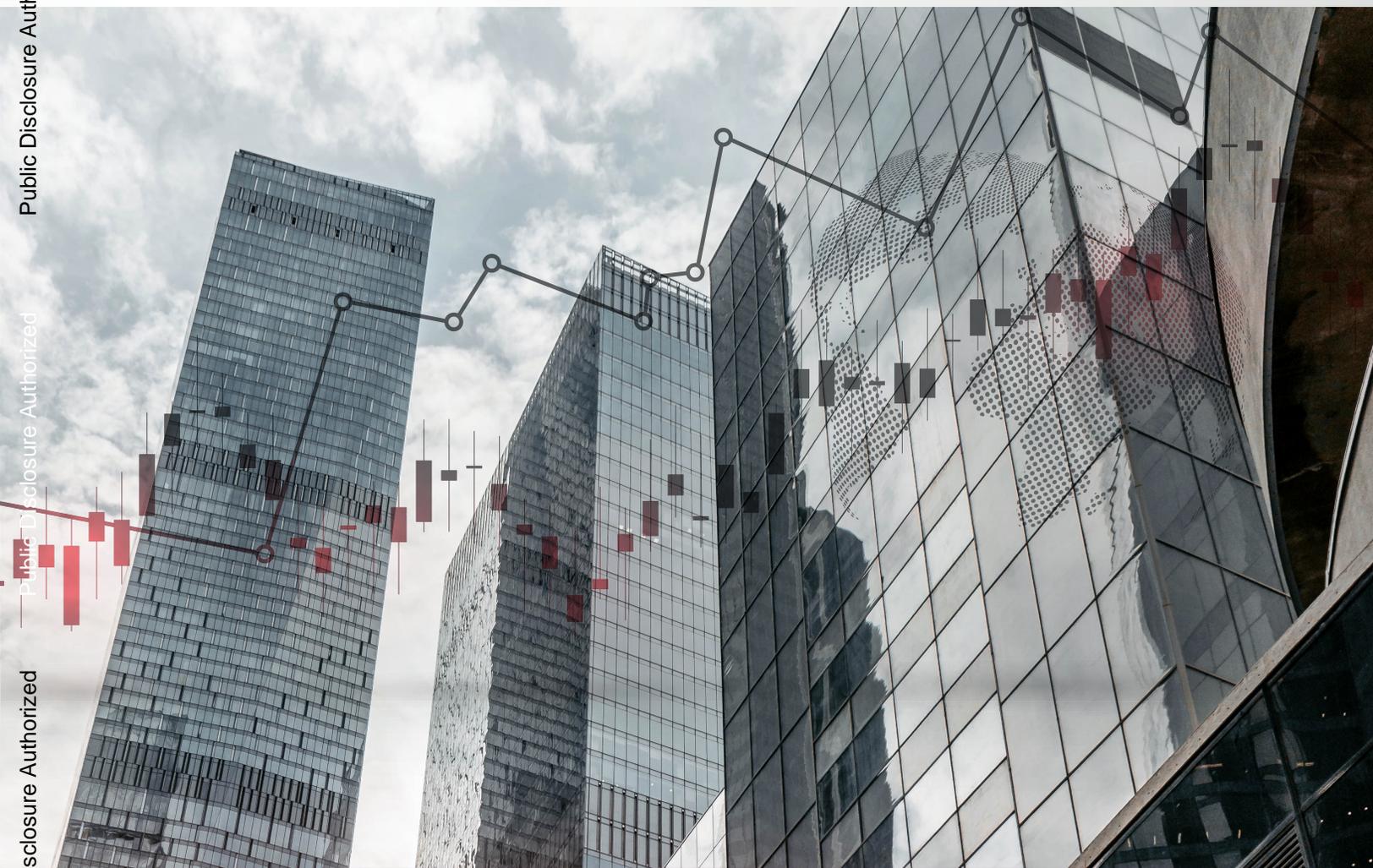


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A LITERATURE REVIEW

CAPITAL MARKETS DEVELOPMENT

December
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CAUSES, EFFECTS, AND SEQUENCING

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Selected Abbreviations

ARDL	Autoregressive Distributed Lag
CEEC	Central and Eastern European Countries
ECM	Economic Confidence Model
EU	European Union
GDP	Gross Domestic Product
GLS	Generalized Least Squares
GMM	Generalized Method Of Moments
GNP	Gross National Product
ICMA	International Capital Market Association
IPO	Initial Public Offering
LSDV	Least-Square Dummy Variable
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
R&D	Research And Development
ROA	Return On Assets
SME	Small And Medium Enterprise
SUR	Seemingly Unrelated Regressions
TFP	Total Factor Productivity
TSLS	Two-Stage Least Squares
VAR	Vector Autoregressive
WFE	World Federation of Exchanges



Executive Summary

This note consolidates and summarizes the theoretical and empirical research produced in the past 20 years on the causes, effects, and sequencing of capital markets development.

This review has been triggered by the increased attention given to capital markets as a mechanism that can potentially help channel private sector funding to key strategic sectors of the economy, from corporates to infrastructure, housing, small and medium enterprises, and climate change. Thus, it is important to have a common understanding of the drivers of capital markets development and potential sequencing issues, as well as on the potential impact that capital markets development could have on economic growth and financial stability. Accordingly, this review constitutes a background note that will set the foundation for further work, both knowledge and policy related. By itself, however, this note does not intend to set policy.

Overall, the empirical studies reviewed confirm the potential benefits of capital markets to economic growth. In particular, a strong correlation has been found between capital markets and economic growth—although causality does not run in a single direction: capital markets development generates economic growth, but the level of gross domestic product (prominently, per capita) also contributes to further capital market deepening. In addition, empirical evidence links capital markets and innovation, as well-developed capital markets play a key role in the financing of technology and, more generally, of riskier projects and enterprises, which are not usually financed via banking lending.

Also, there is empirical evidence on the potential benefits of capital markets on financial stability. Most of the empirical studies on this topic are recent and were triggered by the 2008 global financial crisis. The studies show, for example, that post-recession recoveries and investment are stronger in countries with deeper bond markets relative to bank credit. In the same vein, measures of financial systemic risk increase with bank credit deepening and diminish with nonfinancial bond debt and stock market capitalization. Finally, at least in advanced economies, bond market financing has enabled firms to substitute bank loans during the credit crunch that has taken place in the aftermath of the 2008 crisis, acting as a spare tire for these firms and hence turning into a financial stabilizing force. However, this activity does not imply that capital markets do not carry risk. Furthermore, the new literature on the nonlinear effects of financial development on growth and stability argues that financial development (including both banks and capital markets) has a positive effect up to some threshold, but afterwards such effect becomes negative.

At the same time, the empirical research confirms the existence of a series of preconditions for capital markets to develop. In general, such preconditions point to the need for countries to have (a) a stable macroeconomic environment, which mainly translates into economic growth, low inflation, and robust fiscal policies, (b) a certain level of development of the financial sector, including a robust banking sector, institutional investors, and financial openness, and (c) a robust legal and institutional environment, including mechanisms to ensure the protection of investors and, more generally, that the country abides by the rule of law.

Like all empirical research, this body of work also has limitations and blind spots. First, the majority of the empirical research focuses on the stock market, while the corporate bond market has received less attention—in particular, in connection with the role of corporate bond markets in economic growth. Second, most of the research focuses on the secondary markets, while less attention has been given to the primary markets, which are, in fact, the first channel through which capital markets influence the real economy. Third, some important variables have not been analyzed, such as the impact that the structure of the corporate sector has on capital markets development. Still, these limitations notwithstanding, the evidence overwhelmingly supports the conclusion that capital markets are associated with better economic outcomes.

The empirical research on sequencing is more limited. There is more clarity regarding the need for certain components of the financial sector to have developed for capital markets to take hold, including as mentioned, a banking system. But there is not much research on the sequencing between equity and debt markets. The same applies to research on the sequencing of retail versus institutional investors—although there is indeed empirical research that shows the positive correlation between institutional investors and, in particular, pension funds and capital markets development. In any event, the lack of research in this area might also be a reflection of the fact that the path of countries to develop their capital markets differs depending on country context.

From the World Bank Group perspective, the conclusion that certain preconditions are needed for capital markets to develop provides the foundation for the development of tools to inform the World Bank's technical assistance program as well as to guide policy makers in their assessment of the potential that specific countries have to develop their capital markets. Thus, the World Bank Group plans to follow this review with its own analytical exercise aimed at developing an index of capital markets potential that could be used internally to decide which countries to support from a capital markets development perspective and externally by policy makers to identify key areas in which improvements are needed to increase the probability of impact from their actions in capital markets development. Additional research may also follow in areas in which gaps in empirical analysis were identified.



Introduction

This note consolidates and summarizes the theoretical and empirical research produced in the past 20 years on the causes, effects, and sequencing of domestic capital markets development.

This review was triggered by the increased attention that the World Bank Group is giving to capital markets. Well-developed capital markets have played a role in financing the corporate sector, but increasingly they are being looked at as a mechanism that can potentially help channel private sector funding to strategic sectors of the economy that face huge financing gaps, such as housing, infrastructure, small and medium enterprises (SMEs), and climate change. Thus, it is important for stakeholders to have a common understanding of the drivers of capital markets development and potential sequencing issues, as well as on the impact that capital markets development could have on economic growth and financial stability. In addition, this review should help guide the World Bank's knowledge agenda on key areas in which research has been found to be thin. Accordingly, this review constitutes a background note that will set the foundation for further work, both knowledge and policy related. By itself, however, this note does not intend to set policy.

The review focuses on the literature concerning domestic capital markets for public nonfinancial corporate equity and bonds. Therefore, it does not cover government or private (unlisted) securities, the issuance of corporate instruments in foreign markets, nor derivatives markets.¹ The review also does not cover other types of instruments that are being used to mobilize capital market investors to strategic

¹ The main interest, for growth purposes, lies in the market for securities issued by nonfinancial firms. Therefore, government bond markets are dismissed as a direct source of investment and growth. Governments may tap capital markets to finance either current or investment spending, however due to money fungibility it is not possible to make a statement about the ultimate use (as a matter of fact, the same argument may apply to any issuer). Also, even if directed toward public investment, government participation in the markets may be thought of as an input (via higher productivity) in the production function of the nonfinancial corporate sector. A similar consideration is reserved for the activity of financial corporations as issuers in primary capital markets, whose ultimate economic effects are to be felt on the loan market. Derivatives markets will not be studied here either, despite their potential role as a tool for risk management, in light of the understanding that the underlying securities (equity and bonds) have a more direct bearing on macroeconomic outcomes. However, references to some of these other segments may be made when relevant for the analysis. Also, in some cases they will be included in some aggregate indicators (for example, international statistics on market capitalization or value traded do not separate financial and nonfinancial issuers).





sectors, such as project bonds or debt funds for infrastructure financing or fintech platforms and credit funds for SME financing. However, it is important to note that such empirical research is still very limited because of both the novelty of many of these solutions and the lack of data available. Henceforth, the expression “capital markets” will be used in this narrow sense.

The World Bank team reviewed 72 econometric papers, selected on the basis of their pertinence and technical rigor among a much larger number of available studies. These studies have been produced steadily from the early 1990s to 2019, suggesting a lively and continued interest in the subject. The following list summarizes the key characteristics of this research (see table I.1 for an

illustration and see the annex for more detail):

- Emerging and developing countries have attracted the most interest, with 44 percent of the papers covering these economies exclusively and another 49 percent in combined samples with advanced country data;
- A majority of the studies (about 85 percent) exploit panel data of years and countries, and much fewer works use time series (5 percent) and a cross-section of countries (10 percent);
- A majority of the studies (87 percent) work with country-level data, with the remaining cases (13 percent) exploiting company-level data;
- Roughly the same amount of research is dedicated

to the causes and the effects of capital markets (47 percent and 53 percent, respectively);

- A majority of the studies tackle equity markets—that is, 64 percent of the papers tackle just the equity market, 21 percent focus on the bond market, and 15 percent address both; and
- The exclusive analysis of the secondary market (capitalization, value traded) is concentrated in 64 percent of the contributions, with 19 percent addressing the primary market (issuance, number of listed firms) and 6 percent examining both.

The note is organized in five sections. The first section reviews the theoretical underpinnings of capital markets; the second section summarizes the theory and empirical research on the causes of capital markets development; the third section deals with the effects of capital markets; the fourth section addresses sequencing issues; and the fifth section discusses some open questions concerning the interpretation of the findings in the existing literature. Finally, an annex provides a summary of the 72 empirical papers reviewed.

► **TABLE 2.1 Survey participant characteristics**

Classification criteria	Groups	Paper count	Share (%)
Country sample	Only advanced	5	7
	Only emerging and developing	32	44
	Both	35	49
Dataset	Panel	61	85
	Time series	4	5
	Cross-section	7	10
Unit of analysis	Country-level	63	87
	Company-level	19	13
Research question	Causes of capital markets development	34	47
	Effects of capital markets development	38	53
Asset class	Only equity	46	64
	Only bonds	15	21
	Both	11	15
Market	Primary	14	19
	Secondary	54	75
	Both	4	6



BASIC THEORETICAL UNDERPINNINGS

1.1 Debt and equity contracts under asymmetric information

Financial intermediation aims to ameliorate the information and transaction costs that undermine the fluid transfer of funds from surplus to deficit economic units. By agglutinating the resources of many atomized savers and thus exploiting economies of scale, a well-functioning financial system allocates saving to its best uses at the minimum cost possible, while mitigating the risks for all the stakeholders involved (see Levine 2005).

To perform this function, financial markets need to address the asymmetric information syndrome (see Bebczuk 2003, and Tirole 2006, for an introduction). This widely accepted theory states that borrowers possess more information than their financiers do and are prepared to use this advantage to obtain abnormal rents at the expense of the latter, giving rise to a conflict of interest. These informational asymmetries manifest themselves in three modalities: adverse selection (creditors are unable to set apart good projects from bad projects), moral hazard (opportunistic borrowers apply their money to riskier-than-promised projects), and costly state verification (once the project is finished, the borrower falsely declares default to avoid repayment).

In this context, understanding the financial contracts written between companies in need of resources and lenders/investors in the form of debt (loans and bonds) and equity is a first step into the role, benefits, and obstacles that face capital markets in contrast to the banking industry. First, debt contracts have a predetermined maturity and interest rate, whereas in an equity arrangement the contract maturity is not predetermined, the risk is shared, and there is no fixed obligation to remunerate the investor. Those conditions mean that, relative to debt, equity contracts are riskier and longer term. They are riskier because, for a given profit share, the payoff might be very high or very low depending on the company's actual cash flows, with no legal recourse for the financier to be repaid in a bad scenario. In contrast, debt risk is bounded because the fixed interest rate imposes an upper

limit while the ability to claim ownership of the firm in case of bankruptcy mitigates the loss. This risk is further contained when the debt is secured by collateral. Equity contracts are also longer term because the parties do not set a maturity date on which repayment, or rollover, must occur.

1.2 Implications for capital markets development

These contractual attributes, though well known, have profound ramifications on the functioning of the financial system and the potential size of capital markets:

First, overall external financing, including that via capital markets, constitutes a small portion of the way corporations finance themselves.

