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# The Role of Pension Funds in the Development of Capital Markets in Latin America

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## ABSTRACT

Over the past two decades, Latin America has stood out as one of the regions with most promising economic fundamentals and potential among emerging markets. Nonetheless, its track record of economic development has lagged in comparison to other developing economies – especially in the Asia-Pacific region – which points to, among various issues, to an underdevelopment of stable and widespread capital markets. The increasing incorporation of capital markets into financial systems historically dominated by banking systems in Latin America facilitates the process of raising and allocating capital while minimizing transaction costs, mitigating risk through diversification, and improving accessibility to economic actors. This paper analyzes the role of pension funds in the development of capital markets in Latin America as both financial intermediaries and institutional investors with distinguishing characteristics and advantages. I use a series of ordinary least squares regressions to test the effect of the growth on pension fund assets in the growth of stock and bond markets while controlling for entity and time fixed effects, and macroeconomic and demographic factors. The results are both positive and statistically significant for both sets of regressions, despite the differing country-specific circumstances. I conclude that the constructive role of pension funds in Latin American capital markets can promote the enhancement of financial systems overall and contribute to the efficient and equitable economic development of countries across the region. Further, I suggest policies that could be implemented to achieve these objectives.

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## INTRODUCTION

Economic development is connected, at any of its stages, to the movement of funds between economic actors that have excess resources and seek return opportunities and other actors who require these resources to finance their productive projects or future expenditures. This is the reason for the existence of financial systems, which regardless of their sophistication, fulfill this purpose to some extent. Nonetheless, the efficiency of these transactions – not only regarding the speed at which they take place, but also the increased access to participants with different appetite for risk and return, and to firms with various financing necessities – facilitates the path towards broad economic development.

Even though capital markets in developed nations have become established to the point of experiencing diminishing marginal returns, in emerging markets they represent the evolution of finance from systems traditionally dominated by bank credit. Yet, lower levels of development in emerging markets imply higher risk than that of advanced economies in terms of the certainty that domestic or foreign investors will be able to make a profit on their investments. Thus, the main feature of capital markets in developing economies is that, on average, they offer a higher rate of return than those in developed

countries to compensate for the higher risks and volatility. However, in order to transition to a system in which a greater amount of funds is available at a lower cost of capital for firms and households to nurture a country's economic development, there needs to be an increase in the size and number of market participants that demand the securities and provide the funds. This is the case of Latin America, one of the most mentioned emerging economic regions in the world since the 1990s. Nevertheless, it is a region that despite its strong fundamentals and economic potential, has lagged behind industrialized countries and comparable developing country blocs, especially in transitioning to a more efficient system to capture and allocate funds.

This paper will analyze the role of pension funds in the development of capital markets in Latin America, specifically by observing the effect of growth in pension fund assets in the expansion of stock and bond markets in the region. Section II provides an overview of Latin America's macroeconomic environment and characteristics of capital markets during the past two decades. Section III develops the conceptual framework of the importance of capital markets in addition to banking systems in the development of emerging economies, as well as the specific advantages offered by bond and

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stock markets. Section IV explores the role of pension funds as both financial intermediaries and institutional investors, as well as the particular characteristics that define them as key players in the demand side of capital markets vis-à-vis other investors. Section V provides an executive summary of the data with the corresponding descriptive statistics, and Section VI builds up from the former to determine the variables studied, and to structure the econometric models and relevant controls used. Section VII analyzes the results of the regressions, and Section VIII discusses possible explanations for these, as well as the validity and limitations of this research. Finally, Section IX concludes and highlights important policy implications for the future development of capital markets across the region.

## OVERVIEW OF CAPITAL MARKETS IN LATIN AMERICA

During the 1990s, Latin America seemed to be one of the most attractive emerging markets for economists and investors given its strong macroeconomic fundamentals and leading structural reforms (De la Torre, Gozzi & Schmulker, 2007). Compared to other emerging markets such as East Asia, Latin America seemed to have an edge over these in the process of economic development, especially regarding capital markets. Notwithstanding, throughout the past two decades, such promising trend has reversed, and the relative lag of the region has prevented it from living to the expectations set forth during the 1990s. In the study of the development of capital markets in emerging economies, Stallings and Studart identify three main factors that hinder such process: lack of macroeconomic stability, weak institutional framework, and the presence of international markets as attractive substitutes to domestic finance (Stallings & Studart, 2006).

In terms of macroeconomic performance, Latin America has experienced a historically positive GDP growth trend, yet characterized by periods of high volatility as well as considerable differences among certain countries (World Bank, 1991-2016). The region showed a record of stable growth throughout most of the 1990s, only suffering considerable declines following the 1994 Mexican currency crisis and the 1998 Asian financial crisis, which were caused by massive capital outflows from emerging markets. Between 2001-2003, this trend temporarily stalled driven by economic phenomena such as the 2001 Dot-Com bubble as well as non-economic events such as 9/11, which rattled the global investment sentiment. However, Latin America's Golden Age began soon after that following a surge in commodity prices, driven mainly by a larger demand for oil by China, the US, and other industrialized nations around the globe. During 2008-2009, the Great Financial Crisis struck the region and led to an overall contraction of GDP, yet the impact was assimilated

differently in each country, with some like Argentina and Mexico posting contractions close to 5% of GDP, and others like Colombia and Peru faring over 1% growth. The "Oil Bonanza" peaked in 2010-2011, and reached its end in 2014, following the detrimental slump of crude prices from over \$110 per barrel to under \$40 per barrel, and the region has experienced a significant slowdown since.

Historically, the region has been characterized by being a highly inflationary environment – especially during the 1990s – and, although some countries have managed to improve their controls during the recent years, there are notable exceptions of high inflation and even hyperinflation (World Bank, 1991-2016). On average, fluctuations in the regional inflation rate tend to follow suit with each period's growth to a moderate extent. Nonetheless, even though the economic data for the region displays some correlation with region-wide and global phenomena, economic indicators at the individual country level experience significant variability from the regional aggregates. Such differences are even more accentuated when observing the record of inflation for each country, which seems to be more influenced by domestic economic conditions and sentiment, as well as political cycles and changes in policy.

Despite the volatility of growth and inflation rates throughout the last two decades, the region's overall savings rate has shown a lower relative sensitivity to the volatility in the former benchmark macroeconomic indicators (World Bank, 1991-2016). During the aggressive growth of the "Oil Bonanza," the overall gross domestic savings rate depicted an increase of around 3% as a share of GDP to 23% – except for Chile's and Peru's savings rates, which increased by as much as 15% and 8% respectively. The Great Financial Crisis led to a temporary dip in the overall savings rate close to 20%, yet it recovered most of its previous gains shortly after in 2011. Nevertheless, following the peak and end of the Golden Age, the aggregate savings rate followed the decrease in the overall GDP growth rate by falling nearly as low as 17%, yet the near 2% drop in overall inflation was not nearly as prominent.

The slight increase in the savings rate during the Golden Age can be attributed in part to the spike in GDP growth rates, as these also imply that household incomes increased, and individuals were willing to separate a larger portion of their income into their savings. Furthermore, they saw prices to continue rising at a steady pace, and, with their incomes growing at a faster rate, households' purchasing power rose, enabling them to set aside additional savings. Another feature that may have driven an increase in the savings rate is the reduction of income taxes, which, was possible in part due to an increase in government revenues from high-priced commodities. Once again, this further increased households' disposable incomes and allowed them to save a larger portion of it. Overall, a higher savings rate implies that there is a larger

supply of loanable funds in the economy, and, with governments running small or no fiscal deficits while their countries preserved their position as net exporters, such supply would be available at relatively competitive costs for participants in the demand side.

Despite the favorable expansionary conditions of the Golden Age, the reversal in the savings rate during the last six years can also be explained by the fluctuations in the macroeconomic benchmark indicators. The decline in commodity prices caused a substantial cut in the value of oil and overall commodity exports of many Latin American countries, whose GDP composition relies more heavily on net exports than that of industrialized countries with more developed domestic consumption and investment components. This decline in GDP growth rates had two major implications. First, it represented a negative shock to household incomes, coupled with a strong multiplier effect product of previous expansionary policies and reductions of automatic stabilizers (e.g. lower taxes). Secondly, it significantly exacerbated the governments' fiscal deficits given the lower exporting revenues, and countries' overall trade deficits due to the decline in the value of their exports. Furthermore, these deficits were intensified by the depreciation of their local currencies, which also deteriorated each country's purchasing power internationally.

