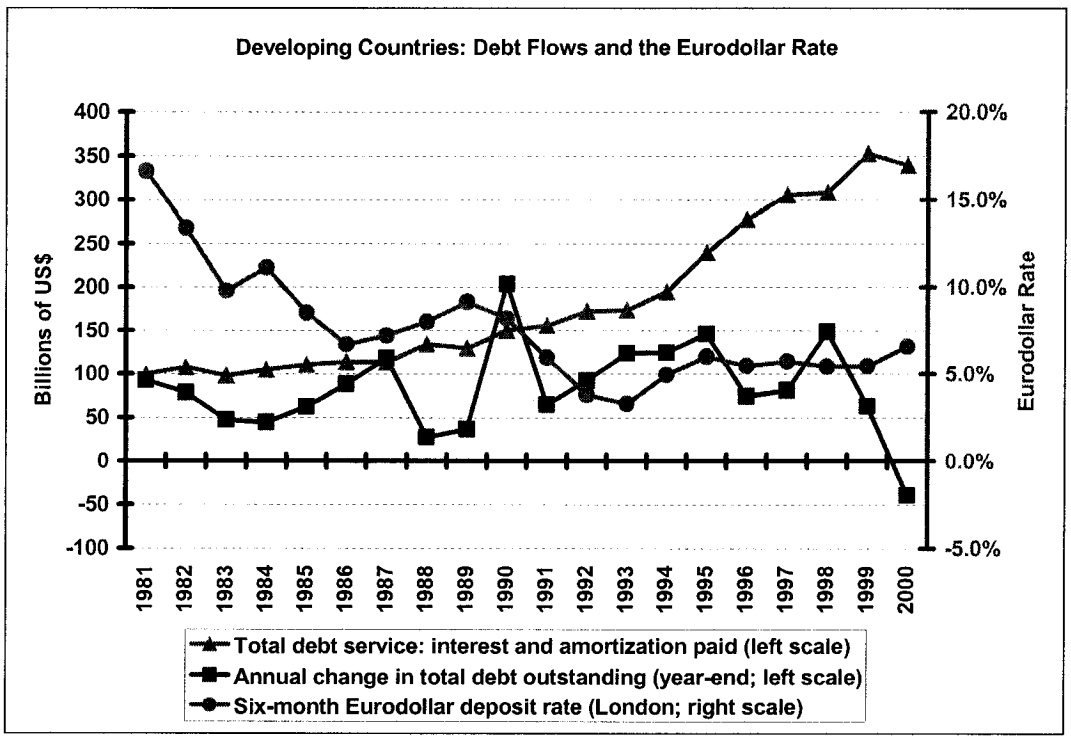
Figure 2.3. Net Long-Term Capital Flows to Developing Countries



Sources: World Bank [1999], World Bank [2001].

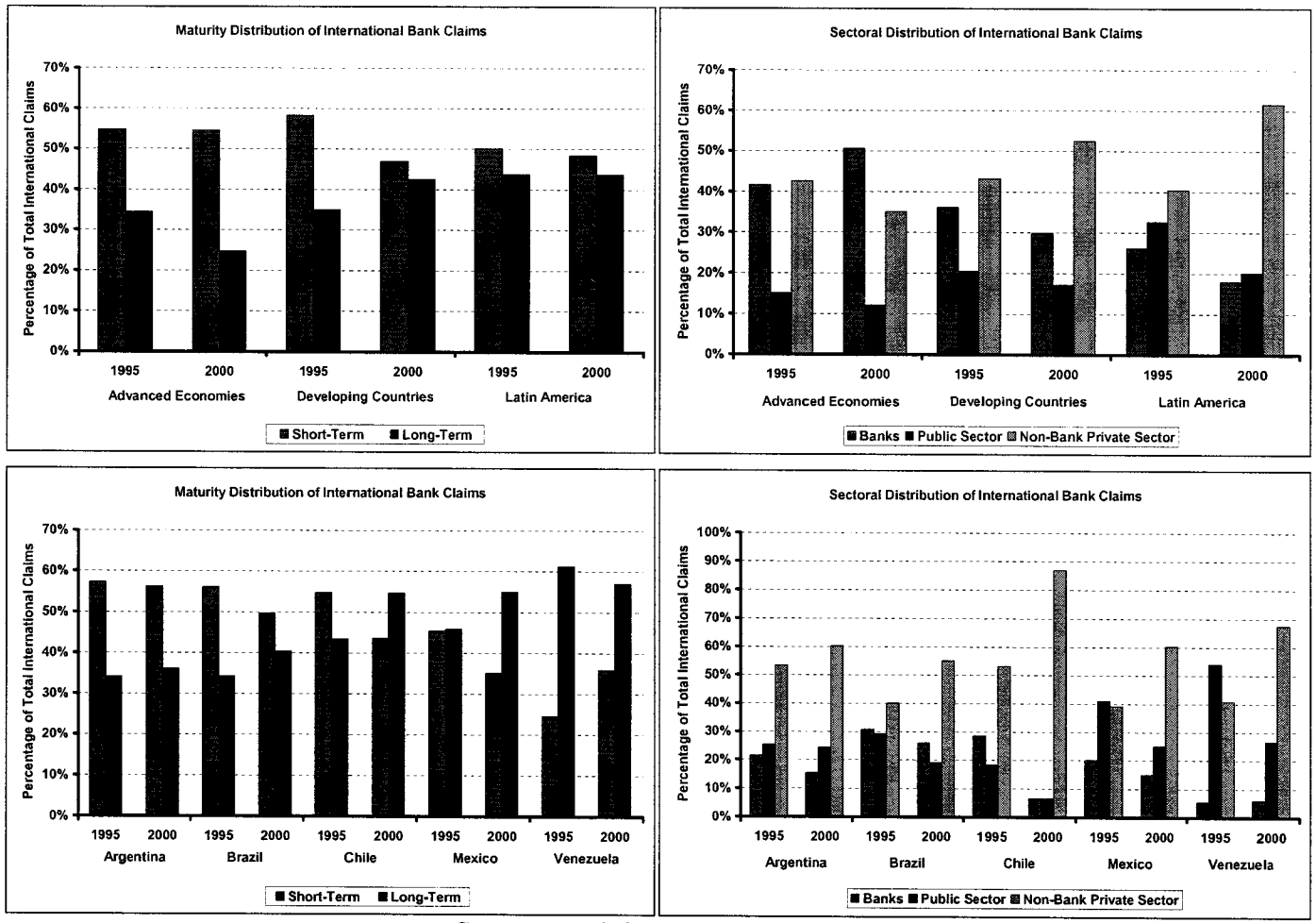
Figure 2.4. Developing Countries External Debt





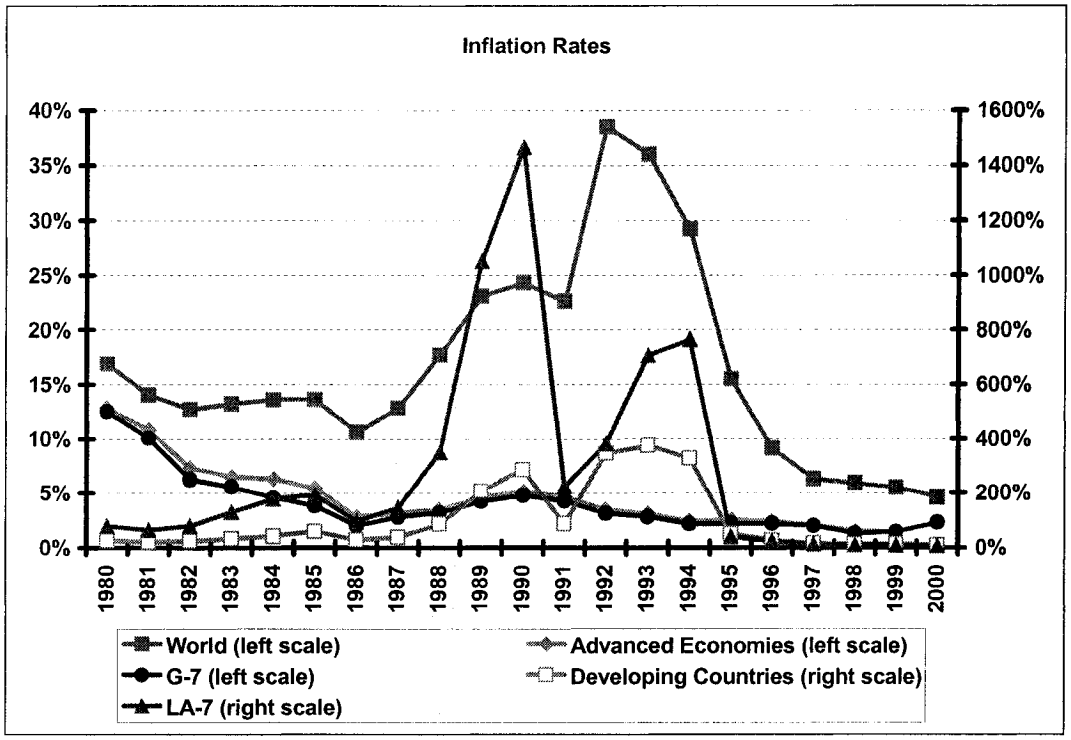
Sources: IMF [2001], FED [2002], Author's calculations.

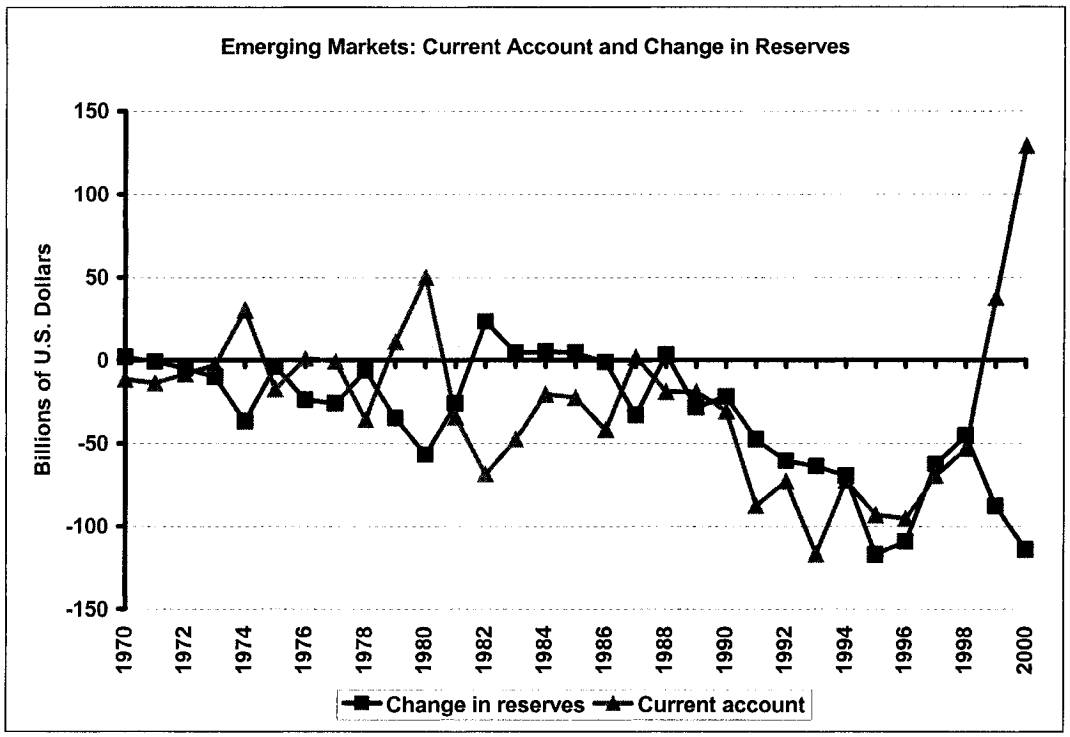
Figure 2.5. Maturity and Sectoral Distribution of International Bank Claims



Sources: BIS [1995], BIS [2002].

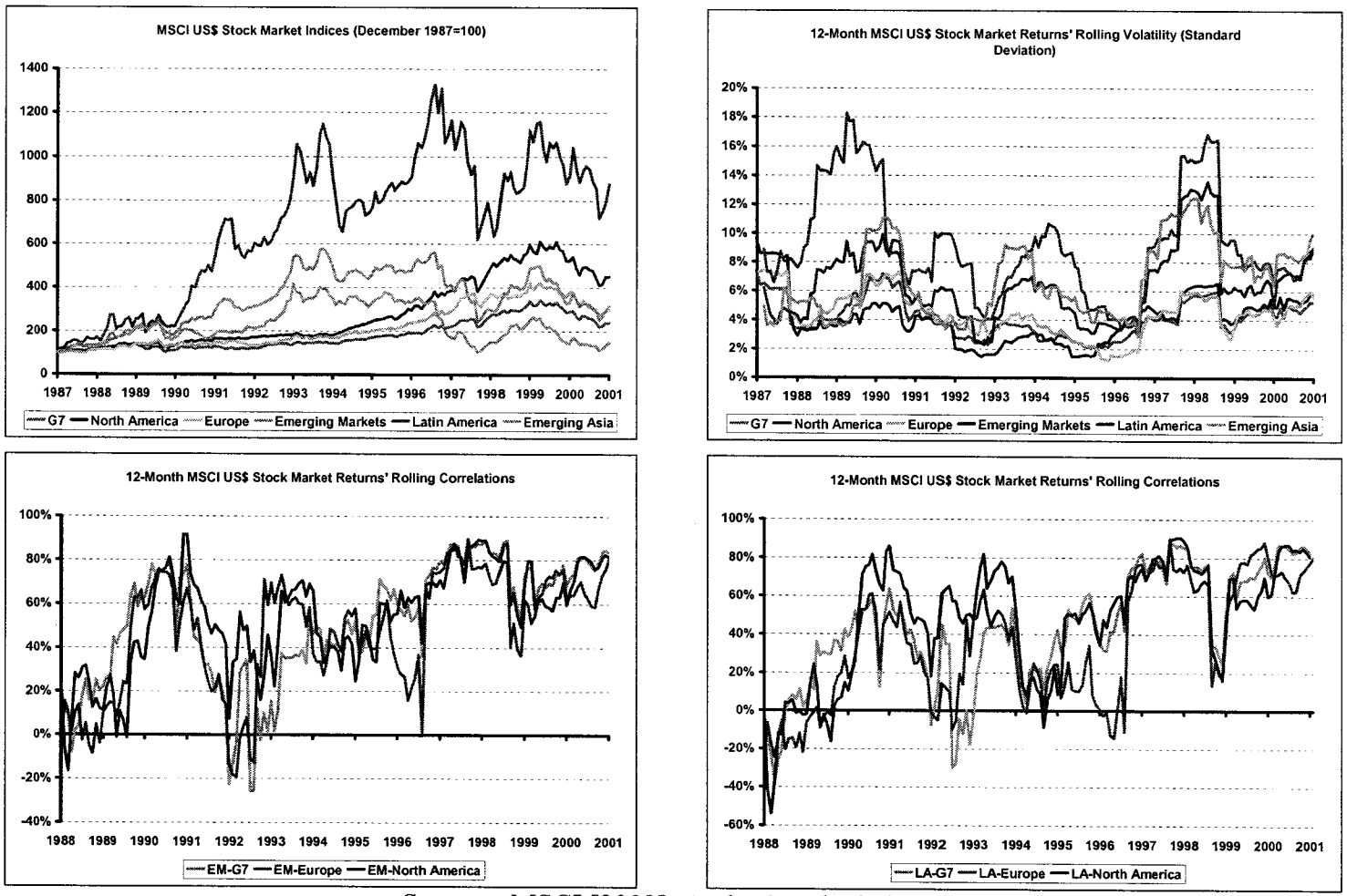
Figure 2.6. Inflation Stabilization and External Accounts





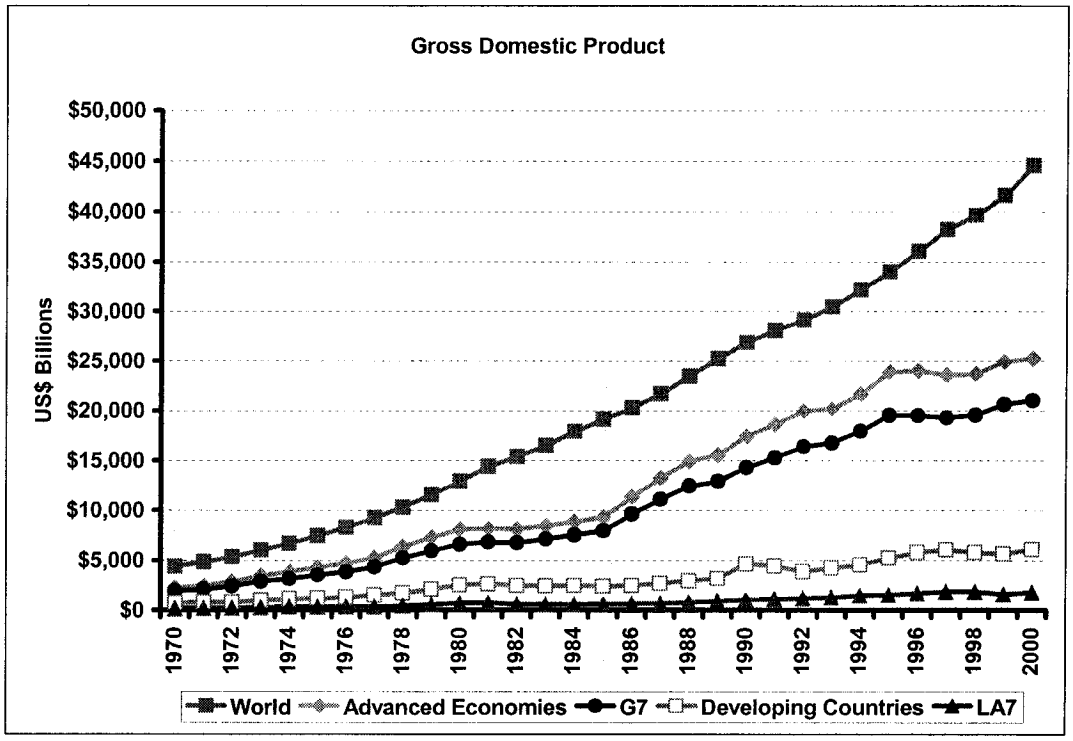
Sources: IMF [2001], Author's calculations.

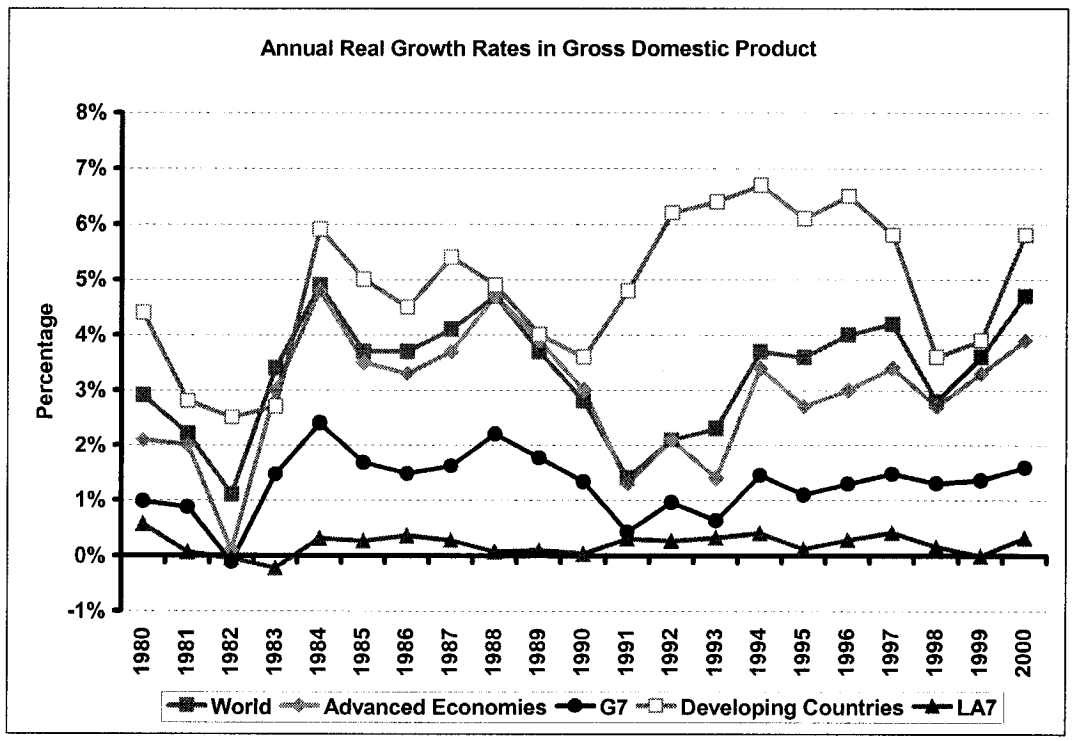
Figure 2.7. Emerging Equity Markets: Returns, Volatility, and Correlation



Sources: MSCI [2002], Author's calculations.

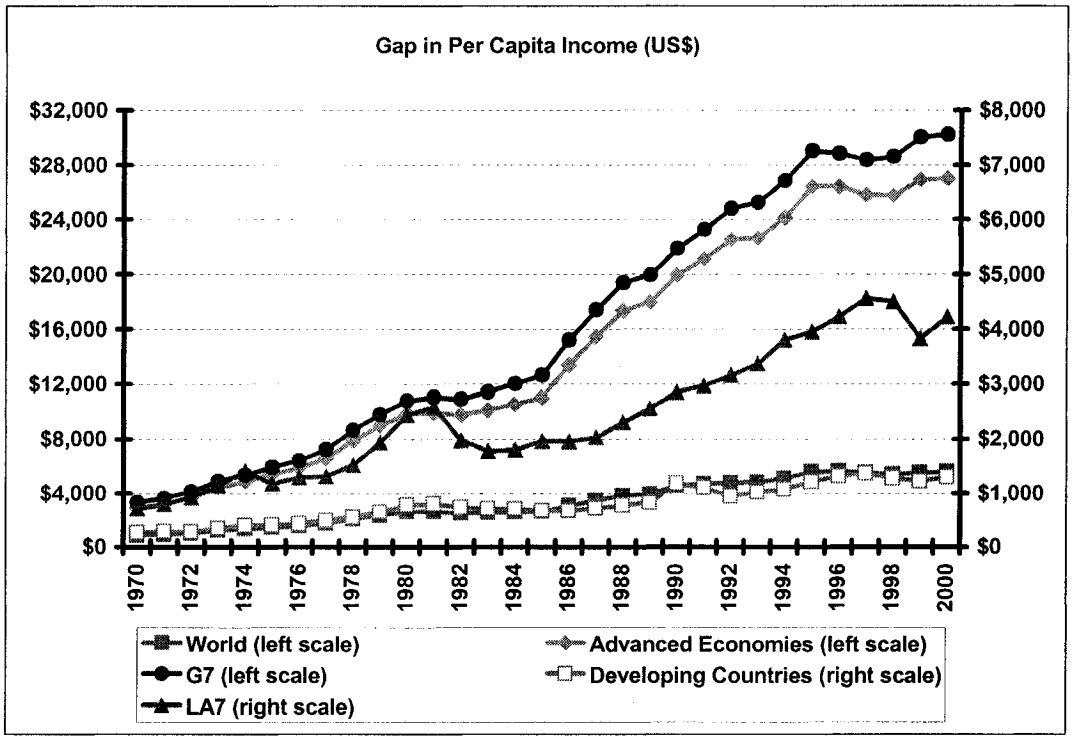
Figure 2.8. Gross Domestic Product

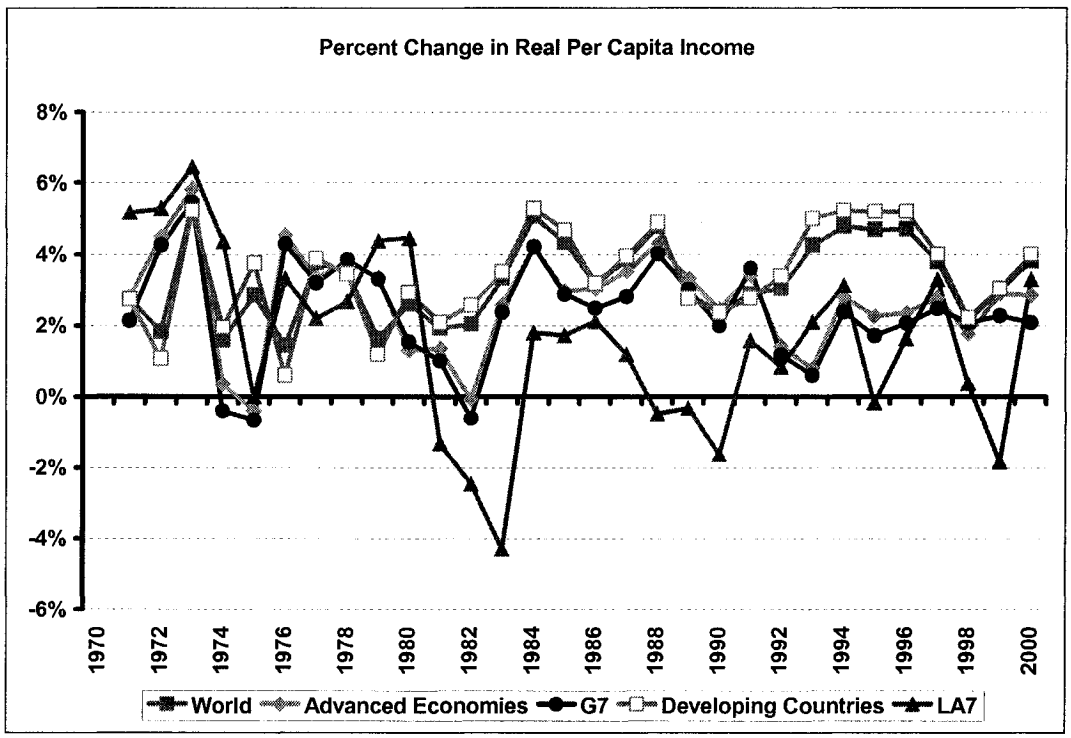




Sources: IMF [2001], Author's calculations.

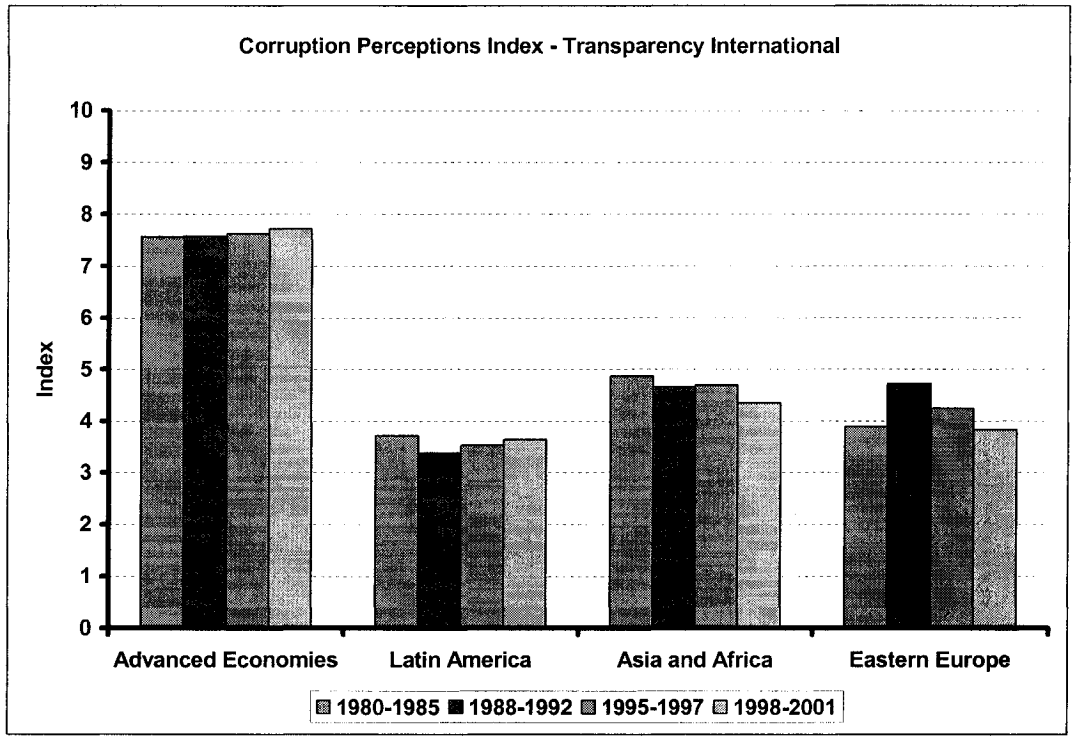
Figure 2.9. Per Capita Income Performance

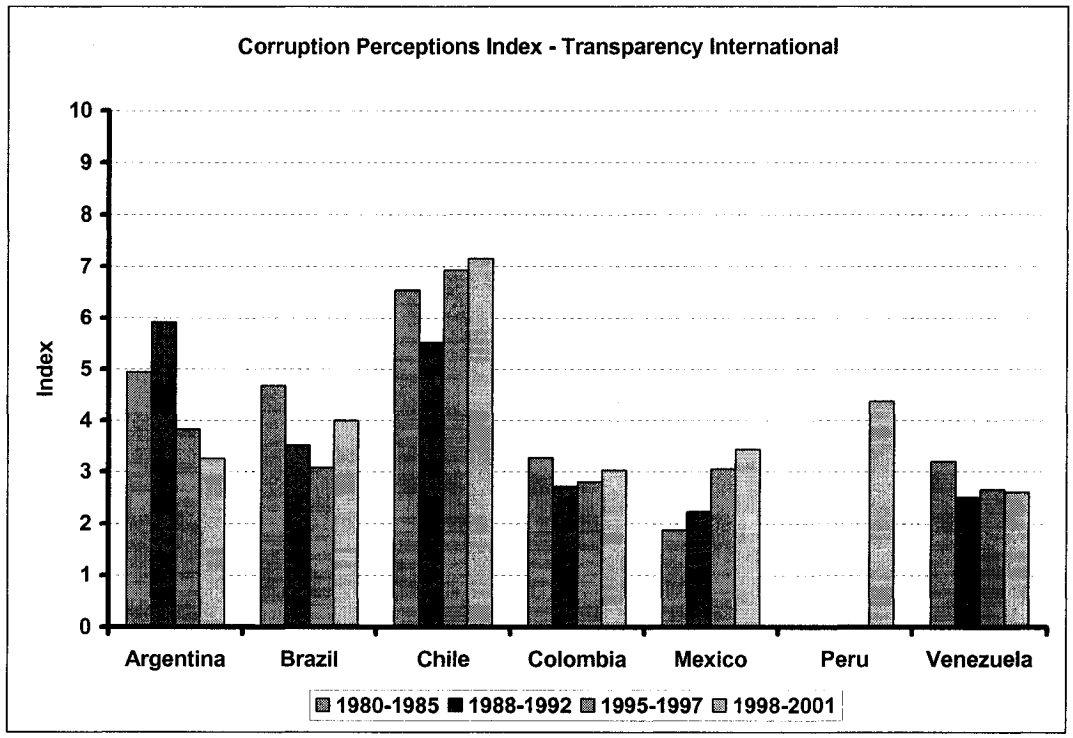




Sources: IMF [2001], Author's calculations.

Figure 2.10. Corruption Perceptions Indices





Sources: Transparency International [2002], Author's calculations.

Table 2.1. Corruption Perceptions Indices

Period	1980-1985	1988-1992	1995-1997	1998-2001
Advanced Economies				
Australia	8.41	8.20	8.75	8.55
Austria	7.35	7.14	7.44	7.65
Belgium	8.28	7.40	6.31	5.85
Canada	8.41	8.97	8.98	9.13
Denmark	8.01	8.88	9.53	9.83
Finland	8.14	8.88	9.22	9.83
France	8.41	7.45	6.87	6.68
Germany	8.14	8.13	8.21	7.73
Greece	4.20	5.05	4.80	4.73
Ireland	8.28	7.68	8.43	7.65
Italy	4.86	4.30	3.81	4.85
Japan	7.75	7.25	6.78	6.33
New Zealand	8.41	9.30	9.40	9.40
Norway	8.41	8.69	8.80	8.90
Portugal	4.46	5.50	6.35	6.48
Spain	6.82	5.06	4.85	6.68
Sweden	8.01	8.71	9.10	9.33
Switzerland	8.41	9.00	8.71	8.70
United Kingdom	8.01	8.26	8.41	8.58
United States	8.41	7.76	7.69	7.60
Simple Average	***7.56***	***7.58***	***7.62***	***7.72***
Eastern Europe				
Czech Republic	5.13	5.20	5.29	4.40
Hungary	1.63	5.22	4.72	5.18
Poland	3.64	5.20	5.33	4.25
Romania	n.a.	n.a.	3.44	3.00
Russia	5.13	3.27	2.43	2.30
Simple Average	***3.88***	***4.72***	***4.24***	***3.83***

Period	1980-1985	1988-1992	1995-1997	1998-2001
Latin America				
Argentina	4.94	5.91	3.82	3.25
Bolivia	0.67	1.34	2.73	2.50
Brazil	4.67	3.51	3.07	4.00
Chile	6.53	5.51	6.93	7.15
Colombia	3.27	2.71	2.80	3.03
Ecuador	4.54	3.27	3.19	2.40
Mexico	1.87	2.23	3.05	3.43
Peru	n.a.	n.a.	n.a.	4.38
Venezuela	3.19	2.50	2.64	2.60
Simple Average	***3.71***	***3.37***	***3.53***	***3.64***
Asia and Africa				
China	5.13	4.73	2.49	3.38
Hong Kong	7.35	6.87	7.14	7.78
India	3.67	2.89	2.72	2.83
Indonesia	0.20	0.57	2.44	1.83
Israel	7.27	7.44	7.84	7.03
Malaysia	6.29	5.10	5.20	5.05
Morocco	8.41	9.03	8.81	4.17
Nigeria	0.99	0.63	1.23	1.43
Pakistan	1.52	1.90	1.93	2.40
Philippines	n.a.	n.a.	n.a.	3.15
Singapore	8.41	9.16	8.91	9.13
South Africa	7.35	7.00	5.42	5.00
South Korea	3.93	3.50	4.53	4.05
Taiwan	5.95	5.14	5.03	5.58
Thailand	2.42	1.85	3.06	3.15
Turkey	4.06	4.05	3.62	3.60
Simple Average	***4.86***	***4.66***	***4.69***	***4.34***

Sources: Transparency International [2002], Author's calculations.

CHAPTER III

3. Causality among Inflation, Real Activity, and Asset Returns: Evidence from Latin America

The previous chapter approached the interdependence between the macroeconomy and the financial sector at a conceptual level. Although some illustrative data is provided, it does not investigate the implications of such interactions rigorously. In this chapter, I explore interdependence in a more formal manner, by investigating at the macroeconomic level the relationship between stock returns and inflation.

3.1. Introduction[1]

The relationship between stock returns and inflation has inspired both theoretical and empirical studies. Most empirical research employed exclusively United States (U.S.) data in the analysis. Some papers extended the investigation to other country samples, but only a few employed emerging markets data. Since inflation used to be – and in large extent it still is – a major concern in many emerging markets, especially in Latin America, additional in-depth investigation on this subject is certainly welcome. Even though most of the research conducted so far concentrates on the investigation of whether the so-called Fisher Hypothesis holds or not, the real point of interest is the investigation of what causes such an effect, what is its behavior, and how the variables relate to each other.

3.1.1. Literature Review

Irving Fisher [1930] hypothesized that the ex-ante nominal interest rate should fully anticipate movements in expected inflation, in order to yield the equilibrium real interest rate. This hypothesis can be easily extended to real assets returns which, as part of the real sector of the economy, should move in a one-to-one basis with expected inflation rates. However, much evidence obtained so far have concluded that stock returns and expected inflation are negatively related. This is puzzling given that "*...common stocks, representing ownership of the income generated by real assets, should be a hedge against inflation*" (Fama [1981],

p.545). Here, I briefly survey the theory and recent empirical evidence on this subject.

3.1.1.1. The Theory of the Fisher Hypothesis

According to Fisher [1930], the expected real interest rate is determined by real factors such as the productivity of capital and time preference of consumers, and is independent of the expected inflation rate. Therefore, real assets should provide an efficient hedge against changes in the nominal monetary aggregates. Consider a two-period (t and $t+1$) economy with a single consumption good.[2] The consumption good sells for a given number of P_t and P_{t+1} monetary units in each period. Fisher proposed that an agent in such economy could choose in period t between a nominal bond and a real bond. The nominal bond pays off R_{t+1} monetary units in period $t+1$, while the real one pays off r_{t+1} units of the consumption good in period $t+1$. At period t, the expected price of the consumption good in period $t+1$ is P^e_{t+1} monetary units, thus the expected inflation rate of this model economy is given by:

$$\pi^e_{t+1} = \frac{P^e_{t+1}}{P_t} \qquad \text{[Eq. 3.1]}$$

Since the nominal bond pays off R_{t+1} monetary units, its (real) yield in terms of units of the consumption good is:

$$\frac{R_{t+1}}{P^e_{t+1}} \div \frac{1}{P_t} = \frac{R_{t+1}}{\pi^e_{t+1}} \qquad \text{[Eq. 3.2]}$$

A simple arbitrage argument can be used to demonstrate that the real return on the nominal bond must be equal to the return on the real bond. If it is not, the agent can always sell one bond and buy another, therefore ending up with a real profit in terms of units of the consumption good. This implies that:

$$\frac{R_{t+1}}{\pi^e_{t+1}} = r_{t+1} \qquad \text{[Eq. 3.3]}$$

Or, equivalently:

$$R_{t+1} = r_{t+1} \times \pi^{e}_{t+1} \qquad \text{[Eq. 3.4]}$$

This is the simplest form of the Fisher Hypothesis: the return on a nominal bond should equal the real interest rate of the economy plus the expected inflation rate. Another result can be derived from this simple framework. If the agent receives a known income stream of y_t and y_{t+1} units of the consumption good in each period (the classic budget constraint),[3] then she could maximize her utility of consumption by borrowing (selling the real bond) or investing (buying the real bond) a chosen amount of consumption goods. Assume the simple utility function:

$$U(c_t, c_{t+1}) = \ln(c_t) + \beta \ln(c_{t+1}) \qquad \text{[Eq. 3.5]}$$

Where $ln(\cdot)$ stands for the natural logarithm of the argument, c_t and c_{t+1} are the agent's consumption in each period, and $\beta < 1$ is the discount factor that implies that consuming the same amount earlier is preferred to consuming it later (what Fisher calls an impatience coefficient). The solution to the agent's maximization problem is such that the slope of its budget constraint is equal to the slope of its utility curve. The former is given by the real interest rate r_t, the latter is called the marginal rate of intertemporal substitution and represents the rate at which the agent can substitute consumption from one period to the other keeping her utility unchanged. The solution then implies:

$$r_t = \frac{c_{t+1}}{\beta c_t} = \frac{g_{t+1}}{\beta} \qquad \text{[Eq. 3.6]}$$

Where g_{t+1} is the growth rate of consumption.

In Fisher's simple economy, the agent has perfect foresight regarding income, prices, and interest rates. Lucas [1978] expands the Fisher model to account for uncertainty. Suppose an infinite-living agent that chooses the number of units of the consumption good she's consuming, and the real and nominal bonds holdings each period, regarding income, prices, and interest rates as random variables[4]. The utility function now becomes:

$$U(c_t, c_{t+1}, ...) = E_t\left(\sum_{i=1}^{\infty} \beta^i \ln(c_{t+1})\right) \quad \text{[Eq. 3.7]}$$

Where $E_t(\cdot)$ is the expected value of the argument, conditional on the information available at time t. The solution to the agent's problem – maximize lifetime utility subject to her budget constraint – yields:

$$\frac{1}{r_t} = \beta E_t\left(\frac{1}{g_{t+1}}\right) \quad \text{[Eq. 3.8]}$$

And:

$$\frac{1}{R_t} = \beta E_t\left(\frac{1}{g_{t+1}} \times \frac{1}{\pi_{t+1}}\right) \quad \text{[Eq. 3.9]}$$

These are multi-period equivalents of the Fisher Hypothesis under uncertainty. Using the well-known result for the expectation of a product of two random variables and substituting Eq. 3.6 into Eq. 3.9 results:

$$\frac{1}{R_t} = \beta \operatorname{cov}\left(\frac{1}{g_{t+1}}; \frac{1}{\pi_{t+1}}\right) + \frac{1}{r_t} E_t\left(\frac{1}{\pi_{t+1}}\right) \quad \text{[Eq. 3.10]}$$

Where $cov(\cdot)$ stands for the covariance of the arguments. This is the Lucas's generalization of the Fisher model under uncertainty. The return on the nominal bond still depends on the real interest rate and the expected inflation, plus a risk premium (the first term in the right-hand side of Eq. 3.10) to compensate the agent for holding the nominal bond in the presence of uncertain inflation. Notice that the sign of the covariance between the inverse of the consumption growth rate and the inverse of the inflation rate determines whether there is a risk premium or a risk discount for the return on the nominal bond.

3.1.1.2. Empirical Evidence on the Fisher Hypothesis

In principle, the Fisher Hypothesis could be extended to any real asset, such as real estate, commons stock, and other risky securities. Empirically, the so-called Fisher's model states that the nominal return of any real asset "j" is given by:

$$E(R_{jt}) = \alpha_j + \beta_j E(\pi_t \mid \varphi_{t-1}) \qquad \text{[Eq. 3.11]}$$

Where $E(R_{jt})$ is the asset j's expected nominal return at any period t, $E(\pi_t|\varphi_{t-1})$ is the expected inflation π_t for period t conditional to the information set available in $t-1$, α_j is the real expected return on asset j (which includes all risk premia), β_j is the (inflation) hedge coefficient of this asset. A common generalization of this model is:

$$E(R_{jt}) = \alpha_j + \beta_j E(\pi_t \mid \varphi_{t-1}) + \gamma_j(\pi_t - E(\pi_t \mid \varphi_{t-1})) \qquad \text{[Eq. 3.12]}$$

Where $(\pi_t - E(\pi_t|\varphi_{t-1}))$ is the difference between actual and expected inflation and the coefficient γ_j represents the sensitivity to unexpected inflation on the asset's return. Under these models, a real asset provides effective hedge against both expected and unexpected inflation if the coefficients β_j and γ_j are indistinguishable from unity.

Another way to test the augmented Fisher Hypothesis above is to consider real rather than nominal returns. In this case, the model becomes:

$$E(r_{jt}) = \omega_j + \theta_j E(\pi_t \mid \varphi_{t-1}) + \lambda_j(\pi_t - E(\pi_t \mid \varphi_{t-1})) \qquad \text{[Eq. 3.13]}$$

Where $E(r_{jt}) = E(R_{jt}) - E(\pi_t)$. In this case, the perfect hedge hypothesis requires the coefficients θ_j and λ_j to be zero, that is, the real return ω_j is insensitive to inflation, either expected or unexpected.

The empirical relationship between inflation and common stocks was first investigated by Jaffe and Mandelker [1976], Bodie [1976], and Nelson [1976]. Jaffe and Mandelker [1976] test the Fisher Hypothesis by regressing the contemporaneous and lagged inflation rate on nominal and real stock returns. Using monthly data from the United States for the period 1953-1971, the authors find a significant negative relationship between those variables. The authors also employ the nominal risk free interest rate as a proxy for expected inflation, and the difference between the risk free rate and actual inflation as a proxy for unexpected inflation. The results are essentially the same as those for the expected inflation, the unexpected inflation effect being negative but non-significant. A

negative though non-significant relationship is found for the expected inflation effect when using yearly data for the period 1875-1970.

Nelson's [1976] study addresses pretty much the same concerns and employs the same general methodology as Jaffe and Mandelker [1976]. Again, using monthly data for the United States in the period 1953-1974 a significant negative relationship between nominal stock returns and contemporary inflation (and its leads and lags) is observed. The innovation proposed by Nelson (1976) is the modeling of the expected inflation as an ARMA (1,1) process. His results do not differ from the Jaffe and Mandelker [1976] ones, and the author concluded that some evidence of market inefficiency is suggested by his study.[5]

While Nelson [1976] also tests the profitability of some trading strategies under the market "inefficiency" suggested by the negative relationship between stock returns and inflation, Bodie [1976] investigates the inflation hedge properties of common stocks in a portfolio. Specifically, the author investigates how effectively an investor can hedge against inflation with a portfolio of common stocks and a nominal default-free bond. The objective is the reduction in the variance of the real – instead of nominal – return of the portfolio. Using annual, quarterly, and monthly data for the period 1953-1972, Bodie [1976] estimates the parameters of such a hedge portfolio and reaches the conclusion that the real return on equity is negatively related to both expected and unexpected inflation. Therefore, in order to use common stock as a hedge against inflation, the investor should sell them short. Although the methodology employed by Bodie [1976] differs from Jaffe and Mandelker [1976] and Nelson [1976], his conclusions are exactly the same as the other authors.

Following these pioneer studies, Fama and Schwert [1977] investigate the inflation effect on asset returns in a broader setting. Using monthly, quarterly and semi-annual U.S. data for the period January 1953 to July 1971, they test the relationship of several assets[6] as hedges against expected and unexpected inflation by running regressions similar to Eq. 3.13 and using the Treasury Bill rate as a proxy for expected inflation. The authors conclude that only private residential

real estate is a complete hedge against both expected and unexpected inflation; government debt instruments are complete hedges against expected inflation, but not against unexpected consumer price changes; the results do not provide evidence on the inflation hedge properties of human capital; and finally, similar to previous studies, common stocks seem to perform poorly as hedge against both expected and unexpected inflation.

Since the earlier studies, the empirical literature on the Fisher Hypothesis has been prolific. Gertler and Grinols [1982] employ a multi-beta model including the market portfolio, unemployment, and inflation, and find higher prices for systematic risk despite negative correlation between inflation and returns. Titman and Warga [1989] test returns as predictors of inflation and interest rates in the period 1976-1984, finding positive (rather than negative) stock returns-inflation and stock returns-interest rates relationships. Their results seem stronger for the period 11/1979-10/1982, a period marked by monetary policy shifts. Buono [1989] proposes that, since inflation variability is negatively associated with real activity and positively associated with the inflation level, it may generate the spurious correlation between inflation and returns. His empirical evidence, however, lends little support for the proposition. Similarly, Randall and Suk [1999] posit that it is the changes rather than the levels of inflation that affect the stock market, and offer some empirical evidence in support of their proposition. Hooks [1993] tests the Fisher Hypothesis as channeled by changes in firm earnings in a nominal-contracting approach, but fails to find empirical support for that claim. Park [1997] documents the negative relationship between inflation and stock returns. Moreover, the author finds that returns are negatively associated with employment levels while inflation is positively so, consistent with Ram and Spencer's [1983] argument (see below).