Firms seek to minimize the cost of capital. Corporate finance theories—prominently, the pecking-order model—state that the internal funds (savings or undistributed earnings) are much less expensive than the external funds (loans, bonds, equity) because the latter are contaminated by information and intermediation costs.

Asymmetric information makes creditors more reluctant to relinquish their money and more prone to limit their exposure, increase the required return, reduce the maturity, and require collateral and other hard evidence of ability and willingness to repay. Also, the intermediation process entails multiple expenses, including physical facilities, human and technological resources, and so on, in addition to the retribution to the intermediary's shareholders. In contrast, internal funds—which are not channeled through the financial system—are free from both of those costs and only carry an opportunity cost. For that reason, internal funding should be the preferred source of funding, regardless of the degree of financial frictions prevalent in each country.

A corollary of the abovementioned pecking-order theory is that, because of their relative costs, internal funds (cash flows or retained earnings) should be the preferred source of funding, followed by debt (especially secured bank debt), and then external equity.

This theory finds support in the data. The World Bank's Enterprise Surveys indicate that internal funds cover, on average, 71.7 percent of business investment, whereas bank debt comes in second place with 13.8 percent.² The remaining 14.5 percent comes from a variety of sources, including trade credit, bond debt, external equity, and informal loans, among others.

Gleisner and Thomadakis (2018) report more detailed data for the 28 member countries of the European Union in 2016/2017 that confirm the prevalence of internal funds in the financing of corporate investment (between 57 percent in large firms and 71 percent in micro firms). Among the external sources, bank credit participates with 38 percent and 28 percent in large versus micro enterprises, respectively; bonds with up to 4 percent; and external equity with up to 1 percent.³

This preference for internal funding reflects itself in the capital structure of nonfinancial corporations. For instance, Fan, Titman and Twite (2012) investigate a sample of about 37,000 listed nonfinancial firms in 39 countries over the period 1991–2006 and conclude that the median debt-to-assets ratio is 22 percent. This means that 78 percent of total assets are financed by (mostly internal) equity.

Second, the public equity market is bound to be a selective club, biased toward larger companies.

Undoubtedly, there are benefits to going public, especially in dealing with financial constraints, signaling the firm's quality and gaining bargaining power with banks by reaching out to a broad investor base (see Pagano, Panetta, and Zingales 1998).⁴ Yet, compared with firms' participation in debt markets, and banks in particular, some strong motives may keep most firms away from the equity market:

- Equity investors have a higher required return in response to the higher risk they are taking. This premium, which has to do with risk aversion and is unrelated to any information friction, remunerates the fact that they share both the upside and the downside of realized cash flows.
- In addition, equity investors also require a higher return

² The dominance of internal funds over external funds should imply that a rather small fraction of private savings is actually intermediated by the financial market. Supporting this conjecture, Bebczuk (2015) estimates that just 8 percent (25 percent) of private savings in Latin America (high-income countries) is channeled through the financial system.

³ Even though domestic capital markets remain a marginal source of funding for the corporate sector, their contribution has been growing since the 1990s, initially due to financial liberalization and then, in the wake of the 2008 crisis, as a consequence of the low-interest-rate environment. See Abraham, Cortina, and Schmukler (2019) for evidence on East Asia.

⁴ Ritter and Welch (2002) assert that raising equity capital is the fundamental reason to go public.

to be compensated for their steeper monitoring costs. In debt contracts, creditors worry about repayment only once a default or reorganization is announced; otherwise, they will receive the contractual interest rate without any concern about the actual cash flows attained by the borrower. Conversely, equity investors get a fixed percentage of such cash flows, forcing them to continuously monitor that the controlling shareholders do not tamper with cash flow to their own benefit. This vigilance is costly and is likely to inflate the gross expected return charged to the issuer;

- By the same token, and being aware that minority shareholders can only partially defend themselves against insiders even under strong legal protection, financial authorities impose strict requirements for new issuers to come into the market. These restrictions put a necessary limit on the number of firms in the market. Far from neglecting a more democratic and open participation, these requirements are intended to preserve a healthy marketplace and keeping “lemons” at bay;
- There are good and bad projects among those interested in making new and seasoned equity issues, but investors have a hard time distinguishing them—this is called the adverse selection problem. Unable to weed out the low-quality issuers, investors end up underpricing the good ones and overpricing the bad ones. As a result of this undervaluation effect, the good projects, and especially those that are new and poorly known by the pool of investors, will be discouraged to participate at the same time that the weaker ones will feel more attracted to raise fresh funds. This phenomenon is another reason market regulators must act as gatekeepers for the sake of misinformed investors.⁵ An additional force holding back the number of public equity issuers in general, and that of smaller firms in particular, is tightly connected to the previous arguments. As Rajan and Zingales (2003) underscore, public capital markets are an arm’s length market, in which investors and issuers do not

meet face to face but only by way of hard information about the borrower. Hard information includes quantitative, codifiable, and documented data—such as the credit history, the accounting books, and the pledging of collateral—that can be easily transmitted to the prospective financier. Given the strict screening and reporting process mentioned, firms that lack this sort of information will most likely be excluded from public markets, and even those small firms with hard information may find the underwriting and listing expenses unaffordable.

Banks, on the contrary, are able to forge a direct lending relationship with some of their borrowers on the basis of soft information—that is, information collected through personal interaction with the borrowers to assess their character, effort, and entrepreneurial skills.⁶ Building a lending relationship takes time and resources, but it can be mutually beneficial as long as it enables the bank to discover good borrowers—not easy to spot at first sight because of adverse selection—and then enjoy some monopolistic power over them, as soft information is private and hence difficult to convey to others. For their part, borrowers benefit from access to the credit that other banks deny or extend at prohibitive interest rates. Although the bank will charge an interest rate above what the good borrower should pay according to its risk, the rate will still be below what other banks require;

The international data confirm the fact that not many companies are willing and able to list their shares in public markets, because equity contracts are severely impaired by informational frictions. In 2017 some 32,200 firms were listed across the world, 68 percent of which were located in high-income countries.⁷ The same figure stood at 23,200 in 1993. These numbers suggest a remarkably low penetration of the public firm, as it implies that there are just 9 public firms for every 1 million people (23 in high-income and 5 in middle-income countries). Further, at least in some of the more mature markets, the number of listed companies has been in decline.⁸ An eloquent

5 As markets prioritize and enforce transparency and disclosure, some firms with good projects may also be reluctant to issue equity to preserve confidentiality on strategic plans (see Pagano, Panetta, and Zingales 1998).

6 It should be noted that the limit between these two extreme models is blurry in practice. Banks engage also in hard information-intensive loans or combine soft and hard information. Market investors, in turn, also use soft information and get closely involved with the issuer in contracts such as venture capital. The same goes for liquidity. In the extreme, capital market securities are liquid and bank assets are not. However, in practice, some securities have limited liquidity, and bank loans can be made liquid through securitization.

7 Compared with the number of total—public plus private—firms included in the Orbis global database, some 310 million units, public firms would represent about 0.01 percent of all companies.

8 In the United States alone, the number of public companies reached a maximum of 8,090 in 1996 and dropped steadily to 4,336 in 2017. Cecchetti and Schoenholtz (2018) and Doidge and others (2018) study the causes and implications of this delisting process, which has been accompanied by a slower pace of initial public offerings (IPOs), from 300 a year in the mid-1990s to about 100 a year in the mid-2010s. Djama, Martinez, and Serve (2012) survey the academic literature on voluntary (motivated by a reevaluation of costs and benefits of staying public) and compulsory (due to violations of stock exchange requirements or financial stress) delistings. Gleisner and Thomadakis (2018) report a similar slowdown of IPOs in Europe, from 504 in 1996 to 193 in 2016.

comparison with the banking system is that, on the basis of the world average, there are some 17,000 corporate bank borrowers for every million people.⁹ Though low in absolute terms, the figure is much higher than the ratio of public companies.

Not only is the total number of listed firms low, but the high costs of registration, underwriting, and trading also make it difficult for small firms to go and stay public.¹⁰ Ritter (2018) estimates an average gross spread at 7 percent of total proceeds, which can be even higher for small issuers. This cost has encouraged the creation of alternative SME markets with lower requirements and fees. However, for the reasons indicated, such requirements cannot be eliminated altogether, and access to the public markets remains a challenge for SMEs.¹¹

Third, access to bond finance, while potentially more open than equity, remains a more viable source for larger companies than for smaller companies.

Although they share some characteristics with bank debt contracts, bonds have the relative advantages of their tradability (but still much less than that of equity) and, more importantly, more flexible conditions and longer maturities (see ICMA 2013 and International Organization of Securities Commissions and the World Bank, 2011).

Banks are constrained in their ability to offer a broad menu of feasible loan contracts by virtue of their reliance on short-term deposits, usually in local currency. To mitigate bankruptcy risk, bank managers—on behalf of the bank's shareholders, concerned by excessive risk taking, or the bank regulator, concerned by eventual systemic spillovers—will limit the degree of risk, maturity, and currency mismatches taken in transforming liabilities into loans.

These impediments are largely lifted in the bond market, where issuers are able to meet their funding needs with investors displaying diverse risk preferences and planning horizons. Because debt is generally safer than equity, theoretically a larger number of companies may enjoy access to this instrument, although adverse selection and fixed entry costs would remain a material obstacle to a massive use of bond markets by smaller companies. In practice, however, research has found that the number of companies that choose to issue bonds in the public markets is smaller than the number of companies that list their shares (see Didier, Levine, and Schmukler 2015)¹² and that, in general, larger companies are more prone to issue bonds in the markets (see Davis, Maslar and Roseman 2017; Duffee and Hördahl 2019).

Fourth, liquidity matters for both equity and debt, although to different degrees.

Unlike loans and bonds, equity contracts have infinite duration and cannot be called by the investor, even if investors change their minds about the expected risk-adjusted return (or face unforeseen liquidity needs) and want to get rid of the particular asset. Liquidity is the only exit clause available to such an investor. Therefore, along with other factors, the development of a dynamic primary capital market hinges on an active secondary market with many and well-informed traders who exchange securities on a frequent basis and at fundamentals-based prices. Conversely, the primary market should nurture the secondary market by bringing new firms into the marketplace and by enlarging transaction volumes, so that economies of scale and efficiency gains can take place. In sum, primary and secondary markets should be, at least in theory, complementary and hence grow in parallel.¹³

9 Statistics on listed firms (for a total 46 countries) are from the World Bank. Organisation for Economic Co-operation and Development figures on total firms come from Entrepreneurship at a Glance 2017. The number of corporate borrowers is taken from the International Monetary Fund's Financial Access Survey and national regulators' sites.

10 Not only small but also some very large companies stay private. In the United States, for instance, the largest nonfinancial publicly traded company, Apple, recorded revenues of \$262 billion in 2018. In turn, the largest private company is Cargill, which posted sales of \$115 billion. See Forbes 2019a and 2019b.

11 According to WFE (2018), as of the end of 2017, 6,807 companies were listed on 33 alternative SME markets, with an average graduation rate of 16 percent of these companies moving to the main board. In turn, Doidge and others (2018) argue that small firms are the main delisters from the main board in the United States and Europe.

12 For example, comprehensive data collected for 51 countries concluded that in 2003–11 there were 14,849 domestic equity issuers and 3,192 domestic bond issuers. The average annual issuance volume was much larger in the bond market (3.1 percent of gross domestic product) than in the equity market (1.3 percent). See Didier, Levine, and Schmukler (2015)

13 The correlation between the number of listed firms (a better measure of the size of the primary equity market) and stock value traded (as a proxy for liquidity) offers some preliminary evidence in this regard. With data for 2017 from the World Bank's Global Financial Development database, this cross-country correlation stands at a strong (and highly significant on statistical terms) 71 percent, suggesting that primary and secondary markets are positively interlinked.



CAUSES OF CAPITAL MARKET DEVELOPMENT

2.1 Theory and empirical research

The economic theory and empirical research have emphasized three sets of factors as economy-wide determinants of capital markets development: the macroeconomic environment, the state of development of the financial sector, and the strength of basic institutions.¹⁴ While the theoretical background dates back from the 1980s and 1990s, the empirical evidence has been regularly produced from the 1990s to the present, revealing a sharp interest on the part of the policy and academic research community in examining both advanced and developing and emerging economies.

Macroeconomic preconditions

Overall the macroeconomic context exerts a strong influence on capital market size and structure through three channels: (a) gross domestic product (GDP) growth and level, (b) stability, and (c) fiscal policies.

Gross domestic product

The level and change of GDP matter because they are a key driving force behind the supply of funds (private savings) and the demand for funds (private investment) flowing into both primary and secondary capital markets.¹⁵

¹⁴ As will be further explained in section 5, there are technical challenges in establishing whether true causality or a simple correlation exist. Overall, this note leans toward supporting the existence of causality when (a) a strong and large body of theory justifies such a belief and (b) a large number of the empirical studies apply and get positive results from state-of-the-art methods to test causality. Also important to note is that, as expected in applied economics and finance, no absolute unanimity can be found across studies on the sign and statistical significance of any given correlate. In light of this, the effects highlighted in the main text of this note reflect the those found in the majority but not the totality of the available research. Cases of mixed and doubtful overall results will be noted as well. These remarks extend to the analysis of capital markets effects in section 3.

¹⁵ Of course, not all private saving and investment are directed toward capital markets, but, all other things equal, the higher they are, the more dynamic the capital markets will be.

Regarding savings, well-accepted consumption theories indicate that, by widening the gap between disposable income and subsistence consumption, higher GDP per capita entails a higher capacity to save. The impact of GDP growth depends on whether people perceive that income as permanent (in which case the additional income would be entirely consumed) or temporary (in which case saving would take place). The evidence supports the latter, which is consistent with the fact that the growth rate tends to display unpredictable swings in the short run. Grigoli, Herman, and Schmidt-Hebbel (2018) uncover strong supporting evidence in their comprehensive empirical study of 165 countries over the period 1981–2012. As for investment, the early accelerator theory and subsequent approaches, such as the Tobin's q model, all posit that higher growth stimulates capital accumulation. Once again, an extensive body of evidence lends strong support to this investment-growth nexus. More controversial is the relationship with the level of GDP per capita. In principle, higher GDP per capita implies higher capital per capita and, by way of the law of diminishing returns, a lower marginal productivity, which discourages investment. However, richer economies tend to exhibit higher levels of total factor productivity, and this behavior may neutralize and even revert the previous effect. Lim (2013), among others, finds that both the level and growth of GDP per capita foster investment in a large country panel.¹⁶

The GDP level may also lead to deeper capital markets via other channels. Here it might be relevant to distinguish the effects of GDP per capita from those of total GDP. On theoretical grounds, the GDP per capita may be important because (a) richer economies tend to comprise better institutions and be more stable and (b) more complex, innovative, high-risk activities expand *pari passu* with GDP per capita, requiring long-term and risk-sharing financing arrangements, which in turn boost the demand for market-based solutions through banking finance.

In turn, the link between capital markets and GDP (total) hinges on the context that larger economies have more firms in general and larger firms in particular. In view of

the hefty fixed costs for entry into capital markets, firm size is therefore key. A similar argument can be made from the market infrastructure's side: due to the presence of bulky fixed costs and the need for economies of scale, a cost-effective, dynamic, and liquid marketplace calls for the participation of many and large companies so as to spread those infrastructure expenses across a large volume of transactions.