The effect of the former implication on the savings rate – along with a relatively sustained inflation – was negative, as households' purchasing power was eroded, and they had to spend a larger portion of their income to sustain their standard of living. Moreover, the increase in inflation in the case of Brazil and Colombia implied that the real return on their savings declined, holding nominal interest rates constant, which created a disincentive to save. The effect of the latter implication was that governments not only had to draw from the private supply of loanable funds to finance their deficits, but that they also had to engage in contractionary fiscal reforms in order to increase their tax revenues and compensate for the budget hole left by their lower export revenues. Higher taxes implied a reduction in households' disposable income that further magnified the impact of lower GDP growth rates and was reflected on their lower savings level. Overall, lower savings rates and higher government deficits significantly reduced the supply of loanable funds in Latin American economies, increasing the costs of capital for firms and borrowers, and complicating the development of stable capital markets.

In terms of the quality of the institutional framework, Stallings and Studart's findings point out that most Latin American countries have not had consistent periods of high government effectiveness and regulatory quality, along with an inefficient and often-politicized implementation of the rule of law and weak control of corruption (Stallings & Studart, 2006). The institutions resulting from different legal traditions and their enforcement of

property rights, private contracts, and investor protection laws “shape the willingness of savers to invest in firms, the effectiveness of corporate governance, and the degree of financial market development” (Thorsten & Levine, 2014). The aggregate of these institutional factors determines the ease in the conduct of business in these countries, and thus the confidence that market participants both in the demand and supply sides place on the orderly behavior of financial systems. In developed and industrialized countries, the robustness of these parameters generates no detrimental expectation that investors' capital will be confronted by an institutional risk that was not priced when entering the market.

The issue with the lack of institutional quality in emerging markets is not only that the supply of funds by both domestic and international sources is restricted by aversion of these risks, but that, in order to enter the market, investors demand a higher compensation to face those additional risks caused by poor institutions. For instance, as mentioned by De la Torre, Gozzi and Shmulker, premature financial liberalization without a minimum level of “institutional strength in terms of the legal and regulatory framework, supervisory capacity, and accounting and disclosure standards is likely to exacerbate distortions in financial markets” (De la Torre, Gozzi & Schmulker, 2007). Thus, if there is a restricted supply of funds and higher costs of capital to price additional risks, then the development of capital markets is hindered from a fundamental standpoint. Additionally, this creates a further incentive for the propagation of bank credit as a substitute of capital markets, as banks are able to offer financing to a higher degree of certainty to counterparties in financial markets through rigorous background checks and contracts, but at greater transaction costs. This, along with banks' relationship building with clients, explains in part the propagation of bank finance in the region, which increases the overall costs of funding due to higher transaction costs and overweighing of certain behavioral factors that hinder the development of capital markets.

Finally, access to the international financial markets can represent a further hindrance for the development of domestic financial markets, both on the side of borrowing firms and individuals, and on the side of lenders and investors. Regarding the former, borrower-issuers can find a substitute to the domestic loanable funds and capital markets abroad in countries that offer more competitive costs of capital, reducing the domestic demand for funds, and thus the supply of debt and equity issuances (Stallings & Studart, 2006). On the other hand, lender-investors with higher risk aversion may prefer to purchase securities abroad and face a lower institutional and market risk. The main downside of this approach is that, by increasing their activities in the international market, participants are exposed to currency risk, which in the case of Latin American countries, presents high levels of volatility. Such volatility does not imply that they will by

default experience losses when they liquidate their international positions, but that the variability can significantly increase the value at risk of their investments or the size of their financial obligations as issuers of paper. Therefore, this disadvantage does not originate from the existence of an undesired possibility, but on the higher probability that it will occur, and the uncertainty associated with predicting the final outcome.

## IMPORTANCE OF CAPITAL MARKETS IN ADDITION TO BANKING SYSTEMS

The development of domestic capital markets does not imply an eradication of banks, yet their existence and orderly function in addition to established banking systems proves to be beneficial to financial market participants on the demand and supply sides, as well as to the overall economic development of a country. This section initially discusses the advantages of capital markets overall: the availability of an alternative to bank credit, the provision of new savings and investment instruments for lenders, and a lower dependence on foreign capital flows. Next it will elaborate on the advantages specific to bond markets, which include establishing a market interest rate, preventing overconcentration of risk on the banking sector, and facilitating the conduct of monetary policy. Following the advantages of the bond market, the next subsection covers those of the stock market, which include the availability of higher risk-return instruments, and higher liquidity than the bond market. The final subsection provides an overview of fundamental reforms of financial and capital markets in emerging economies that enable their efficient development.

### Advantages of Capital Markets

The availability of an alternative to bank credit in capital markets increases the competitiveness of financial markets overall by leading to lower costs of capital, and a higher number of participants in both the supply and demand of funds. From a demand standpoint, capital markets can be seen as a substitute to bank credit as they provide an additional source of funds for firms and households. Therefore, as the users of funds pursue the least costly alternative to raise capital, suppliers of funds need to lower their offered costs of capital in order to compete with the relatively less expensive alternatives. Furthermore, competitiveness in financial markets is intensified by the fact that capital is hardly a differentiable product, which forces participants to compete mainly on price. Finally, capital markets are designed in a way that they can reduce the need for financial intermediation, which contributes to lowering transaction costs and thus investors' required rates of return.

In terms of the composition of capital markets, these enable access to funds to a larger group of firms and

households with more diverse levels of risk, as they are able to raise capital directly from investors without a bank's intervention (Leaven, 2014). Banks tend to have a threshold for the amount of credit risk of their borrowers and thus may refuse to provide funds to borrowers with lower credit worthiness. Nonetheless, primary capital markets solve this accessibility issue by incorporating such specific risks into the price of the securities issued by a given entity, until it is attractive enough for the marginal investor to purchase them. Furthermore, the structure of the market as a centralized exchange for stocks or over-the-counter networks for bonds facilitates the process of finding such investors.

Additionally, capital markets provide a larger range of savings and investment instruments different from bank deposits that are better able to match a broader spectrum of risk appetite of savers and investors (Stallings & Studart, 2006). The greater variety of instruments in the market allows investors with more risk-seeking behaviors to pursue higher returns, while improving their ability to diversify their portfolios and manage risk (Narayanawamy, Blitzer & Carvajal, 2017). For instance, domestic capital markets offer a natural hedge against inflation and currency risks for local-currency investors (Leaven, 2014). Another important feature that stems from the broader spectrum of risk preferences is the greater availability of long-term financing, as heterogeneous investors have different investment horizons and thus tolerance for maturity risk. Even though this is a characteristic of investors in the supply side, it improves firms' and households' ability to manage their own exposure to interest rate and maturity risk in the demand side (Leaven, 2014). In such a way, firms and households are better able to match the maturities of their financial and non-financial assets with those of their financial obligations. Likewise, they can match their fixed- and variable-return assets with a proportional mix of fixed- and variable-payment liabilities, avoiding the possibility of a credit crunch due to changes in interest rates.

Even though foreign financing and investment contribute to the development not only of financial markets, but also of overall economies, there are dire consequences related to a reversal of foreign capital flows and systematic deleveraging by international investors (Leaven, 2014). Massive foreign capital outflows generate downward pressures on the local currency, as investors' demand for it declines while the relative demand for foreign currencies rises. Due to the depreciation of the local currency, firms with foreign financial obligations experience considerable increase in the value of such liabilities and their associated payments, risking their default. Therefore, given that domestic capital markets provide an additional alternative to international finance, they may reduce the relative international exposure of a country, and thus mitigate the adverse effects of foreign capital outflows. Moreover, robust domestic capital markets shield

a country's economy against contagion of international crises, as both local sources and users of capital are able to reduce their sensitivity to international risk by participating in the domestic market.

### Advantages of Bond Markets

In the same way as the equilibrium price is defined in any market, a market-determined interest rate is the point in which borrowers' marginal willingness to pay equals lenders' marginal cost to supply a given quantity of loanable funds. Beyond a mathematical exercise, the market-determined interest is derived from the confidence and expectations of market participants shaped by their own assessment of the available information that will affect their future returns. Hence, the more information that such entities have access to, the better they will be able to price the risks and opportunity costs of investment alternatives, and the lower the possible discrepancy between their expectations and actual outcomes. Even though most modern economies have government-controlled policy rates that influence broad market conditions, the market-determined interest rate provided by the local bond market absorbs this information along with various other factors that are not accounted for by a policy rate. Furthermore, in the case of bank credit, lending rates are the product of the risk-return assessment of the parties involved in a loan contract. Yet, even though both may have access to private information about each other, they may not be able to price their opportunity cost accurately without the information provided by the market-determined interest rate (Stallings & Studart, 2006).