3.1.1.3. Hypothetical Explanations for the Empirical Fisher Hypothesis

The early studies on the Fisher Hypothesis mentioned above are mainly concerned in documenting and describing the nature of the relationship between stock returns and inflation, and not in suggesting any explanation to the puzzling results

obtained. Interestingly, in his discussion of some of the above papers, Nichols [1976] suggests some possible explanations for the striking relationship between stock returns and inflation that would be explored by many researchers in the following years, as the tax effects of inflation in the firm's balance sheet, short-term versus long-term effects, and monetary-based explanations.[7]

Several alternative explanations for empirical Fisher Hypothesis in stocks emerged from the literature. The Tax-Effect Hypothesis proposed by Feldstein [1980] argues that inflation generates artificial capital gains due to the valuation of depreciation and inventories (usually nominally fixed) subject to taxation. This increases corporate tax liabilities and thus reduces real after-tax earnings. Rational investors would take into account this effect of inflation by reducing common stock valuation. In this sense, inflation "causes" (i.e., precedes) movements in stock prices. Although appealing, the Tax-Effect Hypothesis depends mainly on the United States tax regime, and there is evidence of negative stock returns and inflation relationship in countries with different tax laws, in which adjusted values of inventories and depreciation are considered for tax purposes.[8]

Fama [1981] hypothesizes that the anomalous relationship observed between real stock returns and inflation in the United States is a consequence of a "spurious" relationship: negative stock returns-inflation relations are induced by the positive correlation between stock returns and real activity and the negative correlation between inflation and real activity – the Proxy Hypothesis.[9] The argument hinges on the money demand behavior of rational agents who perceive a fall in economic activity and therefore a decrease in money demand (implied by the unwillingness to hold increasingly worthless money) that causes an excess money stock and thus inflation.[10] In this sense, measures of real activity – such as output and capital expenditure – should dominate measures of inflation when both are used as explanatory variables for real stock returns in testing the Fisher Hypothesis.[11] Fama [1981] provides some, but not definite, evidence on the validity of the Proxy Hypothesis. Moreover, the author does not provide evidence on the causality relations between the variables.

Commenting on Fama's paper, Ram and Spencer [1983] note that his explanation calls into question conventional theories of the Philips curve, in which a positive rather than negative relationship between inflation and real activity[12] is suggested. Ram and Spencer [1983] find consistent evidence of a positive relationship between real activity and inflation, and a negative relationship between real activity and real stock returns. Further, the authors investigate the directional causation between inflation and stock returns using Sims [1972] technique, and conclude that inflation unidirectionally "causes" (in an econometric sense) real stock returns. These findings strongly contradict Fama's Proxy Hypothesis.[13]

Elaborating on Fama's work, Geske and Roll [1983] propose that, besides money demand, a money supply linkage that may help explain the phenomenon. The authors propose a chain of macroeconomic events that leads to a "spurious" correlation between stock returns and inflation. They suggest that stock prices' reaction in anticipation of future economic activity (Fama's model) is highly correlated to government revenue, so that the government faces a deficit when economic output decreases. In order to balance the budget, the Treasury either borrows or issues money through the central bank, causing inflation. Thus, stock returns and inflation are negatively related due to a fiscal and monetary linkage – the Reverse Causality Hypothesis. The authors find some evidence in support to their framework, especially the signaling from stock returns to changes in nominal interest rates and changes in expected inflation. They also find little evidence for a real interest rate effect. Figure 3.1 provides a diagram summarizing the causality implications of each of these three hypotheses.

Beyond explanations based on money demand (Proxy Hypothesis) and money supply (Reverse Causality Hypothesis), a monetary equilibrium-based explanation seems a natural extension. Indeed, Kaul's [1987] main hypothesis is that the equilibrium process in the monetary sector causes the observed stock returns-inflation relationship. Basically, money demand and counter-cyclical money supply effects lead to negative relations between stock returns and expected, unexpected, and changes in expected inflation. Moreover, the author claims that these relations vary over time in a systematic manner depending on the influence

of money demand and supply factors. Further work on this issue (Kaul [1990]) suggests that during the post-war period the negative relation observed varies systematically depending on the operating targets of the monetary authorities. In addition, Kaul and Seyhun [1990] argue that negative relationships proxy for the negative effects of relative price variability on the stock market. At best, only partial empirical support is found for Kaul's [1987] proposition[14] (e.g. McCarthy, Najand, and Seifert [1990], Ely and Robinson [1992], Liu, Hsueh, and Clayton [1993], and Ely and Robinson [1994]).[15]

3.1.1.4. Empirical Evidence on Hypothetical Explanations

Empirical research focus shifted from simply testing the Fisher Hypothesis to testing which of the alternative explanations (Tax-Effects, Proxy, Reverse Causality, or Monetary Equilibrium Hypothesis) better fitted the data. Hasbrouck [1984] investigates the econometric properties of survey versus time series modeled measures of expectational variables and concludes that cross-forecaster dispersion (an uncertainty measure) is significant in explaining returns, eliminating the significance of the inflation variable.

Benderly and Zwick [1985] provide stronger support for Fama's claim that the correlation between inflation and stock returns is spurious. Their explanation, however, is based on a real balance effect that implies the direction of causality running from current inflation to future output growth, which contradicts the Proxy Hypothesis.

Ely and Robinson [1992] extend the studies of Geske and Roll [1983] and Kaul [1987] by employing a rational expectations model of real stock returns. Using U.S. data in the period 1953-1979, the authors cannot support the debt monetization hypothesis as suggested by Kaul [1987]. Also, a counter-cyclical monetary policy although apparent, does not provide a consistent explanation for the negative stock returns-inflation relationship.

Wei and Wong [1992] study the Fisher Hypothesis using industry portfolios instead of aggregate market indices. Their results provide partial support for the

Proxy Hypothesis (for natural resources industries only) but cannot support the Tax-Effect Hypothesis.

In a study on the role of monetary policy in the stock returns-inflation relationship, Park and Ratti [2000] report findings that do not support Fama's proposition, but do provide some support for Geske-Roll's and Kaul's explanations. The authors also suggest that structural breaks in the relationship are present in the post-Bretton Woods period.[16]

3.1.1.5. International Evidence on the Fisher Hypothesis

International tests of the Fisher Hypothesis and its explanations have also spawned a fruitful literature, although a consensus is yet to be achieved. Gultekin [1983] tests the Fisher Hypothesis in a sample of 26 countries using time series and cross-sectional analyses. His time series results are not favorable to the Fisher Hypothesis, while the cross-sectional study finds that countries with high inflation rates are associated with high nominal stock returns and this appears to be in contrast to the time series results.

In a multi-country study,[17] Solnik [1983] tests an extended version of the Fisher and Geske-Roll's models and finds strong support for the Reverse Causality Hypothesis, although the author does not investigate the causal direction of the stock returns-inflation relationship.

Wahlroos and Berglund [1986] test the Fisher and Proxy Hypotheses using Finnish data, and rejects both of them. Cozier and Rahman [1988] test the Proxy Hypothesis in Canada and again a negative relationship between real stock returns and inflation emerges. Canadian data provides a better support for the Proxy Hypothesis than Fama [1981] obtains using U.S. data: when real activity is introduced in the Fisher model, both expected and unexpected inflation coefficients become insignificant. The authors then investigate the causality direction by employing Granger's [1969] framework and find evidence that real stock returns are determined independently from inflation, while there is some evidence of causation from stock returns to inflation.[18]

Using monthly data from the United States, Germany, and the United Kingdom in the period 1962-1987, McCarthy, Najand, and Seifert [1990] reject the Proxy Hypothesis since no significant relationship is found between expected real stock returns and expected real activity. Yet, the negative relationship between expected inflation and expected stock returns persists even after accounting for expected real activity.

Using quarterly data in the period 1957-1992 for a multi-country sample of developed countries,[19] Ely and Robinson [1994] employ multivariate cointegration analysis to test the explanations suggested by Fama [1981], Geske and Roll [1983], and Kaul [1987] among others. Little evidence on the cointegrating relationship is found, and even in these cases, the authors could not conclude that both stock prices and goods prices are important components in the cointegrating relationship. The hypothesis that common stocks are a good hedge against inflation is also soundly rejected for every case examined.

Amihud [1996] examines the effects of unexpected inflation on stock prices using a direct measure of unexpected inflation[20] on Israeli daily data in an event study-type framework. The author contends that a number of explanations suggested for the negative relationship between stock returns and inflation in the United States do not apply in Israel,[21] therefore characterizing an ideal setting for the testing of these hypotheses. Despite these characteristics, the results strongly suggest that unexpected inflation does have a negative effect on stock prices.[22]

Liu, Hsueh, and Clayton [1993] provide a comprehensive test of the Proxy Hypothesis using monthly and quarterly data from the United States, Germany, Canada, and the United Kingdom in the period 1974-1990.[23] The authors find strong evidence against the Proxy Hypothesis. Ammer [1994] tests the Fisher Hypothesis in 10 developed countries[24] employing two-stage least squares. His overall findings favor nominal contracting (tax-related) theories. Erb, Harvey, and Viskanta [1995] extensively study the stock returns-inflation relationship in a sample of 41 countries, including 20 Emerging Markets.[25] Their results confirm the negative relation between realized stock returns and realized inflation in a time

series approach, even when longer horizons are considered.[26] The authors find that emerging markets are more correlated with world and the United States equity markets in low rather than high inflation states. They also find that differences in inflation rates have some ability to explain expected returns and even more the volatility of returns.

Finally, Solnik and Solnik [1997] test the Fisher relation in 8 developed countries,[27] using a GMM (Generalized Method of Moments) estimation approach in pooled data. They cannot reject the Fisher model for those countries for periods ranging from 1 to 12 months.

Recent studies have provided a glimpse of the behavior of inflation and stock returns in emerging markets. Kwon, Shin, and Bacon [1997] test a multi-beta model for South Korea in the period (1980-1992) and find that nominal variables such as inflation and nominal interest rates are mostly insignificant for the Korean case. Lee [1998] rejects the Proxy Hypothesis for Hong Kong, Singapore, South Korea, and Taiwan in the period between 1978-1995. Adrangi, Chatrath, and Raffiee [1999] study the returns-inflation relationship for Mexico and South Korea. The authors reject the Proxy Hypothesis in the short-run but find evidence of cointegration between inflation, stock returns, and real activity, which supports the notion that the Proxy Hypothesis may hold in the long-run. Finally, Henry [2001] investigates the reaction of 25 emerging markets to 81 inflation stabilization plans, and concludes that stabilizing high inflation yields a significant market increase, while the results of stabilizing moderate inflation are economically weak and statistically insignificant.

3.1.1.6. The Fisher Hypothesis in the Long-Run

Some authors argue that the Fisher Hypothesis holds in the long-run, although in the short-run anomalous results may prevail. Boudoukh and Richardson [1993] use long-run United States (1802-1990) and United Kingdom (1820-1988) data to test the behavior of common stocks as an inflation hedge in the long-run (five-year holding periods). The authors provide strong support for a positive relation, yet not a perfect hedge, between stock returns and inflation at long horizons. In a

similar fashion, Cochran and DeFina [1993] argue that previous studies ignored long-run constraints in the short-term price dynamics. Using quarterly U.S. data in the period 1947-1989, their evidence strongly indicated that inflation, both realized and unexpected, generally depresses real stock returns. However, inflation does not simply proxy for future changes in real output as suggested by the Proxy Hypothesis, since the inclusion of the expected growth rate in output in the model does not weaken the significant negative effect of inflation.

More recently, Ely and Robinson [1994] use cointegration analysis to test for a long-run relationship between stock prices and inflation for a sample of 15 industrial countries.[28] The data do not indicate any long-run relationship between stock prices and the general price level. The merit of Ely and Robinson's [1994] study is to reject – in a broad multi-country sample and using rigorous econometrics – the hypothesis that the negative relationship between stock returns and inflation is due to some short-run disequilibrium.

Finally, Schotman and Schweitzer [2000] suggest that the negative inflation hedge potential of common stocks can turn out positive, if the investment horizon is optimally chosen. In general, common stocks have a positive potential as inflation hedge over long horizons. The choice of the hedge ratio depends on key parameters such as the persistence of inflation, the magnitude of the Fisher Hypothesis effect, and the stock's sensitivity to inflation. In sum, the empirical evidence on the long-run validity of the Fisher Hypothesis is not in general any more favorable than it is for the short-run.

3.1.1.7. Recent Alternative Empirical Approaches to the Fisher Hypothesis

Some authors, seeking a more "microeconomic" approach, perform tests using industry portfolios instead of market indices. In a two-factor CAPM framework, Loo [1988] tests the Fisher Hypothesis for 20 industry portfolios in the period 1970-1985. His results largely confirm at the industry level the same negative relationship previously documented for the market aggregate. Wei and Wong [1992] use industry returns in a study that rejects the Tax-Effect Hypothesis and partially supports the Proxy Hypothesis. Boudoukh, Richardson, and Whitelaw

[1994] develop a model of returns-inflation relationship consistent with money neutrality that explains the short-run negative association and long-run positive one. Empirical evidence supporting the model predictions is found for 22 industry portfolios of United States stocks in the period 1953-1990.

More recently, a couple of papers have raised the hypothesis that the relationship between inflation and stock returns is asymmetric in nature. For instance, Domian, Gilster, and Louton [1996] document a significant asymmetry in the returns-inflation relationship, i.e. declines in inflation rates increase stock returns as much as a year later, while increases in inflation rates have a modest and insignificant effect on stock returns. Their results cannot support the Reverse Causality Hypothesis. Park [1997] tests the relationship between inflation and returns piecewisely, and finds that the results are more pronounced in annual rather than monthly and quarterly data. The author raises the interesting point that the asymmetric dynamic effect of inflation on returns may be conditional to the stage of the business cycle. For instance, an increase in activity during a recession is "good news", while the same event during a boom is "bad news" because of fears of counter-cyclical response from the Federal Reserve. Hess and Lee [1999] account for the anomalous Fisher Hypothesis by decomposing disturbances into supply (real) shocks and demand (monetary) shocks. Pre- and post-war empirical evidence from American, British, German, and Japanese quarterly data suggests that the nature of the relationship is indeed regime dependent: the negative relationship is due to supply shocks while the positive one is due to demand shocks. Finally, Henry's [2001] findings regarding stock market yields from the stabilization of inflation (mentioned above) also come in support to the notion that the returns-inflation relationship is asymmetric.

3.1.1.8. Causality and Hypothetical Explanations

A sensible way to test which hypothesis (Tax-Effects, Proxy, or Reverse Causality) better explains the empirical relationship between inflation and stock returns is to explore the causality implications of each model. As shown in Figure 3.1, the direction of causality is an indication of which explanation better suits the

data. An early study by Cozier and Rahman [1988] employed the Granger [1969] technique in order to determine the direction of causality between inflation and stock returns. Their findings suggest support for the Proxy Hypothesis in Canada. James, Koreisha, and Partch [1985] noted that Geske-Roll's equation-by-equation estimation procedure is inappropriate for what is essentially a system of equations. The authors investigate the Reverse Causality Hypothesis using a Vector Autoregression Moving Average (VARMA) approach in order to jointly estimate the links between stock returns and inflation as well as the direction of the causality. The authors find support for the Reverse Causality Hypothesis, consistent with Solnik [1983]. Lee [1992] uses a Vector Autoregression (VAR) innovation accounting approach to investigate the Granger [1969] causality and dynamic interactions among the variables in the United States His findings support Fama's version of the Proxy Hypothesis and, contrary to James, Koreisha, and Partch [1985], could not support Geske-Roll's approach.

A simplified summary of this literature is presented in Table 3.1. In summary, a large and rich stream of literature has been dedicated to the investigation of the anomalous empirical Fisher Hypothesis. Alternative explanations of the phenomena have been proposed and several empirical studies have been conducted with the purpose of establishing which one better describes real world regularities. So far, the debate remains unsettled. I believe that investigating the causality relationships in multi-country data is a promising research path.

3.1.2. Purpose and Overview of the Essay

In this essay, I extend the work of James, Koreisha, and Partch [1985] and Lee [1992] to a multi-country sample. The causal relations among inflation, real stock returns, real interest rates, and real activity are studied in the context of seven Latin American countries, and the results are compared to those obtained for the Group of Seven industrial countries, as well as to the findings of other empirical studies. This essay adds to the literature in several ways: in contrast to most previous studies which focus only in the United States, developed market, or single country data, I explore the topic in a multi-country sample, including some

major emerging markets. Instead of using actual variables, I use expected versions of actual variables, which is more in tune with the theory. Instead of arbitrarily determining the order of the Vector Autoregressions, I let the data determine it by employing a selection criterion. I test for causal relationships using more than one methodology. And finally, besides exploring the problem in a country-by-country fashion, I also investigate causality relations by pooling countries together, while still allowing for country-specific effects.

My findings indicate that each of the three main theoretical explanations find some empirical support in my sample, country-specific factors are less important than expected (including differences between industrial and developing countries) and that the current theoretical explanations do not explain satisfactorily the relationship between expected real stock returns and expected inflation.

The remainder of the essay is organized as follows: the next section explains the methodology, the variables used in the empirical study, the data sources, and detail the empirical model. Section 3.3 presents and discusses the results obtained from the Latin American data, and compares it to the results obtained for the Group of Seven. The last section summarizes the essay and presents some concluding remarks.

3.2. Methodology, Variables, and Data

3.2.1. Vector Autoregression Analysis[29]

The empirical methods employed in this essay are standard tools obtained from Vector Autoregression (VAR) analysis. This approach provides a parsimonious yet insightful specification to treat the problem at hand. Although some critics remark that such method may resemble econometrics without a backing economic theory (Pesaran and Wickens [1995]), VAR analysis has been employed in a wide range of economic problems where the dynamic impact of shocks need to be estimated, mostly in macroeconomics (Canova [1995], Watson [1994]).

Let Z_t be a matrix of jointly determined dependent variables, $L(p)$ be the p^{th}-order lag operator, W_t be a matrix of exogenous independent variables, and α_0, α_1 and α_2 be the vectors/matrices of coefficients. A VAR(p) model would have the form:

$$Z_t = \alpha_0 + \alpha_1 L(p) Z_t + \alpha_2 W_t + \varepsilon_t \qquad \text{[Eq. 3.14]}$$

Where $p \geq 1$ is the order of the VAR system, and ε_t represents the matrix of shocks to the system displaying all the usual desired properties. In such a system, any variable in Z_t is assumed to be a function of lagged values of itself and the other endogenous variables in Z_t, plus any exogenous variables defined in W_t.

One of the advantages of a VAR specification is that it allows for the computation of impulse response functions (IRF), i.e. functions of the response of any endogenous variable to one standard deviation shock in any other endogenous variable in the system. Usually, such functions are computed using a Cholesky decomposition of the covariance matrix of the shocks. The transformed shocks have unit standard errors and are orthogonal to each other – hence the IRF is usually known as the "orthogonalized impulse response". Moreover, the forecast error variance can be accordingly allocated from the orthogonalized impulse response functions – hence known as the "orthogonalized forecast error decomposition" (FEVD). As Lee [1992] points out, the VAR analysis is a more appropriate method to investigate the causality among variables than a simple bivariate causal test because of intransitivity of causal ordering and dynamic interactions in large systems of variables.

One of the drawbacks of such approach is that the order in which the variables enter the system is likely to affect both the (orthogonalized) IRF and the (orthogonalized) FEVD. In order to overcome such problem, Pesaran and Shin [1998] suggest an alternative specification, the "generalized" IRF and FEVD. The main advantage of such approach is that it is unaffected by the ordering of the variables. One shortcoming is that, unlike the orthogonalized FEVD, the generalized variance decomposition for any given variables does not necessarily add up to 100%. Given that in this study I am employing a 4-variable VAR in 14 different countries,[30] the generalized IRF and FEVD seem more appropriate.

3.2.2. Variables and Data

In this study I focus on seven major Latin American economies (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela, henceforth LA-7). These countries are responsible for the major part of Latin America's population, real output, foreign trade, stock market capitalization, and international capital flows (see Table 3.2). Moreover, these countries have experienced very diverse economic environments in a relatively short period of time: hyperinflation, deep recession, generalized protectionist measures, opening up to international trade and capital flows, macroeconomic stabilization plans, privatization, deregulation, and re-regulation.

Also, I replicate the analysis for the Group of Seven industrial countries (Germany, Canada, France, Italy, Japan, the United Kingdom, and the United States, henceforth G-7) as a "control" group.[31] My intent here is to compare the dynamics between these two groups of countries as well as among individual countries, and especially contrast my findings with those of previous studies focused in the United States

Data sources are as following: stock market indices for the LA-7 are from International Finance Corporation's Emerging Markets Database (EMDB), while indices for the G-7 are from the International Monetary Fund's International Financial Statistics (IFS) "share price index" in local currencies. Consumer price indices are obtained from IFS for all countries except Argentina, whose source is INDEC (Instituto Nacional de Estadística y Census [2000]), the official Argentine statistics body. Interest rates are also from IFS for all countries, but their definition varied according to availability. Whenever available, I chose the yield in short-term government bills (Germany, Canada, France, Italy, the United Kingdom, and the United States). Short-term bank deposit rates are used for Argentina, Brazil, Chile, Mexico, Peru, and Japan.[32] Finally, the central bank's discount rate is used for Colombia and Venezuela[33]. The choice criteria always take into account the available time span of each series, in order to obtain longer periods of usable data. Finally, the industrial production indices are from IFS for

Colombia, Mexico and the G-7. For Chile and Peru the manufacturing production index obtained from IFS is employed instead. For Argentina and Brazil, industrial production indices are provided respectively by Macroeconomica© and Lopes Filho & Associates© available through Datastream©. Finally, Venezuela's industrial production index is obtained from Banco Central de Venezuela [2000]. Industrial production indices for the G-7 are already seasonally adjusted by the IMF, while indices for the LA-7 are not. In order to make the series comparable, I seasonally adjusted the LA-7 production indices using the standard procedure in the software Minitab©. A summary of variables and data sources is presented in Table 3.3.

The variables used in this study are presented as monthly rates computed from the original series. Inflation rates (INF_{it}) are computed by the end of period according to:

$$INF_{it} = \ln\left(\frac{CPI_{it}}{CPI_{it-1}}\right) \qquad \text{[Eq. 3.15]}$$

Where CPI_{it} stands for the end of period t consumer price index of country i, and $ln(\cdot)$ is the natural logarithm of the argument. The nominal rate of return on the stock market (RET_{it}) is obtained according to:

$$RET_{it} = \ln\left(\frac{SMI_{it}}{SMI_{it-1}}\right) \qquad \text{[Eq. 3.16]}$$

Where SMI_{it} is the nominal stock market index by the end of period t for country i in local currency. Similarly, the growth rate of industrial production (GIP_{it}) is computed as:

$$GIP_{it} = \ln\left(\frac{IPI_{it}}{IPI_{it-1}}\right) \qquad \text{[Eq. 3.17]}$$

Where IPI_{it} is the industrial production index[34] by the end of period t for country i. Nominal interest rates (INT_{it}) are obtained by re-scaling the original annual rate in its monthly nominal effective rate, i.e.:

$$INT_{it} = (\sqrt[12]{1 + NIR_{it}} - 1) \qquad \text{[Eq. 3.18]}$$

Where NIR_{it} is the annualized short-term nominal interest rate at the end of period t for country i.

Table 3.4 summarizes the descriptive statistics for each series. For the sample periods studied here, inflation rates reached very high levels for some Latin American countries, being also highly volatile. The interest rates, however, do not seem to encompass either the variability or the levels of the inflation rates most of the time. Also, as expected, the stock returns present much higher volatility than the inflation and interest rates series. Skewness and excess kurtosis are pronounced in most series, suggesting rather non-normal distributions. The average growth in real activity for the LA-7 is in general well above the average growth of the G-7, with the exception of Venezuela, which experienced a negative average growth in the sample period.[35] Another fact that emerges from Table 3.4 is that most nominal series are highly positively autocorrelated (the autocorrelation coefficients $\rho(p)$ are reported for lag p = 1 to 6 for each series), with the exception of growth in real activity that displays negative first-order autocorrelation (except for the United States). Finally, the volatility of the nominal variables, as well as that of inflation, for the LA-7 is substantially larger than those observed for the G-7.

3.2.3. Empirical Model

This essay employs a four-variable VAR system in order to explore the causality relations between inflation, real stock returns, real interest rates, and real activity. Recalling Fisher [1930], the expected nominal return on stocks should anticipate expected inflation, i.e. the Fisher Hypothesis states that in Eq. 3.11 above, $E(\pi_{t+1})$ should have a unity coefficient.[36] This means that, if common stock is a hedge against inflation, its *ex-ante* nominal return should fully anticipate any *expected* inflation. Notice that this is different from postulating a unity coefficient for π_t in the regression of R_t, since such formulation would define the *ex-post* relationship. Among other things, it would restrict the covariance term in the (Lucas) Eq. 3.10 to zero.[37] This theoretical aspect has important empirical implications. McCarthy,

Najand, and Seifert [1990], for instance, argue that previous tests of the Proxy Hypothesis are misspecified, since they have used actual values instead of expected values for the variables.

Therefore, in order to test the theory properly, one needs to analyze *expected* rather than actual variables. This is a common problem faced by empirical researchers, since it is often difficult to pinpoint *expectations*. Assumptions have to be made in order to make this problem empirically tractable. One easy way out would be to assume that actual realized variables proxy for expected variables. However, in such a setting, there is no room for forecast errors and erroneous expectations.[38] Forecasting inflation with the short-term interest rate (or its changes), has been a solution employed by many researchers (Solnik [1983], James, Koreisha, and Partch [1985], Domian, Gilster, and Louton [1996], and Randall and Suk [1999], among others). However, such solution implies a fixed real interest rate, which is a rather strong assumption. Indeed, Lee [1992] provides evidence of a non-negligible real interest rate effect. Another solution is to use survey data on expectations (Hasbrouck [1984]) or market reaction to announcements (Amihud [1996]). Availability of reliable and credible survey data, however, is an issue, and market reaction to announcements is only meaningful in high frequency data. Finally, a common way to deal with this problem is to assume that expectations are formed according to some simple rule, such as rational expectations. Many previous studies relied on time series techniques in order to generate expectational variables (e.g. Wahlroos and Berglund [1986], Cozier and Rahman [1988], Loo [1988], Buono [1989], McCarthy, Najand, and Seifert [1990], Lee [1992], Wei and Wong [1992], Liu, Hsueh, and Clayton [1993], Ammer [1994], Boudoukh, Richardson, and Whitelaw [1994], Lee [1998], Hess and Lee [1999], Adrangi, Chatrath, and Raffiee [1999], and Park and Ratti [2000], among others). The techniques mostly employed are ARIMA, ARCH/GARCH, the Hodrick-Prescott Filter, and the Kalman Filter.

I choose to estimate expected nominal variables with a standard Kalman Filter[39] in a VAR(p) specification where the endogenous variables are described according to equations Eq. 3.15 to Eq. 3.18, that is:

$$\begin{bmatrix} EINF_{it} \\ ERET_{it} \\ EINT_{it} \\ EGIP_{it} \end{bmatrix} = \alpha_0 + \sum_{p=1}^{P} \alpha_p \begin{bmatrix} INF_{it-p} \\ RET_{it-p} \\ INT_{it-p} \\ GIP_{it-p} \end{bmatrix} \qquad \text{[Eq. 3.19]}$$

Where α_0 and α_p are the recursively estimated coefficients. Notice that the empirical model includes, besides expected real stock returns and expected inflation, expected real activity and the expected real interest rate. The former is because of the Proxy and Reverse Causality Hypotheses, which require a measure of real activity in order to sort out the "spurious" empirically observed correlation. The latter, enters because of Lee's [1992] documentation of a significant real interest rate effect for the United States.

The order *(p)* of the VAR is determined for each country by the Schwarz-Bayesian Information Criterion (SBIC), according to Schwarz [1978]. Such criterion is chosen because, according to Pesaran and Pesaran [1996], it usually selects more parsimonious specifications than the Akaike Information Criterion (AIC, Akaike [1974]).[40] The SBIC selects two lags for Chile and Mexico and one lag for all other countries.

Once the expected nominal variables have been estimated, I proceed to compute the real variables that should enter the final specification. Expected real variables are computed by subtracting expected inflation from the expected nominal variable obtained previously, that is:

$$RERET_{it} = ERET_{it} - EINF_{it} \qquad \text{[Eq. 3.20]}$$

And,

$$REINT_{it} = EINT_{it-1} - EINF_{it} \qquad \text{[Eq. 3.21]}$$

Of course, this is true only for nominal interest rates and nominal stock returns, since the change in industrial production is a physical volume measure. Notice that since interest rates are given in the end of each period, in order to obtain the expected real yield in a given period I must subtract the respective inflation rate from the preceding period's nominal interest rate. In summary, the four variables that are included in the final VAR are the expected inflation rate ($EINF_{it}$), the expected real stock returns ($RERET_{it}$), the expected real interest rate ($REINT_{it}$), and the expected growth in real activity ($EGIP_{it}$) for each country i in each period t. A constant is used as the sole exogenous variable. Again, the order of each VAR system is determined according to the SBIC as follows:

LA-7	# Lags	G-7	# Lags
Argentina	2	Germany	2
Brazil	2	Canada	3
Chile	3	France	2
Colombia	1	Italy	1
Mexico	2	Japan	3
Peru	2	United Kingdom	3
Venezuela	1	United States	3

The final empirical model is therefore represented by:

$$\begin{bmatrix} EINF_{it} \\ RERET_{it} \\ REINT_{it} \\ EGIP_{it} \end{bmatrix} = \alpha_0 + \sum_{p=1}^{P} \alpha_p \begin{bmatrix} EINF_{it-p} \\ RERET_{it-p} \\ REINT_{it-p} \\ EGIP_{it-p} \end{bmatrix} + \varepsilon_t \qquad \text{[Eq. 3.22]}$$

All final series seem stationary. They are tested for unit root by using the augmented Dickey-Fuller test, and the null hypothesis of unit root is rejected for all of them, with the exception of Venezuela's expected real interest rate, expected real stock returns and expected changes in industrial production (results not reported). This result may be due to the (much) shorter span of Venezuelan data, which covers less than three years. Given these facts, results for Venezuela should be taken with extra caution.

3.3. Empirical Results

3.3.1. Estimation Results

The model is estimated according to the VAR(p) specification determined in Eq. 3.22. Ordinary Least Squares (OLS) estimation is used. Because lagged values of the same dependent variables are present in the right-hand side in all equations in the system, OLS estimation is consistent and efficient (Hall and Cummins [1997]). The estimated coefficients and respective heteroskedasticity-consistent standard errors[41] (White [1980]) are presented in Table 3.5, along with the adjusted R^2 statistic for each equation. The specification in general provides a good fit for all variables across all countries. The specification suits the LA-7 slightly better than the G-7, except for expected real stock returns, that are more predictable for the G-7 than for the LA-7. The VAR approach does not perform homogeneously across countries and variables however, suiting some better than others. That is the case for real activity, which is less well explained by the model than the other variables.

It is noteworthy that lagged values of the inflation rate have little significance in explaining stock returns (see Panel B of Table 3.5) in the presence of a real activity measure. Indeed, inflation is significant only for Argentina, Venezuela, Germany, Canada, and the United Kingdom. This evidence weighs in favor of the Proxy Hypothesis (Fama [1981]). However, the coefficients of real activity are also almost all non-significant. Moreover, their signs are often negative, even for the United States.[42] This contradicts Fama's argument in part. Recall that the Proxy Hypothesis's main argument (the "spurious" relationship between returns and inflation proxies for more fundamental relations) hinges on the significance and sign of the relationships between returns, real activity, and inflation.

Another interesting empirical regularity is that, for most countries, the coefficients of the inflation rate are negative in the real stock returns' equation (although mostly insignificant). Among those that do have significant coefficients, Venezuela, Germany, and Canada display negative one-lag coefficients while the United Kingdom displays a positive one[43] (although for the second lag the signs

are the inverse). This could be interpreted as a confirmation that stocks are a poor hedge against inflation in these countries – at least in the very short-run. Since for most countries the inflation coefficients are non-significant, the conclusion is that expected inflation rates have little effect over expected real stock returns, although such effect is in general negative.

In general, lagged values of the inflation rate seem to be more significant for the LA-7 than for the G-7 in explaining the real interest rate and real activity, which suggests that the higher level and volatility of the inflation rate in Latin America plays a bigger real economic role than it does in more stable industrial countries.

3.3.2. Test for Block Non-Causality

A straightforward likelihood ratio test is used to test if any of the endogenous variables and their lagged values in each block of equations is relevant in explaining the other endogenous variables, under the null hypothesis that they have zero coefficients. Results are reported in Table 3.6. The most important finding from this test is that – for all fourteen countries in the sample – it strongly rejects the hypothesis that the expected change in real activity does not cause[44] the other variables in the system. At conventional significance levels, the test fails to reject non-causality of the inflation rate in five countries (Colombia, Peru, Italy, Japan, and the United Kingdom). Regarding real stock returns, the test fails to reject non-causality only for Colombia, Peru, and France,[45] while it does not reject the non-causality of the real interest rate only for Colombia and Japan.[46]

Eight countries reject non-causality of the four endogenous variables in the VAR specification: Argentina, Brazil, Chile, Mexico, Venezuela, Germany, Canada, and the United States. These results suggest that inflation and stock returns might be simultaneously determined in these eight countries, which lends support for the Proxy Hypothesis. Also, it seems that, in Latin America, bigger countries are better represented by these four variables than smaller ones. The specification does not suit well Colombia, where only the change in real activity seems to cause the other variables in the system.

Overall, the causality tests suggest a major role for the real activity measure across all countries. Real stock returns and the real interest rate seem to have a little less influence across countries, but they are still important variables (with returns being slightly more relevant for industrial countries than in the LA-7). Finally, the inflation rate seems to be a less important factor in some countries than the real variables, although it remains important for most of them, including the bigger LA-7 countries, Germany and the United States. As for the comparison between developed and emerging markets, I cannot observe any systematic differences in the causal behavior of the variables between these two groups.

3.3.3. Generalized Impulse Response and Variance Decomposition Analyses

The next step is to examine the impulse response function (IRF) and the decomposition of forecast error variance (FEVD) among the variables, in order to gain insight into the following question: to what extent do shocks to one of them influence the others?

The various panels of Figure 3.2 present the generalized IRFs for each country in the study. The charts plot the response of each variable in the system to a (one standard error) shock in a given variable. Inspecting the charts of responses to a shock to the inflation rate it can be observed that the (own) response of the inflation rate to a shock is positive and persistent. As expected, shocks to inflation usually have a strong negative effect over stock returns, although sign reversions and even positive responses are not uncommon for a couple of periods in the short-term (Argentina, Chile, Mexico, Peru, Canada, France, and Italy). Also, shocks to inflation provoke a positive but small contemporaneous response from real activity in most countries (Brazil, Chile, Peru, Germany, France, Italy, Japan and the United States). This appears to contradict the Proxy Hypothesis.

Real stock returns respond positively to their own shocks, but the effect dies out faster in LA-7 than in the G-7, where it seems more persistent. The other variables have a smaller response to shocks to real stock returns, although a small positive effect can be observed for real activity (Brazil, Chile, Mexico, Peru, Venezuela,

Japan, and the United Kingdom), and for the inflation rate in the case of Argentina, Mexico, France, and Italy.

The inspection of the responses to shocks to the real interest rate reveals that their effect on the inflation rate is negative and quite persistent, while the response of real stock returns is mostly positive (although reversing the sign quickly in some cases) in the first couple of periods.[47] Canada and France display a large and slow-dying positive effect. The response of real activity is in general small and positive in the first periods, but short-lived.

Finally, with respect to the responses to shocks to real activity, inflation responds with a moderate positive effect, while real stock returns display a striking negative effect somewhere in the first couple of periods, or even persistently negative as in France and the United States (with the exception of Canada, where the effect is positive up to lag 6, after which it becomes persistently negative). This fact casts doubts on the validity of the Proxy Hypothesis.

Although preserving characteristic country-specific patterns, impulse responses are in general similar between the LA-7 and the G-7. From the generalized IRF, it is clear that the effect of shocks to inflation over expected real returns is stronger than otherwise. Moreover, the responses of real returns are in general negative, although sign reversions are not uncommon in the short-term. Negative responses from G-7 stock returns to inflation shocks are largely similar to LA-7 ones, but G-7 inflation responses to shocks to returns seem relatively less important.

The decomposition of variance is another tool that may shed light on the causality direction. Table 3.7 presents the 24-month generalized FEVD for each country in percentage terms. A large percentage of forecast error variance explained for a given variable (in the rows) by shocks of another variable (in the columns) indicates the degree of influence of one variable over the other. Usually, most of one variable's forecast variance can be explained by shocks to the variable itself (the main diagonal elements). Notice that, unlike the orthogonalized FEVD, the generalized FEVD does not add up to 100%, as mentioned above.

Ignoring the main diagonal elements (large own-effects), the real interest rate stands out as a major factor in explaining the inflation rate in all countries. Furthermore, it is also important in explaining the other real variables especially for the LA-7. On the other hand, real activity does not help to explain much of any other variable in the system (neither is it substantially explained by shocks to other variables). In particular, there is no strong evidence that returns and real activity are caused by each other, in either direction. This contradicts the central argument of the Proxy Hypothesis. The inflation rate is an important explanatory variable for the real interest rate as well, which suggests that they might be simultaneously determined. Real stock returns are not so important in explaining the variance of other variables, except perhaps for Argentina's inflation rate. Also, the percentage of stock returns forecast variance explained by shocks to the inflation rate is often larger for the LA-7 than for the G-7, except for the United States. This would suggest that the magnitude and volatility of the inflation rate, which are higher for the LA-7, might be important in explaining the presence or absence of the Fisher Hypothesis effect.[48]

Overall, the importance of the real interest rate effect is in line with the findings of Lee [1992], especially for the explanation of inflation forecast variance. Such effect is more pronounced in the (lower inflationary) G-7 than in the (higher inflationary) LA-7. Note that James, Koreisha, and Partch [1985] overlook such effect since they implicitly assume a fixed real interest rate in their model. Shocks to real activity do not seem to explain substantially the variance of real stock returns, perhaps with the exception of the United States (10.07%). Finally, with respect to the stock returns-inflation relationship, inflation seems an important factor in Brazil, Chile, Colombia, Venezuela, and the United States, while real returns seem relevant in Argentina, Japan, and the United Kingdom. In sum, there is not an obvious common pattern among the countries studied, but the evidence suggests that the elements that are relevant for the Proxy Hypothesis are particularly present in the United States.

3.3.4. Test of Single Equation's Parameter Restrictions

In order to explore the direction of causality more formally, I use a likelihood ratio test of zero restrictions in the coefficients of a given endogenous variable in the equation to explain each of the other endogenous variables pair-wise. Note that James, Koreisha, and Partch [1985] argue that such equation-by-equation approach is not the most appropriate in a system of simultaneous equations because of cross-influences among variables. Table 3.8 presents the results. Indeed, when real activity is present in the real stock returns equation, coefficients of lagged values of the inflation rate often become non-significant, as argued by the Proxy Hypothesis. However, only Chile, Colombia, Italy, and Japan provide strict support for the Proxy Hypothesis since inflation is non-significant *and* real activity is significant in the stock returns equation for these countries. Evidence for Argentina, Brazil, Mexico, Venezuela, Canada, and the United Kingdom is not compatible with the Proxy Hypothesis. The remaining countries are inconclusive in this sense (Peru, Germany, France, and the United States).

The Tax-Effects and Reverse Causality Hypotheses can be assessed by inspecting the direction of causality between stock returns and inflation, according to the methodology of Sims [1972]. If causality runs from inflation to stock returns, that can be interpreted in support of the Tax-Effects Hypothesis. This is the case for Peru, Venezuela and Canada. If causality runs the other way round, it suggests the Reverse Causality Hypothesis, and that is the case for Chile,[49] Germany, and the United States. Bi-casuality between those two variables is found for Argentina, Brazil, Mexico, and the United Kingdom, while non-causality is suggested in Colombia, France, Italy, and Japan.

These findings can be summarized as follows:

- Support for the Tax-Effects Hypothesis: Peru, Venezuela and Canada.
- Strict support for the Proxy Hypothesis: Chile, Colombia, Italy, and Japan.
- Strictly inconsistent to the Proxy Hypothesis: Argentina, Brazil, Mexico, Venezuela, Canada, and the United Kingdom.

- Support for the Reverse Causality Hypothesis: Chile, Germany, and the United States.
- Inconclusive: France.

In summary, some support for each of the three main explanatory hypotheses is found among the 14 countries studied. Although some support for the Proxy Hypothesis is found, strict rejections of such explanation are even more common. Moreover, despite the obvious differences between the LA-7 and the G-7, support/rejection for the hypotheses is more or less evenly distributed between these two groups. These findings have two implications: first, differences between developed and emerging markets are not as sharp as one would presume; second, the existing theories for the anomalous Fisher Hypothesis do not have a universal reach. Indeed, it seems that the relative empirical success of the Proxy Hypothesis in previous research may be contingent to specific characteristics of the U.S. economic environment.

3.3.5. Cross-Section Time Series Analyses

In order to assess the interrelationships between the variables across countries, I repeat the analyses with the data pooled together. The idea is to obtain insight on the behavior of the variables more independently from country-specific noise. If – even with the data pooled together – substantial country-specific effects persist, then I can conclude that neither existing hypothesis are satisfactory in explaining the phenomenon.

In order to pool the data sensibly, however, a few adjustments must be done.[50] Since inflation rates, stock returns, and interest rates are given with respect to a particular monetary unit (each country's own currency), appropriate pooling together of such variables requires that they must be comparable across countries. Therefore, I decided to take the United States (U.S.) dollar as a reference unit. Nominal exchange rates against the U.S. dollar for the LA-7 are the same used by IFC's EMDB, while exchange rates for the G-7 are obtained from IMF's IFS. All exchange rates are in end of period basis. Changes in exchange rates are given by:

$$\Delta FX_{it} = \ln\left(\frac{FXR_{it}}{FXR_{it-1}}\right) \qquad \text{[Eq. 3.23]}$$

Where ΔFX_{it} is the nominal change in the foreign exchange rate of country's i currency against the U.S. dollar in period t.

I forecast expected nominal changes in exchange rates along the same lines described above, that is, employing a Kalman Filter in a VAR(p) specification including the inflation rate, nominal stock returns, the nominal interest rate, the change in real activity, and the nominal exchange rate for each country. These expected exchange rates are then used to compute expected *nominal* U.S. dollar variables, by subtracting from the expected nominal variables obtained previously. Since I am concerned with expected *real* variables, it is necessary to discount expected United States inflation from expected nominal stock returns and nominal interest rates, both given in U.S. dollar terms.[51] The variables entered in the system are, in summary:

$$PEINF_{it} = EINF_{it} - E\Delta FX_{it} \qquad \text{[Eq. 3.24]}$$

$$PRERET_{it} = ERET_{it} - E\Delta FX_{it} - EUSINF_{t} \qquad \text{[Eq. 3.25]}$$

$$PREINT_{it} = EINT_{it} - E\Delta FX_{it} - EUSINF_{t} \qquad \text{[Eq. 3.26]}$$

$$PEGIP_{it} = EGIP_{it} \qquad \text{[Eq. 3.27]}$$

Where $PEINF_{it}$, $PRERET_{it}$, $PREINT_{it}$, and $PEGIP_{it}$ are respectively the *pooled* expected inflation rate, expected real stock returns, expected real interest rate and expected change in real activity for country i in period t, and $EUSINF_t$ is the expected inflation rate for the United States in period t. The empirical model becomes then:

$$\begin{bmatrix} PEINF_{it} \\ PRERET_{it} \\ PREINT_{it} \\ PEGIP_{it} \end{bmatrix} = \sum_{p=1}^{3} \alpha_{1p} \begin{bmatrix} PEINF_{it-p} \\ PRERET_{it-p} \\ PREINT_{it-p} \\ PEGIP_{it-p} \end{bmatrix} + \sum_{i=1}^{7} \alpha_{2i} W_i + \varepsilon_t \qquad \text{[Eq. 3.28]}$$

Where W_i is the matrix of (exogenous) country dummy variables that control for country-specific effects. The lag order is once more selected based in the Schwartz-Bayesian Information Criterion, which suggests a VAR(3) for both the LA-7 and the G-7.

Table 3.9 presents the results of the OLS estimation for the LA-7 and the G-7. In general, the model does not seem to work as well in the pooled data as it does for single country data, nevertheless fitting better the G-7 than the LA-7. A possible explanation is that the higher volatility of Latin American variables may introduce too much noise in the estimation, rendering it less efficient.

The role of country-specific effects seems limited, since most dummy coefficients are non-significant.[52] There is no clear pattern indicating that any given country exhibits a peculiar effect in all four equations, except for the United States and, perhaps, for Canada. The peculiarity of the United States effect however should be taken with caution, since variables are converted to U.S. dollars.[53]

As for the variables themselves, the negative relationship between inflation and stock returns is once more confirmed, although non-significant for all three lags in the LA-7. Surprisingly, coefficients for real activity in the returns equation are negative (although non-significant) for the LA-7, and positive and significant only for the first lag in the G-7.

Likelihood ratio tests of block non-causality are presented in Table 3.10. The VAR specification seems adequate to describe the dynamics of the variables for both groups of countries, with the possible exception of the expected real interest rate in Latin American countries. The test cannot reject the null of non-causality for this variable in the block of equations of the remaining three variables in Latin America at conventional significance levels.

Figure 3.3 presents the generalized IRFs for the LA-7 and the G-7. Surprisingly, the contemporaneous effect of shocks to the expected inflation rate over expected real stock returns is reasonably large and positive in both groups of countries, although it quickly reverses its sign in the LA-7. This finding is puzzling when compared to the results obtained from single country analyses. Moreover, shocks

to the expected real activity causes a small and negative contemporaneous response of stock returns (although quickly reversing its sign for the G-7). This evidence does not favor Fama's Proxy Hypothesis. The effect of shocks to stock returns over inflation are small and positive, which suggests that causality runs from inflation to returns, in contrast to most of the previous analyses indicate, but consistent with the Tax-Effect Hypothesis. The mutually respective cumulative responses up to 24 months are positive for both inflation and stock returns, indicating that in longer horizons the negative effect of the Fisher Hypothesis may indeed become positive.

Similarly to the impulse response analysis, the results from the FEVD analysis, presented in Table 3.11, do not evidence great differences between the LA-7 and the G-7. It is clear, however, that influences are considerable between stock returns and inflation, being slightly more pronounced in the G-7. Shocks to the real interest rate emerge as a major explanation for the variance of inflation in the LA-7 (68.03%) and especially for the G-7 (90.75%). Expected changes in real activity, on the other hand, do not seem to exercise much influence over the other variables neither suffer their influence. Nevertheless, there is evidence that stock returns indeed lead real activity (as suggested by Fama [1981] and Geske and Roll [1983]), in the sense that innovations to returns explain more of the variance of real activity than otherwise (although percentages are small). Such regularity seems more pronounced in the LA-7 than in the G-7.

Finally, Table 3.12 presents the likelihood ratio test of restrictions in single equations for pooled data. For both groups of countries, the coefficients of lagged values of inflation are non-significant in the real stock returns equation, in the presence of changes in real activity,[54] as suggested by Fama [1981]. On the other hand, the test strongly rejects the zero-coefficient restrictions for lagged values of stock returns in the inflation equation, which indicates that causality runs unequivocally from stock returns to inflation. This is consistent with both the Proxy and the Reverse Causality Hypotheses. The relationship between real stock returns and the real interest rate may provide some clue about which hypothesis is better supported by the data. According to Geske-Roll's model, economic

slowdown signaled by lower stock returns leads the government to run a deficit. This deficit can be either monetized (generating inflation), or financed in the bond market, or *both*. If the government finances at least part of the deficit, the market would bid governments bonds down thus increasing the (real) interest rate. Therefore, if causality runs from stock returns to the real interest rate, it can be interpreted as (partial) support for the Reverse Causality Hypothesis. Table 3.12 shows that indeed that is what happens in the pooled data for both the LA-7 and the G-7. Moreover, Table 3.9 shows significantly negative coefficients for stock returns in the real interest rate equation of both groups of countries (although for the G-7 the second lag coefficient is significantly positive). This can be interpreted as a (weak) evidence in favor of the Reverse Causality Hypothesis.[55]

It is puzzling to verify that some results for the pooled data are in contrast to those obtained for single countries. One possible explanation for these findings may be that pooled data is measuring excess inflation, returns, and real interest rate *vis-à-vis* foreign exchange variation. That is, it is implied that interest rate parity holds. Validity of such parity has been empirically challenged (e.g. Cumby and Obstfeld [1981]). Nevertheless, the results presented in this section are of importance for the international portfolio investor whose functional currency is the U.S. dollar.