Although GDP per capita is customarily employed as an explanatory variable of equity and bond market development in both advanced and emerging economies, total (as opposed to per capita) GDP is also included in a number of studies. In both cases, the effect has been found to be almost invariably positive.¹⁷ Along with GDP, the saving and investment rates have also been used in some studies.¹⁸

Stability

Macroeconomic stability provides the foundations for investors to invest long term. The negative impact of macroeconomic instability is self-evident. By undermining the ability to assess the creditworthiness of most prospective issuers, volatility exacerbates the degree of informational frictions, the prime deterrent to investor participation. In other words, risky projects become riskier in the eyes of the prospective financiers, inhibiting the supply of funds into capital markets.¹⁹ By the same reasoning, if and when transactions take place, instability might bias the set of instruments toward bonds; short maturities; secured, low-risk, and local currency-denominated securities; and local markets, and hence away from equity and long-term, high-risk securities as well as foreign currencies and markets. This preference will lessen the welfare effects normally associated with capital markets development.²⁰

Because uncertainty is not a directly observable variable, empirical proxies are used to capture its effect, with the inflation rate being the most popular, and to a lesser extent the inflation and the exchange rate volatilities. The negative impact shows up consistently in studies related

16 Despite being in theory a forward-looking decision, business investment seems to be sensitive to recent GDP growth. Businesses may be sensitive because of (a) myopia, (b) inability to form reliable expectations into the future, thus trusting the imperfect signal of current growth as a predictor of future growth, or (c) the correlation between recent growth and the generation of internal cash flows, which helps overcome financial constraints. In any case, the positive role of GDP growth on investment is a robust finding in the empirical literature (see Bebczuk and Cavallo, 2016).

17 The GDP growth rate, as opposed to its level, is generally overlooked in the literature on the causes of capital markets development, although some studies include variables that are heavily influenced by the GDP growth rate, as is the case of the saving and investment rates.

18 See Garcia and Liu (1999); Ben Naceur, Ghażouani, and Omran (2007); Billmeier and Massa (2009); and Bebczuk (2007).

19 The inability to forecast cash flows and interest rates may also reduce the corporate demand for funds, except in the case of opportunistic issuers.

20 A partial countervailing effect may arise from the fact that uncertainty, as measured by the inflation rate, the GDP growth variance, and other proxies, may boost so-called precautionary saving, which may in the end increase the volume of funds funneled into capital markets.

to both the equity and the bond markets in emerging and advanced countries alike.

Fiscal policies

The third and last macroeconomic channel runs through fiscal policies, in particular budget imbalances, which may act by creating a sovereign debt market at different maturities, thus providing, by way of a yield curve, benchmarks against which to value corporate bonds (Dittmar and Yuan 2008).²¹ The government debt market will also play a catalytic role in giving rise to a minimum threshold of trading volume and liquidity to jump-start the private market. The flip side is twofold: for one, government bond issuance may crowd out private sector issuance;²² second, unmanageable fiscal borrowing—as well as external deficits, for that matter—may end up in more macroeconomic instability and even crises, thus jeopardizing market development.

According to the studies reviewed, the fiscal deficit to GDP, by fostering the government bond market, exerts a positive effect on the private sector bond market in both advanced and emerging countries. Some other studies directly use the size of the government bond market as an explanatory variable, reaching the same conclusion. Against the background of this crowding-in effect of fiscal deficits on the development of the private sector bond market, little evidence has been produced on their influence on the equity market.²³

Financial markets preconditions

A common thread across the theoretical literature is that capital markets development is likely to coincide with deeper financial markets as a whole. Three different conduits can be distinguished—namely, (a) the preexistence of a well-developed banking system, (b) the emergence of institutional investors, and (c) the degree of international financial openness.

Banking system

In regard to the first factor, a consensus exists around the notion that capital markets are not likely to develop if a country has not been able to build a deep and solid banking industry. As will be more thoroughly explained in section 4, financial intermediation usually starts through deposit and loan contracts and later gains more complexity as trust between investors and borrowers consolidates. In a similar vein, some research has concluded that investors in capital markets tend to consider a long and good track record with the banking system a prerequisite to buying any issuer's securities (see Rojas-Suarez 2014).

The bulk of the evidence confirms this positive effect. The ratio of domestic credit to the private sector to GDP is a usual explanatory variable in bond and equity market regressions featuring both developed and emerging economies.²⁴ Other variables used include the bank interest net margin and the bank lending to deposit ratio, as proxies for efficiency of the credit market. In addition, the literature mostly sees a link between credit registries and the depth of the banking sector (see, for instance, Djankov, McLiesh, and Shleifer 2007).

Institutional investors

The institutional investors industry may become instrumental in igniting, on behalf of its clients, the appetite for a broad set of assets that are issued and traded in capital markets. Armed with sizable resources, institutional investors create the necessary demand for the securities issued by both the private and the public sector. In this sense, this demand should be able to gradually create its own supply, even if the assets in demand are not available in the first place. In addition, institutional investors may strengthen financial innovation, transparency, information disclosure, and corporate governance, as well as reinforcing economies

21 In particular, an active market for long-term government bonds is required for the establishment of a yield curve. The monetary policy—by altering the interest rate and the yield curve—and the exchange rate policy—by changing the incentives to issue in different currencies and countries—may also have some impact on capital market outcomes.

22 Of course, crowding out is not an automatic consequence of government bond issuance but will arise only if the government bond issues prevent financially constrained corporate issuers to tap the market. Besides, crowding out of nonfinancial issuers may as well occur in favor of financial institutions, especially banks. This will also stifle productive investment if banks use the money to fund activities such as consumption loans or government securities. A more positive effect of fiscal deficits is that it may encourage more private saving through the so-called Ricardian equivalence.

23 For instance, De la Torre, Goggi, and Schmukler (2008); Claessens, Klingebiel, and Schmukler (2007); and Eichengreen and Luengnaruemitchai (2004) include the fiscal balance in their econometric specifications, whereas Fløgstad (2017) and Luengnaruemitchai and Ong (2005) work with the government debt market outstanding to GDP. Bebczuk (2007), in turn, finds that fiscal deficits crowd out equity issuance, using data for 31 countries in 1989–2001.

24 The trust-based argument also can be invoked to postulate that the initial level of capital markets development is likely to trigger its own subsequent expansion, along with the fact that, via economies of scale, the larger the market, the lower the transaction costs.

of scale, all of which is likely to feed back into more capital markets development (see Vitas 1998).²⁵ Naturally, the existence of this industry is not a sufficient condition for a thriving market. In particular, when funds are overwhelmingly allocated to sovereign bonds or to blue chips trading in the secondary market, little impact should be expected on the issuance of new corporate securities by new or seasoned companies. In addition, other factors could play a role, such as the structure of the corporate sector. Likewise, when institutional investors follow buy-and-hold strategies, they will be of little help in invigorating market liquidity.

The empirical work shows a positive effect exerted by institutional investors in capital markets development. Causality issues aside, the inception of private pension systems and their size stand as a robust correlate of the stock and bond market development in economies at different levels of economic development.²⁶ It is important to note, however, that the research has focused on the pension funds industry, disregarding other institutional investors such as investment funds and insurance companies.

Financial openness

External policies—in the form of financial openness, in general, and securities market liberalization, in particular—may enter the scene by either leveraging or hindering the expansion of local markets. A positive outcome will materialize if foreign capital is pulled into domestic markets, a process that might also bring with it a lower cost of capital and lower transaction costs. The reform may become self-defeating, though, if it paves the way for cross-listing and migration of local issuers (especially the larger and more liquid ones) to international markets, causing a loss of liquidity and diseconomies of scale.

Empirically, it appears that the positive effect prevails in connection with both equity and bond market development in advanced and emerging countries.

25 Whether institutional investors or securities markets come first remains an open issue and highly dependent on the particular context of the country under analysis (see Vitas 1998; De la Torre, Feyen, and Ige 2013). For example, in the United States, securities markets came first, whereas the opposite is true in Chile. However, the hard evidence surveyed in the literature clearly supports the effect of institutional investors on capital markets development—a finding that does not point to a two-way relationship. Case in point, Fernando and coauthors (2003) produce international evidence on capital markets inducing the growth of the mutual funds industry.

26 Causality is dealt with elementarily in some cases (for example, by lagging the pension funds variable) and with more sophisticated methods in others (as in applying value at risk, VAR, or generalized method of moments, GMM, techniques). All in all, results seem to be driven by economic causality and not just by mere correlation.

27 La Porta and coauthors (1998) advance the point widely taken since in the law and finance literature, that countries associated with the English legal family are more investor friendly than others. Relatedly, La Porta, Lopez-de-Silanes, and Shleifer (2006) study the role of securities laws in regard to the issuance of new public equity, finding that laws that mandate disclosure benefit these markets by facilitating private enforcement. However, public enforcement by the regulator does not appear to have an effect. Note that this pertains to the realm of legal rules and thus is a different issue from the credibility and effectiveness of the regulator implementing such laws. Recent research by Jackson and Zhang (2018) found evidence that strong public enforcement (proxied by the budget of the securities regulator) does have a strong correlation with key indicators of capital markets development.

To measure this effect, researchers have used legal measures of openness, such as indexes of capital account and stock market liberalization, as well as economic measures, such as actual volume of overall capital flows and equity issues abroad.

Although not strictly related to capital markets development per se, the degree of financial openness might have negative side effects by facilitating capital outflows when the foreign investors lose confidence and exit the host country. If that happens, the local economy will undergo a surge in volatility that most likely will spill over into capital markets. See Kang and Kim (2019) for evidence on the occasional destabilizing influence of capital market integration. Earlier surveys by Prasad and others (2003) and Kose and others (2010) find inconclusive results on the link between financial integration and macroeconomic stability. Mirdala, Svrčeková, and Semančíková (2015) update the Prasad and others (2003) study, finding that financial integration heightens macroeconomic volatility, especially in developing countries. Reinhart (2009) as well advances the point that financial crises tend to be preceded by episodes of financial liberalization.

Preconditions related to the legal and institutional environment

The legal and institutional environment may boost capital markets development in two main ways: (a) via the existence of robust legal investor protection and, at a more general level, (b) via the protection of the rule of law and political stability.

Legal protection of investors

In order to provide investors with the confidence to put their money into firms they do not know and to give them assurance that their contractual rights will be enforced if needed, legal protection against fraudulent borrowers is a precondition for investor participation in financial markets (see La Porta and others 1997).²⁷

The nature of this protection differs according to the type of contract (see Laeven 2014). In debt contracts, creditors look to recover as much money and as quickly as possible in the event of default. In equity contracts, the legal protection should strive to safeguard minority shareholders (the outsiders) from expropriation at the hands of the controlling shareholders (the insiders), by ensuring effective voting participation, proper standards of corporate governance, and access to timely and transparent information on business affairs.

To test for this institutional channel, researchers use indexes of legal protection of creditors and equity holders, such as those originally devised by La Porta and others (1997) or those currently available for a large set of countries from the World Bank's Doing Business studies. Some studies include the legal family to which the country belongs (with the Anglo-Saxon framework associated with more legal assurances to the financier; the Continental, with less). Some, but not all, studies control for the effectiveness with which the legal framework is enforced—that is, the time and cost involved in the settlement of contractual disputes. In all cases, the results strongly support the enhancing role of those variables on the development of corporate equity and bond markets across emerging and developed economies.

Beyond private mechanisms of enforcement, the credibility of the securities regulator plays a key role in preventing opportunistic investors and issuers from exploiting informational asymmetries at the expense of the less informed parties. This role requires regulators to review the information provided by issuers to ensure that it is complete, accurate, and timely, as well as to supervise market participants and the markets themselves with a view to deterring (and, if necessary, punishing) wrongdoing. (See Carvajal and Elliott 2007; Litan, Pomerleano and Sundararajan 2003).²⁸ However, in spite of regulation's importance, there is limited applied work that links the strength of securities regulation and supervision with capital markets development. A key

reason for this absence is the difficulty of measuring the functioning of securities markets regulators.²⁹

Rule of law and political risk

Over and beyond the financial market-specific dimensions of institutional strength, the country's overall institutional foundations—as measured by indicators of rule of law, control of corruption, political risk, and so on—are also relevant. The confidence in and the enforcement of property rights as well as the absence of crime and violence, politically motivated or otherwise, is a prerequisite for sustained capital markets development, and for economic development in general. That said, a distinction must be made between variables such as political risk and others such as rule of law. The former measures the degree of political instability and violence, which are more likely to hit capital markets by heightening macroeconomic instability rather than through a direct impact on financial contracts. In contrast, rule of law reflects perceptions of contract enforcement and property rights, which do shape the contractual environment per se.³⁰

The applied literature unveils compelling evidence of the positive effect that the rule of law and political stability exert on the size of the equity and bond markets all over the globe. The main proxies that have been used are the World Bank Worldwide Governance Indicators and the index of the International Country Risk Guide.³¹

2.2 Summary table

The summary table, table 2.1, displays the results for each channel previously identified with the corresponding papers, as listed in the annex (where more details are provided).³² On the whole, the applied work is highly consistent with the theoretical assumptions.

28 In defining this concept, Carvajal and Elliott (2007) argue that “Securities regulation comprises the regulation of public issuers of securities, secondary markets, asset management products and market intermediaries. Regulation is designed to address asymmetries of information between issuers and investors, clients and financial intermediaries and between counterparties to transactions; and to ensure smooth functioning of trading and clearing and settlement mechanisms that will prevent market disruption and foster investor confidence.”

29 Nevertheless, two potential qualitative proxies are (a) the International Monetary Fund and World Bank Financial Sector Assessment Program, which involves a systematic assessment of regulatory systems, and (b) the index of the quality of securities regulation, produced as part of the World Economic Forum Global Competitiveness Index. While the former is more thorough than the latter, the latter is available for a larger number of countries.

30 In practice, though, they tend to be correlated. For example, in the World Bank's Worldwide Governance Indicators, political risk and rule of law display a pairwise correlation coefficient of 0.77.

31 See PRS Group, International Country Risk Guide, <https://pub.prggroup.com/products/icrg/international-country-risk-guide-icrg#>.