From a risk-management standpoint, bond markets prevent the overconcentration of credit and its associated risks in the banking sector, and such risk sharing mitigates the impact of an eventual banking crisis in the entire financial system (Leaven, 2014). The main advantage of distributing credit risk between bank and non-bank institutions is that in the event of large systematic defaults, the ripple effect of this shock is alleviated by their different sensitivity to systematic risk. Through capital markets, non-bank firms can get exposure to credit risk, so the adverse repercussions of credit events are shared by more entities, and the systematic shock is reduced as they are able to absorb smaller shares of the credit losses without defaulting. Furthermore, firms outside the banking industry, usually under less regulatory scrutiny, may be better able to cover these losses through their own operating cash flows, and even face less restrictions to raise capital to reduce their leverage. Additionally, the presence of capital markets facilitates the use of financial derivatives to further manage risk and increase risk-sharing opportunities (Leaven, 2014).

Finally, bond markets support the conduct of monetary and fiscal policy by improving the transmission mechanism, allowing governments to better finance their

deficits, and providing them information about macroeconomic conditions (Leaven, 2014). First, a higher number of instruments through which the government can conduct open market operations and asset purchases allows the monetary authorities to gauge the strength and scope of such policies. Whether through conventional or unconventional monetary policies, having the ability to intervene in the markets of additional instruments accomplishes a more accurate and efficient effect of these measures overall. For instance, as mentioned by Leaven, long-term bonds facilitate the currency sterilization process – central bank's intervention of the exchange rate without affecting the monetary base and domestic interest rates using offsetting transactions involving foreign reserves and domestic financial assets – because relying on short-term instruments tends to drive up short-term rates and increase inflows into such investments (Leaven, 2014).

In addition, the bond market allows governments to finance their deficits without resorting to foreign borrowing or financial repression through their own domestic debt issuances (Leaven, 2014). By doing so, governments avoid being exposed to currency risk, which, as in the case of private borrowers, could experience a significant increase in the value of their foreign financial obligations due to exchange rate volatility. Additionally, it prevents them from resorting to financial repression such as raising taxes or placing restrictions on capital mobility, which would have adverse effects not only in the financial sector, but also in the real economy. The main limitation that arises from governments financing their deficits through capital markets is that they start competing against the private sector for funds, and the resulting greater overall demand will raise the real interest rate for loanable funds. Furthermore, if the deficit financing is not coupled with a reduction in government expenditures, leading to consistently higher real interest rates, it may end crowding out the private-investment component of GDP in the long run.

The bond market also provides monetary authorities with information about macroeconomic conditions relevant to their conduct of policy (Leaven, 2014). Governments favor using bond markets – and capital markets in general – to monitor investor and market expectations, as they better enable them to anticipate the behavior of the real economy, which is harder to gauge on a regular basis. This feedback process not only allows them to have a clearer picture of the state of the overall economy, but it also empowers them to implement forward guidance in an attempt to manage investor expectations, and check their reactions to policy changes.

### Advantages of Stock Markets

The main benefit of stock markets is that they provide an investment alternative with unlimited upside for in-

vestors with risk-seeking behavior (Stallings & Studart, 2006). Unlike bonds, the return on stocks is not capped at the interest rate, because shareholders have claims over the residual cash flows of a company after the claims to other stakeholders, including creditors, have been fulfilled. Furthermore, stocks offer voting rights that allow investors to influence the company's management to their best interest. Nonetheless, even though stocks offer limited liability to shareholders, they have the last claim over a firm's assets in the event of bankruptcy, and, unlike bondholders, are more likely to lose their entire investment. From the firms' perspective, stocks can be favorable for firms with unstable cash flows, as they are not legally bound to payout dividends to shareholders and would not put them in a default scenario as a missed interest payment would.

Alongside the higher upside, stock markets are relatively more liquid than those for bonds, as the centralized-exchange dynamic allows investors to move their positions more easily. The faster execution of transactions in this market reduces by default investors' exposure to market risk, and even country and currency risk in the case of international investors, as they can liquidate their positions before suffering unforeseen losses. Furthermore, it may provide information about macroeconomic and financial conditions more frequently than debt markets to market participants and regulators, yet to the expense that such data may have some distortions associated in part with irrational investors.

## Structural Reforms

The evolution of capital markets – and financial systems in general – into modern drivers of investment and economic growth is fueled by cycles of financial innovation and crisis, yet is formally established through structural reforms to the financial system. Even though governments officially implement these reforms, they are often championed by and designed with the help of private entities. Overall, such transformations of the financial system have aimed to create a balance between empowering of private-sector participants with particular interests and attenuating the level of government intervention. However, there are countless nuances and variations to this reform mix on a country-by-country basis in Latin America, yet, on average, moving towards such general trend. This subsection provides an overview of the fundamental reforms of financial markets in emerging economies that enable their efficient development: financial liberalization, privatization, opening of the financial account, and pension reform (discussed in Section IV).

Financial liberalization constitutes the core structural reform to the financial system and sets the foundations for the rest of free-market reforms. Stallings and Studart define it as “the partial or complete elimination of gov-

ernment-imposed restrictions on domestic financial behavior, so that economic agents can make their own decisions with regards to volume, price, timing, and purpose of financial transactions” (Stallings & Studart, 2006). To this effect, they identify a dual purpose for such reform: first, to signal the government's commitment to the private sector's involvement in the market, and, second, to provide market participants with the appropriate legal framework and practical tools to do so. Even so, financial liberalization cannot be identified as an outcome, but rather as a means towards nurturing higher investment and economic growth, and broad access to finance for all economic actors, without compromising financial stability.

Paradoxically, these may create a scenario of conflicting goals for market participants and regulators, which has spurred a still ongoing debate on the optimal mix of liberalization and government intervention. This suggests that the issue of liberalization must be addressed and gauged at different dimensions, including the speed and extent of the implementation process, the country's institutional strength, and the accompanying regulatory and macroeconomic policies (Stallings & Studart, 2006). Most economists agree that a gradual implementation to the point in which the government's role focuses on prudential supervision rather than imposing a political agenda on the market facilitates successful liberalization. However, this is contingent not only on a country's institutional tradition, but also on the enhancement or preservation of institutional strength after liberalization to avoid distortions in the conduct of business.

This raises the issue of the timing of reforms, as not all emerging markets have the minimum institutional robustness and small developing economies have little control over international conditions that may influence the outcome of such reforms (Stallings & Studart, 2006). Therefore, governments in developing countries must implement changes to financial regulation in such way that it adheres to international standards, especially when dealing with principal-agent problems, information asymmetries (i.e. adverse selection and moral hazard), and conflicts of interest (Stallings & Studart, 2006). Additionally, further strengthening of institutions can be achieved through private monitoring, such as disclosure of material information, and external auditing and ratings (Stallings & Studart, 2006). Finally, as mentioned in the first section, macroeconomic stability proves to be a significant determinant of the development of capital markets, thus, by transitivity, it grounds the success of liberalization. Hence, governments need to support this process by promoting real growth and price stability, moderate deficits, and competitive exchange rates, as well as appropriate regulatory reforms that reduce uncertainty in the market.

One of the main reforms that stems from financial liberalization is privatization, which follows the premise of

lower government involvement in financial markets by transferring firm ownership to the domestic and even foreign private sector. In the scope of capital markets, privatization has two main implications: it allows new firms to enter the marketplace and forces them to obtain funds within the private sector, consequently, creating an incentive for them to increase their profitability. Regarding the former implication, new private firms must recur to financial innovation and create attractive instruments for private investors with different risk profiles in the absence of government fiscal revenues (Stallings & Studart, 2006). This implies that private firms' core incentive is profit maximization, not only because it will allow them to generate a return to all its stakeholders, but also it will better enable them to raise funds from new investors. Capital markets serve as a device to augment the effects of the privatization by both facilitating the movement of funds through trading instruments, and improving the disclosure of information relevant to investors.