Overall, the cross-section time series analysis suggests that there are few dynamic differences between the LA-7 and the G-7 despite the substantially more volatile economic environment of the former. Also, country-specific effects seem less important than one would intuitively anticipate given the heterogeneity of the countries studied. Finally, some support is found for the Reverse Causality Hypothesis, although the robustness of such finding is debatable.

3.4. Summary and Concluding Remarks

3.4.1. Summary of Results

An overall examination of these results yields the following general conclusions:

- As observed in several previous empirical works, common stocks are a poor short-term hedge against inflation both in the G-7 and the LA-7 (mainly in the latter);

- The specification employed here fits equally well (or badly, depending on the point of view) both the G-7 and the LA-7, despite the differences in magnitude and variability of the variables between the two groups. Expected real activity is the less predictable variable in this specification, while expected inflation rates is the more predictable one. Stock returns seem slightly more predictable in the G-7 than in the LA-7;

- Each of the main explanatory hypotheses (Tax-Effects, Proxy, and Reverse Causality) finds some support across countries, although there are some inconsistencies in some key linkages, especially for the Proxy Hypothesis. Also, such support is not robust across countries, and seems to depend a great deal on the specific technique employed;

- According to the Granger non-causality test, the expected change in real activity is a major variable in the system. Also, the test suggests that inflation and stock returns are jointly determined. These findings come in support of the Proxy Hypothesis. The model seems more adequate to describe bigger countries in the LA-7 than smaller ones, and inflation seems less important than real stock returns and the real interest rate overall. Previous results obtained for the United States are often confirmed but not so for other countries, even developed ones, suggesting that the validity of some explanatory hypotheses are very specific to this country;

- Impulse response analyses indicate that a consistently positive or negative effect of inflation on stock returns (and conversely) is more often the exception than the rule. Sign reversions are often within 1 to 6 months after the shock for both groups of countries. Moreover, positive cumulative responses after 24-months are observed for Argentina, Brazil, Peru, Venezuela, the pooled LA-7, and the pooled G-7. This finding suggests that the negative empirical relationship may indeed be a horizon-sensitive

phenomenon, as argued by Boudoukh and Richardson [1993] and Schotman and Schweitzer [2000];

- Variance decomposition analysis indicates a major role for the real interest rate effect that has been overlooked by other studies, as noted by Lee [1992];
- Country-specific effects play at best a limited role in explaining the interactions among the variables, which suggests that the institutional, legal, and "cultural" environment are not as important factors in this particular economic phenomenon;
- Finally, cross-sectional time series techniques do not seem to be particularly useful in furthering the understanding of this kind of problem. The insights provided by such techniques are limited and add little to what is already known from (single-country) time series techniques. That said, pooled data results have lent some support for the Reverse Causality Hypothesis. More interestingly, these results also confirm that differences between developed and developing countries are smaller than initially thought.

Summarizing the results of all these different techniques is not an easy task. Nevertheless, in Table 3.13 I provide a synthesis of the empirical findings of this essay by country and region. It is easy to see that the Fisher Hypothesis does not hold in general either for the LA-7 or for the G-7. As for the theoretical explanations, some support for each of them is found among the countries in the sample. The Reverse Causality Hypothesis seems to perform slightly better than the other two, but barely. What does emerge from Table 3.13 is the fact that no clear pattern separates emerging economies from advanced ones. In this sense, the stock returns-inflation puzzle still awaits for a more robust theoretical explanation.

3.4.2. Concluding Remarks

This essay employs a VAR approach to investigate the causality relationships between expected real inflation rates, real stock returns, real interest rates, and changes in real activity in a sample of seven Latin American developing countries

and seven industrial countries. The methodology is based mainly upon Vector Autoregression analysis, but other techniques are also employed in order to gain insight on the robustness of the results. Also, cross-section time series analysis is used in order to explore country-specific effects that may be relevant to such phenomenon. The main findings confirm the poor inflation hedge characteristics of stocks that have been observed by previous studies. Also, there are fewer differences between developed and developing countries than one could initially presume, given the sharp differences in the levels and volatility of the variables in those two groups of countries. Some support is found for the three major explanatory hypotheses, although the robustness of these findings is relatively weak. Causation is more often observed from stock returns to inflation, although some contradiction remains. Expected changes in real activity and the expected real interest rate seem to have a major role in such relationship, which have not been entirely recognized in previous studies. Overall, the results of this essay suggest that existing theories of the empirical Fisher Hypothesis are not able to adequately explain the phenomenon, and further theoretical investigation is necessary. Given that country-specific effects do not seem to be a major factor in explaining such phenomenon, there is room for an explanatory model based upon economic fundamental relationships, which could have a general applicability across countries. In particular, different empirical techniques employed here raise the question of whether the observed negative stock returns-inflation relationship is a short-term phenomenon, and – if that is the case – what are the determinants of an optimal horizon for effective hedging.

In addition, a few comments should be made regarding the empirical methods employed here. First, it is important to note that U.S. data used in previous research covered a much larger period than the data used in this study (e.g., James, Koreisha, and Partch [1985] covered the period between 1962-1981 while Lee [1992] covered the period between 1947-1987). The comparisons made here should therefore be taken with caution. The number of observations for each LA-7 country ranges from only 33 (for Venezuela) to 274 (for Chile), while the number of observations for the G-7 are much larger and more even (from 262 for Italy to

368 for Canada and Japan). Yet, James, Koreisha, and Partch [1985] use 240 observations[56] while Lee [1992] has around 492 observations with a similar specification. Also, the robustness of the results presented in this study with respect to different orders of the VAR system is not precisely known, and should be an interesting empirical question to be investigated in the future. This essay has the advantage of determining VAR orders by employing selection criteria instead of arbitrarily defining it as previous research do. However, a further look in the properties of such techniques is necessary before any definite conclusions can be drawn. Similarly, the sensitivity of the results reported here regarding different sample periods is not explored.[57] It would be interesting to verify how such results behave as different time spans are chosen. In particular for the LA-7, it is important to investigate if these results are robust to periods of hyperinflation versus periods of monetary stability. Finally, and perhaps more importantly, the data employed here are essentially first-difference versions of the underlying economic measures (consumer prices, industrial production, and stock indices). If these series are integrated, then I am ignoring potentially useful information regarding the long-run equilibrium adjustment.[58] Therefore, cointegration techniques may be useful to further explore this problem.[59] These are left as a suggestion for further research.

In closing, it seems clear from the empirical results of this essay that existing theoretical models cannot so far provide a good universal explanation for the observed phenomena. The need to develop new theoretical models, therefore, is the main challenge that results from this empirical exercise.

In the next chapter, I further the study of the interdependence between the financial sector and the macroeconomy by focusing on its managerial implications for the firm.

3.5. Endnotes

[1] Prof. Kate Phylaktis first suggested this topic of study to me in 1994. Prof. Kris Jacobs suggested that I set up the essay in a causality framework in 1997. I also profited from Prof. Luis Rivera-Batiz's comments on an earlier version of this

essay. I am thankful to them for their generous contributions. I am also thankful to participants of the Northern Financial Association Meeting in Toronto and of the Doctoral Seminar in International Money and Banking at the Aarhus Graduate Business School (both in 1998) for their comments on an early version of this essay. I am also thankful to Mr. Hyunchul Chung and Mr. Marcelo dos Santos for helping with the collection of data for this essay. Any errors are nevertheless my responsibility.

[2] I draw most of the exposition that follows from Ireland [1996], who provides an excellent summary of Fisher's theory.

[3] For the sake of concision, I omit the usual budget constraint equations.

[4] Again, I closely follow Ireland [1996] in the derivation that follows.

[5] Nelson [1976] notes that such a conclusion depends on the correct modeling of the expectations formation process, since market efficiency can only be tested jointly with a particular hypothesis about the behavior of expected returns.

[6] The assets included are: equally and value-weighted NYSE common stock portfolios, treasury bills returns, long-term United States government bonds returns, human capital income, and return on residential real estate.

[7] Other alternative explanations that have been proposed include for instance Modigliani and Cohn's [1979] money illusion approach and Santoni and Moehring's [1994] inflation measurement approach.

[8] This is the case of Brazil and Israel, for instance.

[9] In the sense that real stock returns "proxy" for real activity measures.

[10] Ely and Robinson [1989] remark that Fama's [1981] argument is not a common one in monetary models. Moreover, Fama [1981] assumes an exogenous interest rate, an assumption that is also questioned by some authors, in particular Lee [1992].

[11] In another paper, Fama [1990] finds evidence that expected returns and real activity measures account for up to 59% of the variance in stock returns from a value-weighted NYSE portfolio.

[12] Measured by unemployment.

[13] In his reply to Ram and Spencer [1983], Fama [1983] argues that the variables employed to proxy for real activity induce spurious correlation in their specification in comparison to his original variables. Moreover, Fama [1983] questions the internal consistency of the Ram-Spencer model, as well as the transformations needed to produce well-behaved residuals, which is not the case in his original 1981 paper.

[14] Ely and Robinson [1989] note that Kaul's [1987] work relies on a consistent counter-cyclical policy by central banks, which is not a consensual model of central bank behavior.

[15] Besides Feldstein [1980], Fama [1981], Geske and Roll [1983], and Kaul [1987], other authors have also developed alternative theoretical explanations for the anomalous inflation-returns relationship (i.e. Day [1984], Stultz [1986], Giovannini and Labadie [1991], and Marshall [1992]). However, those formers are the ones that caught most of the attention from empirical researchers so far.

[16] Notice for instance the two oil shocks that occurred in this period.

[17] Nine industrialized countries: G-7 except Italy, plus Switzerland, Belgium, and the Netherlands.

[18] A conclusion that can be interpreted in principle as in support to Geske and Roll's [1983] Reverse Causality Hypothesis, although that is not mentioned in the text.

[19] Australia, Austria, Belgium, Canada, Finland, France, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

[20] The market-based measure of unexpected inflation was the price reaction of CPI-linked bonds on the day following the announcement of the official CPI.

[21] The characteristics of Israeli data cannot support the nominal-contracting, the tax-effects, and inflation-induced wealth transfer hypotheses because most of the contracting in Israel is in real rather than nominal terms.

[22] Given the nature of the methodology, the positive association between real activity and stock returns and the negative relationship between inflation and real activity could not be tested directly. However, his results can hardly be interpreted as a support to Fama's [1981] Proxy Hypothesis, since other explanations could not be ruled out either.

[23] The period of floating exchange rates.

[24] G-7 plus Belgium, the Netherlands, and Switzerland.

[25] The main objective of their work was not to provide an explanation to the Fisher Hypothesis, but rather to exhaustively describe this effect across countries.

[26] In contrast to Boudoukh and Richardson [1993] but consistent with Ely and Robinson [1994] .

[27] The same ones studied in Solnik [1983], with the exception of Belgium. Interestingly, both Solnik [1983] and Solnik and Solnik [1997] left Italy out of their samples, the developed country in which inflation has been the most pronounced over their periods of study.

[28] See note 19 above.

[29] The methods described in this section are a summary compiled from Pesaran and Pesaran [1996] and Lee [1992].

[30] The possible number of different combination orders is 24 in a 4-variable VAR system. In my sample of 14 countries this mean 336 potentially different outcomes for the IRF and the FEVD.

[31] Of course, this is not a control group in the usual statistical sense. The results for the G-7 are in fact benchmarks against which the results for the Latin American countries are compared in order to highlight the differences – if any – between developed and emerging markets.

[32] I realize that these are imperfect measures of the nominal interest rate. However, in many Latin American countries with a history of high inflation, bank term deposits are often invested in short-term government securities that are not easily available to retail investors. In this sense, such instruments approximate well the risk-free interest rate.

[33] As mentioned in the previous note, these are imperfect proxies for the basic interest rate. However, these are used in the absence of better data. Therefore, when examining the results for Colombia and Venezuela, the reader should bear this data limitation in mind.

[34] Manufacturing production indices are used for Peru and Chile.

[35] Again, I remind the reader that Venezuelan data are available for less than three years.

[36] In the real returns version adopted by some authors and in this essay, the equivalent would be a zero coefficient for $E(\pi_{t+1})$ in Eq. 3.13.

[37] More recent theoretic work regarding the expectation assumption and its relationship to money neutrality can be found in the asset pricing literature. Seminal papers of such literature are Lucas [1978] and Cox, Ingersoll, and Ross [1985].

[38] Forecast errors may be of particular relevance in economic environments where large and unexpected shifts in nominal variables are frequent, which is the case for many Latin American countries over the sample period studied.

[39] The Kalman Filter is appropriate in this setting because, as a recursive procedure, it mimics fairly well the decision-making of a rational agent as new information is being released. For a more in-depth discussion of the Kalman Filter's properties and applications in finance please see Wells [1995].

[40] Given the data span limitations for some countries, a parsimonious empirical specification is desirable.

[41] Given the different economic regimes experienced by Latin American countries over most of the sample period, I expect heteroskedasticity to be present.

[42] Although non-significant in this case.

[43] Gultekin [1983] reports a similar finding for the United Kingdom in his study.

[44] In a Granger [1969] sense.

[45] France would reject non-causality of stock returns at the more generous 10% significance level.

[46] Japan is a borderline case, since it fails to reject at the 6% level.

[47] One possible explanation for this fact is that an increase (decrease) in the real interest rate depresses (pushes up) current stock prices thus increasing (decreasing) expected real returns, within a traditional (static) Gordon [1962] Dividend Growth Model framework. Of course, if the usual market efficiency assumptions hold, the current price should adjust only enough to maintain the expected risk-return relation unaltered.

[48] Of course, this is hard to reconcile with the evidence in the United States, which does not have the higher level and volatility of inflation among the G-7.

[49] Notice that this finding for Chile is not contradictory to the Proxy Hypothesis, since, in its formulation, the Reverse Causality Hypothesis does not necessarily rule out the money demand linkage that is central to the Proxy Hypothesis.

[50] Of course, countries with longer coverage influence the results more than the ones with fewer data points. However, the differences in time series span within LA-7 and G-7 are smaller than between LA-7 and G-7. Since countries are pooled together between these two groups and not all 14 countries in the same pool, the relative unbalances are less of a concern.

[51] Inflation rates are thus simply kept in excess of foreign exchange variation. Changes in real activity are kept unchanged, since they are given originally as Laspeyres indices of production volumes.

[52] Dummy variables in Table 3.7 correspond respectively to the following LA-7/G-7 countries: D1: Argentina/Germany; D2: Brazil/Canada; D3: Chile/France;

D4: Colombia/Italy; D5: Mexico/Japan; D6: Peru/United Kingdom; and D7: Venezuela/United States.

[53] Also, Canadian variables are the highest correlated with American variables among all countries in the sample.

[54] The test cannot reject the zero-coefficient restrictions for changes in real activity in the returns equation for the LA-7 though.

[55] I stress once more that as James, Koreisha, and Partch [1985] note, single equation tests may not be the most appropriate form of establishing causality patterns in a system of equations. Moreover, Lee [1992] remarks that, given the intransitivity of the causal ordering, the equation by equation approach is not the best tool for determining causality direction. That is, if real activity does cause stock returns, and stock returns do cause the real interest rate, it does not mean that real activity causes the real interest rate.

[56] The authors remark that due to the leads and lags employed in their specification, the reported results refer to 199 observations only.

[57] Mostly by limitations of time series span.

[58] I am grateful to Prof. John W. Galbraith for pointing this out.

[59] Notice however that Ely and Robinson [1994] employ cointegration analysis precisely for the same type of problem – the Fisher Hypothesis in a multi-country sample – and their results strongly reject the short-term disequilibrium hypothesis.

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Table 3.1. Summary of the Literature on Stock Returns-Inflation Relationship

Context	Hypotheses	References	Findings
United States	Fisher	Jaffe and Mandelker [1976], Bodie [1976], Nelson [1976], Fama and Schwert [1977], Gertler and Grinols [1982], Buono [1989]	Reject
		Titman and Warga [1989]	Support
	Tax-Effects	Feldstein [1980]	Supports
		Hooks [1993]	Rejects
	Proxy	Fama [1981], Benderly and Zwick [1985], Wei and Wong [1992], Lee [1992]	Support
		Ram and Spencer [1983], Park [1997]	Reject
	Reverse Causality	Geske and Roll [1983], Ely and Robinson [1992], Park and Ratti [2000], James, Koreisha, and Partch [1985]	Support
		Lee [1992]	Rejects
International	Fisher	Solnik and Solnik [1997], Kwon, Shin, and Bacon [1997]	Support
		Gultekin [1983], Cozier and Rahman [1988], Ely and Robinson [1994], Erb, Harvey, and Viskanta [1995], Lee [1998]	Reject
	Tax-Effects	Ammer [1994]	Rejects
	Proxy	Cozier and Rahman [1988]	Support
		Wahlroos and Berglund [1986], Liu, Hsueh, and Clayton [1993], McCarthy, Najand, and Seifert [1990]	Reject
	Reverse Causality	Solnik [1983]	Support

Table 3.2. Selected Economic Series for Latin America

	ARGENTINA			BRAZIL			CHILE			COLOMBIA		
SELECTED SERIES	1990	1995	2000	1990	1995	2000	1990	1995	2000	1990	1995	2000
Population (millions)	32.53	34.77	37.04	144.09	155.32	165.93	13.10	14.20	15.22	35.42	38.81	42.31
Share of world population (%)	0.6157%	0.6110%	0.6100%	2.7271%	2.7293%	2.7300%	0.2479%	0.2495%	0.2500%	0.6703%	0.6820%	0.7000%
Nominal GDP (million US$)	141,353	258,097	282,489	463,038	704,143	623,464	30,324	65,274	68,410	40,274	92,502	82,011
GDP per head (US$)	4,345.30	7,423.00	7,630.00	3,213.50	4,533.50	3,760.00	2,314.80	4,596.80	4,490.00	1,137.10	2,383.20	1,940.00
GDP (annual % real change)*	-3.0000%	-2.8450%	-0.3000%	-4.3000%	4.2000%	4.2000%	3.6980%	10.6280%	5.4000%	4.2710%	5.2020%	3.0000%
Share of world GDP (%)	0.6172%	0.8891%	0.9000%	2.0217%	2.4257%	1.9800%	0.1324%	0.2249%	0.2200%	0.1758%	0.3187%	0.2600%
Consumer prices (annual % change)	2370.0000%	3.4130%	-0.9380%	2947.7330%	66.0070%	7.0440%	26.0360%	8.2330%	3.8430%	29.1380%	20.8980%	9.2210%
Current account balance/GDP (%)	3.2200%	-2.0110%	-3.8000%	-0.8260%	-2.5760%	-4.0000%	-1.5990%	-2.0670%	-1.4000%	1.3460%	-4.9690%	0.7000%
Exchange rate (LCU/US$)	0.49	1.00	1.00	0.00	0.92	1.83	304.90	396.42	537.93	502.26	912.83	2,087.90
Trade balance FOB (million US$)	8,627	2,159	1,320	10,753	-3,157	-697	1,284	1,380	1,436	1,657	-2,938	1,834
Trade balance FOB/GDP (%)	6.1028%	0.8365%	0.4673%	2.3223%	-0.4483%	-0.1118%	4.2332%	2.1146%	2.0991%	4.1143%	-3.1760%	2.2363%
Share of world goods exports (%)	0.3628%	0.4092%	0.4000%	0.9226%	0.9078%	0.8700%	0.2459%	0.3128%	0.2900%	0.1987%	0.1991%	0.2100%
Net direct investment flows (million US$)	1,836	4,112	8,216	324	3,475	28,819	653	2,205	2,082	484	712	385
Stock market capitalization (million US$)**	3,268	37,783	83,887	16,354	147,636	227,962	13,645	73,860	68,228	1,416	17,893	11,590
Stock market capitalization (% of GDP)**	2.3119%	14.6390%	29.6000%	3.5319%	20.9670%	43.0530%	44.9970%	113.1530%	101.6410%	3.5159%	19.3430%	13.3750%

	MEXICO			PERU			VENEZUELA			LATIN AMERICA 7		
SELECTED SERIES	1990	1995	2000	1990	1995	2000	1990	1995	2000	1990	1995	2000
Population (millions)	81.25	91.20	97.36	21.57	23.53	25.66	19.50	21.84	24.17	347.46	379.68	407.69
Share of world population (%)	1.5377%	1.6026%	1.6000%	0.4082%	0.4135%	0.4200%	0.3691%	0.3838%	0.4000%	6.5760%	6.6717%	6.7100%
Nominal GDP (million US$)	262,746	286,164	561,158	28,962	53,594	54,144	48,598	77,389	103,767	1,015,295	1,537,164	1,775,443
GDP per head (US$)	3,233.80	3,137.80	5,760.00	1,342.80	2,277.50	2,110.00	2,492.20	3,543.50	4,290.00	2,922.07	4,048.63	4,354.88
GDP (annual % real change)*	5.0680%	-6.2180%	6.9000%	21.6600%	8.5700%	3.6000%	6.4780%	3.9810%	3.2140%	n.a	n.a	n.a
Share of world GDP (%)	1.1472%	0.9858%	1.7900%	0.1265%	0.1846%	0.1700%	0.2122%	0.2666%	0.3300%	4.4330%	5.2954%	5.6500%
Consumer prices (annual % change)	26.6520%	34.9990%	9.5080%	7485.2720%	11.1260%	3.7570%	40.6580%	60.0460%	16.2030%	n.a	n.a	n.a
Current account balance/GDP (%)	-2.8360%	-0.5500%	-3.2000%	-4.8980%	-7.6800%	-2.8000%	17.0360%	2.6020%	12.5000%	0.0190%	-2.1436%	-2.3971%
Exchange rate (LCU/US$)	2.81	6.42	9.46	0.19	2.25	3.49	46.90	176.84	679.96	n.a	n.a	n.a
Trade balance FOB (million US$)	-881	7,089	-8,012	399	-2,165	-332	10,580	6,388	16,937	32,418	8,756	12,486
Trade balance FOB/GDP (%)	-0.3353%	2.4771%	-1.4278%	1.3759%	-4.0394%	-0.6135%	21.7704%	8.2544%	16.3221%	3.1929%	0.5696%	0.7032%
Share of world goods exports (%)	1.1956%	1.5527%	2.6300%	0.0975%	0.1091%	0.1100%	0.5139%	0.3603%	0.5200%	3.5370%	3.8510%	5.0300%
Net direct investment flows (million US$)	2,549	9,526	13,000	41	2,048	604	76	894	3,789	5,963	22,972	56,895
Stock market capitalization (million US$)**	32,725	90,694	154,044	812	11,795	13,392	8,361	3,655	7,471	76,581	383,316	566,574
Stock market capitalization (% of GDP)**	12.4550%	31.6930%	32.1270%	2.8037%	22.0080%	25.8880%	17.2040%	4.7229%	7.3086%	7.5427%	24.9366%	31.9117%

* For Peru only, this figure refers to 1991, first data available

** For all countries, the figure for 2000 refers to 1999, last data available

Table 3.3. Summary of Variables and Data Sources

Variables	Original Series	Sources	Countries
Inflation rate	Consumer price indices	INDEC	Argentina
		IFS	All others
Stock returns	Stock market indices	EMDB	All LA-7
		IFS	All G-7
Interest rates	Short-term government bills	IFS	G-7 but Japan
	Short-term bank deposit rates	IFS	Argentina, Brazil, Chile, Mexico, Peru, and Japan
	Central bank discount rate	IFS	Colombia and Venezuela
Real Activity	Industrial production indices	Macroeconomica©	Argentina
		Lopes Filho & Associates©	Brazil
		Banco Central de Venezuela	Venezuela
		IFS	Colombia, Mexico, and all G-7
	Manufacturing production indices	IFS	Chile and Peru

Table 3.4. Summary Statistics for Time Series

PANEL A: INFLATION RATE

	Period	# Obs.	Mean	Median	Standard Deviation	Min	Max	Skewness	Kurtosis	Autocorrelation (-1)	(-2)	(-3)	(-4)	(-5)	(-6)
Argentina	Feb-85 Oct-99	177	6.80%	1.25%	14.15%	-0.75%	108.73%	4.0974	20.9339	77.94%	56.02%	33.77%	22.45%	28.68%	39.81%
Brazil	Dec-82 Oct-99	203	11.85%	9.43%	11.63%	-0.53%	60.09%	1.2837	1.9597	91.45%	80.74%	71.79%	65.37%	59.95%	54.86%
Chile	Jan-77 Oct-99	274	1.44%	1.23%	1.29%	-0.86%	8.34%	1.3560	3.4673	53.11%	46.04%	39.29%	33.70%	39.30%	33.24%
Colombia	Dec-87 Apr-97	124	0.60%	0.29%	4.85%	-26.09%	31.86%	1.3043	22.5595	8.22%	-31.38%	-12.25%	19.15%	10.42%	-13.64%
Mexico	Oct-80 Oct-99	229	2.88%	2.04%	2.47%	0.42%	14.40%	1.6252	3.2592	86.58%	75.04%	68.37%	64.41%	59.72%	55.33%
Peru	Jan-93 Oct-99	82	1.02%	0.78%	0.97%	-0.57%	4.71%	1.7828	3.9979	79.65%	72.52%	75.72%	69.99%	60.18%	54.68%
Venezuela	Feb-97 Oct-99	33	2.14%	2.05%	0.73%	0.87%	3.70%	0.4068	-0.6908	56.67%	38.20%	39.79%	27.76%	44.67%	39.62%
Latin American Averages		**160.3**	**3.82%**	**2.44%**	**5.15%**	**-3.93%**	**33.12%**	**1.6937**	**7.9267**	**64.80%**	**48.17%**	**45.21%**	**43.26%**	**43.28%**	**37.70%**
Germany	Jul-75 Dec-98	282	0.23%	0.19%	0.34%	-1.63%	1.95%	0.5887	5.2952	31.93%	16.85%	5.56%	7.60%	-2.83%	-8.62%
Canada	Jan-70 Aug-00	368	0.42%	0.39%	0.41%	-0.78%	2.60%	0.7379	1.8530	38.07%	38.47%	44.17%	47.52%	39.67%	33.38%
France	Jan-70 Dec-98	348	0.49%	0.42%	0.40%	-0.31%	1.94%	0.5670	0.0591	75.39%	67.76%	70.94%	63.54%	63.22%	69.87%
Italy	Mar-77 Dec-98	262	0.67%	0.54%	0.51%	-0.42%	3.09%	1.2718	2.2187	73.24%	66.36%	65.68%	67.16%	61.64%	59.75%
Japan	Jan-70 Aug-00	368	0.32%	0.20%	0.72%	-1.07%	3.94%	1.4328	3.4264	30.33%	6.52%	17.95%	18.89%	28.64%	34.74%
United Kingdom	Jan-70 Mar-99	351	0.63%	0.49%	0.69%	-0.97%	4.26%	1.8738	5.9808	48.33%	34.01%	30.16%	24.97%	29.91%	42.88%
United States	Sep-74 Aug-00	312	0.40%	0.32%	0.32%	-0.50%	1.41%	0.8262	0.6482	70.30%	54.07%	48.22%	45.65%	46.40%	40.61%
Group of Seven Averages		**327.3**	**0.45%**	**0.36%**	**0.49%**	**-0.81%**	**2.74%**	**1.0426**	**2.7830**	**52.51%**	**40.58%**	**40.38%**	**39.33%**	**38.09%**	**38.94%**

PANEL B: STOCK RETURNS

	Period	# Obs.	Mean	Median	Standard Deviation	Min	Max	Skewness	Kurtosis	Autocorrelation (-1)	(-2)	(-3)	(-4)	(-5)	(-6)
Argentina	Feb-85 Oct-99	177	8.04%	3.70%	24.94%	-49.55%	130.63%	2.4506	8.6907	16.73%	26.81%	17.80%	3.58%	2.74%	10.35%
Brazil	Dec-82 Oct-99	203	12.90%	8.89%	20.28%	-53.03%	69.54%	0.2482	0.4290	21.90%	31.35%	21.30%	23.27%	17.08%	17.53%
Chile	Jan-77 Oct-99	274	2.95%	2.12%	9.30%	-30.42%	51.25%	0.3680	3.0994	17.24%	20.40%	-1.53%	7.75%	-0.01%	7.64%
Colombia	Dec-87 Apr-97	124	3.58%	2.67%	8.38%	-18.01%	33.68%	1.2613	3.0171	42.29%	12.44%	0.62%	-3.93%	8.04%	11.96%
Mexico	Oct-80 Oct-99	229	3.61%	3.96%	11.86%	-53.36%	35.81%	-0.7442	3.7908	30.75%	-0.62%	0.21%	6.39%	14.60%	5.89%
Peru	Jan-93 Oct-99	82	1.81%	0.90%	9.14%	-30.56%	27.69%	-0.1698	2.0062	3.98%	-9.72%	-12.90%	6.34%	-19.65%	-6.98%
Venezuela	Feb-97 Oct-99	33	-0.37%	-0.67%	16.20%	-47.12%	30.02%	-0.2523	1.3401	-20.50%	16.01%	-9.73%	2.48%	6.64%	10.59%
Latin American Averages		**160.3**	**4.65%**	**3.08%**	**14.30%**	**-40.29%**	**54.09%**	**0.4517**	**3.1962**	**16.05%**	**13.81%**	**2.26%**	**6.55%**	**4.21%**	**8.14%**
Germany	Jul-75 Dec-98	282	0.71%	1.02%	4.92%	-25.48%	13.75%	-1.0272	4.0035	8.47%	-1.73%	0.22%	5.91%	-7.70%	-6.25%
Canada	Jan-70 Aug-00	368	0.65%	0.82%	4.87%	-25.64%	16.17%	-0.9552	4.1831	6.92%	-6.30%	4.67%	-5.84%	5.68%	4.53%
France	Jan-70 Dec-98	348	0.75%	1.18%	6.77%	-28.02%	41.63%	0.1077	5.4622	-4.65%	-7.64%	4.30%	0.28%	5.85%	-6.28%
Italy	Mar-77 Dec-98	262	1.26%	0.91%	7.58%	-39.07%	32.85%	-0.3728	5.8260	5.88%	2.15%	3.71%	4.25%	0.69%	11.44%
Japan	Jan-70 Aug-00	368	0.59%	0.77%	4.21%	-14.66%	13.45%	-0.3530	0.9591	33.97%	7.64%	3.52%	8.94%	0.97%	-6.76%
United Kingdom	Jan-70 Mar-99	351	0.84%	1.18%	5.03%	-24.66%	35.22%	0.2622	8.0924	32.44%	-2.31%	1.19%	3.37%	-11.35%	-12.73%
United States	Sep-74 Aug-00	312	0.98%	0.90%	3.51%	-14.26%	11.37%	-0.5747	2.6587	23.82%	-6.56%	-5.73%	-1.73%	-2.67%	-5.22%
Group of Seven Averages		**327.3**	**0.82%**	**0.97%**	**5.27%**	**-24.54%**	**23.49%**	**-0.4161**	**4.4550**	**15.26%**	**-2.11%**	**1.70%**	**2.17%**	**-1.22%**	**-3.04%**

Table 3.4. (continued) Summary Statistics for Time Series

PANEL C: INTEREST RATE

	Period	# Obs.	Mean	Median	Standard Deviation	Min	Max	Skewness	Kurtosis	Autocorrelation (-1)	(-2)	(-3)	(-4)	(-5)	(-6)
Argentina	Feb-85 Oct-99	177	6.29%	1.37%	10.75%	0.49%	82.93%	4.0274	21.8640	79.19%	54.81%	40.86%	32.11%	29.25%	36.23%
Brazil	Dec-82 Oct-99	203	14.36%	11.08%	13.71%	1.44%	69.00%	1.4691	2.2843	93.04%	82.75%	72.75%	64.38%	57.18%	50.99%
Chile	Jan-77 Oct-99	274	2.10%	1.82%	1.30%	0.30%	7.86%	1.4240	2.3405	90.30%	79.71%	74.16%	69.58%	68.71%	68.36%
Colombia	Dec-87 Apr-97	124	0.78%	0.80%	0.12%	0.62%	1.10%	0.6066	-0.1746	96.63%	91.23%	85.18%	78.48%	70.80%	63.34%
Mexico	Oct-80 Oct-99	229	2.98%	2.68%	1.43%	0.96%	8.12%	1.0301	0.7170	97.10%	91.71%	85.96%	80.68%	76.92%	74.53%
Peru	Jan-93 Oct-99	82	1.55%	1.22%	0.70%	0.99%	3.63%	1.7534	1.7306	99.58%	98.73%	97.43%	95.72%	93.70%	91.37%
Venezuela	Feb-97 Oct-99	33	3.58%	3.99%	0.48%	2.72%	3.99%	-0.4833	-1.4517	86.88%	71.87%	49.31%	35.62%	21.50%	11.90%
Latin American Averages		**160.3**	**4.52%**	**3.28%**	**4.07%**	**1.08%**	**25.23%**	**1.4039**	**3.9014**	**91.82%**	**81.55%**	**72.23%**	**65.23%**	**59.72%**	**56.67%**
Germany	Jul-75 Dec-98	282	0.45%	0.43%	0.16%	0.24%	0.95%	0.7030	-0.3073	98.93%	97.24%	95.15%	92.83%	90.23%	87.46%
Canada	Jan-70 Aug-00	368	0.74%	0.73%	0.18%	0.41%	1.36%	0.6882	0.6439	98.65%	97.07%	95.61%	94.03%	92.72%	91.33%
France	Jan-70 Dec-98	348	0.71%	0.71%	0.24%	0.26%	1.45%	0.1769	-0.1346	98.58%	96.30%	93.73%	90.74%	87.60%	84.51%
Italy	Mar-77 Dec-98	262	0.99%	0.96%	0.29%	0.25%	1.64%	0.0017	-0.0422	98.81%	97.64%	96.15%	94.60%	92.93%	91.12%
Japan	Jan-70 Aug-00	368	0.24%	0.29%	0.13%	0.00%	0.49%	-0.3494	-0.8439	99.28%	98.34%	97.43%	96.36%	95.17%	93.92%
United Kingdom	Jan-70 Mar-99	351	0.79%	0.81%	0.19%	0.36%	1.32%	0.0686	-0.4443	97.83%	94.27%	90.61%	87.25%	84.11%	81.12%
United States	Sep-74 Aug-00	312	0.56%	0.49%	0.21%	0.24%	1.32%	1.3015	1.5729	97.91%	94.32%	91.01%	88.17%	85.61%	83.06%
Group of Seven Averages		**327.3**	**0.64%**	**0.63%**	**0.20%**	**0.25%**	**1.22%**	**0.3701**	**0.0635**	**98.57%**	**96.46%**	**94.24%**	**92.00%**	**89.77%**	**87.50%**

PANEL D: CHANGES IN REAL ACTIVITY

Real Activity	Period	# Obs.	Mean	Median	Standard Deviation	Min	Max	Skewness	Kurtosis	Autocorrelation (-1)	(-2)	(-3)	(-4)	(-5)	(-6)
Argentina	Feb-85 Oct-99	177	0.19%	0.04%	5.89%	-14.34%	20.92%	0.3088	1.1857	-33.71%	-3.80%	4.00%	-2.30%	-16.79%	14.02%
Brazil	Dec-82 Oct-99	203	0.18%	-0.03%	5.04%	-27.14%	25.60%	-0.0003	6.7115	-29.77%	-3.79%	11.73%	-16.52%	-5.98%	2.96%
Chile	Jan-77 Oct-99	274	0.27%	0.60%	4.94%	-13.05%	15.71%	0.0446	0.4133	-34.35%	-16.13%	22.31%	-25.10%	-1.12%	25.50%
Colombia	Dec-87 Apr-97	124	0.26%	0.18%	4.07%	-10.24%	16.76%	0.6383	2.8982	-52.98%	6.62%	1.94%	-1.22%	-2.04%	9.01%
Mexico	Oct-80 Oct-99	229	0.21%	0.26%	2.84%	-8.09%	10.17%	0.3057	1.3620	-43.09%	7.51%	19.65%	-20.20%	7.12%	-0.10%
Peru	Jan-93 Oct-99	82	0.23%	-0.05%	5.19%	-14.89%	17.14%	0.4190	2.6205	-36.39%	-13.77%	15.70%	-1.72%	-0.82%	-9.14%
Venezuela	Feb-97 Oct-99	33	-0.49%	-1.51%	5.64%	-8.09%	19.81%	1.5377	4.0544	-27.75%	-13.64%	36.84%	-37.27%	7.22%	12.68%
Latin American Averages		**160.3**	**0.12%**	**-0.07%**	**4.80%**	**-13.69%**	**18.02%**	**0.4648**	**2.7494**	**-36.86%**	**-5.29%**	**16.02%**	**-14.90%**	**-1.77%**	**7.85%**
Germany	Jul-75 Dec-98	282	0.13%	0.21%	1.80%	-9.58%	11.34%	0.0579	7.4843	-41.54%	4.69%	4.28%	1.90%	-1.89%	-6.03%
Canada	Jan-70 Aug-00	368	0.23%	0.25%	1.28%	-4.43%	7.15%	0.4212	3.6894	-13.00%	8.97%	12.75%	-3.76%	14.97%	1.02%
France	Jan-70 Dec-98	348	0.15%	0.00%	1.48%	-5.07%	5.17%	-0.0168	1.2978	-38.45%	14.15%	5.13%	-6.30%	5.00%	12.61%
Italy	Mar-77 Dec-98	262	0.12%	0.12%	2.83%	-13.71%	13.34%	0.0021	4.0851	-44.89%	-2.11%	-5.25%	20.39%	-10.10%	6.55%
Japan	Jan-70 Aug-00	368	0.24%	0.20%	1.55%	-4.55%	4.46%	-0.1223	0.3422	-27.25%	8.46%	32.11%	-10.09%	10.87%	17.25%
United Kingdom	Jan-70 Mar-99	351	0.11%	0.13%	1.57%	-8.29%	9.34%	-0.1543	9.1650	-18.15%	-5.07%	1.28%	-3.00%	5.76%	-7.34%
United States	Sep-74 Aug-00	312	0.23%	0.33%	0.79%	-4.30%	3.39%	-0.9934	5.2506	38.52%	30.62%	23.40%	9.63%	4.86%	-0.47%
Group of Seven Averages		**327.3**	**0.17%**	**0.18%**	**1.62%**	**-7.13%**	**7.74%**	**-0.1151**	**4.4735**	**-20.68%**	**8.53%**	**10.53%**	**1.25%**	**4.21%**	**3.37%**

Table 3.5. Ordinary Least Squares Estimation of Single Equations in the Vector Autoregression of the Expected Inflation Rate, Expected Real Stock Returns, Expected Real Interest Rate, and Expected Real Activity. Standard errors computed based on White's heteroskedasticity adjusted covariance matrix; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel A: Dependent Variable is the Expected Inflation Rate

	Independent Variables:													
	Inflation Rate			Stock Returns			Interest Rate			Real Activity			Constant	Adjusted R-square
	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3		
Argentina	1.2457 **	-0.4375 **		0.3424 **	-0.1486 **		-0.6238 **	0.4570 *		0.5655 **	0.0964		0.0069	0.8575
	0.138	*0.132*		*0.052*	*0.043*		*0.234*	*0.212*		*0.192*	*0.161*		*0.005*	
Brazil	1.4370 **	-0.4836 **		0.1945 **	-0.0909 **		-0.3413	0.2105		0.3092 **	-0.1251		0.0073	0.9044
	0.087	*0.102*		*0.063*	*0.029*		*0.209*	*0.163*		*0.112*	*0.108*		*0.004*	
Chile	1.1802 **	-0.6839 **	0.3191 **	0.0389 **	-0.0436 **	0.0223 **	0.1864 *	-0.2796 *	0.2247 **	-0.0014	0.0376 *	-0.0350 *	0.0013 *	0.7085
	0.116	*0.182*	*0.120*	*0.007*	*0.009*	*0.007*	*0.087*	*0.128*	*0.078*	*0.015*	*0.016*	*0.016*	*0.001*	
Colombia	1.0381			0.0316			0.5846			-0.0597			-0.0020	0.1776
	1.575			*0.027*			*1.592*			*0.074*			*0.013*	
Mexico	0.9912 **	0.0487		-0.0542 **	0.0268		-0.0645	0.3191		0.0924	0.0765		-0.0017	0.8233
	0.253	*0.254*		*0.014*	*0.018*		*0.293*	*0.288*		*0.048*	*0.050*		*0.002*	
Peru	1.7659 *	-0.8117		0.0048	0.0003		1.0029	-0.6437		0.0320	-0.0004		-0.0019	0.8116
	0.751	*0.690*		*0.010*	*0.009*		*0.740*	*0.677*		*0.020*	*0.021*		*0.001*	
Venezuela	1.1822 **			0.0127			0.3207			0.1241 **			-0.0084	0.6016
	0.317			*0.009*			*0.214*			*0.038*			*0.010*	
Germany	1.1525 **	-0.3200		0.0164 **	-0.0168 **		0.1573	0.1054		0.0351 **	-0.0052		-0.0002	0.6109
	0.422	*0.433*		*0.004*	*0.005*		*0.419*	*0.427*		*0.012*	*0.013*		*0.000*	
Canada	1.1045 **	-0.8965 *	0.7329 *	0.0018	-0.0081	0.0023	0.2257	-0.4363	0.2549	0.0407 *	-0.0179	0.0158	0.0000	0.7299
	0.276	*0.454*	*0.315*	*0.005*	*0.005*	*0.004*	*0.265*	*0.446*	*0.318*	*0.017*	*0.017*	*0.018*	*0.000*	
France	0.9008 **	0.0530		-0.0018	-0.0006		0.1076	0.0554		0.0189	0.0047		-0.0002	0.7177
	0.274	*0.276*		*0.003*	*0.003*		*0.283*	*0.283*		*0.015*	*0.015*		*0.000*	
Italy	0.9870 **			0.0034			0.2369 **			0.0191			-0.0007	0.7367
	0.045			*0.004*			*0.084*			*0.014*			*0.000*	
Japan	0.6520	0.2941	0.2071	-0.0196 *	0.0297 *	-0.0151	-0.3268	0.9196	-0.1684	0.0183	0.0062	0.0372	-0.0003	0.6525
	0.799	*1.174*	*0.734*	*0.009*	*0.014*	*0.009*	*0.804*	*1.167*	*0.721*	*0.021*	*0.020*	*0.024*	*0.000*	
United Kingdom	1.9188 **	-1.1381	0.2849	-0.0276 **	0.0584 **	-0.0334 *	0.9431 *	-0.6888	0.0670	0.0388	-0.0181	-0.0324	-0.0009	0.6762
	0.470	*0.814*	*0.557*	*0.009*	*0.018*	*0.014*	*0.471*	*0.819*	*0.558*	*0.034*	*0.031*	*0.030*	*0.001*	
United States	1.4768 **	-0.6488	0.0847	0.0310 **	-0.0377 **	0.0174 *	0.4685	-0.1569	-0.2021	0.0349	-0.0193	0.0025	0.0000	0.6858
	0.274	*0.584*	*0.432*	*0.007*	*0.009*	*0.007*	*0.294*	*0.596*	*0.414*	*0.036*	*0.048*	*0.036*	*0.000*	

Table 3.5. (continued) OLS Estimation of Single Equations in the Vector Autoregression of the Expected Inflation Rate, Expected Real Stock Returns, Expected Real Interest Rate, and Expected Real Activity. Standard errors computed based on White's heteroskedasticity adjusted covariance matrix; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel B: Dependent Variable is the Expected Real Stock Returns

	Independent Variables:													Adjusted
	Inflation Rate			Stock Returns			Interest Rate			Real Activity			Constant	R-square
	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3		
Argentina	-0.5377	0.8181 *		-0.1302	0.2822 *		-0.5118	1.7370 **		-1.1934 *	-0.3576		0.0050	0.2029
	0.413	*0.347*		*0.182*	*0.129*		*0.940*	*0.545*		*0.557*	*0.358*		*0.012*	
Brazil	-0.4964	0.5583		-0.0824	0.5383 **		1.2771 **	-1.4043 **		-0.1885	0.1333		0.0020	0.2162
	0.381	*0.383*		*0.099*	*0.098*		*0.465*	*0.471*		*0.328*	*0.330*		*0.012*	
Chile	-0.0026	1.2606	-0.6123	0.3242 **	0.4228 **	-0.2305 **	0.3844	-0.3095	-0.4148	-0.2903 *	-0.0666	0.1282	-0.0001	0.3075
	0.960	*1.443*	*0.995*	*0.072*	*0.082*	*0.077*	*0.843*	*1.168*	*0.729*	*0.139*	*0.176*	*0.147*	*0.007*	
Colombia	-0.9154			0.7306 **			-0.9817			0.7139 **			0.0137	0.5105
	2.656			*0.120*			*2.709*			*0.192*			*0.021*	
Mexico	0.1537	0.8348		0.5191 **	-0.1565		-0.6159	2.7229		-0.4547	-1.0750 **		-0.0239	0.3167
	1.309	*1.378*		*0.125*	*0.116*		*1.499*	*1.481*		*0.317*	*0.315*		*0.015*	
Peru	-6.7023	7.3888		0.6410 **	-0.1939		-9.7785	10.1719		-0.2122	-0.4178 *		-0.0047	0.3771
	6.175	*5.845*		*0.104*	*0.128*		*6.351*	*5.660*		*0.173*	*0.181*		*0.012*	
Venezuela	-17.6723 *			-0.3258			-11.9080 *			-0.2850			0.5218 *	0.0589
	7.255			*0.167*			*4.982*			*0.962*			*0.226*	
Germany	-11.4650 **	11.3904 *		0.5069 **	0.1327		-11.4438 *	10.5747 *		0.3153	0.0041		0.0033	0.3685
	4.379	*4.517*		*0.103*	*0.089*		*4.542*	*4.533*		*0.188*	*0.158*		*0.005*	
Canada	-10.5990 *	14.4228 *	-4.8164	0.5916 **	0.1102	-0.1226 *	-12.3217 *	16.8955 **	-5.0353	0.1275	0.0029	-0.0884	0.0067	0.4416
	4.619	*5.979*	*3.660*	*0.063*	*0.066*	*0.057*	*4.825*	*6.166*	*3.666*	*0.241*	*0.205*	*0.200*	*0.006*	
France	-4.5685	3.6628		0.3038 **	0.2793 *		-4.1899	3.9105		-0.3018	-0.0707		0.0067	0.2668
	4.518	*4.398*		*0.114*	*0.114*		*4.606*	*4.359*		*0.360*	*0.401*		*0.006*	
Italy	-0.3892			0.6424 **			-0.6116			0.4643			0.0061	0.4329
	0.723			*0.075*			*0.975*			*0.248*			*0.007*	
Japan	-4.8083	-3.6886	8.3475	1.1168 **	-0.5847 **	0.1964 **	-4.9646	-3.5879	8.4046	-0.5873 **	0.5263 **	0.0756	0.0009	0.6386
	5.149	*7.894*	*5.846*	*0.066*	*0.090*	*0.060*	*5.175*	*7.929*	*5.856*	*0.155*	*0.126*	*0.163*	*0.002*	
United Kingdom	8.3385 *	-14.9248 *	6.6802	1.2088 **	-0.7360 **	0.2401 **	8.3820 *	-14.5171 *	6.4412	0.0989	-0.5377 *	0.0707	0.0000	0.6592
	3.841	*6.520*	*3.696*	*0.091*	*0.117*	*0.060*	*3.741*	*6.467*	*3.660*	*0.171*	*0.214*	*0.157*	*0.004*	
United States	1.0844	-1.9687	-0.0983	0.9317 **	-0.4719 **	0.0940	1.8001	-2.0340	-0.3099	-0.0853	-0.1430	-0.2451	0.0087 **	0.5388
	2.522	*4.170*	*2.577*	*0.086*	*0.095*	*0.063*	*2.517*	*4.062*	*2.454*	*0.345*	*0.425*	*0.322*	*0.003*	