32 See footnote 14 on the issue of causality.

► **TABLE 2.1 Empirical correlates of capital markets development**

	Channel	Sign*	References
Macroeconomic preconditions	Gross domestic product growth and per capita	+	La Porta and others (1997), Bayraktar (2014), Yartey (2008, 2007), Garcia and Liu (1999), Claessens, Klingebiel and Schmukler (2001, 2007), Ho (2019), El-Wassal (2005), Ben Naceur, Ghazouani, and Omran (2007), Billmeier and Massa (2009), Demirgüç-Kunt, Feyen, and Levine (2012), De la Torre, Goggi, and Schmukler (2008), Bebczuk (2007), Bhattacharyay (2011), Eichengreen and Luengnaruemitchai (2004), Smaoui, Grandes, and Akindele (2017), Laeven (2014), Kowalewski and Pisany (2017), Garcia and Liu (1999).
	Macroeconomic stability	+	Bayraktar (2014), Ho (2019), Burger, Warnock, and Warnock (2015), Guscina (2008), Bhattacharyay (2011), Eichengreen and Luengnaruemitchai (2004), Claessens, Klingebiel, and Schmukler (2007), Laeven (2014)
	Government debt market	+	De la Torre, Goggi and Schmukler (2008), Fløgstad (2017), Luengnaruemitchai and Ong (2005), Smaoui, Grandes, and Akindele (2017)
Institutional preconditions	Legal and effective investor rights	+	La Porta and others (1997), Yartey (2008), Bayar (2016), Claessens, Klingebiel, and Schmukler (2001, 2007), Levine and Zervos (1998b), Billmeier and Massa (2009), De la Torre, Goggi, and Schmukler (2008), Bebczuk (2007), Bayraktar (2014), Bayar (2016), Guscina (2008), Burger, Warnock, and Warnock (2015), Eichengreen and Luengnaruemitchai (2004), Laeven (2014)
	Quality of securities regulation	+	Jackson and Zhang (2018), BIS (2019), Carvajal and Bebczuk (2019)
	Rule of law and political risk	+	Eichengreen and Luengnaruemitchai (2004), Bebczuk (2007), Yartey (2008), Bayar (2016), Dima, Barna, and Nachescu (2018), BIS (2019), Claessens, Klingebiel, and Schmukler (2001), Bayraktar (2014), Smaoui, Grandes, and Akindele (2017)
Financial markets preconditions	Banking system development	+	Bayraktar (2014), Yartey (2008), Garcia and Liu (1999), Ho (2019), Ben Naceur, Ghazouani, and Omran (2007), Bhattacharyay (2011), Guscina (2008), Claessens, Klingebiel, and Schmukler (2007), Smaoui, Grandes, and Akindele (2017), Laeven (2014), Kowalewski and Pisany (2017)
	Institutional investors development	+	Enache, Miłosz, and Miłosz (2015), Rocholl and Niggemann (2010), Moleko and Ikhide (2017), Meng and Pfau (2010)
	External liberalization	+	Levine and Zervos (1998b), Claessens, Klingebiel, and Schmukler (2001), Bekaert, Harvey, and Lundblad (2005), Chinn and Ito (2006), De la Torre, Goggi, and Schmukler (2008), El-Wassal (2005), Bebczuk (2007), Calomiris, Larrain, and Schmukler (2018)

* The sign in this column corresponds to the positive or negative correlation—if statistically significant—uncovered in the majority (not necessarily all) of the studies, as cited in the last column.



EFFECTS OF CAPITAL MARKETS DEVELOPMENT

3.1 Theory and empirical research

Economic theory has discussed two main effects of capital markets development: economic growth and financial stability.

Economic growth

According to economic theory, capital markets may spur economic growth by fostering the volume or the productivity of investment, or both (see Kaserer and Rapp, 2014). For the quantity of private investment to increase, larger flows of savings should find their way into productive projects via the primary market. But this effect will materialize only as long as additional net funding is made available to these firms—that is, as long as this issuance is not offset by less bank credit or other forms of financing.

It is important to note, however, that there is a long-standing conceptual debate concerning whether primary markets (in which securities are issued and firms raise fresh funds) or secondary markets (in which such securities are traded among investors) are more important (see Davis, Maslar, and Roseman 2017, 2019). Contrasting views have been put forward over time.

One such view is that capital markets contribute to growth only if they provide resources to undertake the investment projects that are the pillars of economic activity. Secondary markets, if anything, would play the ancillary, but still crucial, role of persuading investors to engage in a contract that is not redeemable directly from the issuer (in the case of equity) or that is redeemable but only after a rather long time (in the case of long-term bonds) but that offers the alternative to transfer ownership to other investors willing to acquire the asset (see Levine and Zervos 1998b). Heavy trading activity is not free of shortcomings, however. Some theorists argue that high liquidity reduces the incentive to monitor insiders, by providing a quick and easy way out when events are not as expected or take a wrong turn. Also, efficient markets, which incorporate all relevant information

in a timely and complete fashion, may—by eliminating abnormal returns—defuse the interest of investors in financing innovative projects (see Giovannini, Iacopetta, and Minetti 2013). Stiglitz (1989) also dismisses the real impact of the secondary market after recalling Keynes’s analogy of such market to a beauty contest, or his own to a gambling casino, where only private rent-seeking activity takes place and no or negative productive benefits are reaped.

Others take a more positive stand toward the secondary market, in relation to its information-producing role (see Bond, Edmans, and Goldstein 2011). While looking at why corporate managers and the press pay so much attention to stock prices, they advance the theory that

prices contain information that guide decision making in the real world. As insiders, managers may be the most informed about a firm’s fundamentals, but the market assembles the opinion of many traders with valuable external information about the economic environment, the demand for the firm’s products, the strength of its competitors, and so on. Likewise, other stakeholders with direct or indirect influence on the manager’s fate—including shareholders, suppliers, clients, regulators, and credit rating agencies—track prices on a regular basis as a means of monitoring the manager’s performance. By internalizing this effect, it is possible for the manager to take actions in response to price movements. If and when this happens, prices might affect the fundamentals that they are supposed to passively reflect.



In any event, along with this volume effect there may be an investment quality effect, for a given amount of funding, that is associated with the productivity of the projects being financed through capital market instruments versus those that go through the banking system. Higher productivity usually comes at the price of extended payback periods and higher risk.

As the initial discussion highlights, unlike the banking system, capital markets boast a broad spectrum of investors with different investment horizons and risk preferences. The ability to stretch maturities is a most valuable attribute of capital markets. The typical investor prefers lending short for various reasons, the most prominent being that the short-term debt could serve as a disciplining device on borrowers by maintaining them on a short leash—with the credible threat not to rollover the debt if the firm misbehaves or performs worse than expected (see Chen and others 2019). For the banking system, this short-term bias is reinforced by its reliance on short-term deposits.³³ Under these circumstances, access to market long-term debt and equity would help matching the duration of highly productive, long-term assets with that of its liabilities so as to manage debt rollover risk (see Martínez Peria and Schmukler 2017 as well as Cortina, Didier, and Schmukler 2016, 2018a and 2018b).³⁴

Likewise, the equity contract creates particularly strong incentives to bet on appealing but risky projects. Along these lines, Demirgüç-Kunt, Feyen, and Levine (2012) contend, on the basis of a large body of prior theoretical work, that banks and markets complement each other, with the former more specialized in rigid, standardized, and collateralized arrangements aimed at funding more traditional activities and the latter in tailor-made and mostly unsecured contracts.³⁵ Because banks tend

to keep away from riskier, long-term, and collateral-scarce activities, capital markets are better suited to fund innovative and longer-term projects, including those intensive in intangibles and human capital, such as software, data analysis, and research and development, which appear to be increasing their share in total investment and driving the productivity growth process.³⁶ As an economy develops and the productive structure becomes more complex, it can be envisaged that securities markets would acquire more relevance in relation to banks.³⁷

At the empirical level, a majority of papers uncover a positive effect of secondary stock market development—measured by capitalization, value traded, and turnover—on GDP growth, both total and per capita.³⁸ The research covers both emerging and advanced economies. Interestingly, no paper addresses specifically the impact of the corporate bond market on growth, but many focus on the size of capital markets (stock plus private sector bonds) relative to the banking system.

A smaller number of other studies encounter a similar positive effect of stock markets in both the level and the productivity of investment, as well as in total factor productivity, in countries at different levels of income with data spanning from the 1970s through the early 2000s.

Another line of research looks at capital markets development (stock and bond capitalization as well as stock value traded) relative to banking depth. Recent contributions on this bank-based versus market-based financial system approach, published mostly from the 2000s on, seem to cluster around the conclusion that market-based systems are associated with faster GDP growth. Relatedly, stock market development appears

33 Group of Thirty (2013) shows that corporate bank loans have an average maturity of 4.2 years in developed countries and 2.8 years in emerging countries. Corporate bonds, in turn, have an average maturity of between 7.7 and 8.0 years in the first country group and between 6.0 and 6.9 years in the second.

34 However, in practice, firms rarely achieve such a full match and instead prefer to absorb part of this risk to take advantage of the lower cost of short-term debt (see Chen and others 2019).

35 Bank contracts (and bond contracts, for that matter) are not well suited to finance high-risk-high-productivity projects with low tangibility. That is because such projects imply a high loss given default—because of the lack of collateral—in the bad scenario and limited profits—because the financier does not share the upside—in the good scenario.

36 Case in point, in the past four decades tangible investment declined from 14 percent to 10 percent of gross value added and intangible investment went up from 10 percent to 14 percent (see Cecchetti and Schoenholtz 2018).

37 Nevertheless, Doidge and others (2018) warn about the difficulties facing companies that invest in new, unproven intangibles when trying to go public.

38 Inspired by the 2008 global financial crisis, researchers have revisited the long-standing consensus around a linearly positive effect of banking depth on economic growth, postulating that the beneficial effect vanishes and even reverts once the banking system becomes too large (see Arcand, Berkes, and Panizza 2012 and Popov 2018). Sahay and coauthors (2015) delve into this issue by constructing a broad index of financial development, reaching a similar conclusion, regarding not only growth but also stability (as measured by the standard deviation of economic growth). However, when decomposing their index into a bank index and a capital markets (bonds and equity) index, they find that, in the latter case, the nonlinearity applies to stability but not to growth. In other words, capital markets that are too large would not jeopardize economic growth but might threaten economic stability. Having said that, this potential problem should not be a major concern for most emerging and developing countries at their current, in general incipient, stage of capital market development.

to bring about more investment in intangibles, research and development (R&D) and technological innovation in general (for example, a larger number of patents and volume of high-tech exports).³⁹ The latter effect is observed in macro-, industry-, and company-level studies for advanced and emerging economies spanning the past three decades.

Financial Stability

Capital markets may have an effect on financial stability through a few channels.

In the case of the volume of funding available to firms, capital markets will play a stabilizing role if bond markets, equity markets, or both counteract credit crunch episodes that hit the banking system. Bank credit is known to be procyclical (see Borio 2012), which implies that negative macroeconomic shocks may be magnified by an unexpected shortage of loans—when explained by lower supply and not by lower demand—and by higher interest rates.⁴⁰ If investors in capital markets are less sensitive to the cycle (because they have a more risk-taking attitude and longer horizons), they may be willing to provide the needed financing to the firms, thus acting as a spare tire to bank lending. Of course, if capital markets behave in the same way that banks do, that would just reinforce the negative feedback between the real side and the financial side of the economy.

Also, in favor of macroeconomic stability, and as a result of their higher contractual flexibility regarding debt contracts, equity markets make issuers more resilient to financial distress. The inability to repay debt triggers default, a more traumatic and insurmountable outcome than a drop in stock price, the latter being a fact likely to cause material damage to investors but not directly to the issuer.⁴¹ If trouble is temporary (a liquidity rather than

a solvency problem), an equity-intensive capital structure may increase the company's chances of getting back on its feet. Similarly, as noted before, both the bond and the equity markets offer firms a better maturity match, thus avoiding a costly premature liquidation of long-term projects.

That said, secondary markets may affect financial stability if stock price volatility is transmitted to the real economy.⁴² This could happen because price movements have a wealth effect on security holders, because firms (listed or otherwise) make investment decisions based on market valuations and/or because consumers at large, regardless of whether they participate in capital markets, somehow feel more or less confident or fearful depending on whether stock prices go up or down. In this context, the speed at which security prices react to current and prospective bad news may make it a good predictor of trouble on the real side of the economy, but not necessarily the underlying trigger. On the question of whether it is a trigger, there is no sound evidence in the literature surveyed of such a causal link.⁴³

Finally, it is important to highlight that the development of local capital markets could favor financial stability by enhancing the ability of investors to manage risk via the introduction of derivatives such as options, futures, and swaps. However, the introduction of derivatives also carries risk that, if not well managed, could amplify vulnerabilities. As indicated earlier, however, the analysis of those instruments is beyond the scope of this document.

Turning to the empirical evidence, the development of the stock and bond market has been found to be associated with higher financial stability in both advanced and emerging countries. Most studies are recent and were triggered by the 2008 crisis (see for instance Becker and

39 This agreement is warranted by the sense that capital markets are better equipped to finance the complex and more productive activities that come along with economic development. See ECB 2018 for a survey reaching similar conclusions.

40 This problem is aggravated by the propensity of banking systems to fall into crisis—there have been 151 full-scale crises in 1970–2017 (see Laeven and Valencia 2018).

41 It is true that a deep stock price drop can harm the ability of the firm to issue additional equity in the future, but funding problems are to be expected for any firm in financial distress, no matter which market it may want to tap.

42 Greenwood, Shleifer, and You (2019) present international evidence that sharp increases in stock market valuations substantially increase the probability of a crash. Stock price volatility is to be expected even in an informationally efficient marketplace, because news bombards the market all the time. For instance, Diebold and Yilmaz (2008) show that stock price volatility captures macroeconomic volatility. Excessive volatility will ensue, though, when prices become misaligned from their fundamentals, giving rise to bubbles explained by unjustified exuberance or pessimism. Evidence on market efficiency is mixed (see Dimson and Mussavian, 1998, and Lim and Brooks, 2011). Bubbles may be more extreme and unpredictable than fundamentals-based volatility and thus more detrimental to financial stability, yet the effect described in the text would be conceptually the same with or without market efficiency. Fornari and Mele (2009) and Espinosa, Fornari, and Lombardi (2012) discuss and produce evidence linking stock market volatility and economic cycles.

43 Barro and Ursúa (2017) study 232 stock market crashes and 100 economic depressions in 30 advanced, emerging, and developing economies over the period 1900–2006 and conclude that such crashes (multiyear real returns of –25 percent or less) are particularly likely to be accompanied by a depression (multiyear macroeconomic declines of 10 percent or more), but they do not claim at all any kind of causal relationship. Reinforcing the point, Laeven and Valencia (2018), using the most comprehensive financial crisis database in the world, cover banking, debt, and currency crises but not capital market crises.

Ivashina, 2014). The evidence shows, for instance, that post-recession recoveries and investment is stronger in countries with a deeper bond market relative to bank credit. Likewise, recessions in countries with bank-oriented systems have been much more severe than in those with a market-oriented financial structure, as measured by the sum of corporate bond and stock capitalization. In the same vein, measures of financial systemic risk increase with bank credit deepening and diminish with nonfinancial bond debt and stock market capitalization. Moreover, the recent literature on the 2008 crisis has unveiled that, at least in advanced economies, firms were able to substitute bond market financing for bank loans during the credit crunch taking place in the aftermath of the 2008 crisis, with the bond market acting as a spare tire for these firms and hence turning into a financial stabilizing force.

The main empirical wrinkle to the stability-enhancing role of capital markets comes from the new literature on the

nonlinear effects of financial development on growth and stability. The studies claim that financial development produces a positive impact up to some threshold and negative afterwards (see Beck and Levine 2018 for a survey). Although this research has for the most part been centered around the banking system, the limited evidence available shows that financial development as a whole that encompasses both banks and capital markets displays the same nonlinear effect (see Sahay and others 2015).⁴⁴ However, given that the negative impact manifests itself at high levels of financial depth, it is unlikely to affect most developing and emerging economies.