In a similar manner to the case of financial liberalization, Stallings and Studart propose a debate regarding the optimal mix of privately-owned financial institutions, and publicly-owned ones. Public banks can contribute to greater financial stability and access to finance for low-income households and small businesses, given that they may not have a strictly profit-maximizing mandate and are influenced by governments' equity goals (Stallings & Studart, 2006). For instance, they may be more willing to extend credit countercyclically and mitigate the impact of economic recessions (Stallings & Studart, 2006). Nonetheless, following political motives may drive them to pursue inefficient projects that will hinder the process of financial and overall economic development. On the other hand, given the profit-maximizing incentives of private banks, they will most likely pursue efficient projects and incur in financial innovation (Stallings & Studart, 2006). However, financial innovation may come at the expense of stability and need for further regulation, as well as less equitable access to finance. Stallings and Studart's findings point out that, given strong institutions, any financial system can function successfully, yet, controlling for institutional characteristics in Latin America, mixed-ownership systems (e.g. Chile) are more efficient than "pure" ownership structures (Stallings & Studart, 2006).

Another branch of financial liberalization is the opening of the financial account, which allows the movement of financial resources from capital-abundant countries to capital-scarce ones, where there is a higher expected return (Henry & Lorentzen, 2003). In turn, the domestic economy would have access to relatively lower costs of capital, leading to higher investment and real economic growth. Financial account liberalization is another reform that faces constant debate, as the reversal of foreign capital flows can exacerbate domestic banking crises and breed currency crises. Notwithstanding, the

consequences of this phenomenon reflect different impacts in debt and equity markets, which invite the partial and gradual implementation of such reform. In the case of debt markets, systematic deleveraging can lead to subsequent liquidity crunches and defaults, given that firms are required to service more expensive foreign financial obligations and find difficulties raising sufficient funds (Henry & Lorentzen, 2003). Equity manages to counter this scenario as firms have full discretion concerning their dividend policy, and such risk is already priced and accounted for through higher returns under stable macroeconomic conditions. Furthermore, in the case of developing financial markets, foreign institutions bring new technology and are able to improve overall productivity, while complementing domestic firms, which tend to have greater knowledge about their local market (Stallings & Studart, 2006).

## ROLE OF PENSION FUNDS AS INSTITUTIONAL INVESTORS

One of the latest and most innovative transformations in financial systems is the liberalization of pension systems. Such pension reforms involve "a transition from unfunded, publicly-managed, 'pay-as-you-go' pension systems to privately-managed, fully-funded, defined contribution systems of individual accounts for beneficiaries" (OECD, 2008). Even though these reforms mainly sought to provide more reliable sources of retirement income while reducing the fiscal drain, it empowered pension funds and other contractual savings institutions (e.g. insurance companies) with sufficient capital to have a material impact on financial markets (OECD, 2008). In the scope of capital markets, pension funds not only became notable participants in the demand side of securities markets – as new sources of funds – but also contributed to their stability given their institutional investment mandates. Chile led Latin America with the first transformation of its pension system to fully-funded private schemes in 1981, and was followed throughout the 1990s by Colombia, Mexico, Peru, and Argentina to different extents – Brazil uses a public scheme for mandatory pensions, but offers complementary voluntary pensions that are managed privately (Stallings & Studart, 2006). This section starts by defining the role of pension funds as both financial intermediaries and institutional investors, as well as comparing the different pension-fund schemes and their incentives towards the economic actors affected by them. The rest of the section discusses the main characteristics of these new participants on the demand side of capital markets: provision of long-term funds, enhanced diversification, economies of scale, and relationship with banks as both substitutes and complements.

Pension funds can be defined as financial intermediaries between contributors (sources of funds) and firms (users of funds), as well as institutional investors with

large-enough pools of capital that allow them to invest at a large scale. Their role as financial intermediaries can be explained through the nature of their liabilities: they enter into a contract in which they are able to collect funds from contributors, usually through their employer sponsors, and are obligated to pay them an annuity upon retirement or even disability (Davis, 1995). While they accumulate funds, they continue to behave as intermediaries by investing in securities and other financial assets of firms, thus mobilizing funds from their sources to their users. On the other hand, even though pension funds' role as institutional investors is tightly linked to their intermediation function, it can be better explained by the nature and size of their assets. Their ability to pool massive amounts of funds enables them not only to make sizable investments with a material impact on the market, but also to manage such assets following a rational investment mandate and benefiting from diversification and economies of scale.

Pension funds exist mainly under two schemes, defined benefit and defined contribution, which "differ in the distribution of risk between the member and the sponsor," and thus in the expected return for the member (Davis, 1995). In the defined benefit scheme, the employer sponsor – and, indirectly, the pension fund administrator – agrees to pay a predetermined annuity to its affiliated employees based on a percentage of their salary and other employment-related considerations established in the contract (e.g. seniority). Therefore, contributors end up trading present wages for future retirement income, while the sponsor guarantees a specific retirement annuity and return, and thus undertakes investment risk as it must fulfill such liability regardless of the actual return on the pension fund's investments (Davis, 1995). On the other hand, in the defined contribution plan, members make fixed contributions to their pension provider and their future benefits depend on the market return. Although this scheme may offer a higher return for beneficiaries, it does not have the same risk-sharing features as defined benefit systems, and thus does not provide the same guarantees on future retirement income (Davis, 2003).

As mentioned above, liberal pension reform in Latin America oversaw a transition towards defined contribution systems motivated by employers reducing the risk of their pension liabilities, as well as providing a wider variety of pension products for individuals with different risk profiles. The latter feature was developed further in the case of Chile, where beneficiaries no longer contribute to a solidarity fund, but rather own their individual capitalizations, allowing pension fund providers to penetrate a broader customer base (Rodriguez, 1998). Additionally, defined contribution schemes allow for further labor mobility, as employer sponsors no longer hold pension liabilities that prevent workers from changing jobs (Davis, 2003). Beneficiaries' higher degree of control over their

own capitalizations in defined contribution plans enables pension funds to better match the risk preferences with their portfolios' risk. In turn, the greater and simultaneous diversification of both beneficiaries and securities may contribute to the development of emerging capital markets, as in the case of Chile (Rodriguez, 1998).

### Characteristics of Pension Funds and Influence in Capital Markets

The long-term nature of pension fund liabilities allows them to invest in long-term assets with higher returns, which increases the supply of long-term funding in capital markets reflected by the increase in demand of instruments with such maturity. This not only mitigates the market's volatility, but also allows pension funds to employ immunization strategies by which they reduce their exposure to interest rate risk by matching the timing of their investment cash flows and their annuity payments to beneficiaries. Furthermore, pension funds, unlike banks, may have a lower volatility of net flows from their members as the funds cannot be withdrawn prematurely on demand and the future benefits are contingent to the fulfillment of the monthly contributions (Davis, 1995). Finally, since long-term investments tend to be more illiquid, this creates an incentive for the funds' stakeholders to rebalance their own portfolios to match their liquidity needs (Impavido & Mussalem, 2000). Such behavior, as mentioned by Impavido and Mussalem, "is likely to reinforce the demand of contractual savings institutions for market-based instruments," which results in further financial intermediation by pension funds through capital markets (Impavido & Mussalem, 2000).

Pension funds offer an enhanced level of diversification at the stakeholder level and at the overall portfolio level. Regarding the former, they allow for significant risk sharing not only among investors, but also among contributors, due to the sheer number of economic actors involved. Therefore, in the event of a sizable loss, its impact would be diluted in such way that it represents only a relatively minor loss at the individual level. On the other hand, the ability of pension funds to pool massive amounts of capital allows them to invest in securities and other financial assets inaccessible to non-institutional investors. This not only grants them access to a broader variety of securities with low correlation among them, but also enables them to purchase indivisible assets with imperfect correlation with the market (Impavido & Mussalem, 2000). Efficient diversification leads to lower exposure to idiosyncratic risk and even less sensitivity to systematic risk, which may be appealing to more risk-averse investors and contributors, thus increasing the funds under management and granting access to a wider variety of investments in capital markets.