Table 3.5. (continued) OLS Estimation of Single Equations in the Vector Autoregression of the Expected Inflation Rate, Expected Real Stock Returns, Expected Real Interest Rate, and Expected Real Activity. Standard errors computed based on White's heteroskedasticity adjusted covariance matrix; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel C: Dependent Variable is the Expected Real Interest Rate

	Independent Variables:													Adjusted
	Inflation Rate			Stock Returns			Interest Rate			Real Activity			Constant	R-square
	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3		
Argentina	-0.2307 **	0.1529 *		-0.1416 **	0.0511		0.7515 **	-0.2649		-0.4252 **	0.0329		0.0052	0.6322
	0.088	*0.072*		*0.038*	*0.034*		*0.166*	*0.146*		*0.110*	*0.093*		*0.003*	
Brazil	0.1925 **	-0.1165		-0.0245	0.0027		0.7878 **	-0.1254		-0.0498	0.0629		-0.0003	0.6765
	0.072	*0.075*		*0.019*	*0.017*		*0.207*	*0.128*		*0.067*	*0.066*		*0.002*	
Chile	0.1238	0.3657	-0.2953 *	-0.0542 **	0.0314 **	-0.0067	0.8411 **	-0.1546	0.0420	0.0073	-0.0487 *	0.0263	-0.0005	0.5534
	0.125	*0.202*	*0.144*	*0.008*	*0.011*	*0.009*	*0.101*	*0.157*	*0.104*	*0.021*	*0.022*	*0.020*	*0.001*	
Colombia	-0.0958			-0.0306			0.3534			0.0598			0.0024	0.1678
	1.573			*0.027*			*1.591*			*0.074*			*0.013*	
Mexico	0.2295	-0.3394		0.0568 **	-0.0320 *		1.1987 **	-0.5907 *		-0.0929 *	-0.0706		0.0038 *	0.6535
	0.219	*0.207*		*0.012*	*0.015*		*0.261*	*0.241*		*0.041*	*0.042*		*0.002*	
Peru	-0.1999	0.2143		-0.0041	-0.0005		0.5702	0.0146		-0.0356	0.0037		0.0024 *	0.4175
	0.749	*0.688*		*0.011*	*0.009*		*0.737*	*0.674*		*0.021*	*0.021*		*0.001*	
Venezuela	-0.1146			-0.0181 *			0.6900 *			-0.1096 *			0.0064	0.7394
	0.454			*0.009*			*0.309*			*0.043*			*0.014*	
Germany	0.1830	-0.0205		-0.0176 **	0.0180 **		1.1833 **	-0.4662		-0.0317 *	0.0074		0.0003	0.5921
	0.396	*0.407*		*0.004*	*0.005*		*0.392*	*0.400*		*0.012*	*0.013*		*0.000*	
Canada	0.0712	0.4781	-0.4909	-0.0067	0.0126 *	-0.0016	0.9529 **	-0.0126	-0.0048	-0.0322 *	0.0185	-0.0189	0.0000	0.6827
	0.278	*0.468*	*0.302*	*0.005*	*0.005*	*0.004*	*0.266*	*0.459*	*0.305*	*0.016*	*0.016*	*0.018*	*0.000*	
France	0.3885	-0.3565		-0.0003	0.0014		1.1993 **	-0.3914		-0.0092	-0.0046		0.0003	0.6118
	0.258	*0.260*		*0.003*	*0.003*		*0.265*	*0.267*		*0.014*	*0.016*		*0.000*	
Italy	0.0030			-0.0052			0.7366 **			-0.0188			0.0008	0.5589
	0.045			*0.004*			*0.080*			*0.014*			*0.000*	
Japan	0.5582	-0.7434	0.0195	0.0189 *	-0.0291 *	0.0149	1.5327	-1.3695	0.3907	-0.0162	-0.0059	-0.0364	0.0003	0.5852
	0.811	*1.184*	*0.731*	*0.009*	*0.014*	*0.009*	*0.815*	*1.178*	*0.718*	*0.021*	*0.020*	*0.024*	*0.000*	
United Kingdom	-0.5280	0.5640	-0.1307	0.0198 *	-0.0488 **	0.0290 *	0.4623	0.0864	0.0992	-0.0318	0.0168	0.0271	0.0012	0.6041
	0.472	*0.800*	*0.546*	*0.009*	*0.017*	*0.013*	*0.470*	*0.803*	*0.546*	*0.033*	*0.031*	*0.031*	*0.001*	
United States	-0.0785	-0.1132	0.2829	-0.0334 **	0.0440 **	-0.0181 **	0.9249 **	-0.6282	0.5793	-0.0311	0.0342	0.0019	-0.0001	0.6396
	0.276	*0.536*	*0.393*	*0.007*	*0.009*	*0.007*	*0.291*	*0.543*	*0.377*	*0.035*	*0.045*	*0.034*	*0.000*	

Table 3.5. (continued) OLS Estimation of Single Equations in the Vector Autoregression of the Expected Inflation Rate, Expected Real Stock Returns, Expected Real Interest Rate, and Expected Real Activity. Standard errors computed based on White's heteroskedasticity adjusted covariance matrix; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel D: Dependent Variable is the Expected Change In Real Activity

	Independent Variables:													Adjusted
	Inflation Rate			Stock Returns			Interest Rate			Real Activity			Constant	R-square
	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3		
Argentina	-0.1283 **	0.0875 **		-0.0444 **	0.0578 **		0.3424 **	-0.3199 **		-0.3409 **	0.3078 **		0.0041	0.3728
	0.032	*0.023*		*0.012*	*0.014*		*0.059*	*0.066*		*0.069*	*0.066*		*0.002*	
Brazil	-0.4364 **	0.4157 **		0.0261	0.0227		-0.0345	-0.0271		-0.1117	0.3213 **		0.0048	0.3280
	0.100	*0.116*		*0.049*	*0.026*		*0.163*	*0.154*		*0.119*	*0.082*		*0.003*	
Chile	-0.9717 *	0.4802	0.7181	-0.0091	-0.0348	0.0670 *	-1.3826 **	0.8306 *	-0.0244	-0.4899 **	-0.2978 **	0.2403 **	0.0048	0.4207
	0.399	*0.552*	*0.395*	*0.031*	*0.034*	*0.031*	*0.354*	*0.421*	*0.266*	*0.065*	*0.068*	*0.060*	*0.003*	
Colombia	0.8679			0.0184			0.8771			-0.6296 **			-0.0040	0.3683
	1.080			*0.021*			*1.097*			*0.090*			*0.009*	
Mexico	-0.5950	0.4777		-0.0465 **	0.0342 *		-0.5746	0.5635		-0.3337 **	-0.0013		0.0061 *	0.1746
	0.342	*0.332*		*0.014*	*0.015*		*0.351*	*0.317*		*0.081*	*0.067*		*0.003*	
Peru	-3.7706	3.5662		0.0927	-0.0075		-3.5897	3.7001		-0.1915	0.3026 *		0.0018	0.1455
	3.474	*3.384*		*0.063*	*0.064*		*3.466*	*3.384*		*0.110*	*0.145*		*0.006*	
Venezuela	-5.1112 *			0.0488			-4.4197 **			-0.2407			0.1766 **	0.3406
	2.037			*0.039*			*1.413*			*0.151*			*0.066*	
Germany	2.4431	-3.2791		-0.0076	0.0448 *		2.8490	-3.6893 *		-0.3117 **	0.3433 **		0.0049 **	0.3173
	1.806	*1.853*		*0.020*	*0.019*		*1.808*	*1.808*		*0.093*	*0.080*		*0.001*	
Canada	0.3551	-0.3034	-0.4014	0.0190	-0.0216	0.0374 *	0.9430	-1.2651	0.0538	0.1583 *	0.4525 **	0.0135	0.0032 *	0.3866
	1.067	*1.480*	*0.985*	*0.013*	*0.017*	*0.016*	*1.096*	*1.499*	*1.003*	*0.064*	*0.054*	*0.054*	*0.001*	
France	-0.5773	-0.0457		0.0071	-0.0022		-0.8422	0.0923		-0.1747 **	0.4248 **		0.0058 **	0.2893
	0.791	*0.790*		*0.014*	*0.015*		*0.837*	*0.834*		*0.062*	*0.059*		*0.001*	
Italy	-0.3066			0.0692 *			-0.4124			-0.5189 **			0.0051 *	0.3171
	0.274			*0.031*			*0.411*			*0.116*			*0.002*	
Japan	-0.6735	-2.2476	3.0066	0.0276	-0.0417	0.0512 **	-0.5137	-2.1869	3.0284	-0.2033 **	0.5291 **	0.4401 **	0.0004	0.4704
	1.802	*2.936*	*1.928*	*0.019*	*0.026*	*0.018*	*1.822*	*2.965*	*1.942*	*0.053*	*0.043*	*0.058*	*0.001*	
United Kingdom	0.3020	0.2542	-0.7794	-0.0124	0.0218	-0.0117	0.2912	0.2697	-0.7115	0.2169 *	0.2816 **	-0.1122	0.0024	0.1257
	0.925	*1.548*	*0.978*	*0.026*	*0.036*	*0.023*	*0.930*	*1.572*	*0.939*	*0.096*	*0.067*	*0.086*	*0.002*	
United States	-0.9406	0.1269	0.5503	0.0257	-0.0234	0.0375 **	-1.0786	0.1667	0.5931	0.8724 **	-0.3556 **	0.2136 **	0.0021 **	0.6333
	0.544	*0.976*	*0.664*	*0.015*	*0.022*	*0.015*	*0.558*	*0.989*	*0.647*	*0.074*	*0.095*	*0.070*	*0.001*	

Table 3.6. Likelihood Ratio Test of Block Granger Non-Causality in the Vector Autoregression of the Expected Inflation Rate, Expected Real Stock Returns, Expected Real Interest Rates, and Expected Change in Real Activity. The test statistic is for testing the null hypothesis that the coefficients of the lagged values of the variable indicated above each column in the block of equations explaining the remaining variables in the VAR are zero, and it is distributed χ^2(d.f.); *p-values in italic*; * significant at the 5% level; ** significant at the 1% level.

	VAR Order	Degrees of Freedom	Expected Inflation Rate	Expected Real Stock Returns	Expected Real Interest Rate	Expected Real Activity
Argentina	2	6	48.5992 **	149.3722 **	58.4672 **	30.0249 **
			0.000	*0.000*	*0.000*	*0.000*
Brazil	2	6	88.5730 **	59.1753 **	21.2725 **	19.7367 **
			0.000	*0.000*	*0.002*	*0.003*
Chile	3	9	49.1644 **	88.1343 **	37.8352 **	38.1570 **
			0.000	*0.000*	*0.000*	*0.000*
Colombia	1	3	0.5120	4.4543	0.6210	12.2494 **
			0.916	*0.216*	*0.892*	*0.007*
Mexico	2	6	22.5526 **	63.3341 **	29.6602 **	20.2576 **
			0.001	*0.000*	*0.000*	*0.002*
Peru	2	6	5.4297	3.9135	15.0761 *	13.5954 *
			0.490	*0.688*	*0.020*	*0.034*
Venezuela	1	3	14.5667 **	8.3872 *	14.5651 **	10.4878 *
			0.002	*0.039*	*0.002*	*0.015*
Germany	2	6	20.8603 **	30.2531 **	28.5093 **	23.2406 **
			0.002	*0.000*	*0.000*	*0.001*
Canada	3	9	22.2872 **	68.4929 **	18.4907 *	19.1415 *
			0.008	*0.000*	*0.030*	*0.024*
France	2	6	19.7010 **	10.7411	23.8566 **	13.2415 *
			0.003	*0.097*	*0.001*	*0.039*
Italy	1	3	2.5012	24.3153 **	17.0585 **	16.2612 **
			0.475	*0.000*	*0.001*	*0.001*
Japan	3	9	8.9641	18.8251 *	16.4195	45.6826 **
			0.441	*0.027*	*0.059*	*0.000*
United Kingdom	3	9	15.0711	78.2676 **	22.6144 **	22.6732 **
			0.089	*0.000*	*0.007*	*0.007*
United States	3	9	33.6774 **	54.1924 **	36.2652 **	26.0372 **
			0.000	*0.000*	*0.000*	*0.002*

Table 3.7. 24-Month Generalized Forecast Error Variance Decomposition for the Vector Autoregression of the Expected Inflation Rate, Expected Real Stock Returns, Expected Real Interest Rates, and Expected Real Activity. The percentages reported here measure the proportion of the 24-month ahead forecast error variance of a given variable (indicated in front of each row) that is accounted for by generalized innovations in another variable (indicated above each column) in the system.

Panel A: Latin American Countries

Variance Explained	By Innovations in:			
Argentina	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	58.99%	18.15%	20.64%	0.66%
Stock Returns	4.31%	83.95%	11.51%	5.38%
Interest Rate	26.29%	14.86%	64.18%	2.02%
Real Activity	12.34%	1.98%	16.85%	71.70%

Variance Explained	By Innovations in:			
Brazil	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	67.21%	4.79%	14.21%	8.98%
Stock Returns	16.99%	88.49%	9.86%	1.85%
Interest Rate	33.71%	2.87%	51.31%	7.96%
Real Activity	27.58%	10.68%	6.96%	68.41%

Chile	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	82.41%	3.72%	46.31%	1.50%
Stock Returns	9.64%	92.55%	7.12%	1.34%
Interest Rate	44.56%	12.88%	64.32%	3.84%
Real Activity	2.52%	2.10%	4.48%	92.31%

Colombia	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	98.08%	10.56%	98.05%	0.59%
Stock Returns	10.71%	95.88%	10.73%	3.00%
Interest Rate	98.43%	10.62%	98.44%	0.59%
Real Activity	0.11%	5.16%	0.11%	99.68%

Mexico	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	81.77%	6.95%	63.34%	1.32%
Stock Returns	4.32%	83.77%	6.35%	4.84%
Interest Rate	71.66%	8.64%	80.24%	2.89%
Real Activity	4.08%	8.71%	4.41%	92.37%

Peru	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	72.91%	1.95%	66.84%	3.86%
Stock Returns	6.96%	83.86%	7.58%	4.70%
Interest Rate	93.41%	1.32%	95.00%	6.70%
Real Activity	1.81%	3.30%	1.79%	95.25%

Venezuela	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	34.80%	6.03%	22.92%	10.20%
Stock Returns	15.76%	71.41%	7.09%	3.57%
Interest Rate	17.67%	5.53%	15.04%	9.79%
Real Activity	12.97%	5.89%	5.04%	37.26%

Table 3.7. (continued) 24-Month Generalized Forecast Error Variance Decomposition for the Vector Autoregression of the Expected Inflation Rate, Expected Real Stock Returns, Expected Real Interest Rates, and Expected Real Activity. The percentages reported here measure the proportion of the 24-month ahead forecast error variance of a given variable (indicated in front of each row) that is accounted for by generalized innovations in another variable (indicated above each column) in the system.

Panel B: Group of Seven Countries

Variance Explained	By Innovations in:			
Germany	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	87.42%	2.77%	84.67%	2.16%
Stock Returns	5.07%	95.18%	4.68%	0.89%
Interest Rate	87.95%	2.59%	89.93%	1.71%
Real Activity	0.70%	1.20%	0.72%	95.47%

Variance Explained	By Innovations in:			
Canada	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	92.56%	1.26%	88.55%	2.62%
Stock Returns	5.43%	92.65%	4.98%	1.84%
Interest Rate	86.58%	0.90%	92.50%	1.82%
Real Activity	11.14%	9.28%	10.00%	85.23%

France	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	87.64%	1.70%	78.73%	4.63%
Stock Returns	2.31%	96.03%	1.87%	2.25%
Interest Rate	90.30%	0.16%	97.62%	1.36%
Real Activity	2.24%	1.08%	1.78%	93.55%

Italy	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	86.33%	1.47%	78.64%	1.96%
Stock Returns	0.58%	97.20%	0.75%	2.85%
Interest Rate	93.37%	3.74%	96.63%	1.11%
Real Activity	0.48%	9.38%	0.30%	97.24%

Japan	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	89.79%	9.75%	89.28%	7.35%
Stock Returns	6.81%	97.14%	6.60%	1.00%
Interest Rate	93.97%	10.21%	94.35%	5.15%
Real Activity	9.32%	11.02%	9.10%	82.67%

United Kingdom	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	82.10%	8.03%	77.66%	0.73%
Stock Returns	0.93%	94.29%	0.82%	2.99%
Interest Rate	95.40%	3.03%	95.07%	1.03%
Real Activity	1.34%	0.67%	1.22%	98.08%

United States	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	86.17%	5.47%	74.51%	5.26%
Stock Returns	16.38%	94.32%	12.73%	10.07%
Interest Rate	79.31%	4.60%	86.70%	3.07%
Real Activity	5.58%	9.08%	2.44%	75.24%

Table 3.8. Likelihood Ratio Test of Parameter Restrictions in Single Equations. The test statistic is for testing the null hypothesis that the coefficients of the lagged values of the independent variable (indicated above each column) in the equation explaining each dependent variable (indicated in front of each row) are zero, and it is distributed χ^2(d.f.); *p-values beneath each statistic in italic*; * significant at the 5% level; ** significant at the 1% level.

Panel A: Latin American Countries

Dependent Variable		Independent Variables			
Argentina	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	2	182.3871 **	134.6473 **	19.1506 **	13.9580 **
		0.000	*0.000*	*0.000*	*0.001*
Stock Returns	2	20.2376 **	14.1156 **	18.0903 **	8.2343 *
		0.000	*0.001*	*0.000*	*0.016*
Interest Rate	2	21.9811 **	74.7341 **	65.2540 **	24.7071 **
		0.000	*0.000*	*0.000*	*0.000*
Real Activity	2	11.4922 **	27.3579 **	29.3058 **	54.2035 **
		0.003	*0.000*	*0.000*	*0.000*

Dependent Variable		Independent Variables			
Brazil	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	2	441.2531 **	56.2783 **	6.7415 *	17.6714 **
		0.000	*0.000*	*0.034*	*0.000*
Stock Returns	2	6.2394 *	47.8347 **	18.1413 **	1.1866
		0.044	*0.000*	*0.000*	*0.552*
Interest Rate	2	44.2244 **	3.1130	117.2668 **	3.6941
		0.000	*0.211*	*0.000*	*0.158*
Real Activity	2	53.7472 **	3.7006	0.5506	30.7441 **
		0.000	*0.157*	*0.759*	*0.000*

Chile	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	3	318.7163 **	53.3823 **	16.2600 **	25.3032 **
		0.000	*0.000*	*0.001*	*0.000*
Stock Returns	3	5.2680	88.1773 **	2.1984	9.2281 *
		0.153	*0.000*	*0.532*	*0.026*
Interest Rate	3	35.7773 **	47.6365 **	130.2197 **	21.6568 **
		0.000	*0.000*	*0.000*	*0.000*
Real Activity	3	12.3568 **	5.6840	18.4011 **	123.5157 **
		0.006	*0.128*	*0.000*	*0.000*

Colombia	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	1	0.3490	0.8835	0.1084	0.3241
		0.555	*0.347*	*0.742*	*0.569*
Stock Returns	1	0.0725	86.9271 **	0.0816	11.7978 **
		0.788	*0.000*	*0.775*	*0.001*
Interest Rate	1	0.0030	0.8401	0.0400	0.3285
		0.956	*0.359*	*0.842*	*0.567*
Real Activity	1	0.4935	0.6075	0.4933	57.2847 **
		0.482	*0.436*	*0.482*	*0.000*

Mexico	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	2	217.2021 **	30.4368 **	10.5034 **	5.2399
		0.000	*0.000*	*0.005*	*0.073*
Stock Returns	2	7.7947 *	61.7347 **	16.4912 **	13.1571 **
		0.020	*0.000*	*0.000*	*0.001*
Interest Rate	2	8.9067 *	40.9373 **	59.8485 **	6.2369 *
		0.012	*0.000*	*0.000*	*0.044*
Real Activity	2	5.3070	11.4139 **	4.0983	27.0129 **
		0.070	*0.003*	*0.129*	*0.000*

Peru	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	2	118.4744 **	0.3723	10.8192 **	3.7891
		0.000	*0.830*	*0.004*	*0.150*
Stock Returns	2	4.2137	32.9151 **	3.1173	4.5619
		0.122	*0.000*	*0.210*	*0.102*
Interest Rate	2	0.3338	0.2856	25.6593 **	4.8628
		0.846	*0.867*	*0.000*	*0.088*
Real Activity	2	1.1384	3.3755	1.3816	15.9389 **
		0.566	*0.185*	*0.501*	*0.000*

Venezuela	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	1	9.4112 **	2.4143	9.5437 **	9.5437 **
		0.002	*0.120*	*0.002*	*0.002*
Stock Returns	1	4.3539 *	3.0093	0.1119	0.1119
		0.037	*0.083*	*0.738*	*0.738*
Interest Rate	1	0.0855	3.9662 *	6.4852 *	6.4852 *
		0.770	*0.046*	*0.011*	*0.011*
Real Activity	1	7.8482 **	1.5796	1.7743	1.7743
		0.005	*0.209*	*0.183*	*0.183*

Table 3.8. (continued) Likelihood Ratio Test of Parameter Restrictions in Single Equations. The test statistic is for testing the null hypothesis that the coefficients of the lagged values of the independent variable (indicated above each column) in the equation explaining each dependent variable (indicated in front of each row) are zero, and it is distributed χ^2(d.f.); *p-values beneath each statistic in italic*; * significant at the 5% level; ** significant at the 1% level.

Panel B: Group of Seven Countries

Dependent Variable		Independent Variables			
Germany	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	2	129.5703 **	16.3857 **	14.4955 **	11.8215 **
		0.000	*0.000*	*0.001*	*0.003*
Stock Returns	2	4.6991	121.4413 **	5.2469	4.5380
		0.095	*0.000*	*0.073*	*0.103*
Interest Rate	2	6.2980 *	19.3661 **	99.1215 **	10.8524 **
		0.043	*0.000*	*0.000*	*0.004*
Real Activity	2	9.0235 *	5.9107	10.1030 **	99.0948 **
		0.011	*0.052*	*0.006*	*0.000*

Dependent Variable		Independent Variables			
Canada	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	3	223.8282 **	3.0655	1.5082	10.6618 *
		0.000	*0.382*	*0.680*	*0.014*
Stock Returns	3	11.7135 **	165.7809 **	12.7677 **	0.4472
		0.008	*0.000*	*0.005*	*0.930*
Interest Rate	3	4.9689	7.5794	201.9266 **	8.6557 *
		0.174	*0.056*	*0.000*	*0.034*
Real Activity	3	4.5607	10.4818 *	3.6802	125.4827 **
		0.207	*0.015*	*0.298*	*0.000*

France	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	2	248.3705 **	0.4761	6.8847 *	1.5940
		0.000	*0.788*	*0.032*	*0.451*
Stock Returns	2	2.7030	93.8139 **	1.1643	1.7936
		0.259	*0.000*	*0.559*	*0.408*
Interest Rate	2	2.7579	0.1854	150.9464 **	0.4134
		0.252	*0.911*	*0.000*	*0.813*
Real Activity	2	14.2724 **	0.4064	13.8157 **	99.2112 **
		0.001	*0.816*	*0.001*	*0.000*

Italy	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	1	257.1290 **	0.8828	3.7003	3.7003
		0.000	*0.347*	*0.054*	*0.054*
Stock Returns	1	0.4078	145.1423 **	13.2017 **	13.2017 **
		0.523	*0.000*	*0.000*	*0.000*
Interest Rate	1	0.0042	2.0729	3.7257	3.7257
		0.949	*0.150*	*0.054*	*0.054*
Real Activity	1	1.6492	14.1287 **	92.7304 **	92.7304 **
		0.199	*0.000*	*0.000*	*0.000*

Japan	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	3	71.7300 **	6.0987	8.5796 *	6.5538
		0.000	*0.107*	*0.035*	*0.088*
Stock Returns	3	3.4743	354.8095 **	3.5507	33.8504 **
		0.324	*0.000*	*0.314*	*0.000*
Interest Rate	3	2.1937	5.8946	14.4644 **	6.0057
		0.533	*0.117*	*0.002*	*0.111*
Real Activity	3	3.0509	10.7664 *	4.1688	220.0839 **
		0.384	*0.013*	*0.244*	*0.000*

United Kingdom	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	3	107.9848 **	23.0576 **	10.8994 *	3.4641
		0.000	*0.000*	*0.012*	*0.325*
Stock Returns	3	10.8347 *	362.8401 **	10.1538 *	11.9776 **
		0.013	*0.000*	*0.017*	*0.007*
Interest Rate	3	2.0010	17.4671 **	32.3304 **	2.5278
		0.572	*0.001*	*0.000*	*0.470*
Real Activity	3	2.1865	0.7732	1.2844	51.9700 **
		0.535	*0.856*	*0.733*	*0.000*

United States	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	3	234.6110 **	21.1505 **	10.2749 *	1.5298
		0.000	*0.000*	*0.016*	*0.675*
Stock Returns	3	4.5753	196.9284 **	2.2229	6.5385
		0.206	*0.000*	*0.527*	*0.088*
Interest Rate	3	4.5980	28.6269 **	188.2454 **	1.9005
		0.204	*0.000*	*0.000*	*0.593*
Real Activity	3	17.7141 **	13.3610 **	19.7155 **	248.6728 **
		0.001	*0.004*	*0.000*	*0.000*

Table 3.9. Ordinary Least Squares Estimation of Single Equations in the Pooled Vector Autoregression of the Expected Inflation Rate, Expected Real Stock Returns, Expected Real Interest Rates, and Expected Real Activity. Standard errors computed based on White's heteroskedasticity adjusted covariance matrix; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Dependent Variable: Inflation Rate	Independent Variables:																			Adjusted R-square
	Inflation Rate			Stock Returns			Interest Rate			Real Activity			Country Dummies							
	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	D1	D2	D3	D4	D5	D6	D7	
Latin America	0.1537	0.1467	0.0106	0.0831 **	-0.0891 **	-0.0070	0.0203	0.0034	0.0567	0.0706	0.0694	0.0132	0.0045	-0.0012	0.0002	-0.0039	0.0012	0.0000	0.0069	0.1583
	0.099	*0.103*	*0.079*	*0.026*	*0.020*	*0.018*	*0.105*	*0.124*	*0.083*	*0.039*	*0.047*	*0.051*	*0.003*	*0.003*	*0.001*	*0.003*	*0.002*	*0.001*	*0.004*	
Group of Seven	0.6535 **	0.1413	-0.1025	-0.0356 *	0.0376 *	0.0095	-0.1451	0.1347	-0.0840	0.1107 *	-0.0019	0.0167	0.0012	0.0008 *	0.0013	0.0014	0.0015	0.0015	0.0013 **	0.3895
	0.092	*0.123*	*0.090*	*0.014*	*0.018*	*0.013*	*0.093*	*0.125*	*0.090*	*0.049*	*0.035*	*0.038*	*0.001*	*0.000*	*0.001*	*0.001*	*0.001*	*0.001*	*0.000*	

Dependent Variable: Stock Returns	Independent Variables:																			Adjusted R-square
	Inflation Rate			Stock Returns			Interest Rate			Real Activity			Country Dummies							
	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	D1	D2	D3	D4	D5	D6	D7	
Latin America	-0.1496	-0.1242	-0.0449	0.3160 **	0.1952 **	-0.0773	0.3921	-0.2366	0.0137	-0.0652	-0.0391	-0.0397	0.0125 *	0.0024	0.0070 *	0.0105 *	0.0036	0.0052	-0.0098	0.1856
	0.277	*0.216*	*0.155*	*0.066*	*0.064*	*0.060*	*0.337*	*0.269*	*0.180*	*0.138*	*0.127*	*0.116*	*0.006*	*0.007*	*0.003*	*0.005*	*0.006*	*0.005*	*0.018*	
Group of Seven	-0.4257 *	0.5340	-0.1621	0.5459 **	0.1458 *	-0.1224 **	0.3071	-0.2649	0.0909	0.3012 *	-0.0273	-0.1564	0.0017	0.0008	0.0019	0.0022	0.0017	0.0026	0.0036 **	0.3687
	0.205	*0.275*	*0.204*	*0.053*	*0.062*	*0.038*	*0.214*	*0.287*	*0.207*	*0.127*	*0.098*	*0.095*	*0.002*	*0.001*	*0.002*	*0.002*	*0.002*	*0.002*	*0.001*	

Dependent Variable: Interest Rate	Independent Variables:																			Adjusted R-square
	Inflation Rate			Stock Returns			Interest Rate			Real Activity			Country Dummies							
	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	D1	D2	D3	D4	D5	D6	D7	
Latin America	-0.3794 **	0.3646 **	-0.1186 *	0.0437	-0.0729 **	0.0047	0.7565 **	-0.2880 **	0.1752 *	-0.0245	0.0149	-0.0229	0.0060 *	0.0090 **	0.0020	-0.0031 *	0.0005	0.0021	0.0107 **	0.3464
	0.100	*0.086*	*0.059*	*0.026*	*0.019*	*0.020*	*0.103*	*0.110*	*0.077*	*0.050*	*0.060*	*0.054*	*0.003*	*0.003*	*0.001*	*0.002*	*0.002*	*0.001*	*0.003*	
Group of Seven	-0.3553 **	0.6428 **	-0.4245 **	-0.0478 **	0.0438 *	0.0112	0.8790 **	-0.3573 **	0.2222 *	0.0763	-0.0044	0.0176	0.0009	0.0008 *	0.0011	0.0013	0.0009	0.0012	0.0017 **	0.4103
	0.094	*0.123*	*0.090*	*0.015*	*0.019*	*0.013*	*0.096*	*0.126*	*0.090*	*0.049*	*0.036*	*0.039*	*0.001*	*0.000*	*0.001*	*0.001*	*0.001*	*0.001*	*0.000*	

Dependent Variable: Real Activity	Independent Variables:																			Adjusted R-square
	Inflation Rate			Stock Returns			Interest Rate			Real Activity			Country Dummies							
	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	t - 1	t - 2	t - 3	D1	D2	D3	D4	D5	D6	D7	
Latin America	0.0246	0.0399	0.0509	0.0373	-0.0109	0.0267	-0.0291	0.0502	-0.0082	-0.3118 **	0.0807	0.2522 **	0.0020	0.0010	0.0022	0.0021	0.0014	0.0018	-0.0014	0.1832
	0.076	*0.066*	*0.063*	*0.025*	*0.018*	*0.014*	*0.101*	*0.076*	*0.071*	*0.069*	*0.068*	*0.056*	*0.002*	*0.002*	*0.002*	*0.002*	*0.001*	*0.002*	*0.005*	
Group of Seven	-0.0909	-0.0578	0.0908	0.0397 *	-0.0288	0.0080	0.0409	0.0935	-0.1303	-0.1901 **	0.4325 **	0.2218 **	0.0007	0.0012 **	0.0007	0.0008	0.0014 **	0.0007	0.0013 **	0.2537
	0.064	*0.093*	*0.063*	*0.016*	*0.020*	*0.010*	*0.068*	*0.099*	*0.068*	*0.067*	*0.035*	*0.040*	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	

Table 3.10. Likelihood Ratio Test of Block Granger Non-Causality in the Pooled Vector Autoregression of the Expected Inflation Rate, Expected Real Stock Returns, Expected Real Interest Rates, and Expected Change in Real Activity. The test statistic is for testing the null hypothesis that the coefficients of the lagged values of the variable indicated above each column in the block of equations explaining the remaining variables in the VAR are zero, and it is distributed χ^2(d.f.); *p-values in italic*; * significant at the 5% level; ** significant at the 1% level.

	VAR Order	Degrees of Freedom	Expected Inflation Rate	Expected Real Stock Returns	Expected Real Interest Rate	Expected Real Activity
Latin America	3	9	68.8487 **	127.9176 **	12.5011	29.9806 **
			0.000	*0.000*	*0.187*	*0.000*
Group of Seven	3	9	47.2345 **	76.9784 **	18.9706 *	45.8110 **
			0.000	*0.000*	*0.025*	*0.000*

Table 3.11. 24-Month Generalized Forecast Error Variance Decomposition for the Pooled Vector Autoregression of the Expected Inflation Rate, Expected Real Stock Returns, Expected Real Interest Rates, and Expected Real Activity. The percentages reported here measure the proportion of the 24-month ahead forecast error variance of a given variable (indicated in front of each row) that is accounted for by generalized innovations in another variable (indicated above each column) in the system.

Panel A: Latin American Countries

	By Innovations in:			
Variance Explained	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	93.64%	14.84%	68.03%	0.46%
Stock Returns	10.01%	98.00%	12.54%	0.34%
Interest Rate	61.80%	12.14%	94.27%	1.61%
Real Activity	1.53%	3.36%	2.18%	95.52%

Panel B: Group of Seven Countries

	By Innovations in:			
Variance Explained	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	97.62%	15.36%	90.75%	0.99%
Stock Returns	16.65%	98.53%	18.79%	0.42%
Interest Rate	90.30%	15.84%	97.11%	0.52%
Real Activity	0.66%	1.74%	0.55%	97.13%

Table 3.12. Likelihood Ratio Test of Parameter Restrictions in Single Equations for Pooled Data. The test statistic is for testing the null hypothesis that the coefficients of the lagged values of the independent variable (indicated above each column) in the equation explaining each dependent variable (indicated in front of each row) are zero, and it is distributed χ^2(d.f.); *p-values beneath each statistic in italic*; * significant at the 5% level; ** significant at the 1% level.

Panel A: Latin American Countries

		Independent Variables			
Dependent Variables	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	3	33.1398 **	82.7178 **	3.5414	5.8993
		0.000	*0.000*	*0.315*	*0.117*
Stock Returns	3	4.4882	167.6955 **	7.0692	0.6811
		0.213	*0.000*	*0.070*	*0.878*
Interest Rate	3	52.7024 **	38.4621 **	200.1110 **	1.5842
		0.000	*0.000*	*0.000*	*0.663*
Real Activity	3	6.5797	27.6075 **	1.1295	175.3655 **
		0.087	*0.000*	*0.770*	*0.000*

Panel B: Group of Seven Countries

		Independent Variables			
Dependent Variables	**d.f.**	Inflation Rate	Stock Returns	Interest Rate	Real Activity
Inflation Rate	3	175.5280 **	17.1580 **	4.0460	15.0939 **
		0.000	*0.001*	*0.257*	*0.002*
Stock Returns	3	5.5664	793.9283 **	2.8207	16.8786 **
		0.135	*0.000*	*0.420*	*0.001*
Interest Rate	3	34.4386 **	25.5648 **	192.6374 **	7.9084 *
		0.000	*0.000*	*0.000*	*0.048*
Real Activity	3	9.7932 *	34.2230 **	7.6519	535.3366 **
		0.020	*0.000*	*0.054*	*0.000*

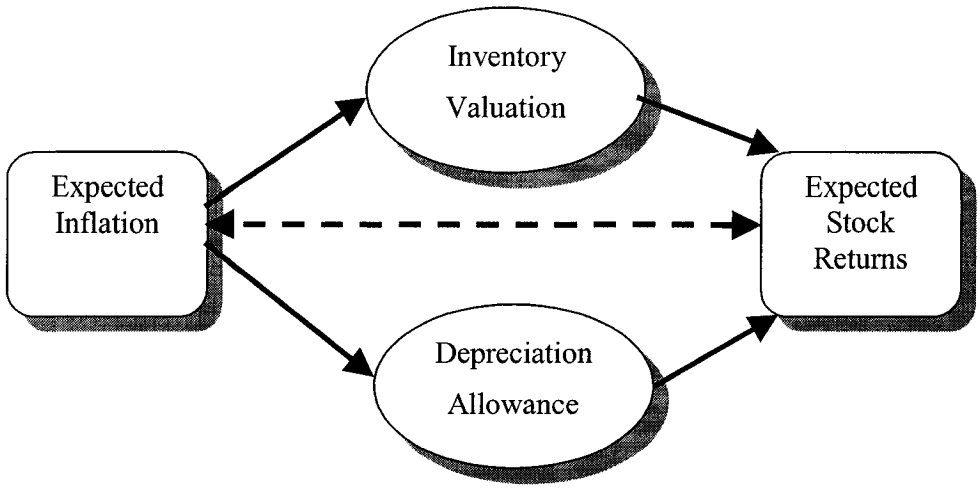
Table 3.13. Summary of Empirical Results. This table indicates whether the empirical evidence is consistent/inconsistent with each theoretical explanation.

Country or Region	Stock Returns-Inflation Hypotheses			
	Fisher Hypothesis*	Tax-Effects Hypothesis†	Proxy Hypothesis†	Reverse Causality Hypothesis†
Argentina	Consistent	Inconsistent	Inconsistent	Consistent
Brazil	Inconsistent‡	Inconsistent	Inconsistent	Consistent
Chile	Inconsistent‡	Inconsistent	Consistent	Consistent
Colombia	Inconsistent‡	Inconsistent	Consistent	Inconsistent
Mexico	Consistent‡	Inconsistent	Inconsistent	Consistent
Peru	Inconsistent‡	Consistent	Inconsistent	Inconsistent
Venezuela	Inconsistent	Consistent	Inconsistent	Inconsistent
Germany	Inconsistent	Inconsistent	Inconsistent	Consistent
Canada	Inconsistent	Consistent	Inconsistent	Inconsistent
France	Inconsistent‡	Inconsistent	Inconsistent	Inconsistent
Italy	Inconsistent‡	Inconsistent	Consistent	Consistent
Japan	Inconsistent‡	Inconsistent	Consistent	Inconsistent
United Kingdom	Inconsistent	Inconsistent	Inconsistent	Consistent
United States	Inconsistent‡	Inconsistent	Inconsistent	Consistent
LA-7	Inconsistent‡	Inconsistent	Inconsistent	Consistent
G-7	Inconsistent	Inconsistent	Inconsistent	Consistent

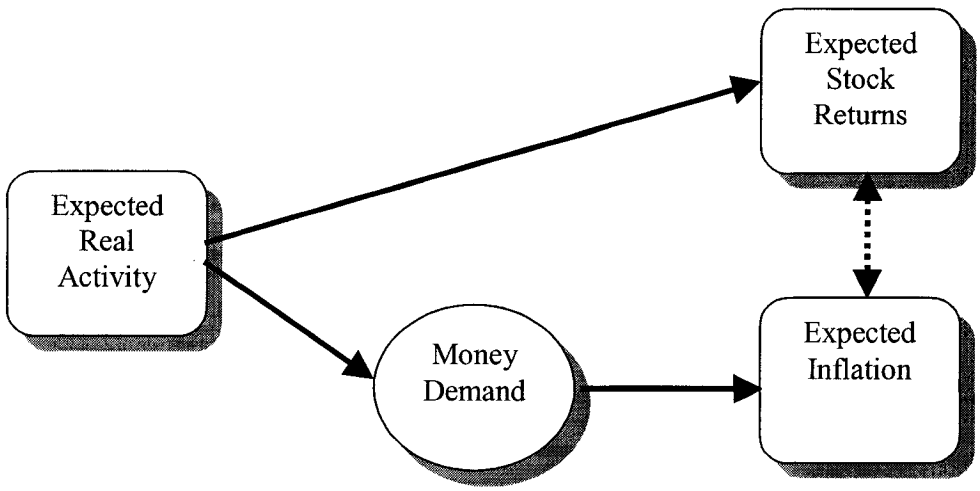
* Based on regression analysis; † Based on causality relationship; ‡ Although the signs of coefficients are in accordance to the statement, they are insignificant.