3.2 Summary table of the empirical research

The following table (table 3.1) summarizes the main empirical findings.⁴⁵ The same caveats discussed at the start of section 2.2 apply.

► **TABLE 3.1 Empirical effects of capital market development**

	Sign*	References
Economic growth	+	Bekaert, Harvey, and Lundblad (2005, 2011), Enisan and Olufisayo (2009), Yartey and Adjasi (2007), Gambacorta, Yang, and Tsatsaronis (2014), Beck and Levine (2004), Levine and Zervos (1998a), Naik and Padhi (2015), Marques, Fuinhas, and Marques (2013), Andriansyah and Messinis (2014), Zhu, Ash, and Pollin (2002), Levine (2002), Langfield and Pagano (2016), Caporale, Howells and Soliman (2004), Caporale and others (2009), Wurgler (2000), Demirgüç-Kunt and Maksimovic (1998), Calomiris, Larrain, and Schmukler (2018), Carlin and Mayer (2003), Carpenter and Petersen (2002), Hsu, Tian, and Xu (2010), Didier, Levine and Schmukler (2015), Didier and others (2019)
Financial stability	+	Bats and Houben (2017), Langfield and Pagano (2016), Grjebine, Szczerbowicz, and Tripier (2018), Giesecke and others (2012), Gambacorta, Yang, and Tsatsaronis (2014), Hsu, Tian, and Xu (2014)

* The sign in this column corresponds to the positive or negative correlation—if statistically significant—uncovered in the majority (not necessarily all) of the studies, as cited in the last column.

44 Further Sahay and others (2015) argue that “a faster pace of financial deepening means a greater risk of crisis and macroeconomic instability, other things being equal”.

45 See footnote 14 on the issue of causality.



CAPITAL MARKETS DEVELOPMENT AND SEQUENCING

4.1 Theory

The economic literature points to a general sequencing for capital markets to develop; that is, capital markets develop once other forms of intermediation have appeared. The conceptual underpinnings for this sequencing lie in the asymmetric information framework summarized in section 1. As explained, this theory predicts that market participants will seek to circumvent expropriation risk by staying clear of contractual arrangements in which the ability to assess creditworthiness is especially impaired. From this point, it follows that, in early stages of financial development, there will be a preference for simpler contracts, safer and collateralized investments, shorter maturities, and more direct control over the allocation of funds. Under proper conditions, and certainly not overnight, a new landscape may arise with more complex, riskier, and longer-term contracts and a higher delegation of asset management (as opposed to direct application by the saving units).

Because financial intermediation entails relinquishing resources against a fragile promise of repayment at a later time, trust stands as the single most decisive force governing the kind of intermediaries and contracts to be found in financial markets—after all, intermediaries and contracts are two sides of the same coin. And since trust takes time to build, it should thus be expected that financial development would follow a sequential ladder.

Primitive societies, in which trust is yet to be built, are cash based. At most, and despite its strong diseconomies of scale, lending would be bilaterally agreed between the fund's owner and the borrower, without any intermediary. Then, in the initial stages of financial development, investors would turn to banks, first for the limited

use of transactional services and with the invested funds readily available (sight deposits) and afterwards, upon proof of viability, for longer and less liquid applications (term deposits). Banks enjoy some advantage over capital markets in attracting savings because they offer simple-to-write-and-monitor contracts such as bank deposits, in which the investor's return is low but known in advance and funds are accordingly applied to mostly secured and short-term loans.⁴⁶

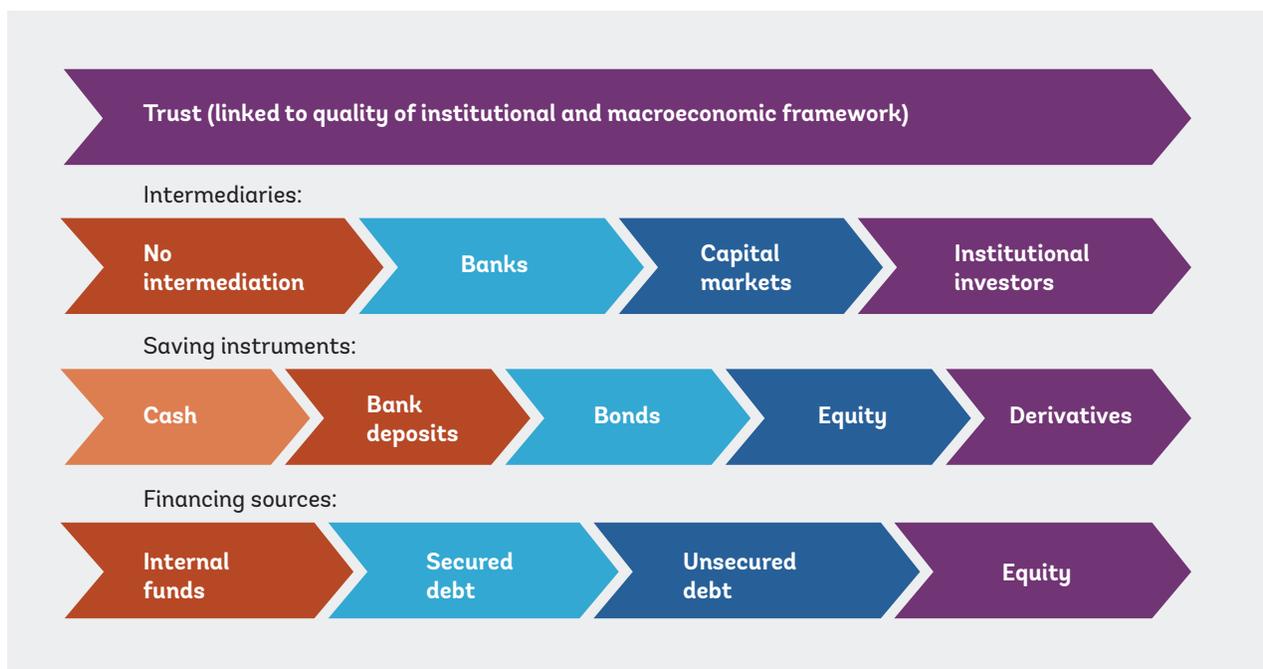
In time, once confidence consolidates, a crisis-free banking system may be a stepping stone to the expansion of capital markets, in which a more sophisticated menu of bond and equity contracts, as well as their derivatives, will be available.⁴⁷ Among the various capital market asset classes, debt instruments should precede equity (because the latter implies higher verification costs) and, within debt, government to corporate securities (because default risk is a priori higher in the latter case).⁴⁸

When investors feel at ease with delegating asset management, a move from retail toward institutional investors in securities markets is likely to occur to exploit the advantages of pooling savings and diversifying portfolios.

But sequencing also has to do with issuer preferences. As explained in section 1, the information and intermediation expenses increase borrowing costs, thus it is in the issuers' best interest to tap the sources with a lower required gross return. This way, because of their relative costs, internal funds (cash flows, or retained earnings) should be the preferred source of funding, followed by debt (especially secured bank debt), and then external equity.

In summary, the financial sequencing argument suggests a hierarchy in how intermediaries and instruments develop over time, which can be visualized as in figure 4.1:

► **FIGURE 4.1 The various dimensions of financial sequencing**



46 Initial preference for banks over capital markets is also related to their physical (brick-and-mortar) presence, face-to-face attention, and geographical proximity—banks used to start local and with close ties to their communities. Over time, this original appeal is reinforced by reputation building as well as by financial safety nets set up by central banks to immunize depositors from negative shocks.

47 De la Torre and Schmukler (2007); Laeven (2014); Luengnaruemitchai and Ong (2005); Karacadag, Sundararajan, and Elliott (2003); and Del Valle and Ugolini (2003) emphasize the importance of sequencing in capital markets development. Rojas-Suarez (2014) posits the argument that a sound banking system is a precondition for bond market development because low credit risk among bank borrowers acts as a positive signal to investors to subsequently purchase their bond securities. Davis (1996) underscores the emergence and role of institutional investors. However, these papers do not produce hard empirical evidence.

48 As usual in financial economics, an alternative theory can often be outlined. In the present case, crowding out would be the opposite yet feasible outcome. Under crowding out, some forms of financial intermediation might choke off others. In section 2 the substitutability between government and private securities was tackled. For crowding out instead of sequencing to take place, a sufficient condition would be that total intermediated saving is constant. Sequencing, on the contrary, requires that the new set of intermediaries or instruments thrive not at the expense of others and that fresh funds go into the newly developed industry or vehicle.

4.2 Empirical Research

To start with some preliminary evidence on the sequencing hypothesis, table 4.1 displays the average allocation of financial wealth in the G7 countries in 1970 and 2016. Over this decades-long period, those economies saw an impressive process of economic growth, institutional upgrade, and financial deepening. As expected according to the sequencing argument, the share of currency and bank deposits dropped, from 51 percent to 30 percent of total financial wealth, whereas the institutional investors jumped from 16 percent to 48 percent.⁴⁹ In turn, the direct holdings of bonds and equity decreased from 33 percent to 22 percent.⁵⁰

In addition, some hard evidence has been produced over the years to explain the dynamics of financial development. While this research did not focus per se on sequencing, overall it is supportive of a general sequencing hypothesis, in terms of the need for certain forms of intermediation to be present for capital markets to develop. However, other more specific issues, such as the sequencing of equity versus bond markets or of retail versus institutional investors, are more debatable.⁵¹

The sequencing of bank credit and capital markets development is supported by abundant empirical research. For example, Bayraktar (2014); Yartey (2008); Garcia and Liu (1999); Ho (2019); and Ben Naceur, Ghazouani, and Omran (2007) all find that domestic stock market capitalization, value traded, or both are explained by the prior expansion of bank credit to the private sector. Bhattacharyay (2011); Guscina (2008); and Smaoui, Grandes, and Akindele (2017) unveil a similar effect of private credit on domestic bond market

capitalization. Finally, sequencing clearly emerges from Demirgüç-Kunt, Feyen, and Levine (2012), who closely inspect a dataset of 72 countries spanning the period 1980–2008 and confirm that bank credit precedes, in earlier stages of economic development, the growth of capital markets (as measured by either stock or stock plus bond capitalization).

The precedence of government bond development to private bond market development is confirmed by Fløgstad (2017) and Luengnaruemitchai and Ong (2005). However, contrarian research also exists. In this regard, Claessens, Klingebiel, and Schmukler (2007) produce evidence showing that bank deposits and stock capitalization explain government bond market depth.

Financial development as a prerequisite for a positive role played by pension funds on the size of securities markets is identified by Meng and Pfau (2010).

Perhaps the most thorough empirical contribution on financial sequencing is De la Torre, Feyen, and Ize (2013), who study a broad sample of countries for the period 1980–2010. Their econometric formulation aims to explain several indicators of financial development as a function of initial GDP per capita, while controlling variables for other macro and institutional variables. They interpret the GDP elasticity of these indicators as a proxy for sequencing, contending that the higher this elasticity, the later the financial activity expands along the country's economic development path. They find that, in line with related research, banks develop before capital markets, and the latter before institutional investors. Nevertheless, they detect some exceptions—namely, (a) equity markets take off earlier than private bonds (which they attribute to the fact that, unlike bond debt, stock

► **TABLE 4.1 Financial wealth allocation in the G7**

Intermediary	1970	2016
Currency and bank deposits	51	30
Bonds and equity (direct holdings)	33	22
Institutional investors	16	48

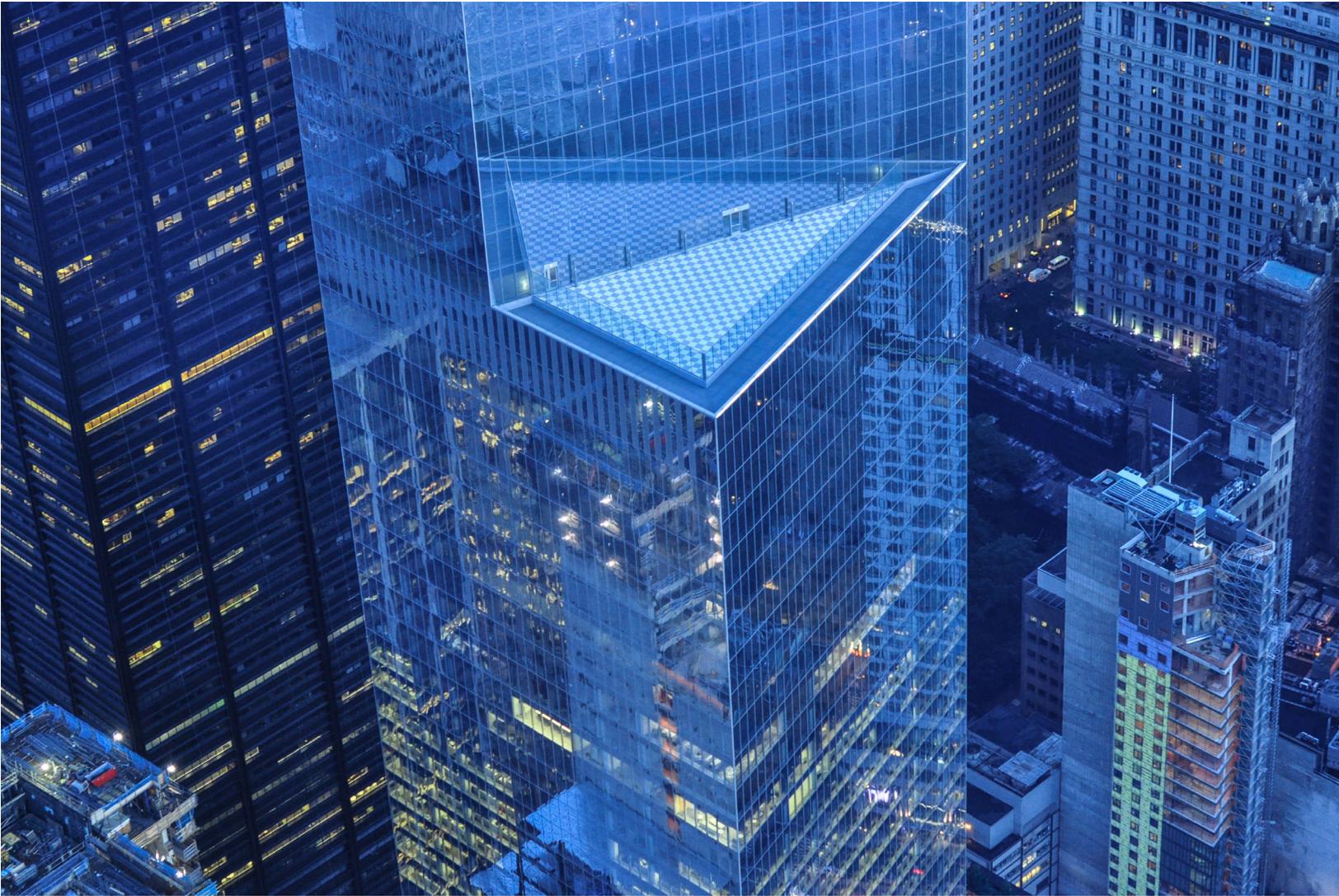
Source: World Bank elaboration based on Organisation for Economic Co-operation and Development data.