Another benefit derived from pooling large amounts of funds is the resulting economies of scale at both op-

Variable	Description
<b>Dependent Variables</b>	
Log(Bond)	Logarithm of bond market value (measured as a percentage of nominal GDP)
Log(Stock)	Logarithm of stock market capitalization (measured as a percentage of nominal GDP)
<b>Explanatory Variables</b>	
Log(PFA)	Logarithm of pension fund assets (measured as a percentage of nominal GDP)
GDP	Nominal GDP (measured current US\$ trillion)
GDPPC	Nominal GDP per capita (measured current US\$ thousands)
Growth	Annual real GDP growth rate
Inflation	Annual CPI inflation rate
Savings	Savings rate (measured as a percentage of nominal GDP)
Interest	Lending interest rate adjusted for inflation measured by the GDP deflator
REER	Real effective exchange rate index (base year = 2010)
Age	Median age of population (using five-year medium variate)
Labor	Size of labor force (in millions)
Credit	Net domestic claims on the government and other sectors of the domestic economy (measured as a percentage of nominal GDP)
External	Outstanding total international debt securities (measured as a percentage of nominal GDP)
<b>Fixed Effects</b>	
Country	Categorical variable equal to unity for each given country
Year	Categorical variable equal to unity for each year in the sampled time period (2002-2016)

**TABLE 1.** | *Summary of Variables*

erational and portfolio management levels. From an operational standpoint, pension funds face lower costs to access the market as they can mobilize large amounts of capital in a single transaction, which reduces the average cost per unit of capital transacted. From a portfolio management perspective, pension funds are better able to provide professional management of individuals' funds, acquiring and processing information more efficiently as institutional investors (Davis, 1995). Therefore, as they expand their contributor base, the implicit transaction and information costs per stakeholder are diluted, thus, indirectly, reducing the costs to access securities markets for individual economic actors.

Considering that pension funds compete for households' savings, they provide a substitute to long-term deposit products offered by banks. Given their higher-yielding portfolios, pension funds offer a greater return on the contributions and may attract individuals pursuing such returns away from lower-yielding bank deposits. This transfer of savings is limited to individuals' risk preferences and liquidity needs. However, as mentioned previously, individuals can benefit from pension funds' efficient diversification and risk-sharing features, while adjusting their holdings of more liquid assets (e.g. cash, demand deposits) in their own portfolios (Impavido, Mussalem & Tressel, 2003). Furthermore, pension contributions provide tax privileges or deferrals at the personal-income level that are not applied to regular savings, incentivizing further contributions – not to mention the various tax advantages at the corporate level (e.g. on capital gains) (Davis, 1995). Such increase in competition has positive spillover effects and efficiencies in capital markets, as it reduces the spread between lending and

deposit rates in the loanable funds market, and thus between deposit rates and overall costs of capital in primary markets (Meng & Pfau, 2010).

Even though pension funds compete against banks to capture deposits and provide long-term funding, and may be in a stronger position to provide higher returns on savings and extend financing for longer maturities, banks can also benefit from such features in their entire capital structure. In the cases of both debt and equity, pension funds can provide funding to banks via long-term securities. This eases banks' short-term financial obligations and allows them to adjust their asset holdings towards higher-yielding investments with longer maturities. For instance, pension funds can help to lower banks' credit risk by reducing their financial leverage through equity investments, and, if done in a systematic manner, may improve stability in financial markets overall (Impavido & Mussalem, 2000). Additionally, pension funds' equity investments may have positive spillover effects, as their position and behavior as institutional investors can contribute to improving corporate governance and minority shareholder activism, as well as foster financial innovation and modernization (Meng & Pfau, 2010).

## DATA

This paper seeks to determine the role and impact of pension funds on the development of capital markets in Latin America, focusing on the cases of Argentina, Brazil, Chile, Colombia, Mexico, and Peru between 2002-2016. Stock market capitalization and bond market value as percentage of GDP are used as proxies for capital market development, while pension fund assets as a percentage

In-Sample Country Means								
Country	Periods	PFA (%)	Bond (%)	Stock (%)	GDP (\$bn)	GDPPC (\$'000)	Growth (%)	Inflation (%)
Argentina	2002-2007	10.66	44.29	23.58	202.21	5,146.26	8.75	9.45
Brazil	2002-2016	13.91	9.70	50.57	1,620.91	8,208.06	2.51	6.83
Chile	2003-2016	60.38	16.87	108.27	196.08	11,439.48	4.09	3.26
Colombia	2002-2016	14.69	27.70	41.13	241.90	5,256.75	4.27	4.78
Mexico	2002-2016	11.10	30.81	32.36	1,017.52	8,752.64	2.36	4.09
Peru	2003-2016	17.26	25.07	43.51	137.80	4,633.78	5.56	2.98
Total		22.25	23.48	52.61	626.80	7,496.39	4.05	4.74

  

Country	Periods	Savings (%)	Interest (%)	REER (Base = 2010)	Age (years)	Labor (mm)	Credit (%)	External (%)
Argentina	2002-2007	24.90	-2.72	119.48	28.50	17.79	11.22	81.82
Brazil	2002-2016	19.48	35.53	80.51	27.89	99.62	48.04	24.89
Chile	2003-2016	28.05	2.59	96.15	31.30	7.71	95.35	49.35
Colombia	2002-2016	19.78	8.11	87.53	25.88	22.27	39.32	28.57
Mexico	2002-2016	21.06	1.34	101.79	25.07	49.98	23.21	25.65
Peru	2003-2016	24.87	16.55	98.31	24.91	14.98	26.32	36.10
Total		22.61	13.80	94.46	27.08	38.18	43.82	35.80

TABLE 2. | Sample Means for Selected Variables by Country

In-Sample Country Standard Deviations								
Country	Periods	PFA (%)	Bond (%)	Stock (%)	GDP (\$bn)	GDPPC (\$'000)	Growth (%)	Inflation (%)
Argentina	2002-2007	9.14	22.66	2.85	61.62	1,485.83	0.41	3.31
Brazil	2002-2016	1.69	3.73	20.10	739.82	3,552.33	3.28	2.69
Chile	2003-2016	5.60	7.57	22.43	66.06	3,545.69	2.38	2.05
Colombia	2002-2016	4.91	12.52	19.60	101.25	2,027.37	1.64	1.79
Mexico	2002-2016	3.80	23.07	9.61	186.85	1,195.93	2.43	0.77
Peru	2003-2016	3.53	11.86	14.71	53.53	1,608.30	2.41	1.13
Total		18.48	16.59	31.96	670.21	3,479.44	2.88	2.61

  

Country	Periods	Savings (%)	Interest (%)	REER (Base = 2010)	Age (years)	Labor (mm)	Credit (%)	External (%)
Argentina	2002-2007	0.83	6.44	4.66	0.58	0.74	1.31	39.37
Brazil	2002-2016	1.79	8.81	14.79	1.93	6.05	14.76	10.36
Chile	2003-2016	3.85	4.87	5.20	1.54	0.88	13.72	10.98
Colombia	2002-2016	2.45	1.61	13.15	1.48	2.02	9.44	7.69
Mexico	2002-2016	0.91	1.54	9.18	1.53	5.35	6.39	7.39
Peru	2003-2016	3.56	3.67	4.43	1.31	1.58	6.58	7.57
Total		4.19	13.80	14.04	2.76	33.43	28.29	19.37

TABLE 3. | Standard Deviations for Selected Variables by Country

of GDP indicate the relative size of pension funds with respect to each country's economy. Macroeconomic variables sampled include nominal GDP, real GDP growth rate, inflation rate, savings rate, real interest rate, GDP per capita, and real effective exchange rate. As nominal GDP was sampled in current US Dollars to facilitate comparability, the real effective exchange rate is included to account for fluctuations in exchange rates that may have influenced the nominal GDP figures. Real GDP growth and inflation rates serve as indicators of overall macroeconomic health, whereas savings rate and GDP per capita provide further insight on consumer behavior and wealth. The real interest rate serves as a proxy to measure the overall real return on financial markets, which, along with the savings rate and GDP per capita, may influence the net flows into the financial system. Demographic variables such as median age and size of the labor force may provide further insight on individuals' contributions to the pension system, as well as possible

outflows of annuity payments as the median age rises and the labor force shrinks. Finally, data on domestic credit and external debt as a percentage of GDP serve to measure the effect of domestic and international substitutes to local capital markets.