Figure 3.1. Hypotheses on Stock Returns-Inflation Relationship

Feldstein's Tax-Effects Hypothesis



Fama's Proxy Hypothesis



Geske-Roll's Reverse Causality Hypothesis

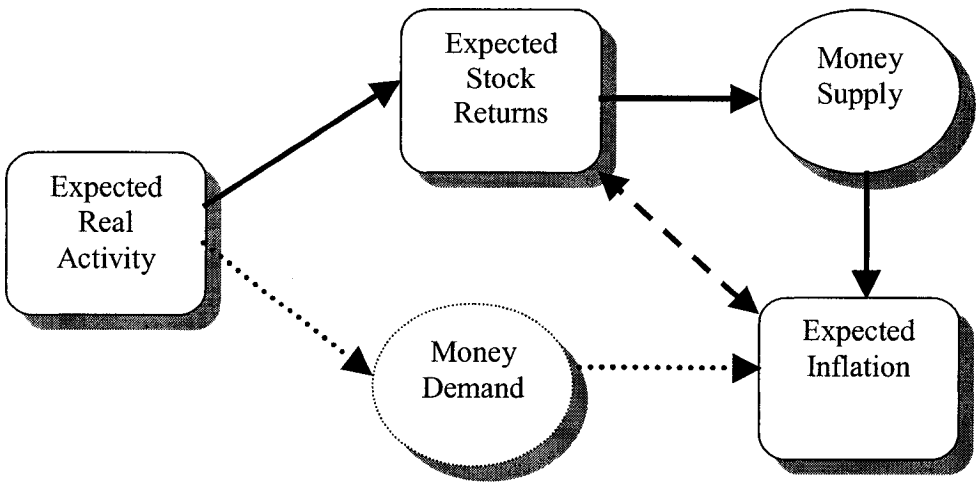


Figure 3.2. Generalized Impulse Response Functions

Panel A: Argentina

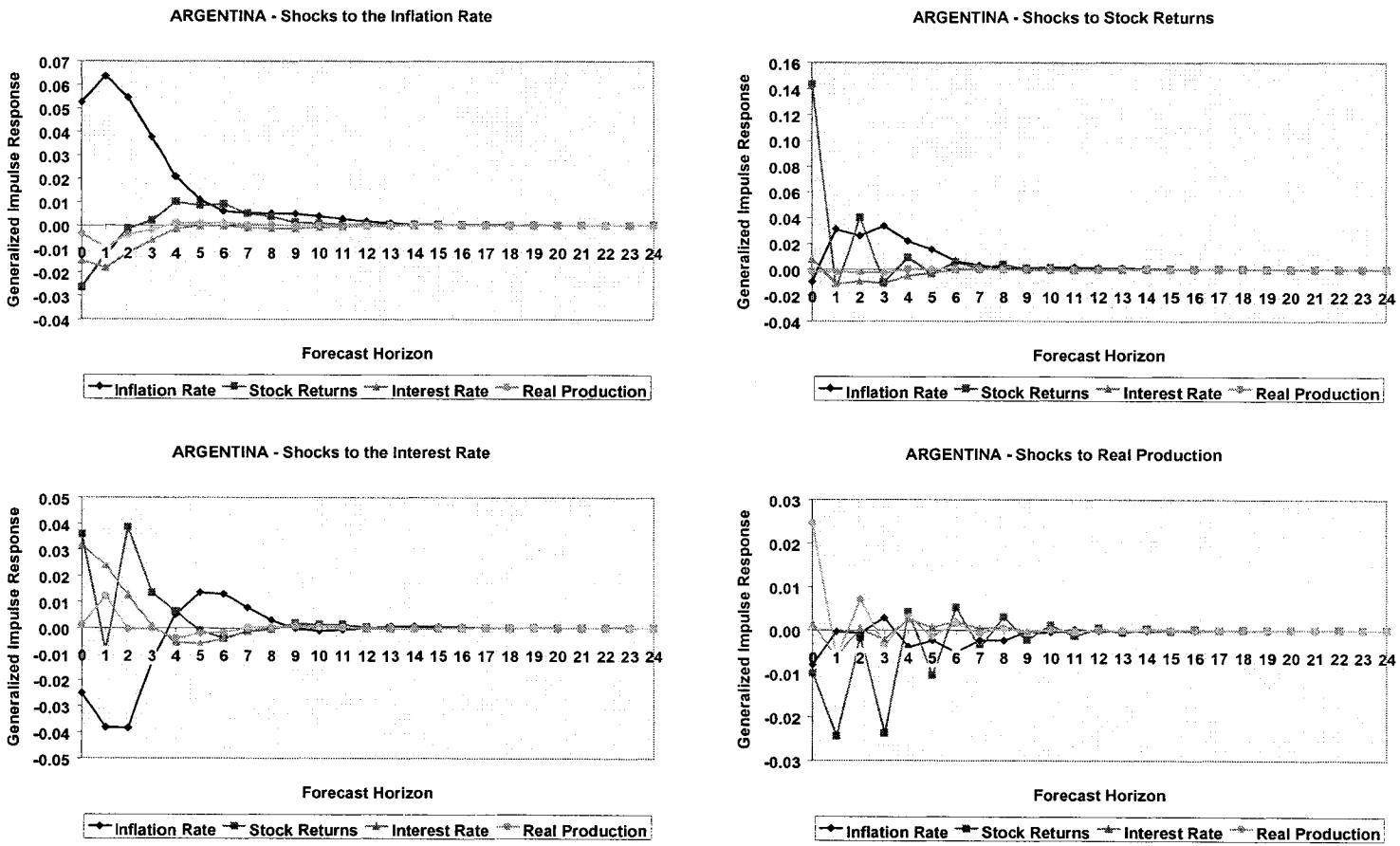


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel B: Brazil

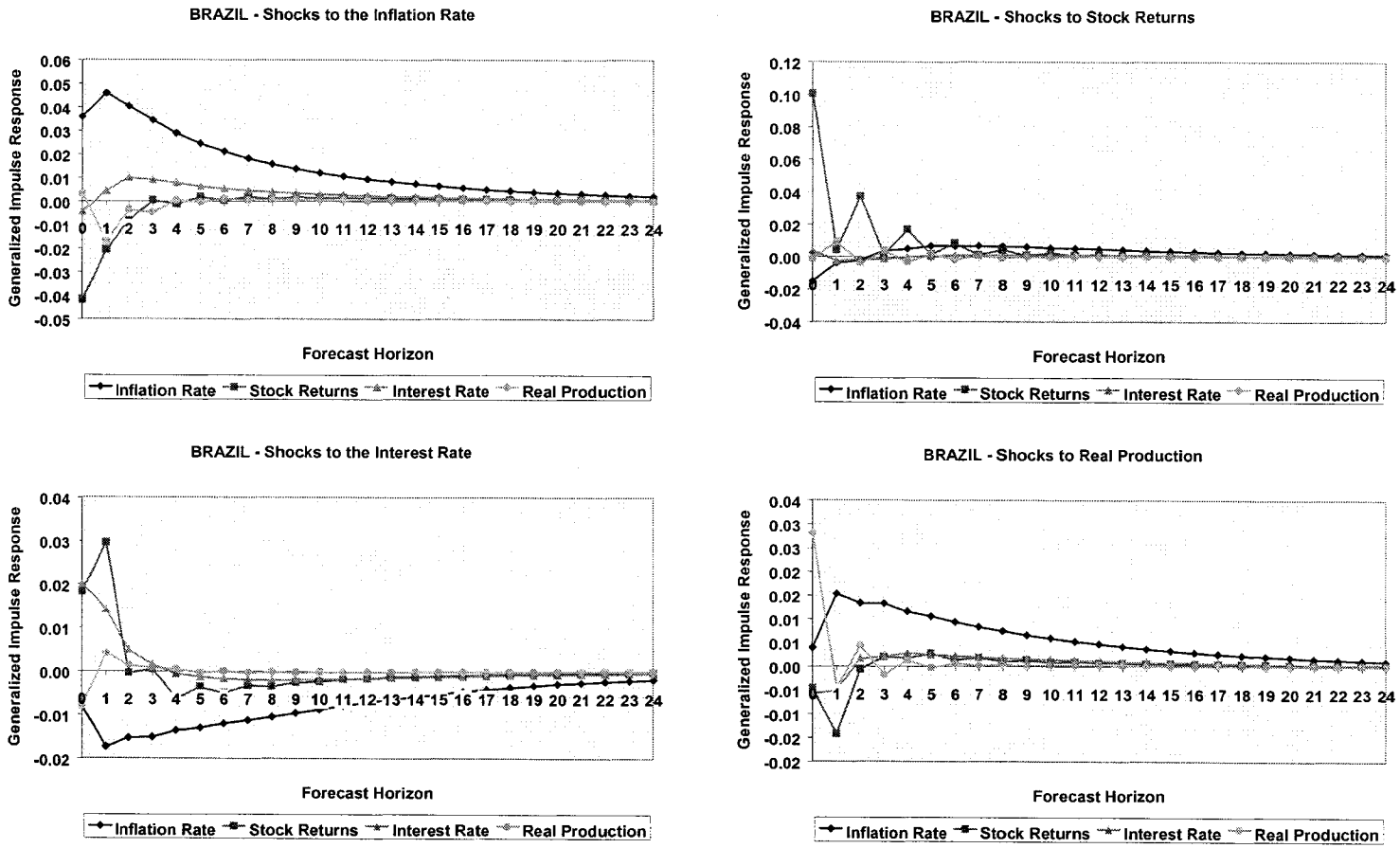


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel C: Chile

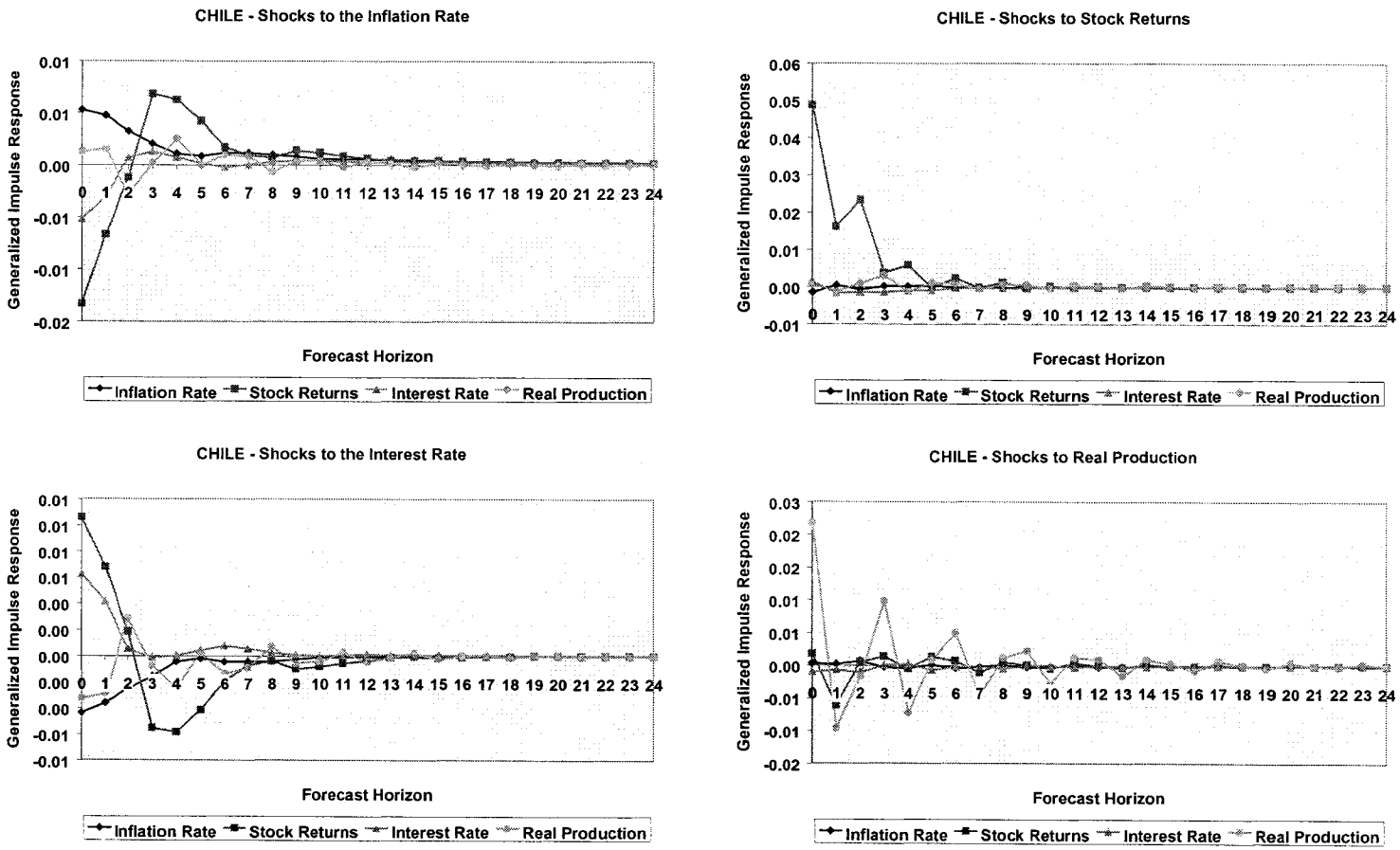


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel D: Colombia

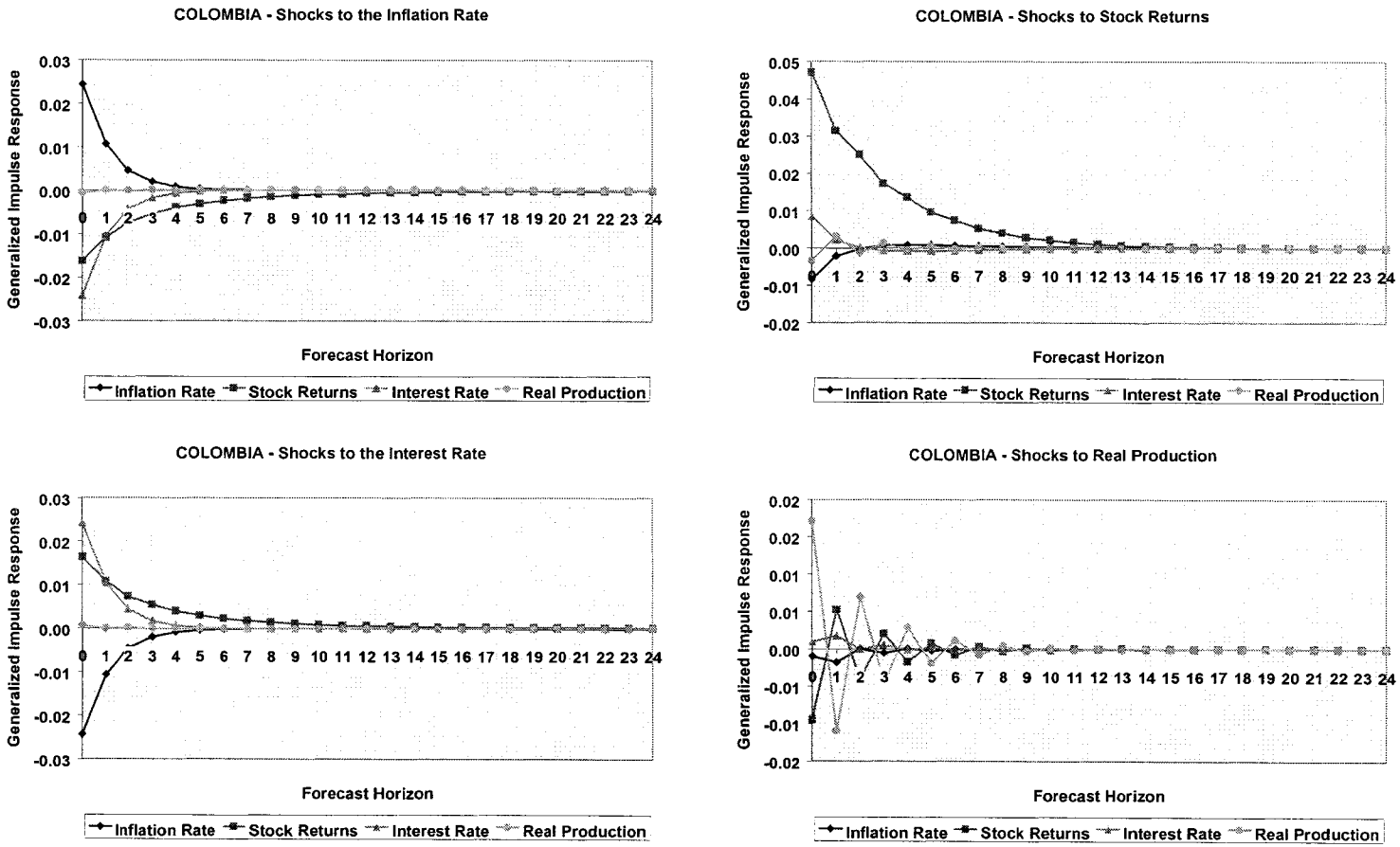


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel E: Mexico

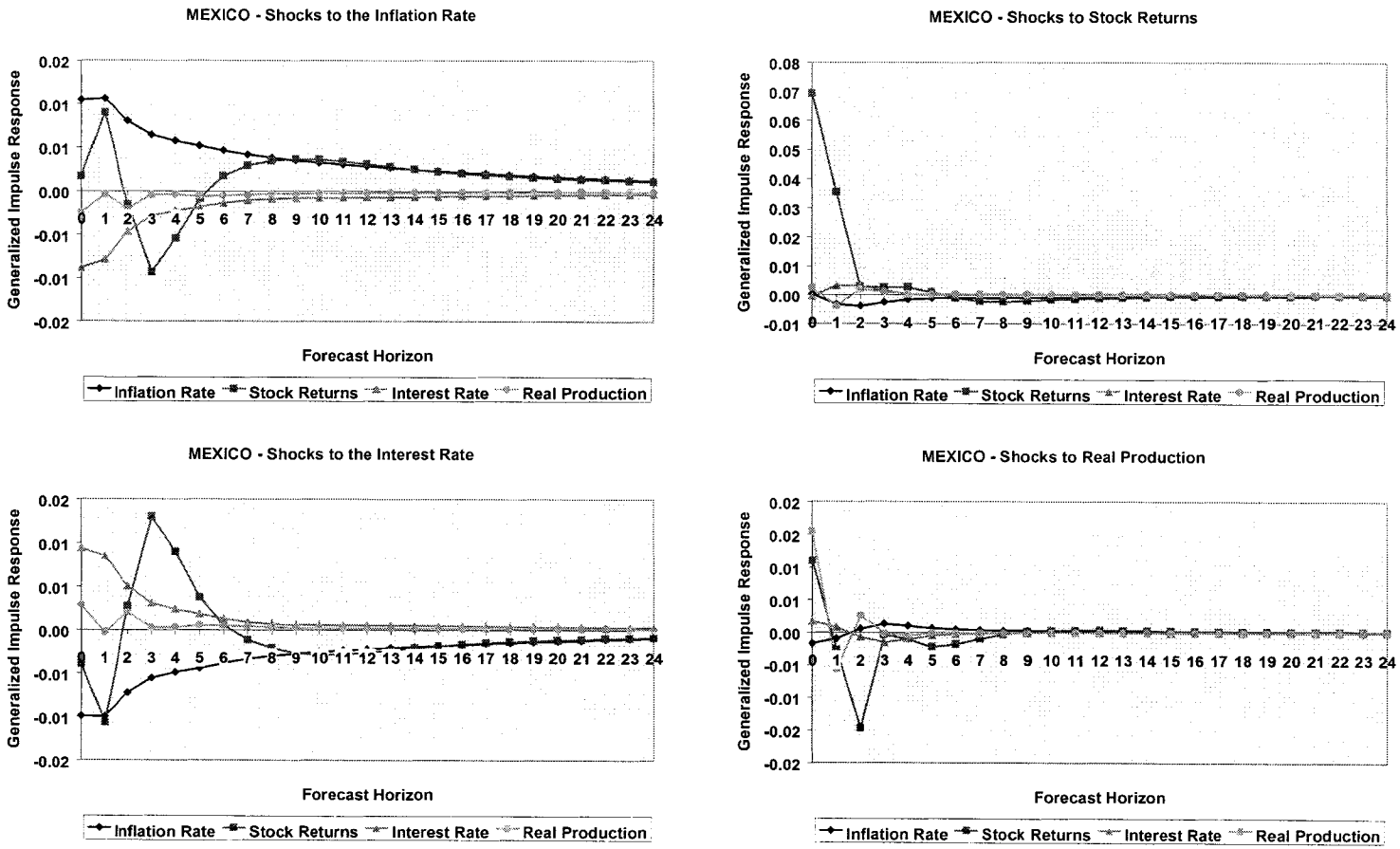
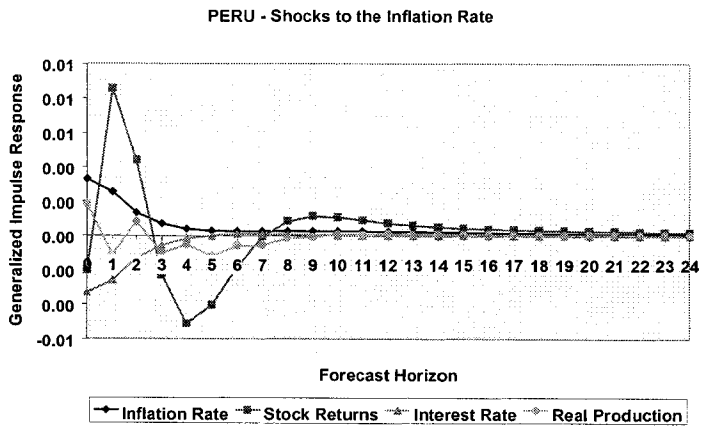
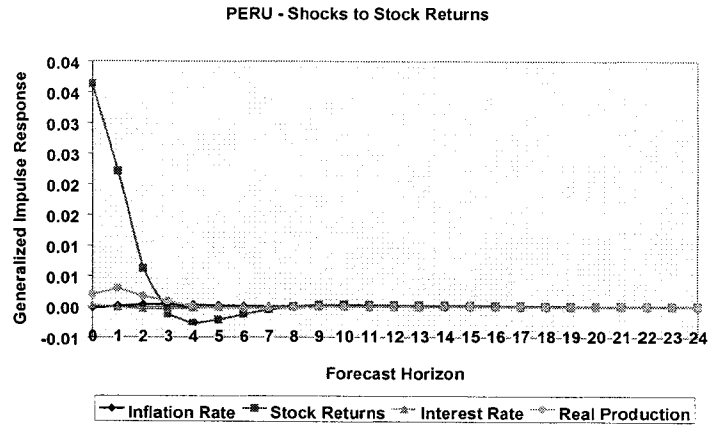
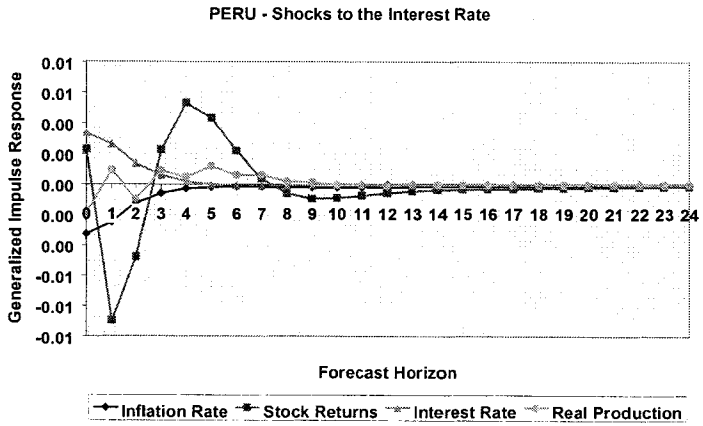


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel F: Peru







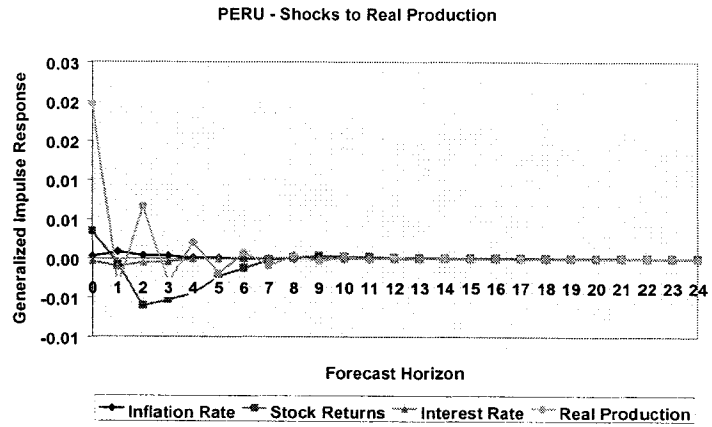
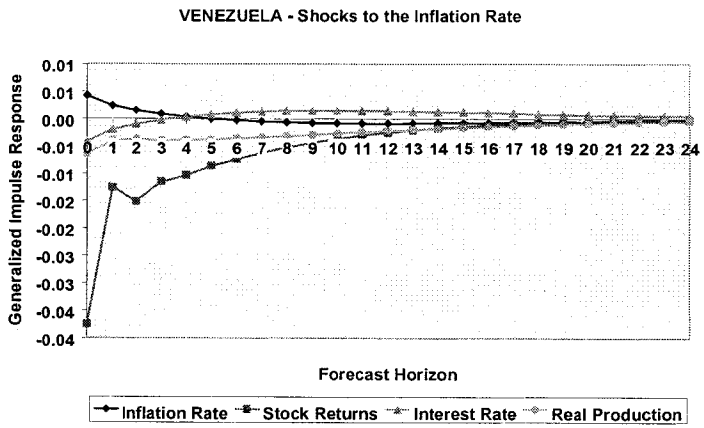
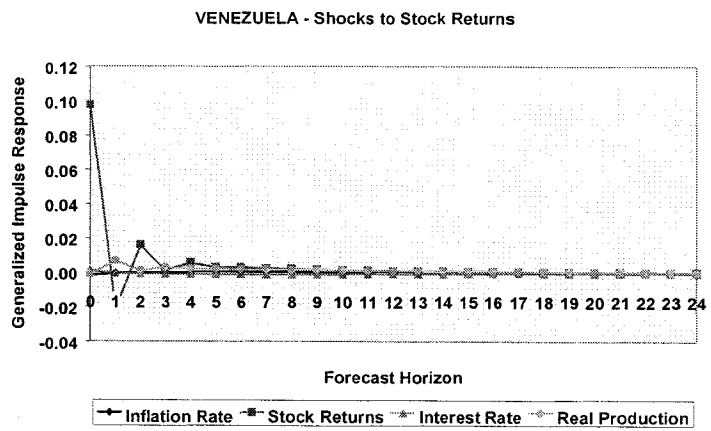
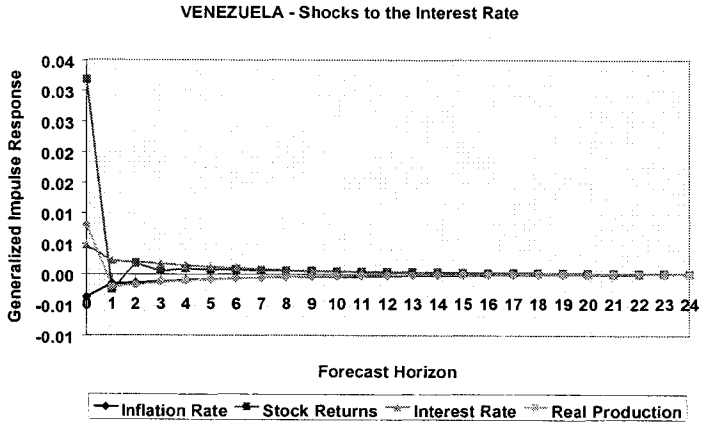


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel G: Venezuela







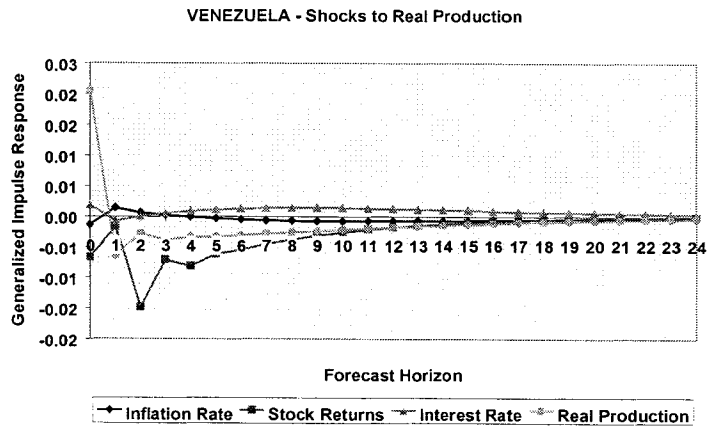
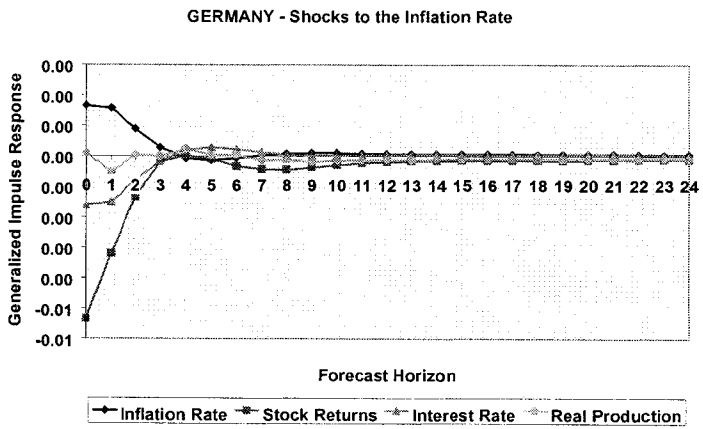
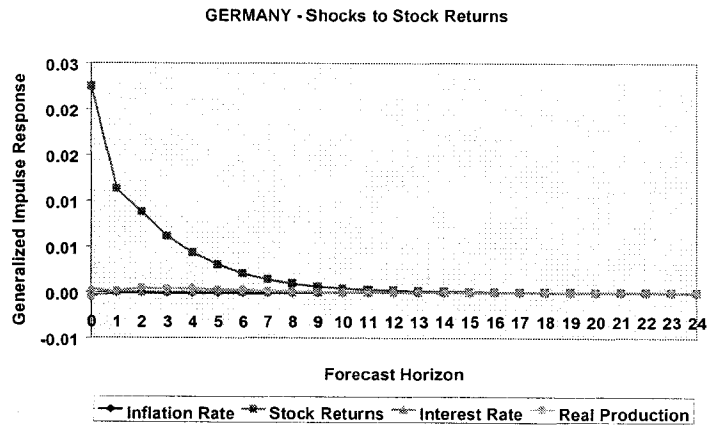
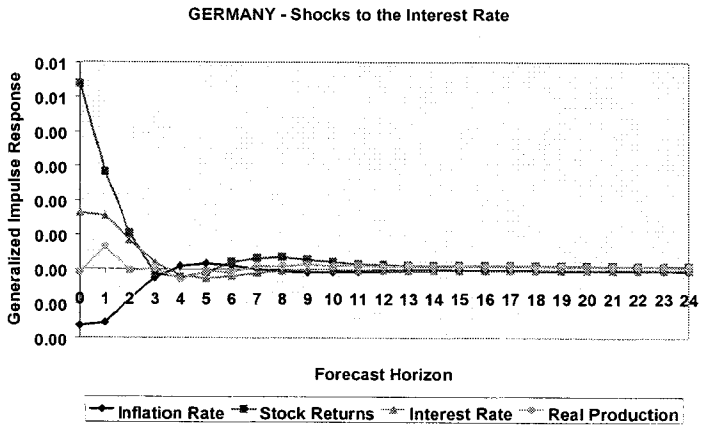


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel H: Germany







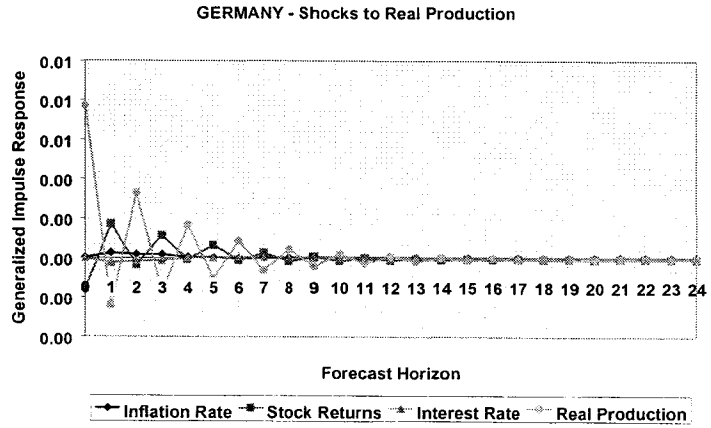


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel I: Canada

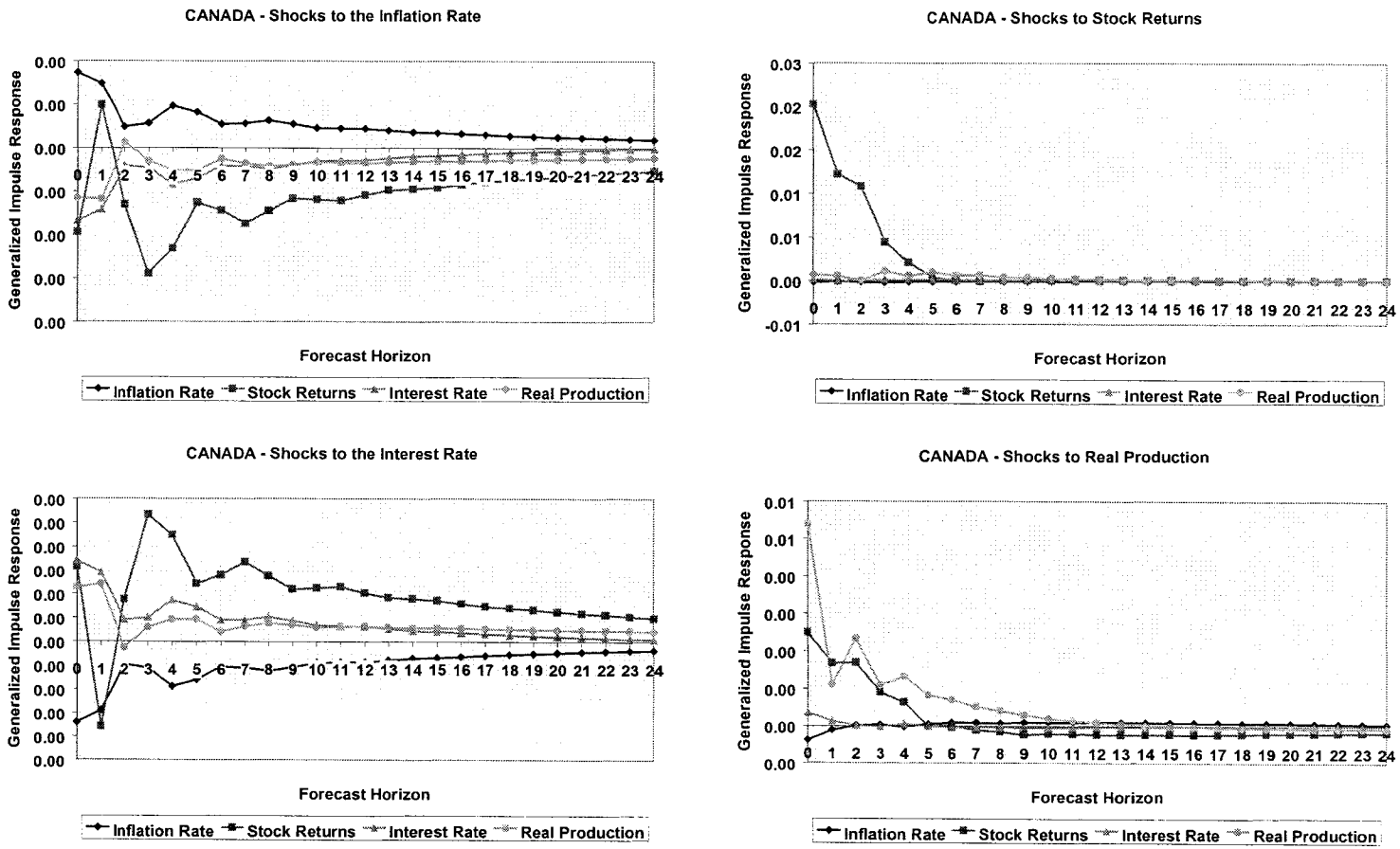
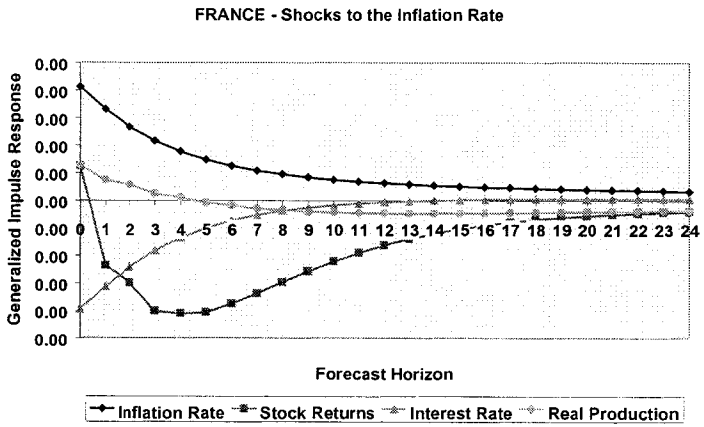
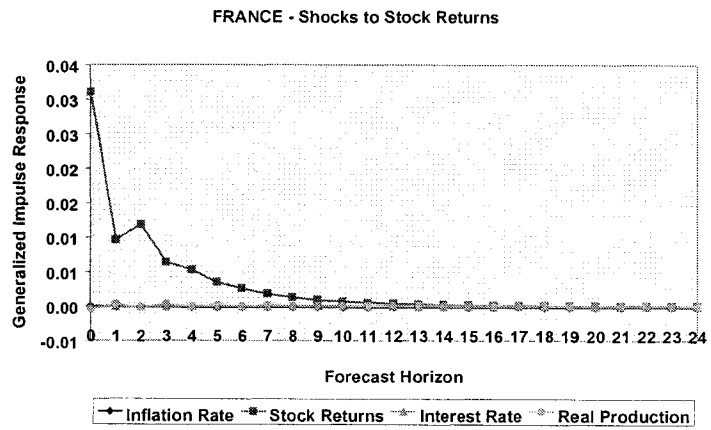
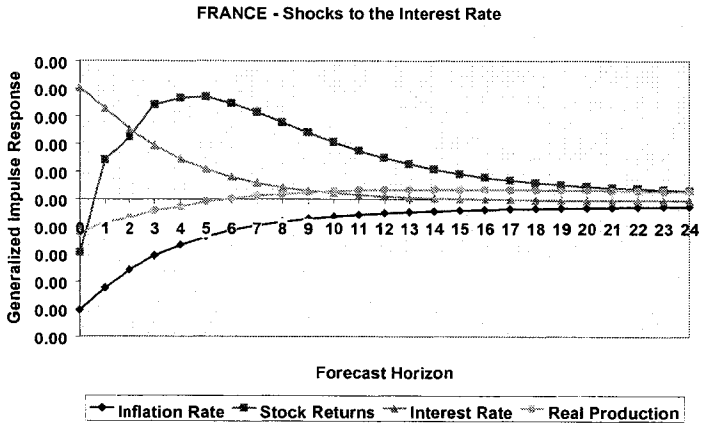


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel J: France







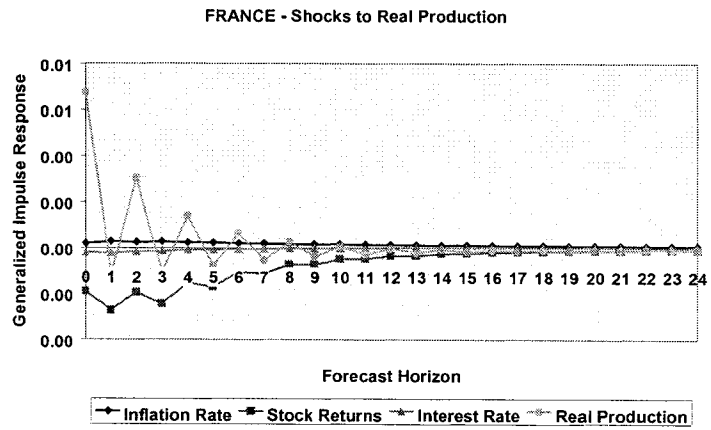


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel K: Italy

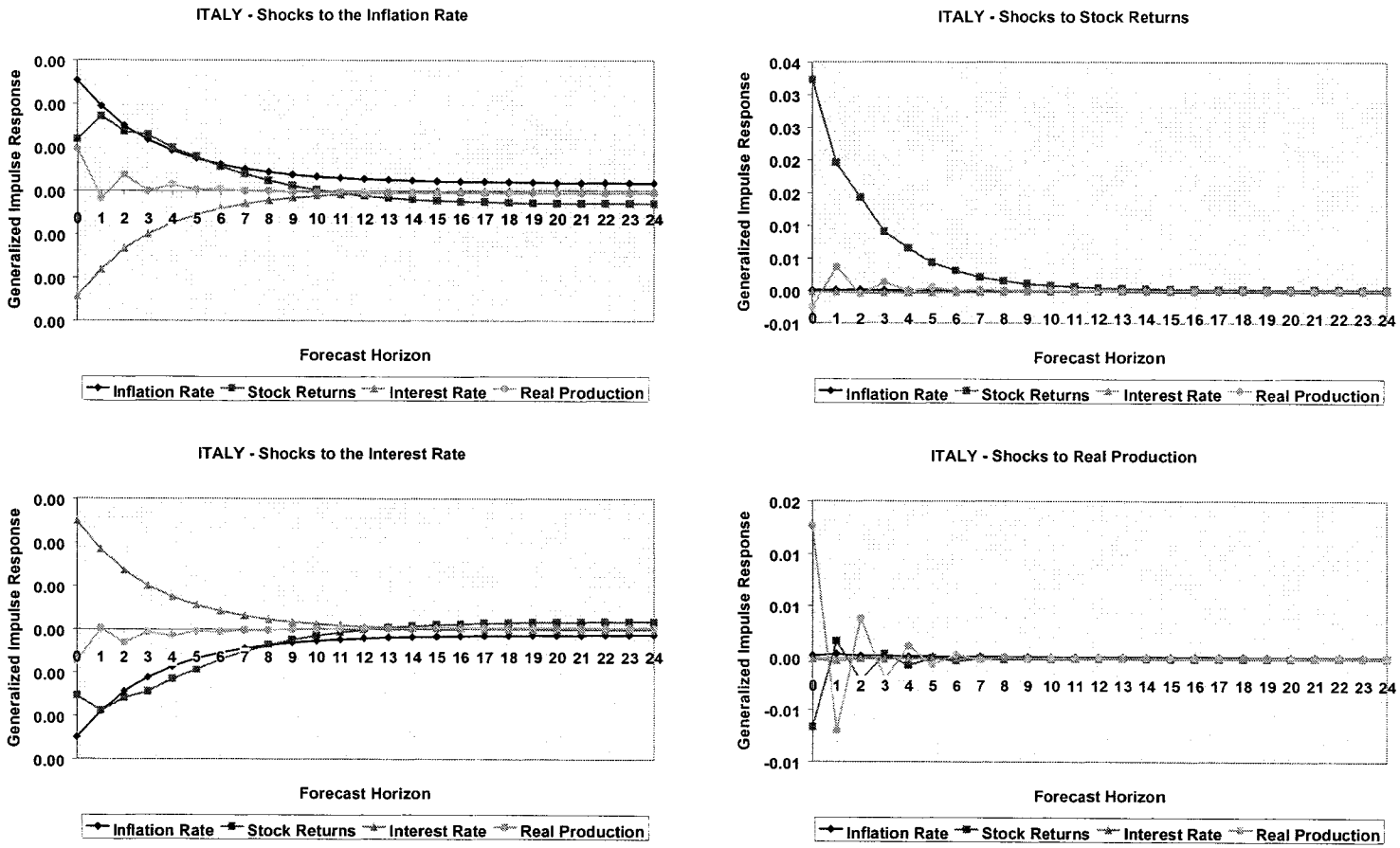
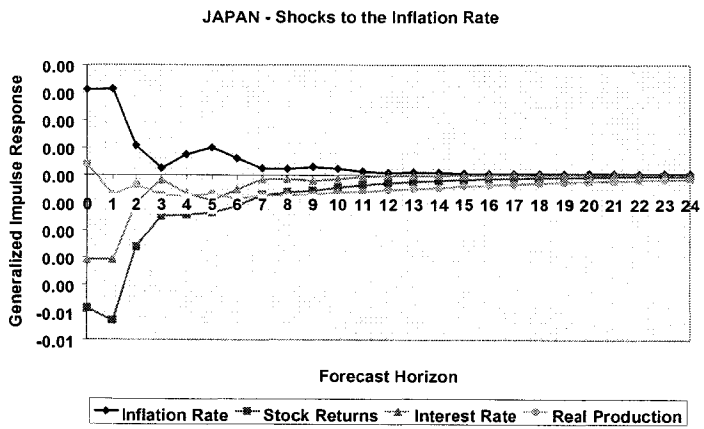
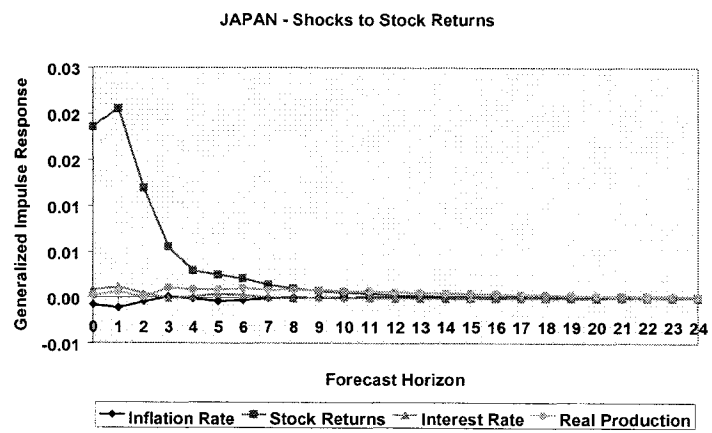
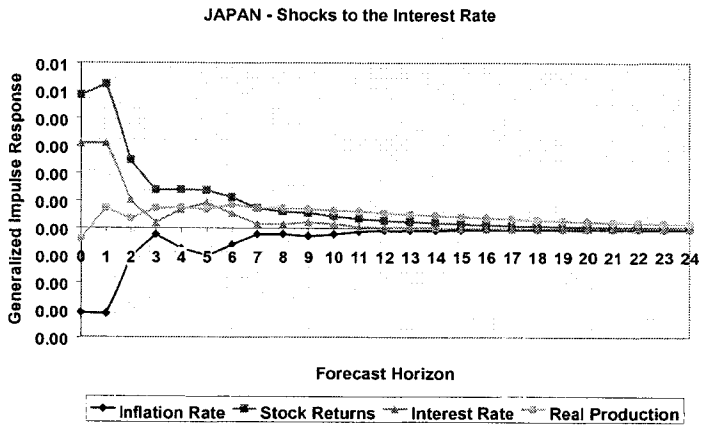


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel L: Japan







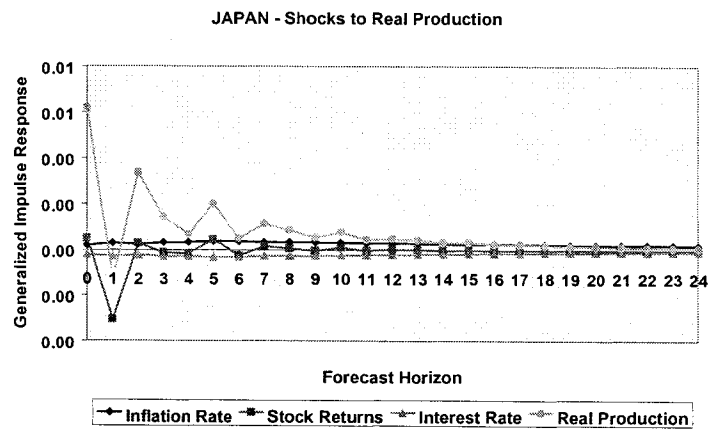


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel M: United Kingdom

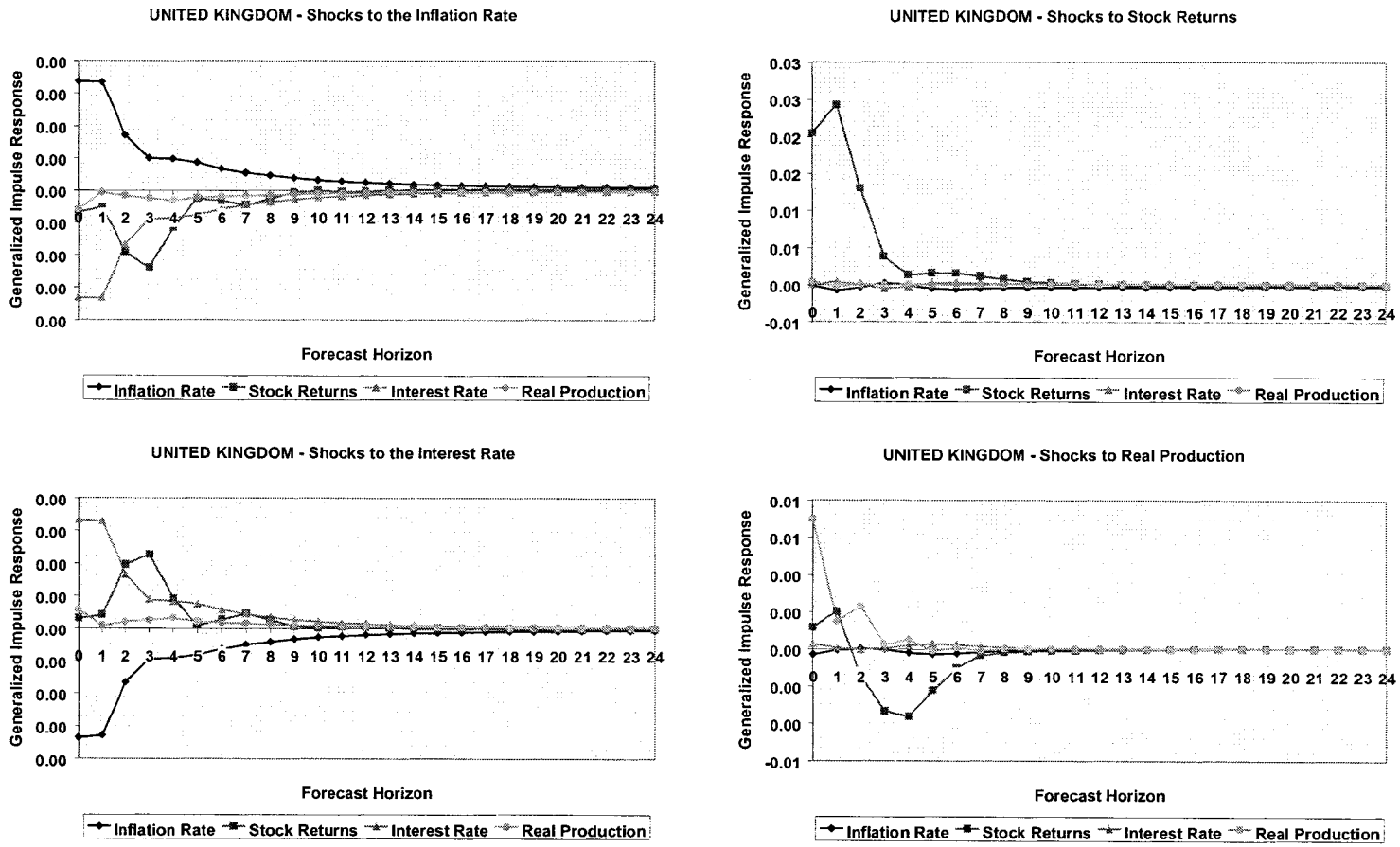


Figure 3.2. (continued) Generalized Impulse Response Functions

Panel N: United States

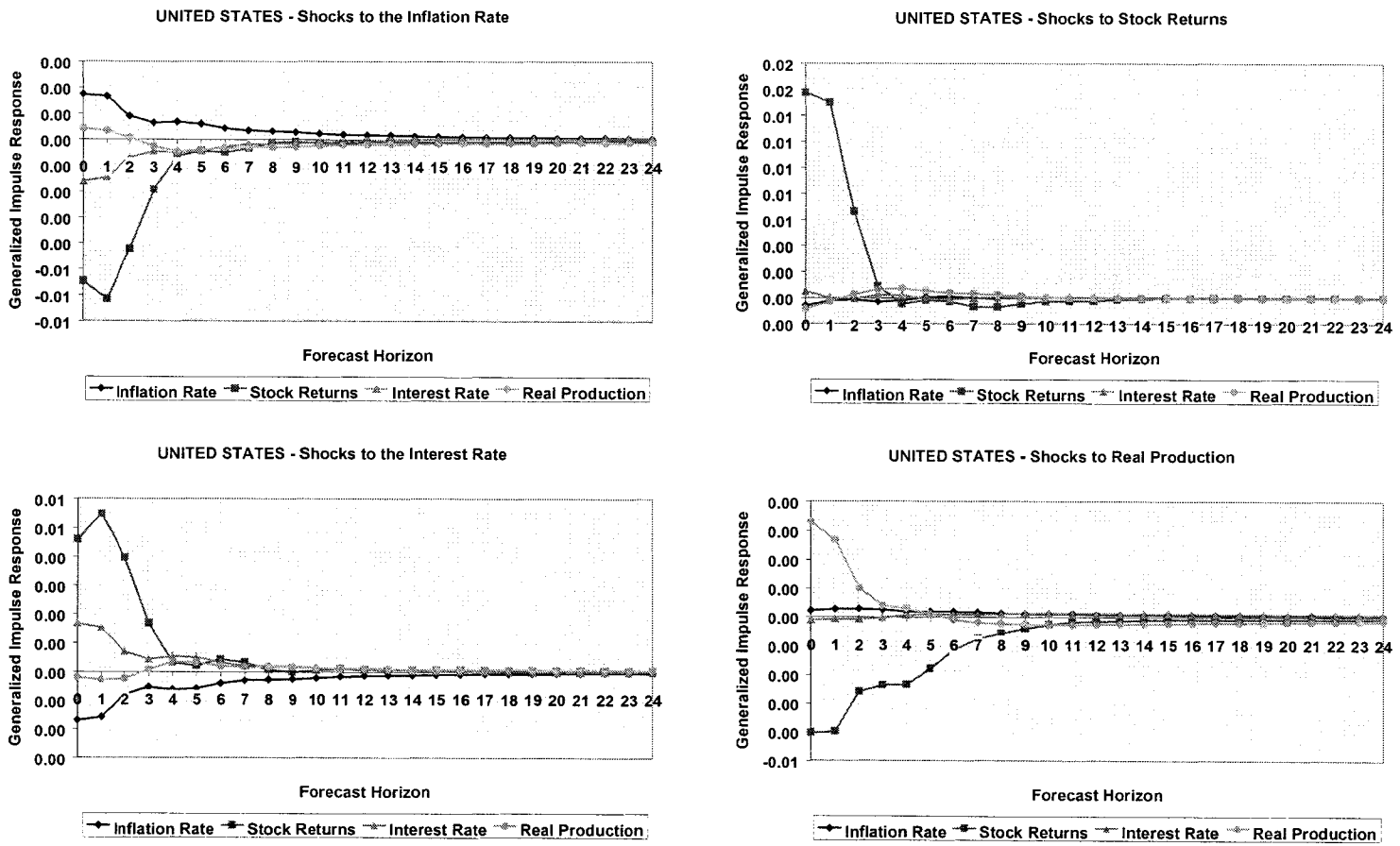
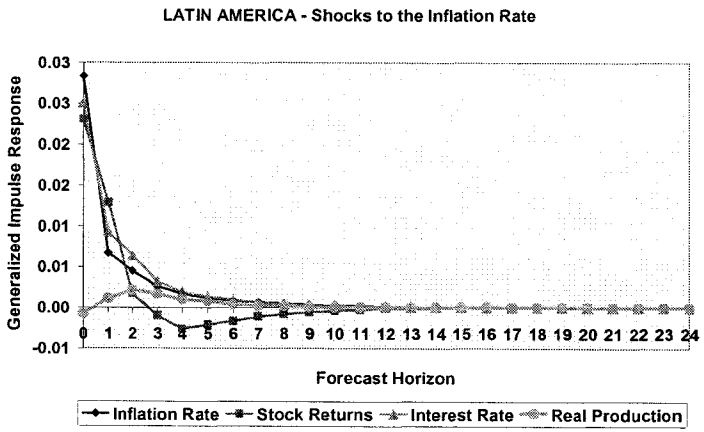
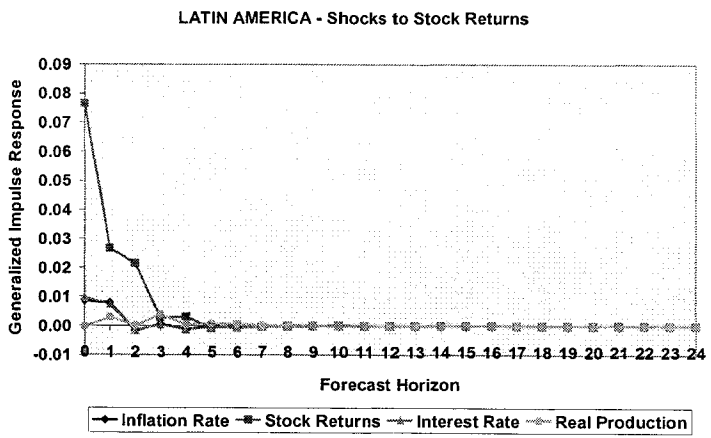
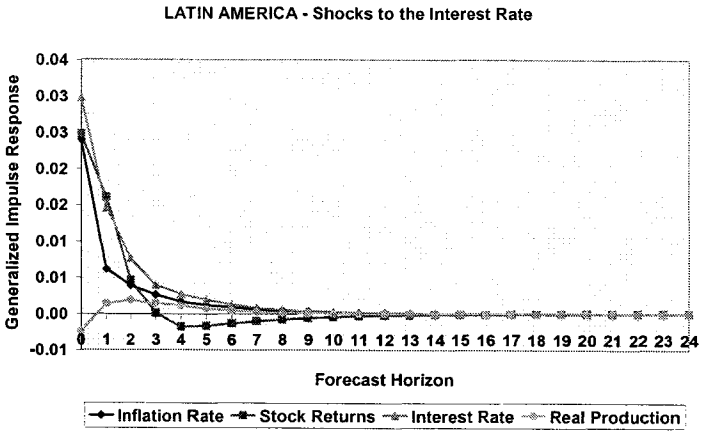