Note: The G7 country group comprises Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.

49 Along the same lines, Ramb and Scharnagl (2011) show how the allocation of financial wealth has changed in Germany between 1959 and 2009 in favor of institutional investors (from 25 percent to 48 percent of total wealth) and away from cash and deposits (from 53 percent to 40 percent).

50 Table 4.1 avoids the double imputation of financial assets managed by institutional investors by subtracting them from total stocks before calculating direct holdings.

51 As a result of not being a central concern of these papers, the dynamics is not explored in depth, so it is not straightforward in all cases to state whether sequencing (one market leading the other), and not just simultaneity (both developing in tandem), is at play.



compensates risk by sharing the upside) and (b) pension funds, rather than growing along with other institutional investors, appear to have a head start (explained by the policy intervention to set up mandatory capitalization pension systems in some countries). Indeed, while in industrialized countries institutional investors set foot after retail investors did, in the case of many emerging markets since the 1980s and 1990s, institutional investors led capital market reforms. In this spirit, Vittas (1998) argues that the institutional investor industry may flourish in this country group even without a prior development of capital markets.⁵² Further, as discussed in section 2, institutional investors may lead rather than just follow capital markets development, so a two-way causation may well be at work.

Finally, using international data for 1980–2013, Sahay and coauthors (2015, 10) explore the evolution of financial systems and state that “...relative to the banking system, domestic private bond markets and stock markets become larger as GDP per capita rises. Mutual funds and pension funds begin to grow rapidly at higher levels of income, while the relative size of public bond markets tends to fall.”

⁵² However, because newly created pension funds manage compulsory rather than voluntary saving, it would be a stretch to compare the experience of these countries with that of developed economies.



OPEN QUESTIONS RELATED TO THE INTERPRETATION OF THE EMPIRICAL RESEARCH

Although the existing literature and empirical research shed light on the major drivers of capital markets development and the effects of capital markets on the economy, there is still disagreement as to how to interpret some results. Two major controversies remain.

5.1 Causality and correlation

The interpretation of regression coefficients as mere correlations or causal effects is by far the most pervasive concern in the econometric arena. The problem lies in the notion that, while the correlation between two given variables is directly observable, the underlying causality is not, thus imposing a serious challenge on policy design.

Causality falls within a more general econometric drawback referred to as endogeneity, which includes reverse causality, omitted variables, and measurement error.⁵³ The presence of endogeneity biases the estimated coefficient in either way, depending on the correlation sign between the endogenous explanatory variable and the error term, making the estimated effects dubious. The usual solution consists of applying different instrumental variable methods. These instruments—that is, variables that are highly correlated with the endogenous regressor but not with the regressand—can be external (exogenous to the model at hand) or internal (lagged values, in levels or differences, of the independent and dependent variables). In recent studies, and restricted to some particular research questions, randomized

⁵³ Omitted variables would be *prima facie* a candidate to explain endogeneity, because most metrics of capital markets development are closely correlated to economic and institutional development. Multivariate regressions incorporate the most relevant additional controls suggested by previous theoretical and applied studies. However, one may not rule out a bias of this kind linked to unobservable macro attributes correlated to capital market indicators, even though that explanation is very unlikely.

experiments and quasi-experimental methods have been borrowed from other disciplines to circumvent the endogeneity critique. The quest for the ideal instruments is elusive, because good external instruments are scarce and internal instruments deliver fragile results in some cases (see for instance Beck, Levine and Loayza 2000).

In the present context, the most pressing issue is the link between capital markets development and economic growth.⁵⁴ In the empirical field, scholars have employed various methods to control for endogeneity. Internal instrument-based techniques encompass generalized method of moments (GMM), vector autoregressive (VAR) analysis, Granger causality, or just simply lagging the explanatory variables. GMM is an advanced and popular method, which, in theory, ensures that endogeneity is taken care of, although estimates appear on occasion to be excessively sensitive to the lag structure chosen.⁵⁵ The other methods just mentioned rely on the assumption that cause should temporally precede effect. While intuitively appealing, this approach fails to acknowledge that economic causality might not follow such a rule.⁵⁶ For instance, last year's stock capitalization and value traded depend on stock prices that are forward looking, so it may be the case that economic causality runs from current (anticipated) growth to past stock market development.

A widely applied external instrumental variable, albeit only useful in cross-section analysis, is legal origin. In particular, the English regime is known to be much more creditor friendly than its polar competitor, the French system. Furthermore, because the legal family a country belongs to is a centuries-old condition, it can be safely considered exogenous to current economic performance, serving as a nice instrument.

Beyond the econometric remedies that may be tried, perhaps more important to this discussion is the fact that both theory and evidence support a two-way causation between capital markets development and

growth. It is to a great extent puzzling that researchers have put painstaking effort into removing endogeneity, in general claiming success on the basis of sophisticated econometric models but neglecting altogether that, while dozens of papers found that capital markets cause growth, a similar number of high-quality studies prove that growth causes capital markets development.⁵⁷ This fact per se casts doubt on the presence of a single causality direction. By reconnecting these two sides of the same coin, the conclusion emerges that causality runs both ways, which by no means undermines policy initiatives to stimulate capital markets development as a growth-enhancing instrument.

5.2 Primary and secondary markets

The economic literature provides arguments backing the positive role that both the primary and the secondary markets have on the economy. However, the review of the existing empirical research shows that secondary markets are more intensely investigated and found to exert a powerful impact on growth. Conversely, the research on the primary market has been quite limited, with scarce evidence to sustain its growth-promoting properties. Data constraints on primary market activity aside, applied researchers investigating the interplay between capital markets and the economy have as a norm chosen to avoid much reference to the primary market to concentrate on the secondary market. This is somewhat disconcerting, because the observable deliverable of capital markets (the provision of fresh funds) would be rendering a much less valuable social benefit than their unobservable deliverables (liquidity and information).

However, an indisputable fact is that, even in countries where capitalization and liquidity are high, very few firms participate in the capital markets (compared with the overall number of registered companies in the country), and the volume of funds raised in the bond and equity market is quite small related to the overall financing

⁵⁴ For other variables, such as the institutional and macroeconomic framework, it would be far-fetched to postulate capital markets as a causal factor on neither theoretical nor empirical grounds. The need to address endogeneity must be dictated, first and foremost, by a theoretical reasoning. If theory does not provide any elements to expect a meaningful relationship between two given variables, endogeneity testing is out of the question. The annex includes in the last column a brief remark on whether causality has been tested or not in each particular study reviewed.

⁵⁵ Another approach to remove endogeneity, which is ingenious yet not free of shortcomings, is that of Rajan and Zingales (1998), which is based on defining industry's financial dependence with the United States taken as a benchmark. However, because this method looks at financing needs as a whole, it does not serve to identify the role of capital markets in view of banks and other sources.

⁵⁶ Regarding the use of lagged regressors, another popular brute-force technique, it can be shown that it does not fix endogeneity when simultaneity truly exists and that the bias worsens even further if the endogenous variable displays serial correlation.

⁵⁷ The same argument can be made in regard to the credit and growth literature.

needs of the corporate sector.⁵⁸ At any rate, a strong secondary market may be a necessary but not sufficient condition for a robust primary market.

In light of the marginal funding services via the primary market, the positive macro effects should arise from the liquidity and information services via the secondary market. Nevertheless, those effects are not expected to be felt across all firms in the economy but only on the firms publicly traded, which, once again, are too few. Unless this trading activity has major externalities on unlisted firms—which are far from conspicuous and have not been identified in the literature—it is not easy to make a clear case in favor of the growth effect of secondary markets on the business sector at large.

Finally, because measures of capitalization and value traded depend directly on security prices, boom and bust financial cycles may distort these indicators and produce misleading implications about the link between capital markets and macroeconomic outcomes.⁵⁹ For instance, in the midst of a positive bubble, stock prices are likely to rise, leading to higher levels of market capitalization and

probably higher value traded. However, how this relates to real economy outcomes, such as economic growth, is not self-evident. Similarly, trading implies price volatility, justified or not by fundamentals. In any case, excessive stock market volatility may unleash panic (when prices are going down) or exuberance and overconfidence (when prices go up), not only among traders but also among outside observers at large. In sum, liquidity carries a number of pros and cons that need to be accounted for and quantified to the extent possible before stating that it constitutes a good, bad, or innocuous influence on real aggregate outcomes.

In conclusion, a more thorough examination of the transmission channels of the secondary market to the macroeconomy, and its links to the primary market, is needed. As of today, the nexus between secondary markets and the real economy is not yet well understood in regard to exactly how the market affects real outcomes. This, in turn, opens up the question as to how liquidity is created and what role the investor base plays, distinguishing between the retail and the institutional investor clienteles.

58 For instance, in dissecting the issuance activity of more than 45,000 companies in 51 countries in 2003–2011, Didier, Levine, and Schmukler (2015) find that, against a background of an average stock capitalization of 84 percent of GDP in their developed country sample and 59 percent in emerging economies, the amount of equity raised was just 1.3 percent of GDP. For the bond market, the figures were 41 percent, 14 percent, and 3.1 percent, respectively. They also show that (a) an annual median of barely 720 firms per country issue securities, (b) these issues are highly concentrated in a few large companies, and (c) issuance is not a recurring financing strategy, because most firms that did issue in the sample period did not return to the market later on (see also Carpenter and Petersen 2002). The same conclusion shows up when looking at the number of listed companies around the world, amounting to about 0.01 percent of all registered companies.

59 Rousseau and Wachtel (2000) are among the few to warn about stock price inflation and deflation and to adjust for this in their work on equity markets and growth. In the same vein, if the social value of capitalization comes from its contribution to stock liquidity, this indicator should be adjusted for free float, which is most often not the case (see La Porta and others 1997).



ANNEX CHARACTERISTICS OF THE EXISTING EMPIRICAL RESEARCH

Number of papers

A search was made of the existing research. This search produced 72 papers of high quality, of which a summary is provided in this annex.⁶⁰ The analysis is broken down into causes—where one or more indicators of capital markets development are the dependent or explained variables—and effects—where these indicators enter as explanatory factors of various measures of economic performance. In turn, these studies are classified into those based on macro-level data (spanning broad panels of developed, emerging, and developing countries over time) and firm-level data (making use of balance sheet information on listed companies and occasionally unlisted ones).

Data sets and countries covered

The datasets span long periods of time, starting in the early 1980s and going up to the early to mid-2010s. Country samples cover a wide and diversified set of countries. With few exceptions focusing on advanced economies, most papers look into both industrial and emerging countries. The interest in the emerging country group, in a middle- to high-income per capita range, is understandable, as these are the most promising cases to examine when seeking to gain insights into the process by which nascent or incipient capital markets grow. On the contrary, advanced countries, with their already mature capital markets, and low-income countries, lacking these markets outright, appear to be less suitable research subjects

⁶⁰ Several dozen papers more were analyzed during the search but were dismissed because of questionable technical standards or data limitations. In addition, it must be noted that the literature on banking development is much more abundant than that on capital markets, which is consistent with banking's relative weight on total financial intermediation and on systemic instability.

Markets covered

Relative to the stock market, the bond market has been visited less as a research topic. In some studies bonds are examined as a standalone asset class, and in others they are merged with public equity to measure total market capitalization. No studies group bonds with bank loans, although they share more features in terms of payoff, maturity, and tradability than bonds and equity do.

Variables

The great majority of papers on causes and effects of capital markets have a macroeconomic angle, grounded on aggregate capital markets as well as macro and institutional indicators. Less work has been produced to explain cross-country differences in the number of listed firms and the phenomenon of listings and delistings in individual countries over time. Additional work in this area could help give a better grasp of the mechanisms through which capital markets end up affecting economic outcomes. This kind of evidence is bound to come up primarily in studies that are intensive in more granular data.⁶¹

The stock market capitalization and value traded to GDP, and to a lesser extent the stock turnover ratio, are the main capital market variables used in empirical work, both as dependent and as explanatory variables.

The emphasis on capitalization and value traded implies that the (equity and bond) primary market has not received much attention either.⁶² Just a handful of papers study the drivers and consequences of security issuance activity. However, once it is acknowledged that the most genuine form of capital markets development is the entry of new issuers and investors, it would be important to get a deeper understanding of the incentives and barriers that these players face in deciding to enter, stay, and leave public capital markets. For example, limited research exists about why firms choose between different private and publicly traded external sources, or what investors are most likely to participate in primary and secondary markets. From this analysis, policy measures may be taken to move in the direction of igniting a larger demand and supply for new corporate securities. This assumption reinforces the need to integrate macro- and micro-data studies to better inform capital market policies.

Methodologies

Studies tend to adopt an annual panel specification, combining time series with countries as the cross-section dimension. The panel approach enables researchers to expand the number of observations and, more important, control for country-specific, time-invariant factors (at least in the short to medium run), most notably the institutional framework. In company-level studies, panels make it possible to examine the incidence of macroeconomic time-variant factors as well. In some cases, when these factors are not of particular interest to the researcher, the inclusion of fixed country and year effects (dummy variables) suffice to avoid misspecification. A minority of studies eschew annual panels, in favor of five-year averages or cross-section averages, which lose the time series dimension but may be better equipped to capture long-term as opposed to cyclical influences. Even fewer examples have been found of pure time series analysis on specific countries, which would be most welcome as a way to generate hard evidence to enrich narrative case studies. Also, in the realm of country-specific analysis, rigorous event studies would be helpful to bring to light the effect of structural reforms with direct impact on capital markets, such as the inception of pension fund regimes, the liberalization of financial transactions, and other major macroeconomic and institutional changes.

An ample variety of econometric techniques are employed in conducting panel estimations. The methodological choice is in many cases guided by the goal of minimizing endogeneity concerns (see section 2 for more details on this), but other researchers just do not clarify why they prefer a certain technique over other feasible options. Though not uncommon in other fields within economics and finance, this variety of techniques clouds the strict comparison across studies.

61 This suggestion by no means implies that no high-quality work has been conducted on the subject; much of the good work has been done by World Bank Group researchers. When relevant to the central topics of this document, such studies have been surveyed, as can be checked in both the summary tables in the body of the text as well as in the annex.