The countries sampled represent over 86% of the region's GDP, and, despite the differing political developments and institutional frameworks, these conform a representative set of comparable countries (IMF, 2016). Even though Venezuela accounts for nearly 6% of the region's GDP, there is a lack of reliable macroeconomic and pension data, not to mention that the events of the past 15 years have turned the country into a macroeconomic outlier. The time period studied was determined based on the availability of reliable pension fund data for all the countries studied, while attempting to have a balanced panel dataset for most countries. Data collected on Brazil, Colombia, and Mexico resulted in balanced panels, while data from Argentina, Chile, and Peru resulted in

unbalanced panels after accounting for outliers in macroeconomic variables. The lack of pension fund data in Argentina from 2008-2016 is due to the renationalization of the pension system in 2008 (Barrionuevo, 2008).

The data on pension fund assets are from the OECD Institutional Statistical Yearbook, OECD Global Pension Statistics, International Federation of Pension Fund Administrators, and national regulators. Stock market capitalization and bond market value data are from the World Development Indicators and the Bank for International Settlements. Macroeconomic and demographic data were retrieved from the World Development Indicators, the IMF International Financial Statistics, and the Federal Reserve Bank of St. Louis.

Descriptive statistics on pension fund assets, bond market value and stock market capitalization are provided in Table 2 and Table 3, along with selected macroeconomic, financial and demographic variables. Table 2 shows that, relative to GDP, countries with large stock markets tend to have smaller bond markets, which may account for the substitute relation between both markets. Furthermore, on average, the countries with larger stock markets appear to have a larger amount of domestic credit as a percentage of GDP, which may indicate a complementary relationship between credit and equity. Chile presents a particular case among the countries sampled, as it shows mean values of pension fund assets, stock market capitalization, and domestic credit relative to GDP (60.38%, 108.27%, and 95.35% respectively) that are significantly higher than the overall sample means (22.25%, 52.61%, and 48.32% respectively). However, it has a smaller bond market value relative to GDP (16.87%), ranking fifth among the countries sampled. Finally, even though there seems to be no strong correlation between pension fund assets and savings rates, countries with higher variability in their savings rate as measured by its standard deviations (see Table 3) seem to have more pension fund assets relative to GDP.

## ECONOMETRIC MODEL

This paper tests whether the growth of pension fund assets has contributed to the development of bond and stock markets in Latin America. For this purpose, two separate sets of log-log regressions are estimated for each of the markets studied using OLS. A log-log specification is used to account for nonlinearities among the data, as well as to facilitate the interpretation of the results for the effect of growth of pension fund assets (PFA) in the growth of *Bond* and *Stock*. Furthermore, it is expected that the relationship of PFA with *Bond* and *Stock* is positive, while showing signs of convergence at lower growth rates due to diminishing returns to scale as both markets and overall economies develop. The models for

**1** Note: Table shows results from ordinary least squares regressions. Heteroskedasticity-robust standard errors are shown in parenthesis. \*, \*\*, \*\*\*, and denote significance at the 10, 5, and 1 percent level.

	Dependent Variable: Log(Bond)				
	Model 1	Model 2	Model 3	Model 4	Model 5
Log(PFA)	0.106 (0.097)	1.016 *** (0.286)	1.470 *** (0.237)	0.973 *** (0.214)	0.645 * (0.237)
GDP		0.197 (0.245)	-1.103 ** (0.412)	-1.103 *** (0.278)	-0.010 (0.287)
Growth		1.387 (3.081)	-0.019 (0.000)	3.216 (3.284)	6.330 * (3.566)
GDPPC		0.673 *** (0.000)	-0.104 (0.000)	0.369 (0.166)	-1.133 *** (0.184)
GDPPC <sup>2</sup>		-0.028 *** (0.007)	0.005 (0.007)	0.012 ** (0.007)	0.034 *** (0.006)
Inflation		-0.985 (2.952)	6.253 *** (2.263)	8.592 *** (2.747)	4.715 * (2.579)
Savings		-11.640 *** (2.398)	-0.167 (2.500)	-0.444 (2.368)	-1.720 (1.800)
Interest		1.748 ** (0.880)	-3.207 ** (1.330)	-5.827 *** (1.200)	-2.457 ** (1.062)
REER		-0.026 ** (0.010)	0.007 (0.010)	0.016 ** (0.008)	0.037 *** (0.007)
Age		0.046 (0.054)	-0.307 (0.071)	-0.130 ** (0.061)	0.419 (0.329)
Labor		-0.025 *** (0.008)	0.060 (0.037)	0.039 *** (0.010)	-0.076 ** (0.030)
Credit		-4.300 *** (0.623)	1.456 (1.582)	-0.320 (0.903)	-1.455 (1.440)
External		2.247 *** (0.525)	1.371 ** (0.513)	0.807 ** (0.424)	-0.902 (0.557)
Constant	-1.512 *** (0.172)	2.461 (1.507)	0.310 (1.828)	3.264 ** (1.324)	-8.710 (7.367)
Country FE	No	No	Yes	No	Yes
Year FE	No	No	No	Yes	Yes
R-squared	0.0095	0.6385	0.8026	0.8925	0.9423
Adjusted R-squared				0.8344	0.9013
Observations	78	78	78	78	78

**TABLE 4.** Effect of Growth in Pension Fund Assets in the Growth of Bond Markets<sup>1</sup>

*Bond* and *Stock* were performed independently of each other in order to avoid multicollinearity issues, as empirical evidence shows that bond and stock markets tend to have an inverse correlation. Macroeconomic covariates include nominal GDP, real GDP growth rate, inflation rate, savings rate, GDP per capita (GDPPC), GDPPC<sup>2</sup>, and real effective exchange rate (REER). Demographic covariates include median age and labor force size, and covariates accounting for alternatives of capital markets include net domestic credit and external debt. Effects of political risk, institutional strength, and tax regimes are captured by country fixed effects ( $Country_{i,t}$ ), while cyclical is captured by year fixed effects ( $\lambda_{Year}$ ).

Five models are estimated for each set of regressions. Model 1 is a single regression model of the effect of the relative growth of PFA on the relative growth of *Bond* and *Stock* respectively. Model 2 accounts for macroeconomic, financial, and demographic variables, along with controls for alternative sources of funds. Model 3 adds controls for country fixed effects. Model 4 adds controls for cyclical to Model 2 using year fixed effects. Model 5 controls for all the fixed effects from the previous models.

	Dependent Variable: Log(Stock)				
	Model 1	Model 2	Model 3	Model 4	Model 5
Log(PFA)	0.755 *** (0.047)	1.111 *** (0.141)	1.232 *** (0.167)	0.864 *** (0.118)	0.744 *** (0.174)
GDP		-0.036 *** (0.124)	-0.435 ** (0.166)	-0.576 *** (0.089)	-0.394 *** (0.122)
Growth		0.270 (1.407)	-1.104 (1.358)	0.660 (1.407)	1.280 (1.262)
GDPPC		-0.192 ** (0.076)	-0.395 *** (0.115)	-0.205 *** (0.068)	-0.348 *** (0.107)
GDPPC <sup>2</sup>		0.006 * (0.003)	0.015 *** (0.005)	0.006 * (0.003)	0.011 *** (0.003)
Inflation		-1.671 (1.360)	-1.431 (1.587)	1.666 (1.176)	1.091 (1.136)
Savings		1.407 (1.060)	5.359 *** (1.271)	2.120 *** (0.753)	2.891 *** (0.945)
Interest		-1.217 ** (0.498)	-1.065 (0.767)	-1.941 ** (0.468)	-0.951 (0.445)
REER		0.020 *** (0.005)	0.028 *** (0.005)	0.021 *** (0.004)	0.028 *** (0.005)
Age		-0.034 ** (0.031)	-0.014 (0.045)	-0.168 *** (0.030)	-0.048 (0.151)
Labor		0.021 *** (0.004)	0.032 * (0.018)	0.029 *** (0.004)	0.019 (0.015)
Credit		0.612 * (0.342)	1.392 * (0.342)	2.270 *** (0.312)	1.207 (0.554)
External		-0.835 ** (0.356)	-0.910 ** (0.302)	0.013 (0.211)	-0.238 ** (0.253)
Constant	0.513 *** (0.085)	0.612 (0.705)	-1.133 (1.197)	2.311 *** (0.641)	-0.921 (3.371)
Country FE	No	No	Yes	No	Yes
Year FE	No	No	No	Yes	Yes
R-squared	0.7341	0.8925	0.9219	0.9749	0.9820
Adjusted R-squared				0.9613	0.9691
Observations	78	78	78	78	78