Figure 3.3. Generalized Impulse Response Functions

Panel A: Latin America







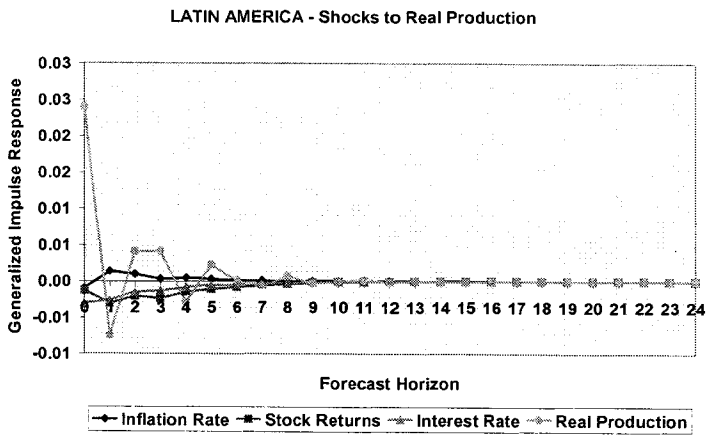
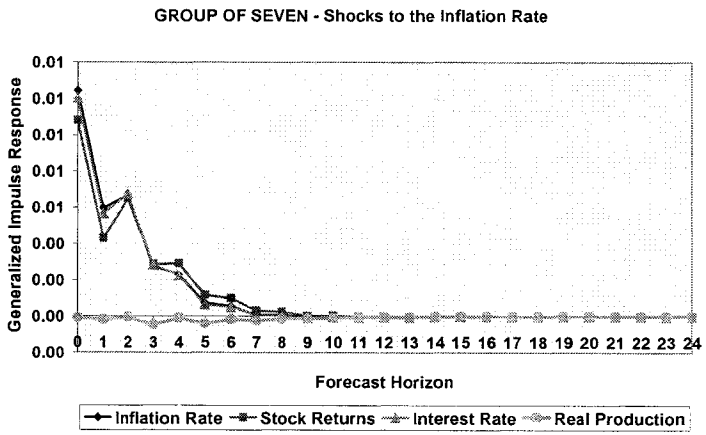
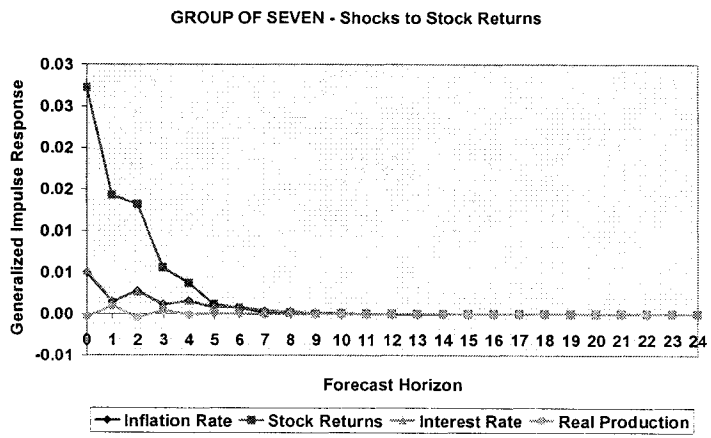
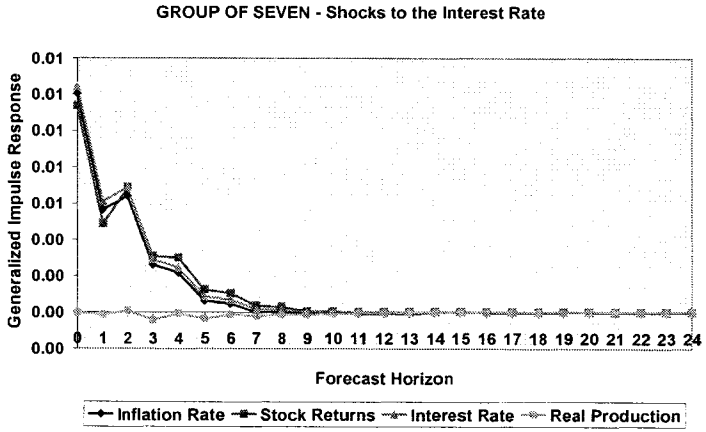


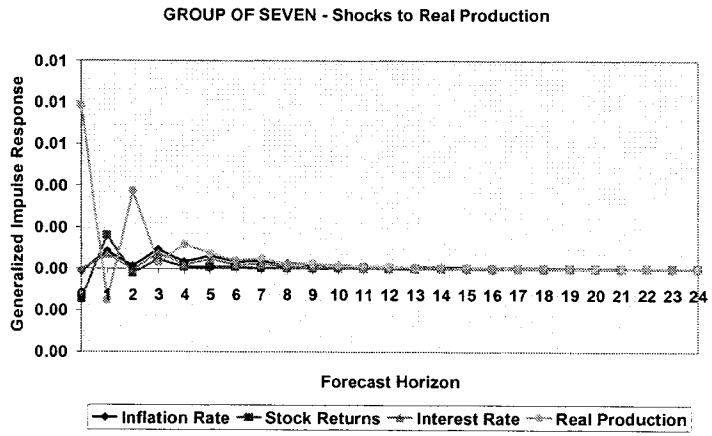
Figure 3.3. (continued) Generalized Impulse Response Functions

Panel B: Group of Seven









CHAPTER IV

4. Determinants of Capital Structure in Latin America

The previous chapter approached the interdependence between the macroeconomy and the financial sector taking the economy as the unit of analysis. In this chapter, I explore such interdependence and its implications for management at the corporate policy level, thus taking the firm as the unit of analysis.

4.1. Introduction[1]

Capital structure is perhaps one of the most prolific areas of research in corporate finance. Extensive research over the past 40 years has yielded little conclusive guidance for managers choosing between debt and equity in financing their firms.

Most empirical work so far has concentrated on developed countries, in particular the United States. In this essay, I investigate this subject for a set of countries of Latin America. These countries are particularly interesting because, besides being well-known examples of developing economies, they have gone through a variety of macroeconomic environments in a relatively short period of time. If the environment is somehow important for capital structure decisions, then it is likely that Latin American firms have experienced such effects.

Also, it is an opportunity to verify the applicability of some of the most popular theories of capital structure in a multi-country setting with a novel dataset. I start by briefly reviewing the literature and setting up the research question.

4.1.1. Literature Review

"*Given the level of total capital necessary to support a company's activities, is there a way of dividing up that capital into debt and equity that maximizes current firm value? And, if so, what are the critical factors in setting the leverage ratio for a given company?*" (Barclay and Smith Jr. [1999], p.8). The sentence above poses one of the most controversial problems in corporate finance: the existence of an optimal capital structure and its determinants. After more than forty years after the breakthrough work of Modigliani and Miller [1958] (henceforth MM), it is

surprising that a satisfactory answer to such question has not yet been provided. Here, I summarize the prolific theoretical and empirical literature in this field.[2]

In order to understand the many contributions to the question of an optimal capital structure, I classify the literature in two major groups: the Static-Tradeoff Hypotheses (henceforth STH)[3] and the Informational Asymmetry Hypotheses (henceforth IAH) and its variation, the Pecking Order Proposition (henceforth POP). Other authors have classified the literature rather differently,[4] but my classification is ample enough to encompass most theoretical work done so far, yet discriminating enough to point out the fundamental differences between each group of hypotheses.

The STH are based on the proposition that the optimal leverage ratio of the firm is determined by the tradeoff between current tax shield benefits of debt against higher bankruptcy costs implied by a higher degree of indebtedness. If the assumptions of zero taxes, a fixed interest rate, constant business risk, and the independence between bankruptcy likelihood and the degree of leverage – along with the traditional market efficiency hypothesis including symmetric information – are made, then the classical MM Proposition I follows: the irrelevance of the capital structure. As imperfections such as taxes, a variable interest rate, credit constraints, and bankruptcy costs are introduced in the model, the STH results (i.e. Modigliani and Miller [1963], Miller [1977]).

Determinant factors along the lines of the STH are fiscal advantages resulting from corporate and individual investor tax shields, tax loss carry-forwards, and the assessment of bankruptcy costs. DeAngelo and Masulis [1980] expand the Miller [1977] model by including substitute non-debt tax shields such as depreciation deductions and investment tax credits. Their model implies a unique optimum leverage structure in equilibrium. Other authors (i.e. Bradley, Jarrell, and Kim [1984], Titman and Wessels [1988]) relate fiscal advantages to the composition of the assets of the firm, arguing that the sign of the relationship depends on the proxies used to measure such advantages. Although the STH have been empirically addressed in a number of papers (Mackie-Mason [1990], Givoly

et al. [1992], Graham [1996]), a definite consensus on the importance of taxes in determining capital structure is yet to be reached. Marsh [1982] results are consistent with target debt ratios, which seem to be a function of firm size, bankruptcy risk, and asset composition.

Firm size, measured either by the volume of sales or by total assets, has also been a factor extensively analyzed. The evidence however has not been consistent. Some authors find a negative relationship (Gupta [1969], for instance), while others (Ferri and Jones [1979] and Titman and Wessels [1988], among others) find a positive relationship.

Beyond the factors referred above, business risk or volatility is also frequently referred to, when considering the hypothesis of a negative relationship between risk and the debt-equity ratio, due to the probability of bankruptcy.[5] Some early studies consider the industry type (i.e. the nature of the activity of the firm) as representative of business risk (Schwartz and Aronson [1967], Scott Jr. [1972], and Ferri and Jones [1979]).[6] Research analyzing the effect of business risk (measured as the volatility of income) on capital structure generally finds an inverse relationship, since larger risk implies smaller capacity to face fixed commitments, specifically the costs of debt (Toy et al. [1974], Ferri and Jones [1979], Bradley, Jarrell, and Kim [1984], Titman and Wessels [1988], and Thies and Klock [1992]). Thies and Klock [1992] observe that the variability of operational income is negatively related to the debt-equity ratio in the long-run, being positively related to it in the short run.

The IAH encompasses all those explanations that are based on imperfect information assumptions. That indeed is a very large branch of the literature on its own. The seminal papers in this literature are Myers [1977] and Myers and Majluf [1984]. Myers [1977] argues that the value of the firm depends on its assets in place (whose value does not depend on future investment) as well as on growth opportunities (whose value depends on future investment strategy). The implication is that this real option characteristic of the firm induces a transfer of wealth between shareholders and bondholders that may prevent the firm from

undertaking positive NPV projects (the debt overhang – or underinvestment – problem). Myers and Majluf [1984] realize that managers have privileged information regarding both tangible (assets in place) and intangible (growth opportunities) assets and that investors are aware of this fact. In light of such imperfect information there may be wealth transfers between old and new shareholders when the firm decides to issue new securities. This information asymmetry affects the firm's financing-investment decision in a way that causes managers to pass up valuable investment opportunities in order to preserve (old) shareholders' interests: the underinvestment problem.

Other streams of literature have also explored the basic information asymmetry set up in their research of the capital structure problem. Jensen and Meckling [1976] and Jensen [1986] suggest the agency theory framework to study the optimal leverage ratio. In their perspective, too little debt can lead to an overinvestment problem, as managers seek to sustain growth at the expense of profitability. This literature topic is also known as the "free cash flows problem". Empirical evidence is as yet inconclusive. Berger, Ofek, and Yermack [1997] find support for the free cash flow proposition, while Graham [1996] refutes it.

Many theoretical and empirical studies propose that the composition of the assets of the firm determines the choice of its capital structure. The idea usually accepted is that firms with more tangible assets that can be used as collateral (i. e., with larger collateral value, as identified by the market) would or could issue more debt (Titman and Wessels [1988], Thies and Klock [1992], Rajan and Zingales [1995]). That is so because the tangibility of assets is a way to reduce the information asymmetry between insider managers and outsider bondholders. If tangible assets are more easily appraised by the market and intangible ones have a specific value essentially for the firm (Bradley, Jarrell, and Kim [1984] and Titman and Wessels [1988]), then there is a positive relationship between the degree of tangibility of assets and the degree of indebtedness of the firm. In this context, Jensen and Meckling [1976] and Myers [1977] argue that if it is not possible for the firm to offer collateral for debt, then creditors would make stricter demands, which would probably have consequences on the firm's cost of debt,

leading it to prefer equity financing instead. Agency theory approaches find support in several empirical works (Friend and Lang [1988], Jensen, Solberg, and Zorn [1992], Bagnani et al. [1994], Jung, Yong-Cheol, and Stultz [1996]). Bradley, Jarrell, and Kim [1984] find that there are strong industry effects across leverage ratios, and that volatility and tangibility seem to be major economic sources of such effect.

Some empirical support has been found for the IAH in its many formulations. For instance, Bradley, Jarrell, and Kim [1984] find that leverage ratios are positively – rather than negatively – related to non-debt tax shields. Similarly, Fama and French [1998] cannot find evidence for a tax-related effect along the lines of traditional theory once profitability is controlled for. The authors interpret such result as an indication in favor of signaling effects. Titman and Wessels [1988] find that debt levels are negatively related to the "uniqueness" (i.e. the capacity to impose costs on their customers, workers, and suppliers in the event of bankruptcy) of a firm's line of business. Also, their results indicate that transaction costs are important determinants of capital structure. They do not find enough support for an effect arising from non-debt tax shields, volatility, collateral value, or growth opportunities.

Myers [1984] proposed that, as a result of information costs, managers would prefer to finance corporate investment by first tapping the less (agency) costly sources. That means that corporate investment should be financed in order by retained earnings, then by debt, and finally – only as a last resort – by equity issues. This variant of the IAH family is known as the Pecking Order Proposition (henceforth POP). In this framework, Thies and Klock [1992] associate the relationship between growth and the debt-equity ratio of the firm.

The POP also has found some support in the recent empirical literature, such as Graham [1996] and Shyam-Sunder and Myers [1999]. In particular, Shyam-Sunder and Myers [1999] test traditional capital structure models against an alternative pecking order model and find that the latter has much greater time-series explanatory power.

The predictions of the various theories of capital structure can be summarized (in a simplified way) as follows:

Dimension of Interest	Predicted Effect on Corporate Leverage According to Each Branch of Theory		
	Static Tradeoff Hypotheses	*Informational Asymmetry Hypotheses*	*Pecking Order Proposition*
Tangibility	Positive	Positive	Positive
Profitability	Positive	Positive	Negative
Size	Positive	Negative	Negative
Growth Options	Negative	Negative	Positive
Tax Rate	Positive	Undetermined[7]	Undetermined
Business Risk	Negative	Negative	Negative

From the above, it is clear that only three factors have capability to discriminate among the theories: profitability, size, and growth options.[8] It is useful, then, to elaborate further on these.

For the STH, higher profitability implies a larger absolute tax burden,[9] which in turn increases the tax advantage of debt. For the IAH, more profitable firms have less binding debt overhang restrictions, and thus they can be more leveraged. For the POP though, higher profitability implies a higher level of internally generated resources available for investments – the "cheapest" source of funds in terms of agency costs – and therefore a lower requirement for external financing capital.

Regarding the firm size, there is evidence that bigger firms have proportionally smaller bankruptcy costs (Warner [1977]). These firms' values therefore deteriorate relatively less in the event of bankruptcy, which is a positive incentive for debt in the STH. Agency approaches of the IAH, on the other hand, consider that management of larger, more established firms may have an incentive for overinvestment, which is accomplished by using the free cash flows of the firm in inefficient projects instead of distributing it to shareholders through dividends or leveraged stock repurchases.[10] This argument works similarly in the context of the POP, except that investment is not necessarily inefficient, but preferably financed with the cheapest source of funds in terms of agency costs.

Finally for growth options, according to the STH, bankruptcy costs (including value destruction) are expected to be larger for firms with substantial growth options, thus these firms should choose to have less debt. The IAH suggest that the higher the growth options of a firm, more likely the firm is going to be financed with equity rather than debt, because for such firms the underinvestment problem is likely to be significant. In contrast, the POP implies that firms with more investment opportunities but lower operating cash flows (growth firms) should have higher debt ratios.

In terms of international evidence on capital structure, Wald [1999] examines capital structure in the United States, Germany, France, and the United Kingdom and finds that differences in tax policies and agency problems (bankruptcy costs, information asymmetries, and shareholder/creditor conflicts) explain differences across countries. The study suggests links between capital structure decisions and legal and institutional differences. Demirgüç-Kunt and Maksimovic [1999] examine firm debt maturity in 30 countries during the period 1980-1991. They find that large firms in countries with active markets have more long-term debt, while small firms in countries with large banking sectors tend to have longer maturity debt.

Finally, Booth et al. [1999] find evidence that debt ratios in developing countries are affected in the same way and by the same types of variables that are significant in industrial countries. However, there are systematic differences in the way these ratios are affected by country-specific factors. Also, knowing the country-of-origin is more important than knowing the size of all the independent variables.[11]

In their study, Booth et al. [1999] suggest that the importance of the country-specific effects in explaining leverage choices of firms across the world is due to institutional arrangements specific to each country, such as the structure of the financial sector, the tradition of the legal system, and accepted accounting practices. However, the literature on financial contagion raises the hypothesis that macroeconomic similarities may indeed be a determinant factor leading investors

to consider countries as similar financial risks.[12] Similarly, it is possible that similar macroeconomic environments may also lead firms to adopt similar leverage ratios. Hodder and Senbet [1990], for instance, have presented theoretical arguments for the capital structure choice in a multi-country world with differences in taxation and inflation. Thus, it is important to verify in what extent the macroeconomic environment determines firms' capital structures.

4.1.2. Purpose and Overview of the Essay

In this essay, I investigate the determinants of corporate leverage in a sample of emerging markets from Latin America. I do so by applying panel data techniques to a sample of over 700 firms from Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela in the period 1986-2000. For comparison purposes, results are also reported for a small sample of firms from the United States. Here, I focus on determining if country-specific factors are indeed relevant in the leverage decision, and if so, whether these effects can be accounted for by the macroeconomic environment or by other institutional factors.

This essay aims at contributing to the existing body of knowledge in the following ways: first, by testing traditional theories of capital structure in a multi-country framework; second, by doing so in a sample of emerging markets using a novel database; third, by employing empirical techniques that account properly for cross-section and time series variation; and finally, by assessing the effect of country-specific and macroeconomic factors on a firm's capital structure.

My main findings are that traditional firm-specific factors of capital structure explain a great deal of the variation in a firm's leverage ratio, and contrary to some previous multi-country studies, country-specific factors – whether institutional or macroeconomic – although significant explain only a small part of the story. I also find some support for the Pecking Order Proposition.

The remainder of the essay is structured as follows: next section details the methodology, presents the data sources, and describes the variables used in the empirical model. Section 4.3 reports and comments the estimation results. Concluding remarks in section 4.4 close the essay.

4.2. Methodology, Variables, and Data

4.2.1. Basic Econometrics of Panel Data Analysis[13]

Panel data analysis presents several advantages for the treatment of economic problems where cross-sectional variation and dynamic effects are relevant. Hsiao [1986] raises three advantages possessed by panel data sets: since they provide a larger number of data points, they allow an increase in the degrees of freedom and reduce the collinearity among explanatory variables; they allow the investigation of problems that cannot be solely addressed by either cross-section or time series data sets; and they provide a means of reducing the missing variable problem.

In principle, classic time series methods can be applied to panels simply by "pooling" all cross-section and time series observations together. Indeed, this approach is often used. In such case, the classical model is employed, that is:

$$Y_{it} = \beta_0 U + \beta_1 X_{it} + \varepsilon_{it} \qquad \text{[Eq. 4.1]}$$

Where Y_t and X_t are respectively the $(1 \times NT)$ stacked vector and $(K \times NT)$ stacked matrix of dependent and independent variables for the i^{th} individual in the t^{th} period, U is the $(1 \times NT)$ unity vector, β_0 and β_1 are respectively the (1×1) and $(K \times K)$ matrix of coefficients, and ε_{it} is the $(1 \times NT)$ stacked vector of disturbances. However, as Hsiao [1986] points out, coefficients estimated with this approach may be subject to a variety of biases arising from cross-sectional heterogeneity of both slopes and intercepts.

Moreover, in a typical panel, there are a large number of cross-sectional units and only a few periods – also referred to as a "longitudinal" data set. This is the type of panel that is examined in this essay, where there are a relatively large number of firms from different countries observed over little more than a dozen years. In such case, the econometric techniques should focus more on cross-sectional variation (heterogeneity) instead of time variation.

A common assumption is that differences across units can be captured in differences in the regression's intercept – the fixed-effects model. Now let Y_{it} and X_{it} respectively be the $(N \times T)$ and $(N \times KT)$ matrices of dependent and

independent variables for the i^{th} individual in the t^{th} period, let D be the $(N \times N)$ matrix of dummy variables,[14] β_0 and β_1 are respectively the $(1 \times N)$ vector and $(K \times K)$ matrix of coefficients, and let ε_{it} be the $(N \times T)$ matrix of disturbances. The fixed-effects model is given by:

$$Y_{it} = \beta_0 D + \beta_1 X_{it} + \varepsilon_{it} \qquad \text{[Eq. 4.2]}$$

This is usually referred to as the least squares dummy variable (LSDV) model (Greene [1993]). This is a classical regression model that can be estimated by OLS. The hypothesis that the intercepts are all equal – a simple way to test the simple pooling versus the fixed-effects formulations – can be tested with a straightforward F-test:

$$F_{(N-1,NT-N-K)} = \frac{(R_u^2 - R_r^2) \times (NT - N - K)}{(1 - R_u^2) \times (N - 1)} \qquad \text{[Eq. 4.3]}$$

This model is a reasonable approach when the differences between units can be viewed as parametric shifts of the regression function. In other settings, it might be appropriate to view individual specific intercept terms as a random variable. Such is the case of the random-effects model:

$$Y_{it} = \beta_0 U + \beta_1 X_{it} + u_{it} + \varepsilon_{it} \qquad \text{[Eq. 4.4]}$$

The component u_{it} is the random disturbance characterizing the i^{th} observation. The choice between fixed- and random-effects models involves a tradeoff between the degrees of freedom lost to the dummy variable approach in the fixed-effects model and the treatment of individual effects as uncorrelated with other regressors as is the case with the random-effects formulation. Testing the orthogonality of the random effects and the regressors is thus important. The usual procedure is to use the Hausman test statistic for the difference between the fixed-effects and random-effects estimates, as suggested by Hsiao [1986].

Estimation of Panel Data models can be done by OLS in the case of simple pooling and fixed-effects formulations and by GLS for the random-effects one (Hall and Cummins [1997]).

The main advantage of such methodology in the investigation of the problem proposed in this essay is that observations of firms from different countries can be pooled together in order to increase the degrees of freedom. Moreover, the methodology allows the testing between the simple pooling and the fixed- or random-effects that are present in the data. Also, by pooling together countries (besides firms) I can infer to what extent the relationships among the variables hold across different countries and determine if country-specific factors help explain the variation observed by other authors.

Pooling of firms together, on the other hand, assumes that parameters (slopes and intercepts) are constant across firms. This is, of course, a very strong assumption and subject to potential biases (Hsiao [1986]). Pooling of firms from different countries together, as done in the last part of this essay, does not make this problem any easier. The fixed- and random-effects models help controlling for the intercept bias, but still there may be present slope biases. That would be the case if the effects of a given independent variable are different for different kinds of firms, for instance small and large firms. The addition of firm-specific variables (such as firm size) helps controlling for these possible biases. Nevertheless this remains a limitation of this research.

4.2.2. Data and Variables

Countries that are the object of this study are Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. Observations are yearly in the period 1986-2000 (subject to availability) and the unit of research is each firm. In total, 707 public firms from Latin America are included in this study, of which 293 (41.4%) are Brazilian-based. For comparison, some results are also reported for a small sample of 132 firms from the United States, drawn from the same dataset. An overview of the number of firms available in the database by country and industry sector is shown in Table 4.1.

In this study I exclude financial firms such as banks, financial groups, holding companies, investment corporations, insurance companies, private pension plans, and "others". Many of these firms are under a "non-financial" SIC division code.

Therefore, in order to exclude such firms, I relied on the database's own documentation, which classifies the firms in more detail than the SIC division codes.

Accounting and stock market firm-level data are from the Economática Pro© database (Economática [2001]). Data on country-level variables such as the growth in real gross domestic product, the consumer price annual percentage change, and the nominal deposit interest rates are from the Economist Intelligence Unit's CountryData© database (Economist Intelligence Unit [2001]), except for the United States' annual inflation rate, which is from the International Monetary Fund's International Financial Statistics obtained through Datastream©. Stock market indices are from Morgan Stanley Capital International, except for the Brazilian stock market index for the years 1986 and 1987, which are from the International Finance Corporation's Emerging Market Database.[15]

From Table 4.1, panel A, it can be seen that Brazil heavily influences the sample: it has the most firms included and for the longest time period, representing more than 40% of the firms in the sample. Colombia and Venezuela, on the other hand, have little influence on the sample. Panel B shows that manufacturing is the predominant activity of the firms included in the sample, representing more than 55% of the firms. Wholesale trade lies in the other end of the spectrum, with only 2% of the included firms.

In this essay, I employ balance sheet data for individual firms and aggregate economic data for countries. The periodicity is annual, since balance sheet information for yearly statements are usually more reliable.[16] Also, considering the long-term implications of the capital structure choice, higher frequency data should not add much to the findings – but it might be noisier.

Accounting information in the database is available in local currency (real or nominal) and in U.S. dollars. Since this is a cross-country study, I use figures denominated in U.S. dollars in order to ease comparisons.

The dependent variable is an indicator of capital structure measured by four different leverage ratios: Total Book Liabilities over Total Book Assets

("Leverage Ratio 1", henceforth simply LR1), Total Book Liabilities over Book Equity (LR2), Long-Term Book Liabilities over Book Equity (LR3), and the Market Value of Debt over Total Market Value of the Firm (LR4). Strictly speaking, capital structure analyses should concentrate on long-term financing (i.e. long-term liabilities and equity such as in LR3). However, long-term debt financing is scarce in many emerging markets, which could distort the results if the analyses are limited to long-term sources of debt. In order to avoid such problem, I also report results for two total leverage indicators (LR1 and LR2). Finally, the true measure of leverage may be market-based instead of book-based. Therefore I report results using a market leverage ratio as well[17] (LR4).

The summary statistics for each dependent variable, broken down by year and country, is available in Table 4.2. One notes that the leverage of Latin American firms has increased over the period of study, except for Colombia and Venezuela. The case of Brazil is particularly striking. Also, the cross-section variation has also increased somewhat over the years for most variables, except perhaps for LR4. Figure 4.1 presents a visual description of country cross-sectional means over time. Book value-based measures of leverage have in general increased over the sample period for the average Latin American firm, but they remain lower than the average U.S. firm in my sample. The market value-based measure (LR4), on the other hand, seems in general higher for the LA-7 than for the United States. This is perhaps the result of the relatively lower market value of the typical Latin American firm. Time series variation is large for all leverage measures, a possible result from the translation of financial statements from nominal local currencies into U.S. dollars figures at market exchange rates.

Firm-specific determinant factors for the capital structure choice are chosen from those often suggested in the literature. Given the objectives of this study, firm-specific explanatory variables can be seen as control variables. Nevertheless, their results are discussed as well. The set of firm-specific explanatory variables is the following: tangibility, profitability, size, growth opportunities, the tax rate, and business risk. I describe each of these in more detail below:

- The degree of tangibility of assets, an indicator of collateral value, is given by:

$$Tangibility = \frac{NetFixedAssets}{TotalAssets} \quad \text{[Eq. 4.5]}$$

- Profitability is measured according to the usual return on assets ratio:

$$ROA = \frac{EBIT}{TotalAssets} \quad \text{[Eq. 4.6]}$$

Where *EBIT* stands for earnings before taxes and interest.

- The size of the firm is measured by:

$$Size = Log(TotalAssets) \quad \text{[Eq. 4.7]}$$

- Growth opportunities of the firm are assessed by:

$$Growth = \frac{MarketCapitalization}{Equity} \quad \text{[Eq. 4.8]}$$

Otherwise known by investing practitioners as the "price-to-book ratio".[18]

- The effective average tax rate of the firm is used as a proxy for the effect of tax shields:[19]

$$AverageTaxRate = \frac{EBT - NetEarnings}{EBT} \quad \text{[Eq. 4.9]}$$

- Finally, business risk is measured by:

$$BusinessRisk = \frac{StdDeviation(EBT)}{AverageTotalAssets} \quad \text{[Eq. 4.10]}$$

Where *EBT* stands for earnings before taxes.

The quality of measurement of these variables, i.e. in what extent the data reported is accurate, is certainly an issue. Annual accounting reports are usually subject to independent auditing and, since all firms present in the sample are public, accounting reports are subject to supervision of each country's securities commission. The degree of compliance may nevertheless differ from one country to another depending on how stringent are each commission's standards and how

much enforcement power and will the commission has. Similarly, stock market data is also dependent on each market's depth. Another possible source of measurement imprecision is the set of accounting standards adopted in each country. These issues shall be taken into account when analyzing the results.

Besides the above variables, the sector of activity of each firm is also included as an explanatory variable, given the possible systematic effects that the nature of the firm's activities may have over its leverage, in particular the total leverage measures. The sector of activity is represented by a set of dummy variables based on the SIC division codes informed in the database. "Manufacturing" is chosen as the base-case so that the regressions may include an intercept.

Similarly, country-specific effects are captured by a set of dummy variables included in the convenient regressions, where "Brazil" is then chosen as the base-case. Therefore, in the regressions that include both the sector of activity and the country dummy, the intercept represents the Brazilian manufacturing firm, and the coefficients of the dummy variables report the effects with respect to this base-case. The intercept of any other firm is thus the sum of the general intercept, the sector dummy, and the country dummy.

Macroeconomic similarities are measured by usual macroeconomic indicators: the growth in real gross domestic product, the inflation rate, the (ex-post) real interest rate, and the (ex-post) real return on the stock market. The real interest rate and real stock returns are obtained simply by subtracting realized inflation from realized nominal rates.

One final remark is that, in determining capital structure, the nature of the ownership of the firm may induce systematic effects.[20] State-owned firms, for instance, may have a lower bankruptcy probability – a factor that according to theory is decisive for the optimal leverage ratio. Similarly, firms that belong to an industrial conglomerate ("*grupo* effect") or that are subsidiaries of powerful multinational corporations may face less credit constraints than independent local firms may. Also, given the wide privatization process that took place in Latin America in the early 1990's, it would be important to precisely determine when

the change of ownership status occurred for each firm. Despite the relevance of changing a firm's ownership structure, the database does not provide reliable detailed information about the ownership of the firms for most of the countries and periods studied. Therefore, I opt for leaving the variable out of the study.[21]

4.2.3. Empirical Model

A Panel Data analysis is performed according to the following (augmented) model:

$$LR_{it} = \beta_{0i} + \sum_{k=1}^{K} \beta_{1k} X_{ikt} + \sum_{j=1}^{J} \beta_{2j} Y_{ijt} + \sum_{m=1}^{M} \beta_{3m} Z_{imt} + \varepsilon_{it} \qquad \text{[Eq. 4.11]}$$

Where LR_{it} is the stacked vector of the dependent variable (the i^{th}-firm leverage ratio on the t^{th}-period), X_{ikt} is the matrix of K firm-specific independent variables (including the sector dummies), Y_{ijt} is the matrix of J country dummy variables, Z_{imt} is the matrix of M country-specific macroeconomic variables, β_{0i} is the intercept (firm-specific in the fixed-effects models), β_{1j}, β_{2k}, and β_{3m}, are the matrices of coefficients, and ε_{it} is a vector of error terms. The model is estimated including each block of independent variables in turn, in order to assess the explanatory power of each one of them. Simple pooling, fixed-effects, and random-effects approaches are employed according to convenience.

4.3. Empirical Results

4.3.1. Specification Tests

The first step is to determine whether the panel data specification that simply pools together all available data for all firms and time periods is adequate to describe the data. As pointed out by Hsiao [1986], simple least squares estimation of pooled cross-section and time series data may be seriously biased.[22] Table 4.3 reports the results for a simple F-test for the equality of intercepts across firms. The model tested included only the firm-specific variables described above, that is:

$$LR_{it} = \beta_{0i} + \sum_{k=1}^{K} \beta_{1k} X_{ikt} + \varepsilon_{it} \qquad \text{[Eq. 4.12]}$$

The test is performed in each country separately and then for all seven Latin American countries pooled together. The test is also computed for the United States for comparison purposes. The results strongly reject the single intercept hypothesis, with the exception of Argentina, Chile, Venezuela and the LA-7 when the dependent variable is the value of debt/value of firm leverage ratio (LR4).

The next step is to determine which model of variable intercepts across firms better fits the data. Table 4.4 presents the results for a Hausman specification test of random- versus fixed-effects. The test, as suggested by Hsiao [1986] (p.49), is particularly appropriate in situations where N (the number of cross-sectional units) is large relative to T (the number of time periods) – precisely the case of this study. Again, only firm-specific independent variables are used. The test rejects the random-effects specification almost everywhere, with the exception of Venezuela when the dependent variables is the book liabilities/book equity ratio (LR2) and when it is LR4 for Argentina, Brazil, Chile, Peru, Venezuela, and the LA-7. Given these results, in the estimation that follows random-effects are used for these countries and fixed-effects for the all other cases.

This study relies mostly on accounting data that is subject to measurement errors and biases through different criteria and practices from country to country. Given the fact that under such errors variable intercept estimates may be even more biased than simple pooled ones (Hsiao [1986], p.63), I also report simple pooled OLS estimates for all cases.

4.3.2. Country-by-Country Estimation Results

Table 4.5 reports estimation results for the simplest capital structure model, the one that relies only on firm-specific variables[23] (that is, Eq. 4.12). Several interesting patterns emerge: first, the fixed-effects formulation explains dependent variables consistently better than simple pooling (and random-effects), for all different measures of leverage, suggesting the existence of omitted variables. One possible explanation is that idiosyncratic factors at the firm level are indeed relevant in explaining the degree of leverage of firms. Also, sign contradictions between simple pooling and fixed-effects coefficients indicate that the omitted

variables in the simple pooling are correlated to some explanatory variables. Particularly, such seems to be the case for size, growth options, and the average tax rate. Besides the measurement difficulties already discussed for these variables, it is interesting to note that – at least for size and growth opportunities – these are proxies for information asymmetry among stakeholders.

Among the four dependent variables, LR4 is the one explained the least by the set of firm-specific exogenous variables. This fact may be attributed to the aforementioned possible low quality of market-based valuation for debt instruments in Latin America reported by the database. Also, the higher volatility of this variable may simply not be matched by the set of explanatory variables chosen. For the other ratios, firm-specific exogenous variables seem to explain fairly well the variation in leverage. Adjusted coefficients of determination range between 0.157 to 0.796 (simple pooling) and between 0.384 to 0.893 (fixed-effects).

Although all leverage ratios signal the degree of indebtedness the same way, the effects of the independent variables are not uniform. Contradictions in signs of significant coefficients from one ratio to the other are frequently observed. This is troubling, since it raises questions about the robustness of some of the results.

For instance, the contrast between results for LR1 and LR2 for some Latin American countries demonstrates one of the problems with measuring leverage. Since both of them proxy for total degree of leverage, one could expect that their results be similar. However, since LR1 brings total assets in the denominator and several independent variables also bring total assets in their computation (tangibility, profitability, size, and business risk) it is possible that spurious correlations are present for this dependent variable. Results for LR1 should then be taken with caution.

An overview of the effects is summarized in Table 4.6. Results for tangibility, size, and the presence of tax shields vary a great deal across countries, to a point where I cannot establish a clear dominating pattern. Although several positive and significant signs are found for the tangibility proxy (as predicted by theory) the

strongly negative signs obtained for LR1 casts doubts on the robustness of the results. The predicted sign for the size variable can go either way, depending on the theoretical story told. Therefore the ambiguous result does not help in discerning between them. Finally, the ambiguous effect observed for the taxation proxy is possibly more attributable to the poor information quality of the variable used to measure it – the average tax rate – than to more fundamental relationships regarding the importance of such factor. As mentioned above, a more correct way to measure tax shields should also use the personal tax rate as in the Miller [1977] tax term, something not accomplished by this study. Booth et al. [1999] raise the hypothesis that the average tax rate may function more as a proxy for profitability rather than for tax-related shields, in the absence (or poor effectiveness) of tax loss carry forwards. However, if that is the case, the sign of the tax variable should have been more consistently negative. That is not the case for the Latin American sample.

It is clear that only profitability has a strongly consistent behavior across countries and across different proxies of capital structure. Its effect is unequivocally negative, and generally large. Such result can be partially interpreted in support of the POP, that is, more profitable firms finance their investment projects with retained earnings first, avoiding to resort to external capital. This result is in line with previous multi-country studies (Rajan and Zingales [1995], Wald [1999], Booth et al. [1999]).

Another interesting result is the contradiction suggested by the empirical results relative to STH and IAH theoretical predictions for growth opportunities. According to Myers and Majluf [1984], firms with better growth opportunities relative to assets in place should choose less debt because of the transfer of value between bondholders and shareholders. However, the empirical evidence in this essay offers more support – although not strongly – for a positive rather than a negative relationship between real options and leverage. This also comes in support of the POP. However, results are as expected for LR4 (which is market-valued as often postulated by the theory), so perhaps the substantive question is once more the measurement of the variables.

Finally, although some support has been found for the effect of business risk on leverage, the limitations of the proxy employed – which assumes a time-invariant risk level for each firm – suggest that such findings should be taken with caution.

From the results summarized in Table 4.6 it can be concluded that the STH and the IAH do not find empirical support in the Latin American sample. In particular, signs of the measures of profitability and growth options (combined with the ambiguity of the effect of the size measure) contradict the predictions of these two theories. Empirical evidence regarding these factors favors the POP instead.

Table 4.5 also reports the estimation for the pooled LA-7 data. The results are not very different than the discussion presented above. It can be observed the influence of Brazilian data in the pooled results, which follows closely the findings for this country.

For comparison purposes, the model is also estimated for the United States. The results for this developed country are largely in line with the results obtained for the smaller, less developed Latin American economies. The implication of this finding is clear: the factors that are usually associated with the capital structure choice of firms in theory and in empirical studies in developed countries are not only found to be important in developing countries too, but also the nature of the relationships are very similar. This is in line with the international evidence presented for developed countries by Rajan and Zingales [1995] and Wald [1999], but slightly at odds with the evidence presented for developing countries by Booth et al. [1999]. These authors find that although the factors are the same, the direction of their effects changes from country to country. The results reported here indicate that the direction of the effects seems in general similar among countries.

In summary, country-by-country estimation yields the following conclusions: the determinants of capital structure and their effects seem similar among developing countries and between these and developed countries; the robustness of the results is cast in doubt by contradiction in the signs of significant coefficients from one measure of leverage to the other; there seems to be important idiosyncratic effects

that cannot be accounted for by existing theory-suggested firm-specific factors; and finally, some support has been found in favor of the Pecking Order Proposition.

4.3.3. Pooled Countries Estimation Results

In order to assess to what extent country-specific factors influence the capital structure choice, I pool all Latin American firms together in a single database. My objective is to determine if such country-specific factors help in explaining further the leverage ratios and – if they do – what kind of factors (institutional or macroeconomic or both) account for such explanation.

I simplify the problem at hand by measuring institutional factors (financial structure, legal tradition, cultural heritage, accounting practices, etc.) as dummy variables for each country. Macroeconomic factors are in turn measured by a set of four broad macroeconomic indicators: the real growth rate of GDP, the inflation rate, the ex-post real interest rate, and the ex-post real stock returns.[24]

Since country dummies remain constant for each firm over time, the models could not be estimated in the fixed-effects formulation (because country dummies would be collinear with the intercept). Although the simple pooling approach is not as good as the fixed-effects one, it does allow for the kinds of verification desired.

Table 4.7 presents estimation results for seven different specifications for each dependent variable, all based on the augmented model presented in Eq. 4.11 above. The specifications are as follows:

- Specification I: traditional firm-specific variables (firm measures and sector dummies) only;
- Specification II: traditional firm-specific variables and country dummies;
- Specification III: traditional firm-specific variables and macroeconomic variables;
- Specification IV: traditional firm-specific variables, country dummies, and macroeconomic variables;

- Specification V: country dummies only;
- Specification VI: macroeconomic variables only;
- Specification VII: country dummies and macroeconomic variables;

The results strongly suggest that firm-specific variables dominate all other blocks of variables. Although country dummies are in fact significant, the augmentations of the traditional capital structure regression do not add much in terms of explanatory power. Adjusted R^2 increase little as the specification aggregates more variables for LR1, LR2, and LR3. In fact, it reduces for LR4. Moreover, the introduction of country variables does not alter the signs of significant firm-specific coefficients,[25] a strong indication that the hypothetical omitted variables suggested by previous fixed-effects estimation above are not country-specific.

Specifications V to VII exclude firm-specific variables in order to verify what explanatory power, if any, these variables have. The results do not yield the same conclusions as Booth et al. [1999]. According to their study, knowing the country of origin of a firm is more important than knowing the levels of all firm-specific variables. Here, I find that, although significant, the country of origin seems a minor influence in the leverage decision of firms.

Results for macroeconomic variables that describe the economic environment of the firms are even less impressive. Again, although some macro variables are significant (in particular the rate of growth of real GDP and, to a less extent, the inflation rate), their combined explanatory power is not remarkable. Significant coefficients for GDP growth are negative, indicating that firms choose a low leverage strategy during expansions in the business cycle. Interestingly enough, this result can also be interpreted in support of the Pecking Order Proposition: when the economy is booming firms resort to internal sources of capital, while in recessions – when profits are usually depressed – firms are forced to tap external sources of capital.

The weaker evidence of the inflation rate also points to a negative relationship with the leverage ratio. Such finding is puzzling, since in rising inflationary periods nominal liabilities such as debt depreciate in value, thus becoming more

attractive to the borrower. A possible explanation is offered: if debt contracts are somehow indexed to the price level, then the possible capital gains from nominal liabilities are offset. Such was the case in Brazil over most of the 1980's up to the mid-1990's. Since Brazilian firms make up more than 40% of the sample, it is difficult to dismiss such a proposition. That, combined with the well-documented negative relationship between stock returns and inflation (e.g. Feldstein [1980], Fama [1981], Geske and Roll [1983], Gultekin [1983]), offer a compelling explanation for these empirical regularities.[26]

In sum, country-specific factors, whether institutional or macroeconomic are significant in explaining capital structures but seem not to matter decisively in such decisions. Contrary to previous studies, here I find that the explanatory power of such factors is well offset by the much more important firm-specific factors. Moreover, given the previous evidence obtained from the fixed-effects panel data analysis, there are unknown idiosyncratic firm factors that seem to matter much more in determining the leverage of the firm.

4.4. Summary and Concluding Remarks

In closing, I offer a summary of the main results of the essay and elaborate briefly on the lessons and limitations of this study.

4.4.1. Summary of Results

In this essay, besides investigating traditional firm-specific determinants of capital structure, I investigate if country-specific factors are relevant for the corporate leverage decision, and if so, whether these effects can be accounted for by the macroeconomic environment or by other institutional factors. I do so employing panel data techniques in a sample of over 700 firms from Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela in the period 1986-2000. Results are also reported for a sample of 132 firms from the United States.

The empirical evidence of traditional single country capital structure models indicates that (1) the determinants of capital structure and their effects seem similar among developing countries and between these and the United States; (2) the robustness of the results is cast in doubt by contradiction in the signs of

significant coefficients from one measure of leverage to the other; (3) there seems to be important idiosyncratic effects that cannot be accounted for by existing theory-suggested firm-specific factors; and finally, (4) some support has been found in favor of the Pecking Order Proposition.

Results from pooled country estimation suggest that (1) country-specific factors, whether institutional or macroeconomic are significant in explaining capital structures but seem not to matter decisively in such decisions; (2) contrary to previous studies, I find that the explanatory power of such factors is well offset by the much more important firm-specific factors; and (3) given the previous evidence obtained from the fixed-effects panel data analysis, there are still unknown idiosyncratic firm factors that seems to matter much more in determining the leverage of the firm.