62 The prominence of financial stocks over flows as a research subject appears in the banking literature as well.

► **TABLE A.1 Survey on macro-level determinants of capital markets development**

Author/s (year of publication)	Countries	Period	Dependent variables	Main independent variables	Results	Main findings and econometric method	
La Porta and others (1997)	49 developing and developed countries	1994	Stock market capitalization (excl. majority shareholdings) to GNP	Legal shareholder rights	Positive	Countries with an English legal origin (which are more investor friendly) and stronger institutional and macroeconomic framework have more developed stock markets. Cross-country OLS, no causality tested.	
				Outstanding debt (private credit plus nonfinancial bonds) to GNP	Legal family (English versus French)		Positive
				Domestic listed firms to population	GDP per capita		Positive
				Domestic IPOs to population	GDP growth		Positive
Bayraktar (2014)	104 developing and developed countries	1990–2012	Stock market capitalization to GDP	GDP growth	Positive	Stock market development associated to its own liquidity, macroeconomic growth and stability, and the size of the banking sector. GMM panel estimation, causality tested.	
				Stock value traded to GDP	Positive		
				Domestic credit to private sector to GDP	Positive		
				Inflation rate	Negative		
				Political risk	Negative		
Yartey (2008)	42 emerging countries	1990–2004	Stock market capitalization to GDP	GDP per capita	Positive	Stock market capitalization linked to previous level (autocorrelation) and same year's GDP per capita, stock market liquidity, private credit, foreign capital inflows and good institutions. GMM panel estimation, causality tested.	
				Stock value traded to GDP	Positive		
				Domestic credit to private sector to GDP	Positive		
				Net capital inflows to GDP	Positive		
				Institutional quality	Negative		
Bayar (2016)	8 European Union transition economies	2002–13	Stock market capitalization to GDP	Political stability	Positive	Stock market capitalization correlated to various contemporaneous measures of institutional quality. SUR random effects panel estimation, causality untested.	
				Regulatory quality	Positive		
				Rule of law	Positive		
				Control of corruption	Positive		
Yartey (2007)	13 African countries	1991–2001	Stock market capitalization to GDP	GDP per capita	Positive	Stock market capitalization linked to previous level (autocorrelation) and private credit, and same year's stock market liquidity. Random effects panel estimation, causality untested.	
				Stock value traded to GDP	Positive		
				Domestic credit to private sector to GDP	Positive		

► **TABLE A.1 Survey on macro-level determinants of capital markets development (cont.)**

Author/s (year of publication)	Countries	Period	Dependent variables	Main independent variables	Results	Main findings and econometric method
Garcia and Liu (1999)	15 countries (13 developing plus Japan and the United States)	1980–95	Stock market capitalization to GDP	GDP per capita	Positive	Lagged levels GDP per capita, saving and investment rates, private credit, and stock market liquidity correlated with subsequent stock market capitalization. Fixed effects panel estimation, causality untested.
				Gross national saving to GDP	Positive	
				Gross national investment to GDP	Positive	
				Stock value traded to GDP	Positive	
				Domestic credit to private sector to GDP	Positive	
Claessens, Klingebiel, and Schmukler (2001)	82 countries (28 high, 19 middle, and 35 low income)	1975–2000	Stock market capitalization to GDP	GDP per capita	Positive	Stock market capitalization positively linked to contemporaneous levels of GDP per capita, institutional quality, legal investor rights and external openness, and negatively to inflation rate. Random effects panel tobit estimation, causality untested.
			Stock value traded to market capitalization (turnover)	Shareholder rights	Positive	
			Stock value traded to GDP	Law and order	Positive	
			Stock market capitalization of international firms/ total	Financial liberalization	Positive	
			Value traded abroad/value traded domestically	Inflation rate	Negative	
			Value traded abroad / GDP	Foreign direct investment (%GDP)	Positive	
Levine and Zervos (1998b)	16 developing countries	1980–93	Stock market capitalization to GDP	Capital control liberalization	Positive	Removal of capital controls correlated to stock market capitalization and liquidity. Time series by country with Perron's structural break test, no causality tested.
			Value traded to GDP Turnover ratio	Business information disclosure		
Ho (2019)	South Africa	1975–2015	Stock market capitalization to GDP	GDP per capita	Positive	Change in stock market capitalization explained by lagged dependent variable and additional controls for banking sector development and economic growth and stability. Time series ARDL, no causality tested.
				Domestic credit to private sector to GDP	Positive	
				Inflation rate	Negative	

► **TABLE A.1 Survey on macro-level determinants of capital markets development (cont.)**

Author/s (year of publication)	Countries	Period	Dependent variables	Main independent variables	Results	Main findings and econometric method
El-Wassal (2005)	40 emerging economies	1980–2000	Stock market capitalization to GDP Stock value traded to GDP	GNP per capita growth rate	Positive	Stock market development associated to initial (or alternatively lagged) economic growth and financial openness. TSLS with fixed effects estimation, no causality tested.
				Financial liberalization		
				Portfolio capital inflows to GDP		
Ben Naceur, Ghazouani, and Omran (2007)	12 Middle Eastern and North African region countries	1990–99	Stock market capitalization to GDP	Saving rate	Positive	Lagged levels of saving rate, private credit, and stock market liquidity correlated with subsequent stock market capitalization. Fixed effects panel estimation, causality untested.
				Domestic credit to private sector to GDP	Positive	
				Value traded to GDP	Positive	
Billmeier and Massa (2009)	17 emerging markets in the Middle East and central Asia	1995–2005	Stock market capitalization to GDP	Institutional quality	Positive	Capital markets development associated to institutional and macroeconomic strength as well as value traded. Pooled OLS estimation, no causality tested.
				GDP per capita	Positive	
				Investment rate	Positive	
				Value traded to GDP	Positive	
Demirgüç-Kunt, Feyen, and Levine (2012)	72 countries	1980–2008	Stock value traded to GDP Stock market capitalization to GDP Securities (stock and bond) market capitalization	GDP	Positive (but increasing for capital market and negative for bank credit)	Economic development is accompanied by a relative growth of capital markets in regard to bank credit. Quantile and OLS panel regressions, no causality tested.
De la Torre, Goggi, and Schmukler (2008)	87 countries	1975–2004	Stock market capitalization to GDP Stock value traded to GDP Capital raised in stock markets to GDP	GDP per capita	Positive	Capital market development linked to good macroeconomic and institutional fundamentals and external openness. Pooled OLS estimation, no causality tested.
				GDP	Positive	
				Fiscal deficit to GDP	Negative	
				Shareholder rights	Positive	
				Stock market liberalization	Positive	
				Equity capital inflows to GDP	Positive	

► **TABLE A.1 Survey on macro-level determinants of capital markets development (cont.)**

Author/s (year of publication)	Countries	Period	Dependent variables	Main independent variables	Results	Main findings and econometric method
Bebczuk (2007)	30 countries	1989–2001	Total equity issues IPOs Seasoned issues	Investment rate	Positive	Equity issuance correlated to investment and GDP growth rate, fiscal balance (crowding out), effective shareholder rights, and international equity issues (complementarity between local and external issuance activity). Cross-section OLS estimation, no causality tested.
				GDP growth	Positive	
				Fiscal balance to GDP	Positive	
				Effective shareholder rights (interacted with rule of law)	Positive	
				Equity issues abroad (%GDP)	Positive	
Bhattacharyay (2011)	10 East Asian countries	1998–2008	Domestic bond market capitalization to GDP	GDP per capita	Positive	Stock market capitalization associated to economy's size (total GDP), economic development (GDP per capita), bank credit deepening, and exchange rate volatility. Panel OLS, GLS, and fixed and random effects, no causality tested.
				GDP	Positive	
				Domestic credit to private sector to GDP	Positive	
				Exchange rate volatility	Negative	
Burger, Warnock, and Warnock (2015)	42 Asian countries	2004–13	Domestic bond market capitalization to GDP	Inflation volatility	Negative	Inflation volatility and legal investor protection are crucial to domestic bond market development. Simple, bivariate correlations, no causality tested
				Creditor rights	Positive	
Guscina (2008)	19 emerging countries	1980–2002	Domestic bond market capitalization to GDP	Inflation/inflation volatility	Negative	Unstable macroeconomic environment, poor quality institutions, and uncertain political climate hinder the development of domestic debt markets. Panel OLS, fixed effects, and tobit estimations, no causality tested.
				Political risk	Negative	
				Domestic credit to private sector to GDP	Negative	
Claessens, Klingebiel, and Schmukler (2007)	35 countries	1993–2000	Local currency-denominated government bond capitalization to GDP	GDP	Positive	Bigger and higher-income economies with more developed banking and stock markets, better investor protection, less inflation, and higher fiscal deficits have larger domestic currency government bond markets. GLS panel estimation, no causality tested.
				GDP per capita	Positive	
				Bank deposits to GDP	Positive	
				Stock market capitalization to GDP	Positive	
				English legal origin	Positive	
				Inflation	Negative	
				Fiscal balance	Negative	

► **TABLE A.1 Survey on macro-level determinants of capital markets development (cont.)**

Author/s (year of publication)	Countries	Period	Dependent variables	Main independent variables	Results	Main findings and econometric method
Eichengreen and Luengnaruemitchai (2004)	41 countries	1990–2001	Total bond market capitalization to GDP Corporate bond market capitalization to GDP	GDP	Positive	Larger country size and income per capita, stronger institutions, less volatile exchange rates, more financially open, and higher fiscal deficits tend to be positively associated with bond market capitalization. Pooled OLS, no causality tested.
				GDP per capita	Positive	
				Institutional quality	Positive	
				Exchange rate volatility	Negative	
				Fiscal balance to GDP	Negative (only for government bonds)	
Fløgstad (2017)	19 emerging countries	1995–2012	Private domestic bond capitalization (%GDP)	(Total, short, and long) government debt market capitalization to GDP	Positive (and stronger for long-term than short-term debt)	Lagged public bond market capitalization linked to larger private bond market capitalization, suggesting crowding-in effect, even after controlling for standard additional drivers. Pooled OLS and fixed effects estimation, no causality tested.
Luengnaruemitchai and Ong (2005)	15 emerging countries	2001	Private domestic bond capitalization (%GDP)	Government debt market cap. to GDP	Positive	Crowding-in effect from public to private bond market. Bivariate correlation, no causality tested.
Smaoui, Grandes, and Akindele (2017)	22 emerging and developing countries	1990–2013	Total bond market capitalization Corporate bond market capitalization	GDP	Positive	Economy's size, institutional and macroeconomic strength, and private credit deepening associated to total and corporate bond market development. Pooled OLS and GMM estimations, causality tested.
				Institutional quality	Positive	
				Fiscal balance to GDP	Negative	
				Domestic credit to private sector to GDP	Positive	
Laeven (2014)	42 countries	1994–2013	Domestic (stock plus private and public bond) market capitalization	GDP per capita	Positive	Strong macroeconomic and institutional fundamentals, as well as deep credit markets, are behind domestic (bonds and stock) capital markets. Pooled OLS, no causality tested.
				Inflation rate	Negative	
				Private enforcement (by investors, not the regulator) of securities laws	Positive	
				Shareholder rights	Positive	
				Debt contract enforcement (days to resolve a payment dispute)	Negative	
				Domestic credit to private sector to GDP	Positive	

► **TABLE A.1 Survey on macro-level determinants of capital markets development (cont.)**

Author/s (year of publication)	Countries	Period	Dependent variables	Main independent variables	Results	Main findings and econometric method
Kowalewski and Pisany (2017)	10 Asian countries	1995–2014	Corporate (financial and nonfinancial) bond market issuance to GDP	GDP	Negative for nonfinancial and positive for financial corporations	Bond issuance appears to be procyclical for financial and countercyclical for nonfinancial corporations. Panel GLS estimation with fixed effects and additional controls, no causality tested.
				Financial crises	Positive for nonfinancial and negative for financial corporations	
				Bank credit to GDP	Positive	
Enache, Miloş, and Miloş (2015)	10 CEEC countries	2001–10	Market capitalization of listed firms (%GDP)	Pension funds assets to GDP	Positive	Market capitalization associated to own lag and current level of pension fund assets. Error correction model, no causality tested.
Rocholl and Niggemann (2010)	57 countries (including all OECD countries)	1976–2007	Growth in corporate bond market capitalization to GDP Growth in stock market capitalization to GDP Equity issuance to GDP	Inception of private pension funds system	Positive	Introduction of capitalization pension systems promotes the increase of bond and stock market capitalization as well as larger equity issuance. Panel GLS and cross-section OLS estimations, with and without additional controls, no causality tested.
Moleko and Ikhide (2016)	South Africa	1981–2013	Stock market capitalization to GDP Bond market capitalization to GDP	Pension fund assets to GDP	Positive	After controlling for other drivers, pension fund assets associated to stock and bond market capitalization. Cointegration and error correction model estimation, causality tested (causality only with stock, not with bond, market)
Meng and Pfau (2010)	32 countries	1980–2008	Stock market capitalization to GDP Stock value traded to GDP Corporate bond market capitalization to GDP	Pension funds assets to GDP	Positive	Market capitalization associated to own lag, and lagged level of pension fund assets. GMM and LSDV estimations, with additional controls, causality tested.

Note: ARDL = autoregressive distributed lag; CEEC = Central and Eastern European Countries; GDP = gross domestic product; GLS = generalized least squares; GMM = generalized method of moments; GNP = gross national product; IPO = initial public offering; LSDV = least-square dummy variable; OECD = Organisation for Economic Co-operation and Development; OLS = ordinary least squares; SUR = seemingly unrelated regressions; TSLS = two-stage least squares.

► **TABLE A.2 Survey on firm-level determinants of capital markets development**

Author/s (year of publication)	Countries	Period	Dependent variables	Main independent variables	Results	Main findings and econometric method
Mizen and Tsoukas (2010)	4,868 firms from 9 Asian countries	1995–2007	Likelihood of issuing new corporate bonds	Bond market capitalization to GDP	Positive	More profitable, indebted, illiquid, with more tangible assets and a track record of bond issuance, listed in deeper and more liquid bond markets, are more likely to issue bonds. Explanatory variables lagged one year. Panel probit estimation, no causality tested.
				Bond market value traded to GDP	Positive	
				Firm's profitability	Positive	
				Firm's leverage	Positive	
				Firm's liquidity	Negative	
				Firm assets' tangibility	Positive	
				Previous bond issuance activity	Positive	
Davis, Maslar, and Roseman (2017)	U.S. listed companies	2002–12	Likelihood of issuing new corporate bonds	Illiquidity of the firm's outstanding bonds	Negative	Bigger companies with more debt and investment, less cashflows, and more traded bonds are more likely to issue new bond debt. Panel probit estimation, no causality tested.
				Firm's leverage	Positive	
				Firm's size	Positive	
				Firm's cashflow	Negative	
				Firm's investment	Positive	
Duffee and Hördahl (2019)	8,300 listed firms from Asia and the United States	2003–16	Changes in bond and bank debt	Firm's leverage	Positive	Bigger, more leveraged, and more cash-scarce companies (lagged one year) are more likely to have bond liabilities. Panel probit, no causality tested.
				Firm's size	Positive	
				Firm's cashflow	Negative	
Didier, Levine, and Schmukler (2015)	51 countries and 45,527 firms	2003–11	Equity issues Bond issues	Firm's ROA	Negative	Bigger firms with higher leverage (especially long-term), more investment activity, and lower profitability are more likely to issue equity and/or bonds. Panel probit estimation, no causality tested.
				Firm's leverage	Positive	
				Firm's long- to total debt	Positive	
				Firm's size	Positive	
				Firm's investment	Positive	
Calomiris, Larrain, and Schmukler (2018)	25 emerging countries and 12,723 firms	1991–2016	Domestic equity issues	Foreign equity inflows	Positive	Foreign equity flows encourage domestic and overseas equity issuance by local listed firms. Panel fixed effects estimation, causality tested.

Note: GDP = gross domestic product; ROA = return on assets.