**TABLE 5.** *Effect of Growth in Pension Fund Assets in the Growth of Stock Markets'*

This approach traces the variation of the coefficient on the relative growth of PFA as additional controls were included in each regression. Moreover, this demonstrates whether the coefficient is consistent with the paper’s hypothesis on the role of pension funds in the development of Latin-American capital markets. Model 5 is the base specification as it controls for all of the observed variables, and it is summarized below for *Bond* and *Stock*:

$$\text{Log}(Bond_{i,t}) =$$

$$\alpha_0 + \alpha_1 \text{Log}(PFA_i) + \alpha_2 GDP_i + \alpha_3 Growth_i + \alpha_4 GDPPC_i + \alpha_5 GDPPC_i^2 + \alpha_6 Inflation_i + \alpha_7 Savings_i + \alpha_8 Interest_i + \alpha_9 Age_i + \alpha_{10} Labor_i + \alpha_{11} Credit_i + \alpha_{11} External_i + \delta Country_{i,t} + \lambda Year + u_{i,t}$$

$$\text{Log}(Stock_{i,t}) =$$

$$\beta_0 + \beta_1 \text{Log}(PFA_i) + \beta_2 GDP_i + \beta_3 Growth_i + \beta_4 GDPPC_i + \beta_5 GDPPC_i^2 + \beta_6 Inflation_i + \beta_7 Savings_i + \beta_8 Interest_i + \beta_9 Age_i + \beta_{10} Labor_i + \beta_{11} Credit_i + \beta_{11} External_i + \delta Country_{i,t} + \lambda Year + u_{i,t}$$

where  $u_{i,t}$  and  $\varepsilon_{i,t}$  account for all other factors that influence the growths of bond and stock markets respectively. The main parameter for the regression on *Bond* is  $\alpha_1$ , which quantifies the marginal relative change of increasing PFA by one percentage point in a country’s bond market value. Likewise, the main parameter for the regres-

sion on *Stock* is  $\beta_1$ , which quantifies the marginal relative change of increasing PFA by one percentage point in a country’s stock market capitalization.

## RESULTS

Results for the sets of regressions for bond market value and stock market capitalization are presented on Table 4 and Table 5 respectively. The results from both sets of regressions support that the growth of pension fund assets has a positive effect on the growth of bond market value and stock market capitalization as a percentage of GDP of the countries sampled. Even though the results from the base specification were only statistically significant for stock market depth, the inclusion of macroeconomic controls in Model 2 substantially improved the significance of the main parameter for both regressions, as well as the models’ fit to the data.

Even so, after adding country and year fixed effects in Model 5, the magnitude of the coefficient was greater for stock market capitalization than for bond market value, while also showing a higher level of statistical significance. For instance, a one percentage point increase in pension fund assets relative to GDP, on average, leads to a 0.744% increase in stock market capitalization as a percentage of GDP at a 1% significance level. On the other hand, a one percentage point increase in pension fund assets relative to GDP, on average, leads to a 0.645% increase in bond market value as a percentage of GDP at a 10% significance level. Additionally, after implementing such controls in Model 5, the bond market regression’s R<sup>2</sup> increased from 0.6385 to 0.9423 (with an adjusted R<sup>2</sup> of 0.9013), and the R<sup>2</sup> for the stock market regression rose from 0.8925 to 0.9820 (with an adjusted R<sup>2</sup> of 0.9691), while remaining jointly statistically significant at the 1% level for both models.

By introducing country and year fixed effects, it was also possible to determine the correlation between these control variables and the main parameter for bond and stock markets, and to avoid misestimating the coefficient due to omitted variable bias. For instance, after including such fixed effects, the elasticity of pension fund assets in the bond market value regression decreased by 0.371 from Model 2 to Model 5, while the same coefficient decreased by 0.367 in the stock market capitalization regression between the respective models. This shows that there was a significantly positive correlation between country-specific factors (e.g. institutional quality, corporate governance), year-specific factors (e.g. cyclicity), and the parameter of the growth of pension fund assets in both capital markets that introduced a positive omitted variable bias.

While some of the main macroeconomic control variables discussed in the literature were statistically significant for both sets of regressions, they displayed correlations with the dependent variables as expected.

The coefficients on real growth and inflation rates were positive for both bond and stock markets, yet were only statistically significant at the 10% level for bond market value. This is expected, as stock market capitalization and bond market value tend to grow with real GDP, as well as with asset prices – bonds and stocks can be used as instruments to hedge against inflation. However, the coefficient on nominal GDP was negative for both bond and stock markets – and only significant for stock market capitalization at the 1% level – as, in the same way as GDP, they tend to experience diminishing marginal returns as they grow larger. The coefficient on GDP per capita was negative and significant at the 1% level for both markets, showing that countries with a high level of economic development as measured by GDP per capita, on average, tend to be less risky than countries with low GDP per capita. Therefore, lower risk implies a lower rate of return on the market, which results in a lower growth rate of capital markets. Furthermore, the coefficient on GDP-PC<sup>2</sup> is negative and significant to the 1% level for both markets, which implies that such reduction of risk and ensuing decrease in market returns experiences diminishing marginal returns. This implies that the negative effect of GDP per capita on the growth rate of bond market value and stock market capitalization is attenuated at higher levels of GDP per capita.

Additional financial indicators were also significant for most of the regressions and showed correlations with the dependent variables as expected in the literature. The parameter of savings was negative for bond market value and positive for stock market depth, yet only statistically significant at the 1% level for the latter. This may indicate that, on average, there is a higher allocation of savings in stocks than in bonds, which is reflected by a greater size of stock markets relative to GDP in countries with high savings rates (e.g. Chile, Peru), and a lower development of bond markets relative to GDP in countries with low savings rates (e.g. Brazil, Colombia). The coefficient on the real interest rate was negative for both markets, but only significant at the 5% level for bond markets. This is expected, as higher real interest rates increase the costs of capital at which the future cash flows from these securities are discounted, which reduces their present valuations and the overall value of the entire bond and stock markets. Finally, the coefficient on the real effective exchange rate (REER) is positive and significant to the 1% level for stock and bond market depth, which may reflect the effect of an increase in the demand for local currencies by foreign investors accounting for differences in purchasing power. This implies an increase in the demand for domestic assets, including, to some extent, a higher demand for financial assets as well.

Most of the covariates accounting for demographic factors behaved as expected in most of the regressions, yet there were few instances in which these displayed signs of statistical significance. The parameter of median

population age was positive for bond market value and negative for stock market capitalization. Even though the age parameter may reflect the effect of higher risk aversion in older populations by increasing their holdings of debt securities and reducing their positions in equities, it was not statistically significant in either of the base specifications. The coefficient on labor market size was positive for stock market capitalization and negative for bond market value, yet only statistically significant at the 5% level for the latter. Pension fund assets were expected to grow as the size of the contributing labor force increased, and, by transitivity, this had a positive effect on both bond and stock market depth. Nonetheless, the relationship between the size of the labor force and bond market value may reflect additional variables that are not studied in this particular model.

Finally, the controls accounting for alternative sources of funds to domestic capital markets showed expected correlations with the dependent variables, yet were only statistically significant in few cases. The coefficient on domestic credit was negative for bond market value and positive for stock market capitalization, yet was not statistically significant in either of the models. Notwithstanding, the negative correlation between domestic credit and bonds may reflect a substitute relationship, while the positive correlation between the former and equities may reflect a complementary relationship. The parameter on international debt is negative for both markets, yet it was only statistically significant at the 5% level for bond market value. This negative relationship may indicate that, on average, international debt is a substitute source of funds to domestic capital markets.

## DISCUSSION

The evidence reported in Section VII shows that pension funds have had a material and significantly positive effect on the development of bond and stock markets in Latin America's largest economies. Even though there are country-specific circumstances that may influence the magnitude of pension funds' impact on domestic capital markets, the positive trend holds after controlling for these variables using entity fixed effects. Such positive influence on the depth of capital markets translates into greater overall financial development, which has the potential to accelerate emerging markets' process towards economic development. Therefore, this suggests that the benefits derived from robust and efficient pension systems may have positive spillover effects in the broad economy, which creates incentives for governments and economic agents to invest in and develop such systems. This section draws from the findings to provide two possible explanations for the beneficial role of pension funds in the development of capital markets through their participation in primary and secondary markets. Subsequently, it exposes the study's limitations by reviewing its

internal and external validity.