4.4.2. Concluding Remarks

The goals of this essay are rather unpretentious. It is not meant to give the final word on a polemic topic such as capital structure, but simply to contribute with a couple of empirical regularities that question some of previous findings. This way, I hope I can call attention to a few points that have been overlooked in present research.

Of course, the study presented here has its shortcomings: as mentioned before, there may be systematic effects induced by the nature of ownership of the firm, an omitted variable here. The variables chosen to proxy for the macroeconomic environment and the institutional framework of the countries studied here are admittedly simple. Perhaps a more complex set of variables can shed more light into the problem. The quality of the measurement of the variables is also an issue. As noted, accounting standards, stock market depth, and the degree of supervision on financial reporting may vary largely across countries. Also, dynamic shifts in the relationship of the variables have been largely ignored. This is the case of the effects of financial liberalization and economic stabilization, two major structural phenomena that took place in Latin America around the period of study. Nevertheless, I believe that a couple of lessons can be derived from the results.

First, although a great deal has been said about the influence of country-specific factors and how these shape the way managers and firms behave, the evidence presented in this essay signals in the opposite direction: the factors that influence capital structure decisions are remarkably similar across countries. Moreover, firm-specific factors explain a lot more than country-specific ones. In addition, determinants of capital structure suggested by established theories – although relevant – do not seem to capture the whole story. There are grounds to believe that other yet unknown firm-specific factors can further the understanding of this phenomenon.

One of such unknown factors may be managerial discretion. As a mere speculative example, perhaps the stock of human capital of a given firm may be a determinant of its capital structure in the sense that better managerial teams are more capable of assessing the "true" value of the firm, balancing its leverage ratio closer to the optimal one, and thus avoiding costly corrections. The strong effect of profitability over the leverage ratio verified here could then be proxying for this genuine idiosyncratic factor.

Needless to say, more theoretical and empirical efforts shall further the understanding of this major research problem.

4.5. Endnotes

[1] I am thankful to Ms. Genessa Robinson for helping with the retrieval of the data for this essay.

[2] Summarizing the prolific literature on the various theoretical and empirical approaches to the capital structure problem is an ambitious task on its own. I do not have such aim here, for other authors have done excellent syntheses of this literature. For instance, the classical paper by Harris and Raviv [1991] on non tax-based theories. More recently, Barclay and Smith Jr. [1999] provide an interesting discussion on the requirements of a comprehensive theory of capital structure, while Graham's [2001] section 1 focuses on tax-related influences on financing decisions. I refer the interested reader to these papers for a deeper insight on the subject.

[3] MM is a particular case of the STH, as explained below.

[4] For instance, Megginson [1997] divides the literature among the Agency Cost/Tax Shield Tradeoff Model, the Pecking Order Hypothesis, and the Signaling Model. Barclay and Smith Jr. [1999] classify the literature among Tax-Based, Contracting Costs, and Information Costs theories. Booth et al. [1999] prefer the Static Tradeoff Model, Pecking Order Hypothesis and Agency Theoretic Framework classification.

[5] Business risk is also relevant for agency costs, as is discussed below.

[6] Industry type as a proxy for business risk is a controversial issue, since its empirical performance has not been consistent (i.e. Remmers et al. [1974]).

[7] "Undetermined" means that the particular theory offers no specific prediction regarding the variable's effect.

[8] Of course, the other variables remain relevant in the sense that they control for important factors in the leverage decision.

[9] In the case of progressive taxation it would also mean larger relative tax burden.

[10] This argument should be taken somewhat cautiously because one can argue that, since debt alleviates the overinvestment problem, larger firms could add value by issuing more debt and, therefore, larger firms would have *higher* leverage ratios. This is essentially the rationale behind Leveraged Buyouts (LBO) and the advocates for concentration of ownership in a smaller group of investors that would exercise stricter supervision over management.

[11] Indeed, some recent studies stress the relation between a country's financial system structure (i.e. bank-based or market-based) and its degree of financial development to the financing choices of firms (e.g. Demirgüç-Kunt and Maksimovic [1996], Demirgüç-Kunt and Levine [1996], and Demirgüç-Kunt and Maksimovic [1999]).

[12] For instance, IMF [1999] Chapter III offers a review of recent episodes of international financial contagion and an analysis of common factors shared by affected countries. Besides macroeconomic similarities, other possible channels of

contagion may be investors' herd behavior, common exogenous shocks, and trade and financial linkages.

[13] The methods described in this section are a summary compiled from Hsiao [1986], Greene [1993], and Hall and Cummins [1997].

[14] In the case where a general intercept is desirable, the first column of matrix D becomes the unity vector.

[15] MSCI does not cover the period prior to December 1987 for the Latin American countries.

[16] Quarterly data is also available in the Economática database.

[17] Notice that the reliability of market-based figures for Latin American firms, especially with respect to debt valuation, is questionable. Also, there are less data points available for LR4 in the database than for the other three measures of leverage.

[18] In theory, "book value" reflects the value of assets in place (e.g. machinery and equipment) closer than it does for expected benefits from research and development (R&D) and advertising investments for instance. Such benefits are supposedly incorporated in the market value of the firm. Therefore, the bigger the price-to-book ratio, the bigger the expected value from investments such as R&D and advertising in relation to current assets in place, thus reflecting the firm's growth opportunities. Data limitations on R&D and advertising expenditures in the financial statements of most firms in my sample lead me to choose the price-to-book ratio as a proxy for growth opportunities.

[19] The more correct way to measure the effect of taxes on capital structure would be calculating the Miller Tax Term, i.e.:

$$Miller = 1 - \left(\frac{(1 - T_c) \times (1 - T_e)}{(1 - T_i)} \right)$$

Where T_c is the corporate tax rate, T_i is the personal tax rate and T_e is the tax rate on equity income. However, obtaining reliable tax rates over several years for

seven different countries can be proven difficult. Here, I chose the average tax rate as a substitute following Booth et al. [1999].

[20] I am thankful to Prof. Omar Toulan for pointing this out.

[21] Indeed, most empirical studies on capital structure overlook such variable as well. However, since most of these studies are conducted for developed countries – where the presence of state-owned firms is less prevalent – such omission is more forgivable there than here.

[22] Hsiao [1986] refers to this as the "heterogeneity bias" (p.6).

[23] Notice that the proxy employed for business risk is the same for all time periods for each firm because of the way it is computed (earnings standard deviation over average total assets). Therefore, it would become undistinguishable from the firm's intercept in the fixed-effects specification. Hence, such variable is dropped in the fixed-effects estimation.

[24] In preliminary runnings, I also included the ex-post real exchange rate as well as the variance of the variables discussed above (with the variance of industrial production instead of the variance of GDP growth). None of these variables substantially changed the results reported here.

[25] The only exception is the proxy for business risk in LR2 equations, which gains significance for specification II and IV. Even then, such gain in significance is marginal, since the previous specification p-values are respectively 0.08 and 0.06.

[26] For a comprehensive discussion of the relationship between inflation and real stock returns, please see Chapter III above.

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Table 4.1. Description of the Sample

Panel A: Firms by Country

Country	Firms in Database	Firms Selected	% Selected	% Sample Composition	Period Covered
Argentina	85	53	62.4%	7.5%	1990-2000
Brazil	328	293	89.3%	41.4%	1986-2000
Chile	189	101	53.4%	14.3%	1987-2000
Colombia	42	26	61.9%	3.7%	1992-2000
Mexico	151	112	74.2%	15.8%	1988-2000
Peru	124	98	79.0%	13.9%	1991-2000
Venezuela	53	24	45.3%	3.4%	1992-2000
Latin America 7	972	707	72.7%	100.0%	1986-2000
United States	216	132	61.1%		1994-2000
Total Overall	1188	839	70.6%		1986-2000

Panel B: Firms by Sector of Activity (SIC Division Codes)

Sector (SIC Division)	Firms in Database	Firms Selected	% Selected	% Sample Composition
Agriculture, Forestry and Fishing	37	34	91.9%	4.1%
Construction	31	30	96.8%	3.6%
Finance, Insurance and Real Estate	234	0	0.0%	0.0%
Manufacturing	510	462	90.6%	55.1%
Mining	41	41	100.0%	4.9%
Nonclassifiable Establishments	2	0	0.0%	0.0%
Retail Trade	61	52	85.2%	6.2%
Services	47	27	57.4%	3.2%
Transportation and Public Utilities	205	176	85.9%	21.0%
Wholesale Trade	20	17	85.0%	2.0%
Total Overall	1188	839	70.6%	100.0%

Table 4.2. Leverage Ratios by Country and Year
Panel A: Total Book Liabilities/Total Book Assets

Country	Statistic	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	All*
	Number of																
	Firms					6	28	34	35	38	39	40	41	42	42	41	53
Argentina	Mean					0.3483	0.3520	0.3572	0.4061	0.4110	0.4003	0.4145	0.4252	0.4534	0.5151	0.4643	0.4230
	Standard					0.2306	0.2046	0.1700	0.1949	0.2110	0.2068	0.2067	0.2008	0.2070	0.3958	0.2185	0.2342
	Deviation																
	Number of																
	Firms	140	154	163	164	164	166	176	183	199	206	219	242	288	289	282	293
Brazil	Mean	0.3275	0.3176	0.3253	0.3074	0.3818	0.2759	0.3252	0.3605	0.3715	0.4141	0.4784	0.5411	0.5718	0.6746	0.7956	0.4642
	Standard	0.1737	0.1835	0.1943	0.1743	0.2313	0.1871	0.2166	0.2514	0.2856	0.3989	0.5554	0.6103	0.8222	1.2276	2.1961	0.8745
	Deviation																
	Number of																
	Firms		1	1	1	42	45	51	53	82	86	98	100	101	101	96	101
Chile	Mean		0.2840	0.2330	0.3700	0.3182	0.3157	0.3132	0.2982	0.2927	0.2790	0.2895	0.3122	0.3470	0.3711	0.3362	0.3177
	Standard					0.1878	0.1799	0.1806	0.1720	0.1741	0.1686	0.1834	0.1967	0.2629	0.3464	0.1900	0.2188
	Deviation																
	Number of																
	Firms							3	6	15	24	25	25	25	26	26	26
Colombia	Mean							0.5937	0.4542	0.3559	0.2850	0.2936	0.2951	0.3048	0.3289	0.3359	0.3217
	Standard							0.0420	0.2979	0.1920	0.1854	0.1798	0.1961	0.2010	0.2132	0.2694	0.2117
	Deviation																
	Number of																
	Firms			12	17	42	49	60	69	71	94	107	110	110	110	111	112
Mexico	Mean			0.3890	0.4240	0.4316	0.4572	0.4595	0.4560	0.4964	0.4950	0.4805	0.4835	0.5204	0.5357	0.5903	0.4984
	Standard			0.1416	0.1488	0.2166	0.2355	0.2113	0.2027	0.2018	0.2405	0.2926	0.3359	0.3912	0.4886	0.3934	0.3256
	Deviation																
	Number of																
	Firms						1	58	62	63	68	83	88	89	88	93	98
Peru	Mean						0.1690	0.4557	0.4599	0.4337	0.4254	0.3933	0.3879	0.4296	0.4490	0.4465	0.4292
	Standard							0.2336	0.2286	0.1911	0.1844	0.2077	0.2119	0.2485	0.2900	0.2734	0.2356
	Deviation																
	Number of																
	Firms							9	10	10	13	14	14	14	14	11	24
Venezuela	Mean							0.4206	0.4304	0.4364	0.3869	0.2919	0.2342	0.2549	0.2844	0.2911	0.3266
	Standard							0.1634	0.2012	0.1707	0.2306	0.1718	0.1511	0.1660	0.1588	0.1443	0.1840
	Deviation																
	Number of																
	Firms	140	155	176	182	254	289	391	418	478	530	586	620	669	670	660	707
Latin America 7	Mean	0.3275	0.3174	0.3292	0.3187	0.3787	0.3198	0.3706	0.3900	0.3887	0.4004	0.4184	0.4477	0.4865	0.5449	0.5980	0.4364
	Standard	0.1737	0.1829	0.1911	0.1746	0.2234	0.2066	0.2170	0.2317	0.2421	0.3021	0.3910	0.4371	0.5896	0.8629	1.4627	0.6412
	Deviation																
	Number of																
	Firms									26	42	102	107	106	107	100	132
United States	Mean									0.5990	0.6208	0.6328	0.6359	0.6368	0.6317	0.6292	0.6309
	Standard									0.1670	0.1532	0.1701	0.1668	0.1675	0.1800	0.1922	0.1729
	Deviation																

* Total number of different firms across all years

Table 4.2. (continued) Leverage Ratios by Country and Year
Panel B: Total Book Liabilities/Book Equity

Country	Statistic	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	All*
	Number of																
	Firms					6	28	34	35	38	39	40	41	42	42	41	53
Argentina	Mean					0.7585	0.8305	0.6922	0.9452	3.0976	1.0504	3.9445	2.3691	1.3892	1.8354	2.9979	1.9595
	Standard					0.7854	1.0838	0.5656	0.9301	13.4828	1.4781	18.6508	9.0923	2.0159	4.3545	11.3486	8.8702
	Deviation																
	Number of																
	Firms	140	154	163	164	164	166	176	183	199	206	219	242	288	289	282	293
Brazil	Mean	0.6431	0.6890	0.6649	0.2973	1.1023	0.4941	2.0178	1.1367	1.4852	0.9290	1.4248	2.0260	2.3586	3.3158	2.2689	1.5637
	Standard	0.6727	1.0406	1.8563	2.0141	4.3480	1.3733	15.3911	4.5526	9.5572	5.3330	4.8559	12.3111	12.2984	22.0174	8.0566	10.2569
	Deviation																
	Number of																
	Firms		1	1	1	42	45	51	53	82	86	98	100	101	101	96	101
Chile	Mean		0.3970	0.3040	0.5870	0.6223	0.5766	0.5694	0.5339	0.5397	0.4889	0.5407	0.5114	0.6002	0.6828	0.6754	0.5776
	Standard					0.6777	0.4774	0.4682	0.5014	0.5639	0.4674	0.5896	0.7826	0.6102	0.7663	0.6442	0.6212
	Deviation																
	Number of																
	Firms							3	6	15	24	25	25	25	26	26	26
Colombia	Mean							1.4783	2.1392	1.2776	0.6921	0.6378	0.6877	1.2007	1.5712	0.3845	0.9546
	Standard							0.2662	3.4930	2.9498	1.3582	1.0535	1.1544	3.7033	5.1334	1.1204	2.7750
	Deviation																
	Number of																
	Firms			12	17	40	45	57	66	69	94	107	110	110	110	111	112
Mexico	Mean			0.7232	0.8484	0.8397	0.8655	0.9781	0.9723	1.2903	0.0684	0.9525	0.8940	1.1931	2.2865	1.7855	1.1521
	Standard			0.4144	0.4735	0.5867	0.6255	0.8104	0.8728	1.2069	8.1357	1.5722	1.1244	1.4771	12.1808	2.1970	5.0387
	Deviation																
	Number of																
	Firms						1	57	62	63	68	83	88	89	88	93	98
Peru	Mean						0.2030	1.2852	1.7558	1.0028	0.9533	0.9657	1.3130	1.2248	0.9225	0.7550	0.7104
	Standard							1.4071	3.2000	0.7728	0.7202	1.1157	3.8477	4.0129	2.2226	4.4087	10.8541
	Deviation																
	Number of																
	Firms							9	10	10	13	14	14	14	14	11	24
Venezuela	Mean							0.8842	0.9684	0.9680	0.9168	0.5001	0.3593	0.4138	0.4781	0.4686	0.6322
	Standard							0.6572	0.6985	0.7788	0.9170	0.3980	0.2958	0.3566	0.4022	0.3176	0.5918
	Deviation																
	Number of																
	Firms	140	155	176	182	252	285	387	415	476	530	586	620	669	670	660	707
Latin America 7	Mean	0.6431	0.6871	0.6668	0.3504	0.9725	0.5978	1.4189	1.1204	1.3416	0.7060	1.2420	1.4108	1.6058	2.2158	1.6835	1.2602
	Standard	0.6727	1.0374	1.7893	1.9233	3.5289	1.1519	10.4013	3.3357	7.2958	4.8096	5.7754	8.2001	8.2913	15.3925	6.3039	8.5918
	Deviation																
	Number of																
	Firms									26	42	102	107	106	107	100	132
United States	Mean									2.4610	2.2692	2.2704	2.3046	2.2314	2.2739	2.5028	2.3179
	Standard									3.1080	1.9250	2.2171	2.3533	2.9380	2.1053	3.1248	2.5484
	Deviation																

* Total number of different firms across all years

Table 4.2. (continued) Leverage Ratios by Country and Year
Panel C: Long-Term Book Liabilities/Book Equity

Country	Statistic	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	All*
	Number of Firms					6	28	34	35	38	39	40	41	42	42	41	53
Argentina	Mean					0.1909	0.1836	0.2178	0.3435	1.3690	0.3596	0.6984	1.3671	0.6869	1.0940	1.0679	0.7625
	Standard Deviation					0.2034	0.2182	0.2629	0.4209	6.5711	0.7259	1.7204	5.9473	1.2436	3.8480	3.2492	3.3506
	Number of Firms	140	154	162	164	164	166	176	183	199	206	219	242	288	289	282	293
Brazil	Mean	0.1889	0.2289	0.1997	0.0759	0.2741	0.1496	0.4450	0.4698	0.5025	0.3772	0.7023	1.0534	0.9508	2.1058	1.3306	0.7200
	Standard Deviation	0.3420	0.5370	0.9122	0.7783	0.8002	0.4200	1.7035	1.6284	2.7208	1.8815	3.1650	7.5007	4.6912	19.1942	5.6606	6.8379
	Number of Firms				1		45	51	53	82	86	98	100	101	101	96	101
Chile	Mean				0.4807		0.3159	0.2667	0.2383	0.2313	0.2080	0.2767	0.2475	0.2855	0.3858	0.3602	0.2851
	Standard Deviation						0.3902	0.2869	0.2498	0.2901	0.2463	0.4458	0.6602	0.3983	0.6539	0.5094	0.4632
	Number of Firms							3	6	17	24	25	25	25	26	26	26
Colombia	Mean							0.2112	1.0919	0.6148	0.2989	0.3196	0.3366	0.9935	0.7085	0.2200	0.5096
	Standard Deviation							0.1623	2.3053	1.6894	0.7349	0.5576	0.6807	3.7407	2.3303	0.5996	1.8435
	Number of Firms			12	17	40	46	58	67	69	94	107	110	110	110	111	112
Mexico	Mean			0.3159	0.3864	0.3446	0.3680	0.4467	0.4501	0.5920	0.2747	0.4974	0.4509	0.5628	0.6472	0.9452	0.5306
	Standard Deviation			0.3079	0.3329	0.4082	0.4136	0.4992	0.5593	0.6833	2.1255	0.8170	0.7450	0.9175	1.4378	1.6573	1.1637
	Number of Firms						1	57	62	63	68	83	88	89	88	93	98
Peru	Mean						0.0733	0.2597	0.6889	0.3412	0.2772	0.2785	0.3853	0.4553	0.2932	0.3537	0.2624
	Standard Deviation							1.2805	1.7071	0.4541	0.3786	0.3920	0.9243	1.7549	1.1768	1.2376	2.9925
	Number of Firms							9	10	10	13	14	14	14	14	11	24
Venezuela	Mean							0.3955	0.4580	0.3773	0.3225	0.2391	0.1555	0.2017	0.1982	0.2110	0.2711
	Standard Deviation							0.3390	0.3328	0.3166	0.3231	0.2380	0.1622	0.2181	0.2493	0.1958	0.2718
	Number of Firms	140	154	174	182	210	286	388	416	478	530	586	620	669	670	660	707
Latin America 7	Mean	0.1889	0.2289	0.2077	0.1071	0.2851	0.2139	0.3717	0.4678	0.5179	0.3125	0.5060	0.6933	0.6900	1.2114	0.9083	0.5706
	Standard Deviation	0.3420	0.5370	0.8839	0.7512	0.7297	0.4064	1.2705	1.3232	2.5894	1.5039	2.0386	4.9643	3.2700	12.6861	3.9012	5.0089
	Number of Firms									26	42	102	107	106	107	100	132
United States	Mean									1.1489	1.1926	1.2894	1.3942	1.3895	1.4241	1.4619	1.3670
	Standard Deviation									1.6073	1.3353	1.2796	1.6258	2.0066	1.5315	2.0345	1.6833

* Total number of different firms across all years

Table 4.2. (continued) Leverage Ratios by Country and Year
Panel D: Market Value of Debt/Total Market Value of the Firm

Country	Statistic	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	All*
Argentina	Number of Firms					2	9	29	21	42	44	47	42	40	43	37	53
	Mean					0.3354	0.2025	0.1435	0.2012	0.4165	0.2194	0.2369	0.2344	0.2983	0.3097	0.2482	0.2625
	Standard Deviation					0.5288	0.2424	0.4733	0.3848	1.5997	0.2991	0.2520	0.2497	0.3553	0.3654	0.7089	0.6601
Brazil	Number of Firms	94	111	132	147	143	144	154	158	179	183	197	191	220	257	243	293
	Mean	0.0220	0.4732	0.3307	0.0019	0.5189	0.4103	0.3149	0.3723	0.1313	0.6101	0.2099	0.2488	0.2578	0.2813	0.2041	0.2905
	Standard Deviation	0.9078	1.2331	1.2547	1.4037	2.1627	1.0649	0.8672	2.7639	0.3690	5.2926	1.0363	0.5437	0.7847	0.4069	0.9091	1.8469
Chile	Number of Firms				1		42	45	52	78	74	75	85	83	81	81	101
	Mean				0.1736		0.0853	0.1157	0.0909	0.0805	0.0664	0.1056	0.0929	0.4005	0.1328	0.1942	0.1441
	Standard Deviation						0.1734	0.1656	0.1234	0.1039	0.1426	0.1858	0.2986	1.8846	0.3688	0.2215	0.6872
Colombia	Number of Firms										11	11	23	18	14	20	26
	Mean										0.3162	0.2028	0.1740	0.1886	0.0643	0.2758	0.2012
	Standard Deviation										0.3823	0.7612	0.3372	0.2609	0.3199	1.8745	0.9103
Mexico	Number of Firms						10	22	32	44	51	63	87	96	92	88	112
	Mean						0.0540	0.0660	0.0721	0.1705	0.2598	0.1997	0.1810	0.3198	0.2607	0.2681	0.2251
	Standard Deviation						0.1444	0.2024	0.1567	0.1838	0.2802	0.2982	0.2537	0.3176	0.3238	0.3498	0.2959
Peru	Number of Firms							18	35	48	46	52	57	51	42	50	98
	Mean							0.2774	0.1106	0.0046	0.2884	0.2508	0.1405	0.2480	0.3128	0.3859	0.2217
	Standard Deviation							0.2704	0.2421	1.0790	0.3614	0.4048	0.6177	0.3205	0.2873	0.4292	0.5404
Venezuela	Number of Firms							10	12	13	14	17	18	19	15	18	24
	Mean							0.1876	0.1922	0.1075	0.2350	0.1905	0.1153	0.3561	0.4573	0.3572	0.2518
	Standard Deviation							0.2029	0.2178	0.5526	0.2283	0.1861	0.1572	0.3784	0.3233	0.3759	0.3272
Latin America 7	Number of Firms	94	111	132	148	145	205	278	310	404	423	462	503	527	544	537	707
	Mean	0.0220	0.4732	0.3307	0.0031	0.5164	0.3172	0.2381	0.2460	0.1396	0.3771	0.1980	0.1891	0.2949	0.2597	0.2409	0.2508
	Standard Deviation	0.9078	1.2331	1.2547	1.3990	2.1482	0.9085	0.6786	1.9803	0.6943	3.4883	0.7171	0.4415	0.9261	0.3775	0.7639	1.4009
United States	Number of Firms									25	49	109	125	130	130	124	132
	Mean									0.0964	0.0928	0.1450	0.1531	0.1408	0.1594	0.1171	0.1379
	Standard Deviation									0.1700	0.1479	0.1821	0.1858	0.1611	0.1884	0.5096	0.2684

* Total number of different firms across all years

Table 4.3. F-Test of Simple Pooled OLS against Fixed Effects Specification. The test statistic is for testing the null hypothesis that firms' intercepts in the basic fixed effects panel data model are all equal, against the alternative hypothesis that each firm has its own (distinct) intercept. The data covers the period 1986-2000. The test assumes identical slopes for all independent variables across all firms, and it is distributed $F(df_1,df_2)$; *p-values in italic*; * significant at the 5% level; ** significant at the 1% level.

Dependent Variables:
LR1: Total Book Liabilities/Total Book Assets
LR2: Total Book Liabilities/Book Equity
LR3: Long-Term Book Liabilities/Book Equity
LR4: Market Value of Debt/Total Market Value of the Firm

Country	Dependent Variable							
	LR1		LR2		LR3		LR4	
Argentina	F(41,260)	20.7750 ** *0.0000*	F(41,260)	3.2647 ** *0.0000*	F(41,260)	3.9667 ** *0.0000*	F(41,237)	1.0695 *0.3674*
Brazil	F(283,2264)	4.6039 ** *0.0000*	F(283,2264)	4.6811 ** *0.0000*	F(283,2264)	12.7040 ** *0.0000*	F(283,2219)	1.1906 * *0.0216*
Chile	F(96,610)	16.1480 ** *0.0000*	F(96,610)	7.5943 ** *0.0000*	F(96,610)	6.6651 ** *0.0000*	F(96,583)	1.0568 *0.3468*
Colombia	F(25,77)	7.8593 ** *0.0000*	F(25,77)	4.2538 ** *0.0000*	F(25,77)	2.9553 ** *0.0001*	F(25,57)	2.7180 ** *0.0009*
Mexico	F(102,472)	13.2130 ** *0.0000*	F(102,472)	3.8799 ** *0.0000*	F(102,472)	5.2012 ** *0.0000*	F(102,468)	5.4492 ** *0.0000*
Peru	F(91,364)	8.2778 ** *0.0000*	F(91,364)	3.8507 ** *0.0000*	F(91,364)	5.4330 ** *0.0000*	F(89,286)	2.8797 ** *0.0000*
Venezuela	F(13,53)	9.9581 ** *0.0000*	F(13,53)	3.7306 ** *0.0003*	F(13,53)	8.7870 ** *0.0000*	F(13,53)	1.8458 *0.0595*
Latin America 7	F(657,4178)	4.7143 ** *0.0000*	F(657,4178)	5.0218 ** *0.0000*	F(657,4178)	10.8530 ** *0.0000*	F(655,3981)	1.0350 *0.2762*
United States	F(108,440)	22.3730 ** *0.0000*	F(108,440)	11.8390 ** *0.0000*	F(108,440)	10.5480 ** *0.0000*	F(108,437)	8.3821 ** *0.0000*

Table 4.4. Hausman Specification Test of Random Effects against Fixed Effects. The test statistic is for testing the null hypothesis of the random effects specification against the alternative hypothesis of the fixed effects specification in the basic panel data model. The data covers the period 1986-2000. The test statistic is distributed $\chi^2(5)$; *p-values in italic*; * significant at the 5% level; ** significant at the 1% level.

Dependent Variables:
LR1: Total Book Liabilities/Total Book Assets
LR2: Total Book Liabilities/Book Equity
LR3: Long-Term Book Liabilities/Book Equity
LR4: Market Value of Debt/Total Market Value of the Firm

Country	Dependent Variable			
	LR1	LR2	LR3	LR4
Argentina	22.3350 ** *0.0005*	60.2370 ** *0.0000*	19.7110 ** *0.0014*	4.8969 *0.4286*
Brazil	49.4870 ** *0.0000*	70.4200 ** *0.0000*	302.6100 ** *0.0000*	3.7671 *0.5834*
Chile	207.5200 ** *0.0000*	34.7510 ** *0.0000*	22.5020 ** *0.0004*	2.2475 *0.8139*
Colombia	37.5520 ** *0.0000*	24.3800 ** *0.0002*	23.9340 ** *0.0002*	24.5190 ** *0.0002*
Mexico	39.8390 ** *0.0000*	55.0400 ** *0.0000*	50.2160 ** *0.0000*	22.2880 ** *0.0005*
Peru	34.7850 ** *0.0000*	20.2000 ** *0.0011*	13.4700 * *0.0193*	8.6272 *0.1249*
Venezuela	26.7780 ** *0.0001*	10.1620 *0.0708*	8.7870 ** *0.0061*	9.7444 *0.0828*
Latin America 7	114.1500 ** *0.0000*	79.3850 ** *0.0000*	193.4900 ** *0.0000*	10.0310 *0.0744*
United States	36.1750 ** *0.0000*	39.8710 ** *0.0000*	28.2140 ** *0.0000*	34.1450 ** *0.0000*

Table 4.5. Country-by-Country Panel Data Analysis of Leverage Ratios. "Simple pooling" refers to plain ordinary least squares estimation of all data pooled together for each country, in the period 1986-2000; "Fixed effects" refers to a fixed effects model where each firm in the sample receives its own (different) intercept; "Random effects" assumes that the intercepts are drawn from a common distribution; "Latin America 7" refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela; "Manufacturing" is the industry sector dummy variable base-case; Reported standard errors are heteroskedasticity-robust; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel A: Dependent Variable is Total Book Liabilities/Total Book Assets (LR1)

Country	Argentina		Brazil		Chile		Colombia		Mexico		Peru		Venezuela		Latin America 7		United States	
Independent Variables	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects
Intercept	0.4148 **		0.6988 **		0.6002 **		0.2072		0.0716		0.3641 **		0.1588		0.5798 **		0.0736	
	0.1168		0.1072		0.1307		0.1479		0.0770		0.0716		0.1285		0.0470		0.1463	
Tangibility	-0.2953 **	0.0677	-0.3881 **	-0.2368 **	-0.2863 **	-0.1469 *	-0.2969 **	-0.2020	-0.0402	0.1638 *	-0.2994 **	-0.2899 **	-0.7013 **	-0.3490 **	-0.3738 **	-0.2098 **	0.1590 **	-0.0505
	0.070	*0.101*	*0.057*	*0.088*	*0.046*	*0.070*	*0.100*	*0.107*	*0.057*	*0.079*	*0.059*	*0.080*	*0.151*	*0.132*	*0.028*	*0.067*	*0.041*	*0.052*
Profitability	-0.4910 **	-0.3049 **	-1.0348 **	-0.9080 **	-1.4038 **	-0.6035 **	-1.3141 **	-0.4952 *	-0.4819 *	-0.3041 **	-0.9132 **	-0.4079 **	-0.7080 **	-0.3492 **	-1.0324 **	-0.8542 **	-0.4427 **	-0.2573 **
	0.120	*0.088*	*0.252*	*0.243*	*0.342*	*0.082*	*0.297*	*0.199*	*0.197*	*0.094*	*0.123*	*0.070*	*0.169*	*0.122*	*0.211*	*0.219*	*0.132*	*0.073*
Size	0.0096	0.0612 **	-0.0056	-0.0184	-0.0082	0.0635 **	0.0193	-0.1444 **	0.0390 **	0.1098 **	0.0184 *	0.0461 *	0.0552 **	-0.0853 **	0.0063	-0.0024	0.0335 **	-0.0177
	0.009	*0.020*	*0.009*	*0.024*	*0.011*	*0.015*	*0.011*	*0.047*	*0.006*	*0.021*	*0.007*	*0.023*	*0.010*	*0.026*	*0.004*	*0.018*	*0.008*	*0.015*
Growth Options	0.0192 **	0.0127 **	0.0127	0.0079	0.0475 **	0.0198 **	0.0087	0.0419 **	0.0005	0.0057	0.0294 **	0.0251 **	0.0717 **	0.0304	0.0181 **	0.0089	0.0022	0.0008
	0.004	*0.004*	*0.009*	*0.009*	*0.009*	*0.005*	*0.029*	*0.013*	*0.008*	*0.007*	*0.007*	*0.009*	*0.022*	*0.020*	*0.005*	*0.005*	*0.002*	*0.001*
Tax Rate	0.0016	0.0001	-0.0006	-0.0008	-0.0002	-0.0003	0.0233 **	0.0035	0.0000	0.0000 **	0.0019 **	-0.0004	-0.0192 *	-0.0214 **	0.0000	0.0000	0.0018	-0.0003
	0.001	*0.000*	*0.002*	*0.002*	*0.005*	*0.002*	*0.007*	*0.006*	*0.000*	*0.000*	*0.001*	*0.000*	*0.009*	*0.007*	*0.000*	*0.000*	*0.002*	*0.001*
Business Risk	0.8765 **		0.5478		-0.0022		2.1976 **		-1.0201 **		0.3972 *		-0.9832 **		0.0088		-1.4374 **	
	0.292		*0.298*		*0.004*		*0.428*		*0.217*		*0.197*		*0.286*		*0.009*		*0.177*	
Agriculture, Forestry and Fishing	-0.1237 **		-0.0466		-0.0459 *				-0.1530 *		-0.1173 **				-0.1153 **			
	0.046		*0.035*		*0.021*				*0.065*		*0.032*				*0.017*			
Construction	-0.0468		-0.0790 **		-0.0253				0.0503		-0.1966 **				-0.0592 **		-0.0492 *	
	0.031		*0.025*		*0.019*				*0.048*		*0.032*				*0.021*		*0.021*	
Mining	0.0715		0.0595		0.0576		0.0513		-0.1447 **		-0.0967 **		0.1141		0.0016		0.0951 **	
	0.037		*0.102*		*0.069*		*0.064*		*0.026*		*0.028*		*0.061*		*0.032*		*0.018*	
Retail Trade			0.0070		0.0276		0.0492		-0.0633 **						-0.0107		0.2408 **	
			0.018		*0.029*		*0.026*		*0.020*						*0.012*		*0.042*	
Services					0.1220 **		0.0952		0.1298 **		0.0822				0.1074 **		-0.0964 **	
					0.044		*0.071*		*0.048*		*0.047*				*0.041*		*0.025*	
Transportation and Public Utilities	0.1516 **		0.0931 **		0.1606 **		0.2300 **		0.0162		-0.0457		-0.1207 **		0.0794 **		-0.0091	
	0.033		*0.018*		*0.020*		*0.037*		*0.030*		*0.036*		*0.025*		*0.012*		*0.015*	
Wholesale Trade	-0.0173		-0.0283		-0.0452				0.0555 *		0.1565 **				-0.0281			
	0.036		*0.026*		*0.032*				*0.028*		*0.033*				*0.017*			
# Observations	795	795	4,395	4,395	1,515	1,515	390	390	1,680	1,680	1,470	1,470	360	360	10,605	10,605	1,980	1,980
Adjusted R-squared	0.261	0.800	0.335	0.525	0.438	0.816	0.609	0.854	0.290	0.776	0.365	0.741	0.657	0.876	0.319	0.547	0.442	0.893

Table 4.5. (continued) Country-by-Country Panel Data Analysis of Leverage Ratios. "Simple pooling" refers to plain ordinary least squares estimation of all data pooled together for each country, in the period 1986-2000; "Fixed effects" refers to a fixed effects model where each firm in the sample receives its own (different) intercept; "Random effects" assumes that the intercepts are drawn from a common distribution; "Latin America 7" refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela; "Manufacturing" is the industry sector dummy variable base-case; Reported standard errors are heteroskedasticity-robust; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel B: Dependent Variable is Total Book Liabilities/Book Equity (LR2)

Country	Argentina		Brazil		Chile		Colombia		Mexico		Peru		Venezuela		Latin America 7		United States	
Independent Variables	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Random Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects
Intercept	4.6491 **		0.5596		0.6340 *		-1.8734 *		-1.1454		1.7670 **		0.1927	0.3346	-1.5892		-12.7256 **	
	1.611		*1.743*		*0.319*		*0.860*		*0.760*		*0.578*		*0.486*	*0.695*	*1.157*		*2.276*	
Tangibility	3.9761 *	8.1100 *	0.6420	3.8335 *	-0.8255 **	-0.7119 *	-0.7632	0.8047	0.0725	4.0710 *	-0.6089	-0.0831	-1.5211 *	-1.2157 *	0.7667	4.7369 **	0.3025	-1.9257
	1.544	*3.164*	*1.322*	*1.558*	*0.138*	*0.297*	*0.523*	*0.921*	*0.385*	*1.705*	*0.503*	*0.728*	*0.617*	*0.504*	*1.087*	*1.471*	*0.676*	*1.244*
Profitability	-12.5762 **	-9.6707 **	-3.4351 *	-2.9788 *	-2.4000 **	-2.4791 **	-2.7235 *	-2.6511	-1.0590	0.5231	-4.2491 **	-2.3668 **	-3.1557 **	-2.5386 **	-4.8096 **	-2.9822 **	-7.8893 **	-4.2334 **
	2.991	*2.511*	*1.373*	*1.305*	*0.736*	*0.400*	*1.374*	*1.550*	*1.324*	*0.801*	*1.053*	*0.668*	*0.988*	*0.605*	*1.475*	*1.005*	*1.716*	*1.455*
Size	-0.8155 **	2.0464 **	-0.3622 *	0.2201	0.0384	0.2179 **	0.1540 *	-0.8713 **	0.1840 **	0.9635 **	-0.0816	0.2258	0.1164 *	0.0876	-0.0166	1.1674 **	0.9172 **	-0.2090
	0.205	*0.584*	*0.149*	*0.265*	*0.026*	*0.067*	*0.068*	*0.309*	*0.056*	*0.318*	*0.073*	*0.225*	*0.051*	*0.057*	*0.074*	*0.268*	*0.132*	*0.238*
Growth Options	4.0977 **	4.6333 **	5.6238 **	5.3906 **	0.0967 **	0.0760 **	-0.1972	0.1604	-0.0041	0.1795	0.5459 **	0.7074 **	0.4242 **	0.3583 **	2.7952 **	3.4321 **	0.1427 **	0.1329 **
	0.778	*0.665*	*1.465*	*0.848*	*0.021*	*0.021*	*0.165*	*0.090*	*0.057*	*0.117*	*0.142*	*0.157*	*0.137*	*0.082*	*1.043*	*0.723*	*0.033*	*0.036*
Tax Rate	0.0132	0.0101	-0.0058	0.0036	0.0053	0.0070	0.0678	0.0663	0.0000	-0.0002 **	0.0047	-0.0053	-0.1099	-0.1287 **	0.0000	0.0000	-0.0132	0.0003
	0.009	*0.011*	*0.026*	*0.016*	*0.013*	*0.007*	*0.055*	*0.079*	*0.000*	*0.000*	*0.003*	*0.008*	*0.067*	*0.035*	*0.000*	*0.000*	*0.032*	*0.012*
Business Risk	0.0943		12.3689		-0.0023		31.6645 **		-1.2503		0.7651		-3.2294 **	-3.4095 *	0.5947		-10.6711 **	
	3.586		*6.357*		*0.021*		*7.371*		*2.459*		*1.200*		*0.999*	*1.714*	*0.340*		*1.930*	
Agriculture, Forestry and Fishing	0.0393		0.5208		-0.0375				-0.6144 *		-0.2663				-0.6695 **			
	0.446		*0.370*		*0.065*				*0.251*		*0.193*				*0.249*			
Construction	-0.9412		1.6384 *		-0.1395 **				0.2318		-0.2842				0.2091		-0.4896 *	
	0.566		*0.697*		*0.040*				*0.260*		*0.173*				*0.338*		*0.232*	
Mining	-0.6156		-1.3910 *		-0.2711		-0.2691		-0.6875 **		-0.3770		0.3230 *	0.3446	-1.8038 **		0.9141 **	
	0.679		*0.653*		*0.146*		*0.385*		*0.132*		*0.226*		*0.154*	*0.319*	*0.582*		*0.273*	
Retail Trade			-1.6922 **		0.0584		0.3286		-0.3395 **						-2.1760 **		-0.4545	
			0.557		*0.084*		*0.179*		*0.120*						*0.687*		*1.363*	
Services					0.3105 **		0.1703		0.4095		-0.1332				-1.6521		-0.8257 **	
					0.100		*0.336*		*0.621*		*0.300*				*0.934*		*0.236*	
Transportation and Public Utilities	-1.1256		0.3861		0.3728 **		2.0695 **		0.6424 *		-0.5418		-0.2897 **	-0.2355	-1.4189		-0.1278	
	0.660		*0.455*		*0.051*		*0.578*		*0.324*		*0.383*		*0.091*	*0.187*	*0.724*		*0.276*	
Wholesale Trade	-0.1236		-1.2147 *		-0.0765				0.1651		0.9447 **				-1.2776 **			
	0.435		*0.617*		*0.129*				*0.191*		*0.315*				*0.443*			
# Observations	795	795	4,395	4,395	1,515	1,515	390	390	1,680	1,680	1,470	1,470	360	360	10,605	10,605	1,980	1,980
Adjusted R-squared	0.796	0.844	0.451	0.610	0.262	0.611	0.682	0.823	0.069	0.384	0.268	0.534	0.618	0.612	0.236	0.506	0.353	0.794

Table 4.5. (continued) Country-by-Country Panel Data Analysis of Leverage Ratios. "Simple pooling" refers to plain ordinary least squares estimation of all data pooled together for each country, in the period 1986-2000; "Fixed effects" refers to a fixed effects model where each firm in the sample receives its own (different) intercept; "Random effects" assumes that the intercepts are drawn from a common distribution; "Latin America 7" refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela; "Manufacturing" is the industry sector dummy variable base-case; Reported standard errors are heteroskedasticity-robust; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel C: Dependent Variable is Long-Term Book Liabilities/Book Equity (LR3)

Country	Argentina		Brazil		Chile		Colombia		Mexico		Peru		Venezuela		Latin America 7		United States	
Independent Variables	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects
Intercept	0.7711		-1.5730		-0.5722 **		-1.3630 *		-1.3694 **		0.2175		-0.3163		-1.9663 *		-8.6419 **	
	0.458		*1.268*		*0.202*		*0.565*		*0.469*		*0.277*		*0.255*		*0.949*		*1.720*	
Tangibility	0.6464 **	0.7434 *	1.7024	3.0203 *	0.0307	0.1732	-0.0136	0.9921	0.1021	2.6609	-0.1471	-0.0979	-0.6907 *	-0.3386	1.2115	3.1356 *	2.0228 **	0.9742
	0.177	*0.366*	*1.258*	*1.208*	*0.064*	*0.150*	*0.376*	*0.629*	*0.261*	*1.463*	*0.210*	*0.208*	*0.302*	*0.225*	*1.009*	*1.260*	*0.517*	*1.265*
Profitability	-1.7117 **	-0.7557	-1.7918 *	-1.5666 *	-0.9122 *	-0.9554 **	-1.8771 *	-1.3259	-0.8041	-0.2399	-1.9700 **	-1.0423 **	-1.0088 **	-0.6414 **	-2.4037 *	-1.2369 *	-4.9536 **	-2.2430 **
	0.423	*0.588*	*0.906*	*0.761*	*0.422*	*0.253*	*0.924*	*1.178*	*0.544*	*0.346*	*0.515*	*0.340*	*0.344*	*0.221*	*1.056*	*0.508*	*1.120*	*0.791*
Size	-0.0978 *	0.1410	-0.2156	-0.0027	0.0633 **	0.1641 **	0.0837 *	-0.6087 **	0.1617 **	0.7231 **	-0.0049	0.1969	0.0875 **	-0.1121 *	0.0016	0.5699 **	0.5416 **	-0.0920
	0.038	*0.078*	*0.132*	*0.163*	*0.017*	*0.057*	*0.042*	*0.229*	*0.034*	*0.259*	*0.031*	*0.124*	*0.020*	*0.054*	*0.061*	*0.157*	*0.097*	*0.128*
Growth Options	0.2995 **	0.3539 **	4.0138 *	3.3922 **	0.0401 **	0.0301 *	-0.1311	0.0822	-0.0104	0.1290	0.2874 **	0.3015 **	0.1519 **	0.0670	1.8053	1.8885 **	0.0700 **	0.0605 **
	0.035	*0.035*	*1.619*	*0.822*	*0.012*	*0.013*	*0.100*	*0.071*	*0.039*	*0.096*	*0.082*	*0.072*	*0.049*	*0.036*	*1.006*	*0.633*	*0.017*	*0.018*
Tax Rate	0.0037 **	0.0006	-0.0081	0.0095	-0.0038	-0.0028	0.0298	0.0193	0.0000 **	-0.0001 **	0.0033 **	-0.0058	-0.0242	-0.0360 *	0.0000	0.0000	-0.0059	-0.0007
	0.001	*0.002*	*0.018*	*0.010*	*0.011*	*0.007*	*0.037*	*0.058*	*0.000*	*0.000*	*0.001*	*0.008*	*0.019*	*0.018*	*0.000*	*0.000*	*0.021*	*0.007*
Business Risk	2.1617		10.8585		0.0020		18.0022 **		-0.9984		-0.1842		-1.6756 **		0.4542		-4.3000 **	
	1.157		*6.536*		*0.012*		*4.949*		*1.810*		*0.647*		*0.496*		*0.326*		*1.329*	
Agriculture, Forestry and Fishing	-0.1290		0.5711		-0.0072				-0.4833 **		-0.0485				-0.3341			
	0.128		*0.301*		*0.057*				*0.079*		*0.118*				*0.178*			
Construction	-0.3095 *		1.5477 *		-0.1006 **				-0.1940		-0.0295				0.2744		-0.2432	
	0.125		*0.746*		*0.023*				*0.135*		*0.112*				*0.277*		*0.155*	
Mining	0.1053		-0.8871		-0.0928		-0.1048		-0.4058 **		-0.0159		0.0350		-1.0214		0.6026 **	
	0.088		*0.496*		*0.084*		*0.280*		*0.098*		*0.118*		*0.105*		*0.527*		*0.198*	
Retail Trade			-1.0472 *		-0.0675		0.0680		-0.4481 **						-1.3958 *		-0.2670	
			0.439		*0.050*		*0.108*		*0.075*						*0.637*		*0.791*	
Services					0.3573 **		0.1147		-0.0651		0.1873				-1.0978		-0.6161 **	
					0.088		*0.206*		*0.190*		*0.166*				*0.758*		*0.148*	
Transportation and Public Utilities	0.1992 *		0.1395		0.2429 **		1.3264 **		0.5888 *		-0.0777		-0.1782 **		-0.8693		-0.2766	
	0.097		*0.286*		*0.034*		*0.372*		*0.260*		*0.117*		*0.045*		*0.668*		*0.209*	
Wholesale Trade	-0.2756 *		-0.7758		-0.0802 *				-0.2654 *		0.1759				-0.8134 *			
	0.107		*0.445*		*0.033*				*0.119*		*0.164*				*0.332*			
# Observations	795	795	4,395	4,395	1,515	1,515	390	390	1,680	1,680	1,470	1,470	360	360	10,605	10,605	1,980	1,980
Adjusted R-squared	0.305	0.505	0.467	0.768	0.214	0.556	0.635	0.753	0.157	0.517	0.254	0.605	0.481	0.795	0.207	0.661	0.320	0.764

Table 4.5. (continued) Country-by-Country Panel Data Analysis of Leverage Ratios. "Simple pooling" refers to plain ordinary least squares estimation of all data pooled together for each country, in the period 1986-2000; "Fixed effects" refers to a fixed effects model where each firm in the sample receives its own (different) intercept; "Random effects" assumes that the intercepts are drawn from a common distribution; "Latin America 7" refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela; "Manufacturing" is the industry sector dummy variable base-case; Reported standard errors are heteroskedasticity-robust; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel D: Dependent Variable is Market Value of Debt/Total Market Value of the Firm (LR4)

Country	Argentina		Brazil		Chile		Colombia		Mexico		Peru		Venezuela		Latin America 7		United States	
Independent Variables	Simple Pooling	Random Effects	Simple Pooling	Random Effects	Simple Pooling	Random Effects	Simple Pooling	Fixed Effects	Simple Pooling	Fixed Effects	Simple Pooling	Random Effects	Simple Pooling	Random Effects	Simple Pooling	Random Effects	Simple Pooling	Fixed Effects
Intercept	0.2761		0.3344		0.7121		1.4452		0.0974		0.0589		0.1468		0.3525		-0.1419	
	0.585		*0.429*		*0.657*		*1.821*		*0.107*		*0.177*		*0.213*		*0.195*		*0.307*	
Tangibility	0.2582	0.9742	0.0560	0.9742	-0.3178	0.9742	1.9008	6.7081 **	0.3259 **	0.8950 **	0.6715 *	0.8950 **	-0.0391	0.8950 **	0.0592	0.8950 **	0.1162	-0.3692 **
	0.593	*1.265*	*0.217*	*1.265*	*0.330*	*1.265*	*2.139*	*1.533*	*0.091*	*0.173*	*0.332*	*0.173*	*0.239*	*0.173*	*0.119*	*0.173*	*0.060*	*0.132*
Profitability	-0.7678	-2.2430 **	-0.2578 **	-2.2430 **	-0.6439 **	-2.2430 **	-0.1894	1.4887	-0.4362 *	-0.2360 *	-0.8618 *	-0.2360 *	-0.8177 **	-0.2360 *	-0.3434 **	-0.2360 *	0.1782	0.5411
	0.482	*0.791*	*0.095*	*0.791*	*0.169*	*0.791*	*3.131*	*2.775*	*0.206*	*0.116*	*0.348*	*0.116*	*0.283*	*0.116*	*0.094*	*0.116*	*0.546*	*0.432*
Size	-0.0166	-0.0920	-0.0057	-0.0920	-0.0128	-0.0920	-0.2305	-0.9014	0.0139	0.0374	-0.0199	0.0374	0.0311	0.0374	-0.0045	0.0374	0.0147	0.0485 **
	0.020	*0.128*	*0.021*	*0.128*	*0.025*	*0.128*	*0.208*	*0.521*	*0.009*	*0.032*	*0.021*	*0.032*	*0.020*	*0.032*	*0.009*	*0.032*	*0.016*	*0.017*
Growth Options	-0.0144	0.0605 **	-0.0587 **	0.0605 **	-0.0477	0.0605 **	-0.1920	0.2266	-0.0749 **	-0.0555 **	-0.0243 *	-0.0555 **	-0.1153 *	-0.0555 **	-0.0506 **	-0.0555 **	-0.0011	-0.0012
	0.018	*0.018*	*0.020*	*0.018*	*0.035*	*0.018*	*0.171*	*0.116*	*0.012*	*0.013*	*0.012*	*0.013*	*0.046*	*0.013*	*0.013*	*0.013*	*0.001*	*0.001*
Tax Rate	0.0023	-0.0007	0.0004	-0.0007	-0.0001	-0.0007	-0.1303	0.4686	0.0000 *	0.0000 **	0.0052 **	0.0000 **	-0.0234	0.0000 **	0.0000	0.0000 **	0.0149 **	0.0100 **
	0.002	*0.007*	*0.003*	*0.007*	*0.010*	*0.007*	*0.339*	*0.394*	*0.000*	*0.000*	*0.001*	*0.000*	*0.023*	*0.000*	*0.000*	*0.000*	*0.004*	*0.002*
Business Risk	0.4320		0.5971		-0.1090 **		5.8607		-1.4798 **		0.9002 *		-2.6325 **		-0.0870 **		-1.3858 **	
	0.765		*0.460*		*0.038*		*4.714*		*0.367*		*0.363*		*0.658*		*0.034*		*0.282*	
Agriculture, Forestry and Fishing	0.0993		0.2030 **		-0.1214				-0.2209 **		-0.2260 **				-0.0925			
	0.360		*0.078*		*0.076*				*0.069*		*0.082*				*0.093*			
Construction	-0.1804 *		0.4169		-0.2244				0.1983 **		-0.1046				0.2213		-0.0435	
	0.091		*0.302*		*0.127*				*0.066*		*0.094*				*0.157*		*0.042*	
Mining	0.0781		-0.2539 **		-0.1858		1.1349		-0.1554 **		-0.1115 *		0.3435 **		-0.0709		0.1971 **	
	0.205		*0.093*		*0.097*		*0.928*		*0.045*		*0.046*		*0.130*		*0.048*		*0.053*	
Retail Trade			-0.6974 *		-0.1127 **		0.0115		-0.1251 **						-0.3344 **		0.2212 **	
			0.272		*0.027*		*0.273*		*0.027*						*0.098*		*0.046*	
Services					0.3519 **		-0.4969		0.0868		0.0197				0.0904		-0.0700 **	
					0.085		*0.399*		*0.047*		*0.105*				*0.050*		*0.017*	
Transportation and Public Utilities	0.1143		-0.0030		0.0570 **		0.1777		-0.0020		-0.1613 **		-0.1726 **		-0.0096		0.1567 **	
	0.179		*0.036*		*0.018*		*0.167*		*0.031*		*0.054*		*0.040*		*0.023*		*0.025*	
Wholesale Trade	0.0068		-0.4358 **		-0.1985				0.0460		0.3522 *				-0.1262 *			
	0.085		*0.132*		*0.141*				*0.046*		*0.153*				*0.063*			
# Observations	795	795	4,395	4,395	1,515	1,515	390	390	1,680	1,680	1,470	1,470	360	360	10,605	10,605	1,980	1,980
Adjusted R-squared	-0.005	-0.005	0.007	0.007	0.024	0.024	0.107	0.414	0.364	0.646	0.066	0.061	0.587	0.584	0.009	0.009	0.352	0.737

Table 4.6. Effects of Explanatory Variables on Dependent Variables. Theoretically predicted and empirically observed effects.