► **TABLE A.3 Survey on macro-level effects of capital markets development**

Author/s (year of publication)	Sample	Period	Dependent variables	Independent variables of interest	Results	Main findings and econometric method
Bekaert, Harvey, and Lundblad (2005)	95 countries	1995–2009	GDP per capita growth rate	Equity market liberalization	Positive	Equity market liberalizations, on average, lead to a 1% increase in annual real economic growth, after controlling for other growth determinants. Panel OLS and instrumental variables, causality tested.
Bekaert, Harvey, and Lundblad (2011)	96 countries	1980–2006	GDP per capita growth rate	Equity market liberalization	Positive	Equity market capitalization increases GDP per capita, capital stock, and TFP by between 0.6% and 1.5% annually, after controlling for other growth correlates. Pooled OLS estimation, no causality tested.
			Capital stock growth	Stock value traded to GDP		
			Productivity (TFP) growth	Turnover ratio		
Enisan and Olufisayo (2009)	7 Sub-Saharan African countries	1980–2004	GDP per capita growth rate	Stock market capitalization to GDP	Positive	Two-way causality exists between growth and stock market capitalization and value traded. ARDL and ECM estimations, Granger causality tested.
				Stock value traded to GDP		
Yartey and Adjasi (2007)	14 African countries	1995–2002	GDP growth rate	Stock market capitalization to GDP	Positive	A 10 percentage point increase in stock value traded increases annual GDP growth by 0.4 percentage points. Capitalization and turnover not significant. GMM estimation, causality tested.
				Stock value traded to GDP		
				Turnover ratio		
Gambacorta, Yang, and Tsatsaronis (2014)	41 advanced and emerging countries	1989–2011	GDP per capita growth rate	Stock turnover ratio	Positive but decreasing	A 10 percentage point increase in stock turnover increases annual GDP per capita growth by 0.24 percentage points, but this effect peaks and then becomes negative at a turnover ratio of 95%. GMM estimation, causality tested.
Beck and Levine (2004)	40 developing and developed countries	1976–98	GDP growth rate	Turnover ratio	Positive	A 10 percentage point increase in stock turnover increases annual GDP growth by 0.24 percentage points. GMM estimation, causality tested.

► **TABLE A.3 Survey on macro-level effects of capital markets development (cont.)**

Author/s (year of publication)	Sample	Period	Dependent variables	Independent variables of interest	Results	Main findings and econometric method
Henry (2000)	11 developing countries	1977–94	Private investment growth rate	Stock market liberalization	Positive	Stock market liberalizations lead private investment booms. Panel fixed effects estimation, no causality tested.
Levine and Zervos (1998a)	47 countries	1973–93	GDP per capita growth rate	Stock turnover ratio Stock value traded to GDP	Positive Positive	A 10 percentage point increase in stock turnover (value traded) increases annual GDP per capita growth by 0.27 (0.95) percentage points. Similar effects found for capital stock and TFP growth rates. Cross-section OLS estimation, no causality tested.
			Capital stock growth rate			
			Productivity (TFP) growth rate			
Naik and Padhi (2015)	27 emerging economies	1995–2012	GDP growth rate	Stock market capitalization to GDP	Positive	A 10 percentage point increase in stock turnover increases annual GDP growth by 0.15 percentage points. Capitalization and turnover statistically insignificant. GMM estimation, causality tested.
				Stock value traded to GDP	Positive	
				Turnover ratio	Positive	
Marques, Fuinhas, and Marques (2013)	Portugal	1993–2011	GDP growth rate	Stock market capitalization to GDP	Positive	Bi-directional relationship between stock market capitalization and growth. VAR estimation, Granger causality tested.
Andriansyah and Messinis (2014)	54 countries	1995–2010	GDP per capita growth rate	Stock value traded to GDP Stock turnover ratio Equity investment flows to GDP	Ambiguous/ insignificant	Neither the primary market (equity issuance) nor the secondary market (as measured by value traded and turnover) has a clear-cut and/or significant effect on growth. GMM and VAR estimations, causality tested.
Zhu, Ash, and Pollin (2002)	47 countries	1973–93	GDP per capita growth rate	Stock value traded to GDP	Not significant	Stock market liquidity does not affect growth. Cross-section OLS estimation, no causality tested.
				Turnover ratio	Not significant	

► **TABLE A.3 Survey on macro-level effects of capital markets development (cont.)**

Author/s (year of publication)	Sample	Period	Dependent variables	Independent variables of interest	Results	Main findings and econometric method
Levine (2002)	48 countries	1980–95	GDP per capita growth rate	Stock market capitalization to bank credit to private sector	Not significant	Overall financial development is robustly linked with economic growth, but not in particular for either bank- or market-based financial systems. Cross-section OLS estimation, no causality tested.
				Stock value traded to bank credit to private sector	Not significant	
Langfield and Pagano (2016)	45 countries	1988–2011	GDP growth rate	Bank assets to (stock plus bond market capitalization)	Negative	More market-based financial systems (relative to banks) associated to higher GDP growth. Panel fixed effects estimation, no causality tested.
Caporale, Howells, and Soliman (2004)	7 countries	1977–98	GDP growth	Stock market capitalization to GDP Value traded to GDP	Positive	Stock market capitalization and value traded have a positive causal role in most (but not all) countries in the sample. VAR estimation, causality tested.
Caporale, and others (2009)	10 transition countries (new EU members)	1994–2007	GDP per capita growth	Stock market capitalization to GDP	Positive	A 10 percentage point increase in stock market capitalization increases annual GDP growth by 0.04 percentage points. GMM and Granger estimation, causality tested.
Antonielli and Altomonte (2014)	European countries and the United States	1995–2010	Investment in intangibles to investment in tangibles	Stock market capitalization	Positive	Investment in intangibles (relative to tangibles) positively associated to stock market capitalization (but also, albeit less strongly, to bank credit). Simple bivariate correlation, no causality tested.
Bats and Houben (2017)	22 OECD countries	2000–15	Financial systemic risk	Nonfinancial bond debt market capitalization (%GDP)	Negative	Financial systemic risk (proxied by the volatility of banks' share prices) increases with bank credit and diminishes with nonfinancial bond debt and stock market capitalization. Panel fixed effects estimation, no causality tested.
				Stock market capitalization (%GDP)	Negative	

► **TABLE A.3 Survey on macro-level effects of capital markets development (cont.)**

Author/s (year of publication)	Sample	Period	Dependent variables	Independent variables of interest	Results	Main findings and econometric method
Langfield and Pagano (2016)	517 listed banks from 20 countries (EU, Japan, and United States)	2000–2012	Systemic financial risk	Domestic credit to private sector to stock market capitalization	Positive	Financial systemic risk (proxied by the volatility of banks' share prices) increases with bank credit and diminishes with nonfinancial bond debt and stock market capitalization. Panel fixed effects estimation, no causality tested.
Grjebine, Szczerbowicz, and Tripier (2018)	23 countries	1989–2013	Recovery after recessions	Nonfinancial bond market capitalization to nonfinancial bank credit	Positive	Stronger post-recession recoveries and investment in countries with deeper bond market relative to bank credit. Panel fixed effects estimation, no causality tested.
			Investment after recessions		Positive	
Giesecke and others (2014)	United States	1866–2010	Economic contraction during crises	Corporate bond crisis dummies	Insignificant	Corporate bond crises of similar intensity than banking crises have much milder impact on economic activity. VAR estimation, causality tested.
				Banking crises dummies	Positive	
Gambacorta, Yang, and Tsatsaronis (2014)	41 advanced and emerging countries	1989–2011	GDP losses in financial crises	Market-based countries (countries where bank assets to stock plus bond capitalization is below sample median)	Positive	Recessions in countries with bank-oriented systems are three times as severe as in those with a market-oriented financial structure. Median value for each country group. No regression analysis conducted.

Note: ARDL = autoregressive distributed lag; ECM = Economic Confidence Model; EU = European Union; GDP = gross domestic product; GMM = generalized method of moments; OECD = Organisation for Economic Co-operation and Development; OLS = ordinary least squares; TFP = total factor productivity; VAR = vector autoregressive.

► **TABLE A.4 Survey on firm- and industry-level effects of capital markets development**

Author/s (year of publication)	Sample	Period	Dependent variables	Independent variables	Results	Main findings and econometric method
Geng and N'Diaye (2012)	27,997 firms from 53 countries; 1,908 firms from China	1990–2009	Firm-level investment to sales	Stock market capitalization to GDP	Positive	Stock market capitalization and number of listed firms associated to higher investment.
			Aggregate investment to GDP	Listed firms per 10,000 people	Positive	GMM estimation, causality tested.
Huang, Panigga, and Varghese (2018)	537,526 firms from 69 countries	1998–2014	Firm's degree of financial constraints	Government debt to GDP	Positive	Government debt crowds out private investment by increasing the sensitivity of corporate investment to cashflows. Panel fixed effects estimation, no causality tested.
Mitton (2008)	11,850 firms from 34 emerging countries	1980–2004	Corporate debt to equity	Stock market capitalization to GDP	Negative	Countries with deeper stock markets exhibit a lower corporate debt-to-equity ratio, other capital structure factors controlled for. Panel fixed effects estimation, no causality tested.
Hsu, Tian, and Xu (2014)	32 emerging countries with industry-level data	1976–2016	Technological innovation (number of patents and R&D expenses)	Stock market capitalization to GDP	Positive	Number of patents and R&D expenses higher in countries with larger stock capitalization. Panel fixed effects estimation, causality tested.
Demirgüç-Kunt and Maksimovic (1996)	About 10,000 firms from 30 developing and developed countries	1980–91	Firm's sales growth	Stock turnover ratio	Positive	The proportion of firms able to grow beyond their cashflow availability increases with stock turnover ratio (but capitalization is insignificant). Cross-section OLS regression, no causality tested.
				Stock market capitalization to GDP	Insignificant	
Wurgler (2000)	65 countries with industry-level data	1963–95	Efficiency of investment allocation	Stock market capitalization to GDP	Positive	Stock market capitalization increases the elasticity of investment growth to value-added growth—that is, the extent to which investment increases (decreases) in its growing (declining) industries. Cross-section OLS regression, no causality tested.

► **TABLE A.4 Survey on firm- and industry-level effects of capital markets development (cont.)**

Author/s (year of publication)	Sample	Period	Dependent variables	Independent variables	Results	Main findings and econometric method
Calomiris, Larrain, and Schmukler (2018)	25 emerging countries and 12,723 firms	1991–2016	Investment in fixed assets	Domestic equity issues by large firms	Positive	Fixed investment to assets by large firms increases with their domestic equity issuance to assets. Panel fixed effects estimation, no causality tested.
Carlin and Mayer (2003)	27 industries from 18 OECD countries	1970–95	GDP growth rate Fixed investment R&D expenses	External equity financing	Positive	A higher share of equity financing associated with higher growth, investment, and R&D expenses. Panel fixed effects, causality tested.
Carpenter and Petersen (2002)	2,400 U.S. high-tech firms	1981–98	Physical capital expenses R&D expenses	IPOs and subsequent equity issuance	Positive (although post-IPO equity issuance is low)	Access to new equity finance increases investment in fixed assets and R&D. Descriptive statistics, no econometric work carried out.
Langfield and Pagano (2016)	517 listed banks from 20 countries (EU, Japan, and United States)	2000–2012	Systemic financial risk	Domestic credit to private sector to stock market capitalization	Positive	Financial systemic risk (proxied by the volatility of banks' share prices) increases with bank credit and diminishes with nonfinancial bond debt and stock market capitalization. Panel fixed effects estimation, no causality tested.
Yadav, Pahi, and Gangakhedkar (2019)	6,506 nonfinancial listed firms from 12 Asian economies	1995–2016	Total debt to equity Short debt to equity Long debt to equity	Stock market capitalization to GDP Stock value traded to GDP	Negative	Total, short-term, and long-term debt to equity lowers in countries with higher stock market capitalization and value traded, after controlling for other capital structure determinants. Panel fixed effects estimation, no causality tested.
Hsu, Tian, and Xu (2014)	34 countries with industry-level data	1976–2006	Change in number of patents	Stock market capitalization to GDP	Positive	Stock market capitalization fosters innovation, as measured by number of patents, R&D expenses, and high-tech exports. GMM estimation, causality tested.
			R&D expenses High-tech exports	Stock value traded to GDP	Positive	

► **TABLE A.4 Survey on firm- and industry-level effects of capital markets development (cont.)**

Author/s (year of publication)	Sample	Period	Dependent variables	Independent variables	Results	Main findings and econometric method
Hosono and Takigawa (2017)	9,588 firm-year observations from listed Japanese firms	2002–13	Likelihood of issuing stock	Investment in intangibles	Positive	Firms investing more heavily in intangibles more likely to issue stock. Panel fixed effects estimation, no causality tested.
Didier, Levine, and Schmukler (2015)	45,527 listed firms from 51 countries	2003–11	Firm's sales and assets growth	Stock and bond issuance	Positive	Stock and bond issuance correlated with subsequent higher sales and assets growth than non-issuers. Panel fixed effects estimation, no causality tested.
Didier and others (2019)	62,653 listed firms from 65 countries	1990–2016	Firm's growth	Stock and bond issuance	Positive	Stock and bond issuance correlated with subsequent higher sales and assets growth than non-issuers. Panel fixed effects estimation, no causality tested.

Note: EU = European Union; GDP = gross domestic product; GMM = generalized method of moments; IPO = initial public offering; OECD = Organisation for Economic Co-operation and Development; OLS = ordinary least squares; R&D = research and development.

► **TABLE A.5 Data sources**

Database	Institution	Internet address
Financial Development and Structure Dataset	World Bank	https://www.worldbank.org/en/publication/gfdr/data/financial-structure-database
Global Financial Development Database		https://datacatalog.worldbank.org/dataset/global-financial-development
World Development Indicators		https://datacatalog.worldbank.org/dataset/world-development-indicators
Enterprise Surveys		http://www.enterprisesurveys.org/
Doing Business		http://www.doingbusiness.org/
World Economic Outlook	International Monetary Fund	https://www.imf.org/external/pubs/ft/weo/2019/01/weodata/index.aspx
Financial Access Survey		data.imf.org/FAS
Systemic Banking Crises Database		https://www.imf.org/en/Publications/WP/Issues/2018/09/14/Systemic-Banking-Crises-Revisited-46232
Global Debt Database		https://www.imf.org/en/Publications/WP/Issues/2018/05/14/Global-Debt-Database-Methodology-and-Sources-45838
Financial Market Liberalization Index		www.imf.org/external/datamapper/LB_data.xlsx
Financial Reform Database		https://www.imf.org/external/pubs/ft/wp/2008/wp08266.pdf
WFE Statistics	World Federation of Exchanges	https://www.world-exchanges.org/our-work/statistics
Credit to the Non-bFinancial Sector	Bank for International Settlements	https://www.bis.org/statistics/totcredit.htm?m=6%7C380%7C669
Debt Securities Statistics	Bank for International Settlements	https://www.bis.org/publ/qtrpdf/r_qt1212h.pdf
FIAP Historical Statistics	International Federation of Pension Fund Administrators	http://www.fiapinternacional.org/estadisticas/
Institutional Investors Database	Organisation for Economic Co-operation and Development	https://www.oecd-ilibrary.org/finance-and-investment/data/oecd-institutional-investors-statistics_instinv-data-en
Global Crises Data by Country	Harvard Business School	https://www.hbs.edu/behavioral-finance-and-financial-stability/data/Pages/global.aspx

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