Primary markets are the markets for issues of new securities in which firms and other users of funds supply paper to investors and other sources of funds on the demand side. Therefore, this is the only instance through which firms are able to directly raise funds from investors in exchange for securities with different risk-return characteristics. The participation of pension funds in this market represents a significant increase in the demand for new issues and thus in the supply of funds for the issuing firms. Furthermore, given pension funds' ability to pool funds from individuals, who may have no access to these securities markets, it allows to move an even larger portion of capital between economic actors, often in sizable transactions with material effects on the price of securities. Therefore, an increase in pension fund's financial and total assets via primary bond and stock markets contributes to their growth, while the rising integration of economic actors via the intermediation of pension funds fosters higher financial development.

On the other hand, even though transactions in the secondary market involve only the owners of the securities and not the issuers of such securities, issuing firms still benefit from price appreciation. As pension funds increase the demand for securities in secondary markets, their prices start hiking, especially due to the material effect of pension funds' transactions. Despite not receiving any of the proceeds directly, higher valuations of these securities in secondary markets have a positive spillover effect in primary markets for firms, as they are able to raise a larger amount of capital per new issue. However, this benefit is limited by the fact that new issues exert dilutive pressures on the prices of existing securities and may lower the valuation of future issues. This implies that there is a window of opportunity for firms to reap such benefits, yet it still holds that an increase in pension fund assets contributes to the growth of bond and stock markets, even via secondary markets.

### Internal Validity

The magnitude of the main parameter from both regressions declined as country and year fixed effects were incorporated. This implies that there was a positive correlation between these previously unobserved variables and the main coefficient, which, after being accounted for, introduced no further omitted variable bias to the results. Nonetheless, though the models from both regressions suggest that this positive effect is statistically significant, there may exist limitations on the magnitude of the main parameter regarding the measurement of the impact of institutional quality and corporate governance.

As mentioned in Section II, countries with a high level of institutional quality – in terms of the effectiveness of regulation and enforcement to ensure the proper conduct of business – have shown to achieve, on average, higher levels of financial development. For instance,

Stallings and Studart use an index of institutional quality, which, as an independent variable, shows a positive relation with the development of capital markets and financial systems overall (Stallings & Studart, 2006). Moreover, in the context of this study, institutional strength may contribute not only to the growth of pension fund assets, but may also magnify the beneficial effects of pension funds on capital markets in countries with strong institutions. As such inefficiencies are mitigated in the market, pension funds and other institutional investors are better able to allocate their investment capital in a wider range of securities, meaning that they would supply funds to a broader spectrum of participants that could be discarded in poor regulatory environments. Furthermore, this follows from De la Torre, Gozzi and Schmulker's hypothesis on the negative repercussions of premature financial liberalization, as suboptimal regulatory institutions may cripple the effect of pension reforms and pension funds' investments in the growth of capital markets (De la Torre, Gozzi & Schmulker, 2007).

Similar to institutional quality, corporate governance has displayed a positive relationship with the growth of capital and financial markets as an independent variable. Likewise, it would most likely accentuate the impact of pension funds in financial development, as greater reliability on such private norms would increase the confidence of institutional investors to engage in a wider variety of investments in the market. Nonetheless, the limitations pertaining to the accurate measurement of such effect may be even greater than those of institutional quality, as corporate governance is a characteristic that can vary among different firms in a single country. Therefore, the effect captured by the controls implemented in this study and even other indexes that weigh different criteria may provide information on the average level of each of the countries sampled. Nevertheless, unlike institutional quality, corporate governance may not present trends with the same level of persistence within specific industries and even more so across entire countries, as a centralized authority does not strictly determine such norms. Even though broad institutional quality may shape firm-specific corporate governance, such structures are designed, within the scope of the law, to accommodate to the best interest of companies' stakeholders.

### External Validity

The high level of fit of the base specifications to the data, as measured by their  $R^2$  and adjusted  $R^2$ , suggests that they can serve to forecast the growth of bond and stock markets in other populations using the growth of pension fund assets. For instance, such analysis could be applied to smaller and, on average, less developed countries in Latin America to predict the performance of their own capital markets. However, despite showing a strong forecasting power, these models would be subject to a group of countries that, on average, may have consid-

erably different domestic macroeconomic features, not to mention the contrasting political circumstances and institutional framework. Another feature to consider would be the existence of financial reforms that shape the dynamics of capital markets and financial systems in terms of private-sector participation, ownership, access to international finance and involvement of institutional investors.

Finally, this study's external validity could be tested by measuring the role of other institutional investors such as insurance companies and mutual funds in the development of Latin American capital markets. Though pension funds tend to have the largest share of financial assets among non-bank financial institutions, insurance companies and mutual funds also hold a considerable portion of these assets (Heng, Ivanova, Mariscal, Ramakrishna & Wong, 2016). In the same way as pension funds do, insurance companies pool funds from policy holders and invest in long-term assets, while they are contractually bound to provide an annuity or lump-sum payment in the event of a claim. These are closely related to pension funds, yet differ mainly on the nature of their liabilities. The value at risk of their claims can be extremely high, especially if they provide unlimited coverage. Consequently, insurance companies tend to overweight safer and more liquid assets than pension funds as the value and timing of their disbursements is hard to predict (Davis, 2003). Therefore, it would be expected that the growth of insurance company assets relative to GDP also contributed to the growth of stock and bond markets in Latin America, yet having a greater impact on the latter.

On the other hand, although mutual funds also hold significant pools of capital, they "seek to offer an enhanced risk-return profile and greater liquidity to individual investors" (Davis, 2003). Unlike long-term contractual savings institutions, mutual funds have less restrictions on their holdings and offer investors the possibility to redeem their fund certificates at their net asset value (open-end funds) or allow them to trade fund shares on exchanges (close-end funds). Thus, although these investment vehicles follow different mandates to cater various investor risk preferences, they tend to hold a larger portion of liquid assets ranging from money market instruments to equities (Davis, 2003). Therefore, the growth of mutual fund assets may contribute to the growth of capital markets in Latin America, yet it would be constrained by the higher liquidity preferences of these funds and their investors. This would imply that mutual fund assets may have a greater effect in markets for more liquid assets (e.g. equities), yet it would also suggest the need of other measurements of financial development other than market depth.

## CONCLUSION

This study shows that, given the constructive role of pension funds in Latin American capital markets, this

subset of institutional investors can serve to promote the growth and enhancement of financial systems across the region and make it live to its economic expectations. Despite having a greater average impact on stock market capitalization than on bond market value, the positive effect of pension funds on the growth of these markets is evident. Given that most of the largest Latin American economies have liberalized their financial systems to an important degree, most of the power to boost financial development lies on the hands of the private sector.

Nonetheless, governments and regulators can design policies that align such private interests with long-term macroeconomic goals. Acknowledging the role of pension funds in capital markets, governments should create such policies addressing the main sources of growth of pension fund assets: funding and investment returns. Tax incentives at the personal-income level and tax deferrals on pension liabilities for corporations may increase their contributions to pension plans on both defined benefit and defined contribution schemes. On the other hand, regulators could allow pension funds to design their investment strategies with less statutory limitations on asset allocations, as these may generate inefficient results. The decrease in regulatory scrutiny can be compensated by increasing their own invested reserve requirements, which use shareholder money instead of contributions, aligning their risk-return incentives by sharing more risk with contributors. This demonstrates that despite most countries' steps towards economic liberalization, the interaction between private and public sectors remains crucial to the fulfillment of financial and economic development objectives.

Though Latin America's economic deceleration and even recession are recent phenomena, these are – to a significant extent – the product of decades of economic underdevelopment. Compared to other emerging markets, the region's strong economic fundamentals ranging from diverse resource endowments to growing populations and human capital do not indicate a lack of potential for development. Instead, as suggested by De la Torre, Gozzi and Schmulker, this circumstance can be attributed to faulty reform sequencing and even incomplete or restraining reforms in some cases (e.g. Argentina) (De la Torre, Gozzi & Schmulker, 2007). Within the scope of this paper, most Latin American countries have missed the opportunity to evolve from traditional bank-centered finance into modern financial systems combined with robust capital markets. Capital markets play a determinant role in the road to financial development, and greater financial development is necessary to boost real economic activity. Thus, it can be said that capital markets are essential to the evolution of emerging markets into advanced economies, and leveraging on pension funds and their qualities can make a difference for Latin America in this process.

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