Explanatory Variables	Effect on Dependent Variable						
	Predicted by Theory	*Empirical Findings*					
		Leverage Measure (Dependent Variable)					*Hypothesis Implication*
		LR1	LR2	LR3	LR4	*Overall*	
Tangibility	*Positive*	Strongly Negative	Ambiguous	Mostly Positive	Mostly Positive	*Ambiguous*	*Neutral*
Profitability	*Positive*[*†] *Negative*[‡]	Strongly Negative	Strongly Negative	Strongly Negative	Strongly Negative	*Strongly Negative*	*Supports POP*
Size	*Positive*[*] *Negative*[†‡]	Mostly Positive	Ambiguous	Ambiguous	Ambiguous	*Ambiguous*	*Neutral*
Growth Options	*Negative*[*†] *Positive*[‡]	Strongly Positive	Strongly Positive	Strongly Positive	Mostly Negative	*Likely Positive*	*Supports POP*[§]
Tax Rate	*Positive*[*] *Undetermined*[†‡]	Ambiguous	Mostly Negative	Ambiguous	Mostly Positive	*Ambiguous*	*Neutral*
Business Risk	*Negative*	Ambiguous	Mostly Negative	Ambiguous	Mostly Negative	*Likely Negative*	*Neutral*

[*] Static Tradeoff Hypotheses; [†] Information Asymmetry Hypotheses; [‡] Pecking Order Proposition; [§] Except for LR4;

Table 4.7. Panel Data Analysis of Leverage Ratios Using Pooled Data for Latin America. The results are ordinary least squares estimation of all data pooled together for all Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela), in the period 1986-2000; Dummy variable base-cases are "Brazil" (for countries) and "Manufacturing" (for industry sectors). Reported standard errors are heteroskedasticity-robust; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel A: Dependent Variable is Total Book Liabilities/Total Book Assets (LR1)

Model /	Including Firm-Specific Variables				Excluding Firm-Specific Variables		
Independent Variables	I	II	III	IV	V	VI	VII
Intercept	0.5798 **	0.6352 **	0.5997 **	0.6767 **	0.4642 **	0.4866 **	0.5393 **
	0.047	*0.058*	*0.051*	*0.063*	*0.016*	*0.013*	*0.024*
Tangibility	-0.3738 **	-0.3586 **	-0.3607 **	-0.3466 **			
	0.028	*0.029*	*0.029*	*0.030*			
Profitability	-1.0324 **	-1.0218 **	-1.0282 **	-1.0129 **			
	0.211	*0.212*	*0.213*	*0.213*			
Size	0.0063	0.0012	0.0054	-0.0006			
	0.004	*0.005*	*0.004*	*0.005*			
Growth Options	0.0181 **	0.0181 **	0.0160 **	0.0174 **			
	0.005	*0.005*	*0.005*	*0.005*			
Tax Rate	0.0000	0.0000	0.0000	0.0000			
	0.000	*0.000*	*0.000*	*0.000*			
Business Risk	0.0088	0.0092	0.0096	0.0103			
	0.009	*0.008*	*0.009*	*0.008*			
Agriculture, Forestry and Fishing	-0.1153 **	-0.1005 **	-0.1322 **	-0.1051 **			
	0.017	*0.017*	*0.018*	*0.017*			
Construction	-0.0592 **	-0.0743 **	-0.0628 **	-0.0765 **			
	0.021	*0.020*	*0.021*	*0.020*			
Mining	0.0016	0.0147	-0.0087	0.0124			
	0.032	*0.035*	*0.033*	*0.036*			
Retail Trade	-0.0107	-0.0220	-0.0170	-0.0246 *			
	0.012	*0.011*	*0.013*	*0.012*			
Services	0.1074 **	0.0791	0.0927 *	0.0751			
	0.041	*0.041*	*0.041*	*0.041*			
Transportation and Public Utilities	0.0794 **	0.0907 **	0.0707 **	0.0832 **			
	0.012	*0.012*	*0.012*	*0.012*			
Wholesale Trade	-0.0281	-0.0364 *	-0.0356 *	-0.0392 *			
	0.017	*0.016*	*0.017*	*0.016*			
Argentina		-0.0011		-0.0301 *	-0.0412 *		-0.0995 **
		0.013		*0.015*	*0.020*		*0.027*
Chile		-0.0344 *		-0.0672 **	-0.1465 **		-0.2012 **
		0.015		*0.016*	*0.018*		*0.027*
Colombia		-0.0497 **		-0.0793 **	-0.1424 **		-0.2136 **
		0.017		*0.019*	*0.023*		*0.029*
Mexico		0.0507 **		0.0231 *	0.0343		-0.0266
		0.011		*0.012*	*0.019*		*0.027*
Peru		-0.0314		-0.0657 **	-0.0350		-0.0962 **
		0.016		*0.020*	*0.018*		*0.027*
Venezuela		-0.0743 **		-0.0974 **	-0.1376 **		-0.2134 **
		0.017		*0.019*	*0.024*		*0.030*
GDP			-0.0186	0.1283		-0.8046 **	-0.3211
			0.145	*0.138*		*0.149*	*0.164*
Inflation Rate			-0.0032 *	-0.0040 **		-0.0095 **	-0.0118 **
			0.001	*0.001*		*0.001*	*0.002*
Real Interest Rate			-0.0001	-0.0002		0.0006	0.0000
			0.000	*0.000*		*0.000*	*0.000*
Real Stock Returns			-0.0010	-0.0016		0.0022	0.0001
			0.001	*0.001*		*0.001*	*0.001*
# Observations	10,605	10,605	10,605	10,605	10,605	10,605	10,605
Adjusted R-squared	0.319	0.322	0.322	0.327	0.008	0.006	0.017

Table 4.7. (continued) Panel Data Analysis of Leverage Ratios Using Pooled Data for Latin America. The results are ordinary least squares estimation of all data pooled together for all Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela), in the period 1986-2000; Dummy variable base-cases are "Brazil" (for countries) and "Manufacturing" (for industry sectors). Reported standard errors are heteroskedasticity-robust; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel B: Total Book Liabilities/Book Equity (LR2)

Model /	Including Firm-Specific Variables				Excluding Firm-Specific Variables		
Independent Variables	I	II	III	IV	V	VI	VII
Intercept	-1.5892	0.3490	-0.3349	1.0036	1.5637 **	1.5610 **	1.9238 **
	1.157	*0.812*	*0.842*	*0.766*	*0.186*	*0.189*	*0.293*
Tangibility	0.7667	0.6537	0.5304	0.6768			
	1.087	*0.985*	*0.986*	*0.979*			
Profitability	-4.8096 **	-4.1250 **	-4.4814 **	-3.9476 **			
	1.475	*1.255*	*1.363*	*1.221*			
Size	-0.0166	-0.1184	-0.0641	-0.1308			
	0.074	*0.097*	*0.087*	*0.100*			
Growth Options	2.7952 **	3.1723 **	2.9741 **	3.2295 **			
	1.043	*1.110*	*1.079*	*1.120*			
Tax Rate	0.0000	-0.0003	-0.0001	-0.0003			
	0.000	*0.000*	*0.000*	*0.000*			
Business Risk	0.5947	0.7684 *	0.6559	0.7991 *			
	0.340	*0.354*	*0.344*	*0.361*			
Agriculture,	-0.6695 **	1.6707 *	-0.0335	1.6273 *			
Forestry and Fishing	*0.249*	*0.705*	*0.259*	*0.689*			
Construction	0.2091	0.5146	0.1696	0.4572			
	0.338	*0.420*	*0.329*	*0.403*			
Mining	-1.8038 **	-1.1414 **	-1.5607 **	-1.1733 **			
	0.582	*0.387*	*0.489*	*0.388*			
Retail Trade	-2.1760 **	-1.3420 **	-2.1140 **	-1.4151 **			
	0.687	*0.398*	*0.650*	*0.417*			
Services	-1.6521	-0.1855	-1.3162	-0.1818			
	0.934	*0.723*	*0.848*	*0.720*			
Transportation and	-1.4189	-0.7235	-1.1986	-0.7950			
Public Utilities	*0.724*	*0.499*	*0.636*	*0.514*			
Wholesale Trade	-1.2776 **	-0.0483	-1.0281 *	-0.0589			
	0.443	*0.411*	*0.400*	*0.411*			
Argentina		-1.5610 *		-1.5496 *	0.3957		0.1407
		0.652		*0.635*	*0.488*		*0.509*
Chile		-4.4447 **		-4.1514 **	-0.9861 **		-1.2119 **
		1.427		*1.303*	*0.187*		*0.234*
Colombia		-0.3828		-0.6207	-0.6091 *		-0.9252 **
		0.281		*0.319*	*0.280*		*0.338*
Mexico		-3.0141 **		-3.0099 **	-0.4116		-0.6817 *
		1.064		*1.043*	*0.248*		*0.300*
Peru		-2.1573 **		-1.9926 **	-0.4562 *		-0.7268 **
		0.747		*0.676*	*0.217*		*0.270*
Venezuela		-0.8661 **		-1.1913 **	-0.9315 **		-1.2761 **
		0.224		*0.289*	*0.195*		*0.285*
GDP			-26.1946 **	-14.5225 **		-5.1545 *	-2.1488
			9.327	*5.422*		*2.566*	*2.398*
Inflation Rate			0.0427	0.0099		-0.0351	-0.0499
			0.045	*0.044*		*0.041*	*0.042*
Real Interest Rate			-0.0042	-0.0172		0.0021	-0.0020
			0.017	*0.017*		*0.015*	*0.015*
Real Stock Returns			0.0073	-0.0434		0.0136	-0.0012
			0.042	*0.041*		*0.037*	*0.036*
# Observations	10,605	10,605	10,605	10,605	10,605	10,605	10,605
Adjusted R-squared	0.236	0.272	0.252	0.277	0.002	0.000	0.002

Table 4.7. (continued) Panel Data Analysis of Leverage Ratios Using Pooled Data for Latin America. The results are ordinary least squares estimation of all data pooled together for all Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela), in the period 1986-2000; Dummy variable base-cases are "Brazil" (for countries) and "Manufacturing" (for industry sectors). Reported standard errors are heteroskedasticity-robust; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

Panel C: Dependent Variable is Long-Term Book Liabilities/Book Equity (LR3)

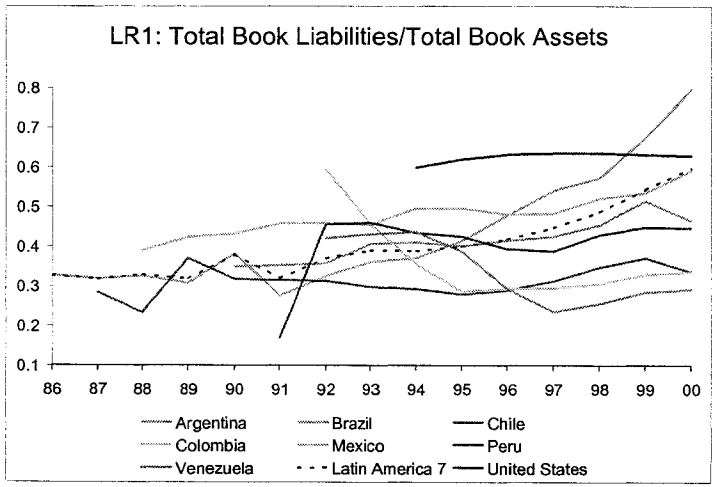
Model /	Including Firm-Specific Variables				Excluding Firm-Specific Variables		
Independent Variables	I	II	III	IV	V	VI	VII
Intercept	-1.9663 *	-0.7343	-1.0836	-0.1973	0.7200 **	0.7597 **	0.9772 **
	0.949	*0.445*	*0.553*	*0.389*	*0.124*	*0.127*	*0.211*
Tangibility	1.2115	1.1385	1.0756	1.1564			
	1.009	*0.918*	*0.912*	*0.913*			
Profitability	-2.4037 *	-1.9876 *	-2.1714 *	-1.8438 *			
	1.056	*0.848*	*0.935*	*0.792*			
Size	0.0016	-0.0637	-0.0324	-0.0765			
	0.061	*0.086*	*0.077*	*0.091*			
Growth Options	1.8053	2.0376	1.9137	2.0724			
	1.006	*1.097*	*1.052*	*1.111*			
Tax Rate	0.0000	-0.0002	-0.0001	-0.0002			
	0.000	*0.000*	*0.000*	*0.000*			
Business Risk	0.4542	0.5603	0.4953	0.5822			
	0.326	*0.358*	*0.338*	*0.366*			
Agriculture, Forestry and Fishing	-0.3341	1.1694	0.0346	1.1322			
	0.178	*0.673*	*0.183*	*0.656*			
Construction	0.2744	0.4667	0.2383	0.4217			
	0.277	*0.378*	*0.264*	*0.359*			
Mining	-1.0214	-0.6016	-0.8741 *	-0.6132			
	0.527	*0.319*	*0.431*	*0.319*			
Retail Trade	-1.3958 *	-0.9220 **	-1.3705 *	-0.9754 **			
	0.637	*0.356*	*0.608*	*0.378*			
Services	-1.0978	-0.2702	-0.9125	-0.2714			
	0.758	*0.437*	*0.669*	*0.446*			
Transportation and Public Utilities	-0.8693	-0.4350	-0.7473	-0.4930			
	0.668	*0.445*	*0.585*	*0.463*			
Wholesale Trade	-0.8134 *	-0.0704	-0.6632 *	-0.0760			
	0.332	*0.289*	*0.277*	*0.289*			
Argentina		-1.1988		-1.2371 *	0.0425		-0.1458
		0.617		*0.602*	*0.211*		*0.242*
Chile		-2.7527 *		-2.6049 *	-0.4350 **		-0.6018 **
		1.403		*1.282*	*0.125*		*0.163*
Colombia		-0.1223		-0.3243	-0.2105		-0.4233
		0.180		*0.224*	*0.186*		*0.235*
Mexico		-1.7764		-1.8127	-0.1894		-0.3858 *
		1.032		*1.014*	*0.130*		*0.181*
Peru		-1.3389		-1.2807 *	-0.3527 **		-0.5298 **
		0.711		*0.641*	*0.132*		*0.178*
Venezuela		-0.4223 **		-0.6740 **	-0.4490 **		-0.6866 **
		0.142		*0.215*	*0.127*		*0.199*
GDP			-16.9405	-9.5567		-3.0982 *	-1.4305
			9.121	*5.265*		*1.538*	*1.258*
Inflation Rate			0.0100	-0.0113		-0.0348 *	-0.0438 *
			0.013	*0.010*		*0.015*	*0.018*
Real Interest Rate			-0.0003	-0.0084		0.0032	0.0008
			0.003	*0.005*		*0.004*	*0.004*
Real Stock Returns			0.0182	-0.0135		0.0201	0.0118
			0.014	*0.011*		*0.013*	*0.012*
# Observations	10,605	10,605	10,605	10,605	10,605	10,605	10,605
Adjusted R-squared	0.207	0.236	0.220	0.241	0.000	0.001	0.002

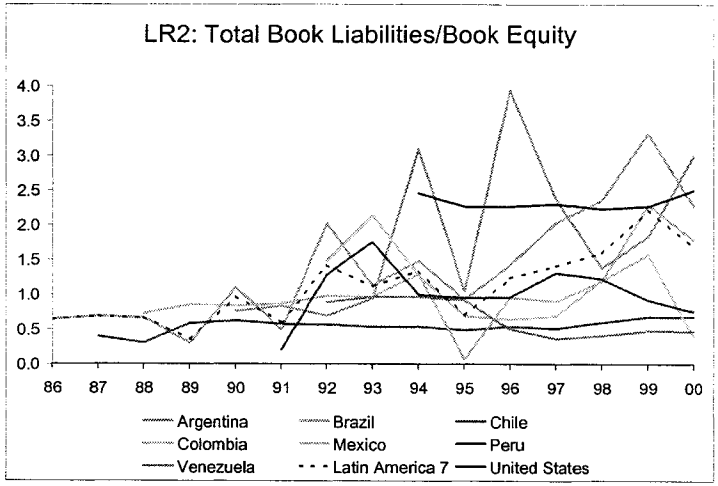
Table 4.7. (continued) Panel Data Analysis of Leverage Ratios Using Pooled Data for Latin America. The results are ordinary least squares estimation of all data pooled together for all Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela), in the period 1986-2000; Dummy variable base-cases are "Brazil" (for countries) and "Manufacturing" (for industry sectors). Reported standard errors are heteroskedasticity-robust; *Standard errors in italic*; * Significant at the 5% level; ** Significant at the 1% level.

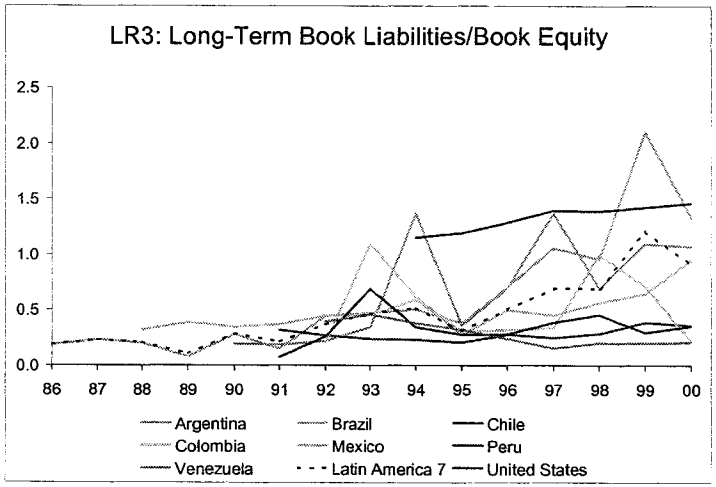
Panel D: Dependent Variable is Market Value of Debt/Total Market Value (LR4)

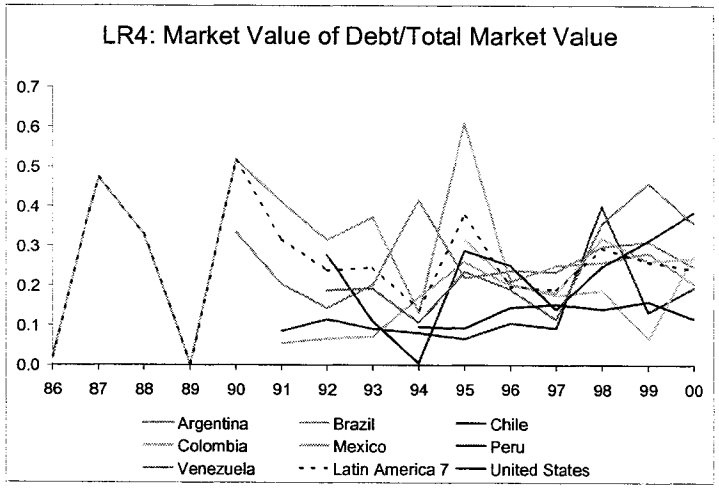
Model /	Including Firm-Specific Variables				Excluding Firm-Specific Variables		
Independent Variables	I	II	III	IV	V	VI	VII
Intercept	0.3525	0.4017	0.3972 *	0.4342	0.2905 **	0.3015 **	0.3253 **
	0.195	*0.226*	*0.194*	*0.231*	*0.037*	*0.024*	*0.045*
Tangibility	0.0592	0.0762	0.0587	0.0737			
	0.119	*0.132*	*0.115*	*0.127*			
Profitability	-0.3434 **	-0.3347 **	-0.3303 **	-0.3251 **			
	0.094	*0.095*	*0.092*	*0.093*			
Size	-0.0045	-0.0094	-0.0061	-0.0100			
	0.009	*0.011*	*0.009*	*0.011*			
Growth Options	-0.0506 **	-0.0511 **	-0.0471 **	-0.0493 **			
	0.013	*0.012*	*0.013*	*0.012*			
Tax Rate	0.0000	0.0000	0.0000	0.0000			
	0.000	*0.000*	*0.000*	*0.000*			
Business Risk	-0.0870 **	-0.0866 *	-0.0848 *	-0.0855 *			
	0.034	*0.034*	*0.034*	*0.034*			
Agriculture,	-0.0925	-0.0789	-0.0835	-0.0813			
Forestry and Fishing	*0.093*	*0.091*	*0.094*	*0.092*			
Construction	0.2213	0.2065	0.2185	0.2033			
	0.157	*0.161*	*0.157*	*0.161*			
Mining	-0.0709	-0.0598	-0.0722	-0.0646			
	0.048	*0.050*	*0.049*	*0.051*			
Retail Trade	-0.3344 **	-0.3481 **	-0.3354 **	-0.3515 **			
	0.098	*0.104*	*0.098*	*0.104*			
Services	0.0904	0.0546	0.0931	0.0553			
	0.050	*0.054*	*0.052*	*0.054*			
Transportation and	-0.0096	0.0010	-0.0072	-0.0011			
Public Utilities	*0.023*	*0.024*	*0.024*	*0.024*			
Wholesale Trade	-0.1262 *	-0.1355 *	-0.1228	-0.1377 *			
	0.063	*0.061*	*0.065*	*0.062*			
Argentina		-0.0052		0.0002	-0.0281		-0.0145
		0.051		*0.065*	*0.051*		*0.062*
Chile		-0.0289		-0.0041	-0.1465 **		-0.0980
		0.049		*0.067*	*0.045*		*0.066*
Colombia		-0.0437		-0.0530	-0.0893		-0.1007
		0.100		*0.106*	*0.099*		*0.104*
Mexico		0.0586		0.0666	-0.0655		-0.0458
		0.045		*0.062*	*0.039*		*0.055*
Peru		-0.0256		-0.0149	-0.0688		-0.0393
		0.064		*0.080*	*0.045*		*0.062*
Venezuela		-0.0498		-0.0587	-0.0388		-0.0566
		0.044		*0.053*	*0.046*		*0.054*
GDP			-0.7826 *	-0.8214		-1.6216 **	-1.3365 **
			0.372	*0.465*		*0.326*	*0.445*
Inflation Rate			-0.0007	-0.0008		0.0003	-0.0007
			0.006	*0.006*		*0.006*	*0.006*
Real Interest Rate			-0.0002	-0.0002		0.0001	-0.0002
			0.002	*0.002*		*0.002*	*0.002*
Real Stock Returns			0.0006	0.0008		0.0029 *	0.0017
			0.006	*0.001*		*0.001*	*0.001*
# Observations	10,605	10,605	10,605	10,605	10,605	10,605	10,605
Adjusted R-squared	0.009	0.008	0.008	0.007	0.000	0.001	0.000

Figure 4.1. Mean Leverage Ratios across Countries









CHAPTER V

5. Conclusions

5.1. Summary of the Dissertation

This dissertation presents three essays on the topic of International Business. The essays respectively cover the conceptual, economic policy, and corporate policy levels of the interdependence between the macroeconomy and finance for developing countries, with a particular focus on Latin America.

Chapter I presents a literature review on the relationship between finance and growth. There is a vast theoretical literature explaining the linkages of financial sector development and economic growth. Under competitive markets the role of the financial system in channeling savings towards the highest return projects is viewed as beneficial to welfare and growth. Moreover, as the financial market develops and becomes more competitive, transaction costs tend to fall and the net savings directed to investment increase. More recent literature, however, questions the direction of the impact of financial development on aggregate savings and the true benefits of risk diversification. Available empirical evidence in general supports the view that overall financial development has a positive effect on economic growth and that stock market development in particular has an even more substantial impact than banking development. There is evidence on the complementary roles between the banking system and the stock market as the financial system becomes more developed. The effect of financial integration with the global market is as yet ambiguous. The chapter closes with a few questions that are as yet unanswered. Three of these, namely the recent experience of developing countries with financial liberalization, the causal linkages between the real and the financial sectors of the economy, and the extent of macroeconomic influence on firms' financial behavior are then chosen to be further developed in the three chapters that follow.[1]

Chapter II reviews the theoretical and empirical literature on financial liberalization and discusses a few stylized facts observed from the recent economic record of developing countries in general and Latin America in

particular. I divide liberalization in two categories: the internal or domestic liberalization, and the external or international liberalization. Although many believe that external financial liberalization has the same potential benefits as trade liberalization, the instability that has been observed following liberalization and the disappointing economic performance over the past decade raises concerns that its costs may be substantial.

Chapter III studies the causality among inflation, real activity, and asset returns for seven Latin American countries. Different explanations have been suggested for the puzzling negative relationship observed between real stock returns and inflation. The most popular ones have been the Tax-Effects Hypothesis (Feldstein [1980]), the Proxy Hypothesis (Fama [1981]), and the Reverse Causality Hypothesis (Geske and Roll [1983]). This study extends research on relationships among expected real stock returns, expected real interest rates, expected real activity, and expected inflation to a sample of seven Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela) using Vector Autoregression (VAR) analysis. The same methodology is also applied to the Group of Seven industrialized countries (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States), and results compared. Some empirical support is found for each of the three main explanatory hypotheses. The results indicate that the differences between industrial and developing countries are not as sharp as initially presumed. Also, the results do not in general support previous findings for the United States even among other industrial countries, which suggests that the U.S. evidence cannot be generalized worldwide.

Chapter IV studies the determinants of capital structure in Latin America. Recent empirical evidence suggests that country-specific factors are major determinants of capital structure in emerging markets. These country-specific factors include institutional framework, legal and accounting practices, financial development, and the macroeconomic environment. Here, I investigate to what extent macroeconomic factors are determinants of capital structures in a sample of firms from seven Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela) plus a subset of firms from the United States. Latin

American countries are particularly interesting because, besides being well-known examples of developing economies, they have gone through a variety of macroeconomic environments in a relatively short period of time. If the environment is somehow important for capital structure decision, then it is likely that Latin American firms have experienced such effects. Using a Panel Data framework with several measures of leverage, and a set of firm-specific explanatory variables (asset tangibility, profitability, size, growth opportunities, the tax rate, and business risk), I explore the relationship between firm capital structure and four broad macroeconomic indicators: the real growth rate of Gross Domestic Product, the inflation rate, the ex-post real interest rate, and the ex-post real stock returns. I also test the Latin American data against three broad hypotheses in the literature: the Static-Tradeoff Hypotheses (STH), the Information Asymmetry Hypotheses (IAH), and the IAH variation, the Pecking Order Proposition (POP). My findings suggest that firm-specific factors are major determinants of capital structure for the sample of firms studied, while country-specific factors, although important, are at best minor determinants – which is in contrast to some previous studies. Also, the determinants of capital structure and their effects seem similar between Latin American countries and the United States, and some support is found in favor of Myers' [1984] Pecking Order Proposition.

5.2. Contributions of the Dissertation

5.2.1. Main Contributions

Each essay of this dissertation contributes to current knowledge in International Business studies in its own way.

Chapter II synthesizes the literature on financial liberalization, with a special focus on developing countries, and contrasts the theoretical predictions regarding financial liberalization in developing countries against a few stylized facts of recent economic record.

This essay's findings suggest that the recent wave of external financial liberalization in emerging economies has resulted in a remarkable increase of

capital flows (in particular of private sources) over the past decade, but the sustainability of such flows is questionable. Inflation did decline dramatically, and emerging equity markets experienced a boom and became more integrated with the world, but the optimal mechanics and sequencing of financial liberalization implementation are still largely unknown. More importantly, real economic effects have been disappointing in many countries, in particular in Latin America. Although theory predicts several benefits from liberalization, and some have been largely accrued by some emerging economies (notably in Southeast Asia), there are a number of failures that call into question the future of liberalization.

Chapter III adds to the empirical literature on the causal relationship among real and financial variables in several ways. In contrast to most previous studies, which focus only in the United States, developed markets, or single country data, it explores the topic in a multi-country sample, including some major emerging markets. Instead of using actual variables, chapter III uses expected versions of actual variables, which is more in tune with the theory. Expected versions of actual variables are estimated recursively using a Kalman Filter. Instead of arbitrarily determining the order of the Vector Autoregressions as some have done in the past (e.g. Lee [1992]), this study lets the data determine it by employing the Schwarz-Bayesian Information Criterion as a selection tool. The test for causal relationships uses more than a single methodology. And finally, besides exploring the problem in a country-by-country fashion, it also investigates causality relations by pooling countries together, while still allowing for country-specific effects.

In Chapter III, some support is found for the three major explanatory hypotheses of the relationship between inflation, assets' returns, and real activity. For the LA-7 and the G-7, causation is more often observed from stock returns to inflation, a finding against the Tax-Effects Hypothesis, with the exceptions of Peru, Venezuela, and Canada. The other countries are split between support for the Proxy Hypothesis and the Reverse Causality Hypothesis, with a slight advantage for this latter, and an inconclusive (France). Expected changes in real activity and the expected real interest rate seem to have a major role in such relationship,

which have not been entirely recognized in previous studies (e.g. James, Koreisha, and Partch [1985]). Given that country-specific effects do not seem to be a major factor in explaining such phenomenon, there is room for an explanatory model based upon economic fundamental relationships, which could have a general applicability across countries. In particular, different empirical techniques employed in Chapter III raise the question of whether the observed negative stock returns-inflation relationship is a short-term phenomenon, and – if that is the case – what the determinants of an optimal horizon for effective hedging are.

Finally, Chapter IV gives several empirical contributions to the vast existing body of knowledge on capital structure. First, the essay tests traditional theories of capital structure in a multi-country framework. Second, it does so in a sample of emerging markets using a novel database. Third, the study employs empirical techniques that account properly for cross-section and time series variation. And finally, it assesses the effect of country-specific and macroeconomic factors on a firm's capital structure.

This essay's findings suggest that – contrary to previous studies – country-specific factors although important, are not decisive determinants of capital structure. Moreover, idiosyncratic firm-specific factors emerge as major determinants of capital structure for the sample of firms studied, relative to country-specific factors. Indeed, traditional firm-specific factors of capital structure explain a great deal of the variation in a firm's leverage ratio, and the determinants of capital structure and their effects seem similar between Latin American countries and the United States. Finally, some support has been found in favor of the Pecking Order Proposition. Although a great deal has been said about the influence of country-specific factors and how these shape the way managers and firms behave, the evidence presented in the fourth chapter signals in the opposite direction: the factors that influence capital structure decisions are remarkably similar across countries. Moreover, firm-specific factors explain a lot more than country-specific ones. In addition, traditional theory-suggested determinants of capital structure – although relevant – do not seem to capture the whole story. There are grounds to

believe that other yet unknown firm-specific factors can further the understanding of this phenomenon.

Besides the above individual contributions of each essay, there are a couple of lessons that are learned across essays. Such lessons have several implications in terms of research, policymaking, and practicing management in International Business that I address below.

5.2.2. Implications for Researchers

The major finding of this dissertation is that, apart from striking differences in benefits of financial liberalization (in terms of economic performance) between the Latin American and Asian economies, and in costs (especially volatility) between industrial and emerging economies, distinctions in the relationship of economic variables between industrial and emerging economies do not seem so clear cut as often assumed by academicians, policymakers, and practitioners. This fact has broad research implications. On one hand, this finding gives rise to the prospect that theoretical generalization in International Business studies may be appropriate across strikingly different environments. On the other hand, several issues are left unexplained by current theory. There seems to be systematic differences between countries that do not depend on whether a country is developed or not. Latin America's economic performance in the wake of financial liberalization *vis-à-vis* other emerging economies, particularly Eastern Asia, is an example. This is also the case for the causality between stock returns and inflation that varies within and across industrial and emerging economies alike, without an obvious common pattern. Also, the determinants of a firm's leverage do not seem to depend decisively on the nationality of the firm, but still there are subtler differences between one country and another that cannot be explained solely by universal factors.

Given the above, the findings of this dissertation contrast to some extent to other important studies of similar subjects. Notably, Rafael La Porta and his co-authors have published extensively on the legal determinants of financial behavior in different countries (La Porta et al. [1997], La Porta et al. [1998], La Porta et al.

[1999], La Porta, Lopez-de-Silane, and Shleifer [1999], La Porta, Lopez-de-Silane, and Shleifer [2000], La Porta et al. [2000a], La Porta et al. [2000b]). One of the most original insights in their approach is that the legal infrastructure of a country (English common law or French Napoleonic civil law) is determinant of several aspects of the financial environment of a country, such as the protection extended to investors and other claimants, the depth of capital markets, and the financial structure (bank-based *versus* market-based). To some extent, the results here indicate that the broad institutional approach, however appealing, may have less explanatory power than expected. As shown in Chapter III, traditional market-based economies (Canada, the United Kingdom, the United States) do not present a common relationship among inflation, real activity, and asset returns any more similar among them than do traditional bank-based ones (Germany, Italy, France, Japan, LA-7). Similarly, there are no systematic differences in the relationship among inflation, real activity, and asset returns between the bank-based systems (Germany, Italy, France, Japan, LA-7) and the market-based systems (Canada, the United Kingdom and the United States). Moreover, Latin American countries (well-known examples of countries with a civil law tradition) are not very similar to France and Italy (European examples of civil law countries) with respect to the inflation puzzle. In addition, regarding the choice of external financing, Latin American firms in the study in Chapter IV behave much like firms in the United States sub-sample, regardless of differences in their respective legal traditions and financial structures.

5.2.3. Implications for Policymakers

A lesson drawn from this research can be summarized as "do not rely too much on specific local factors, always keep universal factors in mind". This finding has a couple of straight policymaking implications. For instance, recently the IMF has been criticized for insisting on orthodox "one-size-fits-all" sets of policies for countries in financial distress. Since the results of this research point to fewer differences between developing and advanced economies with respect to the relationship of a few macro variables, the orthodox approach finds at least partial support here. The importance of the real interest rate and that of real activity on

stock returns and inflation permeates the two sets of countries studied in Chapter III (the LA-7 and the G-7). Also, the findings of Chapter IV with respect to capital structure choices of Latin American firms also echoes similar findings in other international studies (e.g. Rajan and Zingales [1995]) and presents general similarities to results obtained in related studies using U.S. data (e.g. Shyam-Sunder and Myers [1999]).

Nevertheless, some contradictions remain. Chapter II, among other things, illustrates the disappointing recent economic performance of Latin America, which contrasts to other emerging regions in the same period. In this case, obviously, there is something particular to this region's economic policy management that has not been identified in usual macroeconomic data. Similarly, Chapter IV results indicate that with the exception of real activity (under the form of growth in real GDP), the other macroeconomic variables do not help much in understanding the degree of leverage of the Latin American firm.

Among possible practical applications of the results of this dissertation for the policymaker, the major role of expected real interest rates as predictors of inflation documented in Chapter III can be seen to favor macroeconomic operational schemes such as inflation targeting. Moreover, empirical results confirm the major influence of real activity over stock returns and that of stock returns over inflation, a chain that may be of some use in antecedent indicator-based forecasting. Also, empirical evidence presented in Chapter IV confirms a firm's profitability as significantly negatively related to indebtedness. The aggregate effect of which is that during the "good times" firms are likely to demand less credit on average, an effect with possible repercussion for monetary policy. The effect is reinforced by the negative relationship between firm leverage and GDP growth.

Finally, a word of caution is in order since the mechanics and dynamics of optimal financial liberalization are still largely unknown. Thus, prudence should be of uttermost importance when designing economic reforms based on – or supported by – financial liberalization initiatives. Moreover, liberalization alone

does not seem the answer to poor economic performance, although it may be a desirable catalyst. The set of economic policies that must be coordinated in order to achieve sustainable growth seems considerably more complex than what is implied by the so-called Washington Consensus.

5.2.4. Implications for Managers

The results of this dissertation may be received with dismay by practicing managers. After all, this research fails to identify clear empirical regularities in an international context regarding two important issues: the relationship between stock returns and inflation and the determinants of capital structure. Of course, these are empirical questions that have persisted unanswered for several decades prior to this research. Nevertheless, there are several points on which the findings of this dissertation may shed some light.

First, evidence presented in Chapter III emphatically rejects the Fisher Hypothesis. Therefore, private portfolio managers should be aware that, at least in the short-term, stocks provide imperfect hedging against inflation, even when hard currency returns are used to measure performance. Although definite evidence has not been presented, the findings of Generalized Impulse Response Analysis suggest that the Fisher Hypothesis may hold in the medium- to long-term.

Second, Chapter IV's evidence suggests that managers of firms in Latin America follow a priority order when deciding on the financing mix of their firms, favoring internally generated funds. Therefore, fixed income instruments are preferred to variable income ones by corporate borrowers. Also, firms in the region do not seem to have a target leverage ratio, which means that traditional security analysis based on average industry and historic ratios may not be appropriate.

Third, results from Chapter IV's study highlight the prominent role of firm-specific factors in capital structure determination. I speculate that there may be other relevant factors to this financial decision than the contemplated traditional ones, for instance managerial expertise. The implication of this finding is that a more in-depth knowledge of the specific characteristics of a firm is necessary

when assessing its financial perspectives. This seems a common sense recommendation that is largely followed by other areas of management such as marketing and human resources, but that has been often neglected in financial management.

5.3. Limitations of the Dissertation

The essays in this dissertation have their obvious limitations, most of which have been mentioned along the various chapters. Nevertheless, it is important to highlight them once more.

Chapter II is mostly a literature overview with some illustrative data. It does not aim at explaining empirical patterns, but rather to identify them and single out a couple of topics deserving of more research effort. Some important issues not addressed formally by this essay (nor by the dissertation as a whole) are the occasional use of capital controls as crisis prevention mechanisms, legal and institutional arrangements that improve governance during the liberalization process, the design of instruments to reduce the asymmetry of information, and the mitigation of uncertainty problems associated with the liberalization process that may enhance its long-term sustainability.

Chapter III data has limitations in the time series span compared to previous research work. The case of Venezuela – whose data covers less than three years – is emblematic. Also, the robustness of the results presented in this study with respect to different orders of the VAR system is not precisely known. Similarly, the robustness of the results regarding different economic regimes, i.e. periods of hyperinflation versus periods of monetary stability, have yet to be explored. Finally, the essay employs differentiated versions of the underlying economic variables that may ignore long-run equilibrium adjustments. As mentioned before, if that is the case, cointegration techniques may be useful to explore this problem further.

As for Chapter IV, there may be systematic effects induced by the nature of ownership of the firm (i.e. multinational capital, local private capital, part of a local/regional economic group, or state-owned) that are not investigated. Also, the

variables chosen to proxy for the macroeconomic environment and the institutional framework of the countries studied here are extremely simple, and a more complex set of variables may provide a better understanding of the phenomenon. The quality of the measurement of some variables is also an issue since accounting standards, stock market depth, and the degree of supervision on financial reporting may vary widely across countries. The sample period mismatch between the LA-7 firms and the U.S. firms should also be taken into account (U.S. sample period is about half the length of LA-7's), as well as the fact that the U.S. sample is very limited in terms of number of firms. Along the same lines, it is important to underscore that the Latin American firms included in this study are not representative of the typical Latin American firm, since my sample selected only publicly-traded corporations in the region that are usually among the biggest companies of each country. Finally, structural shifts – such as economic crises and economic reforms – that may affect the relationship of the variables have been ignored.[2]

5.4. Directions for Further Research

The recent economic record of Latin American countries deserves more investigation on "what has gone wrong" with liberalization in that region and why its results have been disappointing. The unfortunate conjunction of internal and external conditions is one topic that comes to mind. The governance of the liberalization process may be another. As Dooley [1997] suggests, the incapacity of local governments to face internal resistance from articulated interest groups led many emerging economies to rush into financial liberalization as a means to use external pressure to pull economic reforms through. However, fundamental internal distortions persist and end up undermining the very benefits of liberalization. The case of the Argentine currency board comes to mind. This monetary arrangement worked well to control inflation in that country in the beginning of the 1990s. Initially, monetary stability in conjunction with favorable international conditions boosted growth. However, fiscal imbalances remained unadjusted for too long, precipitating the collapse of the whole economy. Future

research on financial liberalization should focus as much on political factors as on economic ones.

The existing theoretical explanations for the stock returns-inflation relationship do not have a consistent empirical support across countries. In fact, the relative success of some of these hypotheses in previous research seems restricted to the conditions of the U.S. economic environment. On the other hand, no obvious pattern emerged between industrial and developing countries from the results of Chapter III. Thus, theory based upon fundamental economic relationships between inflation and stock returns needs to be developed further. Such theory could have a more general applicability across countries.

Some authors have been exploring such relationship using industry portfolios (e.g. Loo [1988], Wei and Wong [1992] and Boudoukh, Richardson, and Whitelaw [1994]), in an attempt to uncover patterns that are netted out when economy wide indices are used. This is possibly a promising research path for this topic – in particular in light of the results of Chapter IV, which underscore the relevance of firm-specific factors.

The existing theory on capital structure performs relatively better empirically, but an encompassing theory of capital structure is still lacking. According to Barclay and Smith Jr. [1999], a useful theory of capital structure should go beyond the fundamental debt *versus* equity dilemma in order to explain other aspects of the financing decision. According the authors, such aspects mainly include debt maturity and priority, the use of special provisions such as callability and convertibility, the choice between public *versus* private financing, and compensation and dividend policies. The findings of this dissertation suggest that there are a variety of firm-specific factors that are important in the leverage decision, but these are not elaborated into a comprehensive theoretical model as yet. In my point of view, more effort should be directed towards refining the kinds of firm-specific factors that might explain the leverage decision. I have mentioned that managerial expertise may be an important element that has been left aside in existing empirical research.[3]

In closing, the results of this dissertation indicate that future research on International Business should focus on the development of sound universal theoretical models and their empirical application to a variety of country-specific situations with the objective of refining the theoretical models by sorting out what country-specific factors are indeed relevant, and how these factors can be incorporated back into universal theories. More attention is also needed on firm-specific factors. These concerns are very much present in the unsettled issues raised by this dissertation. Focusing future research on the resolution of these issues would be a good point to start.

5.5. Endnotes

[1] The other questions are outside the scope of this dissertation and are left as suggestions for future research.

[2] Preliminary runs of the regressions specified in Chapter IV also included temporal dummy variables. These were found to be insignificant, almost without exception. Results remained largely the same with and without temporal dummies, therefore they were dropped from the model for the final analyses. This may be an indication that temporal shifts may not have a strong effect over the findings of this research.

[3] This is in line with Hart [1993], although this author focuses more on agency-problem aspects of managerial discretion.

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