

Working Paper

INTERNATIONAL MONETARY FUND



WP/09/156

IMF Working Paper

A Framework for Financial Market Development

*Ralph Chami, Connel Fullenkamp and
Sunil Sharma*

IMF Working Paper

IMF Institute

A Framework for Financial Market Development

Prepared by Ralph Chami, Connel Fullenkamp and Sunil Sharma¹

July 2009

Abstract

This Working Paper should not be reported as representing the views of the IMF.

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

The paper proposes a framework for examining the process of financial market development. The framework, consistent with the functional view of financial system design, is anchored in studying the incentives facing the key players in financial markets—borrowers, lenders, liquidity providers, and regulators—whose actions determine whether and how markets develop. While different financial instruments embody different concessions by borrowers and lenders, the framework emphasizes the two main compromises: the tradeoffs between maturity and collateral, and between seniority and control. The framework is used to analyze the sequencing of financial market development.

JEL Classification Numbers: O16; G10; G18; D02; D82; B52.

Keywords: Financial market development; financial instruments; contracts; borrowers; lenders; liquidity providers; regulators; New Institutional Economics.

Author's E-Mail Address: rchami@imf.org, cfullenk@econ.duke.edu, sharma@imf.org

¹ Ralph Chami is an Advisor in the IMF's Middle Eastern and Central Asia Department; Connel Fullenkamp is an Associate Professor of Economics at Duke University; and Sunil Sharma is the Director of the IMF-Singapore Regional Training Institute. For discussions and comments the authors are grateful to Eric Clifton, Tom Cosimano, Burkhard Drees, Daniel Hardy, Leslie Lipschitz, Raghuram Rajan, Ilhyock Shim, and participants in IMF Institute seminars on Financial Markets and New Financial Instruments held in Bangkok, Beirut, Brasilia, Kuala Lumpur, Pretoria, Singapore, Tallinn, Vienna, and Washington. The usual disclaimer applies.

Contents

Page

I. Introduction	3
II. The Framework: Key Players and their Incentives	6
A. Borrowers.....	6
B. Lenders	8
C. Liquidity Providers.....	9
D. Regulators	13
III. The Framework: Compromises That Define Financial Instruments.....	19
A. The Space of Financial Contracts	20
B. The Maturity-Collateral Compromise	21
C. The Seniority-Control Compromise.....	22
IV. Applying the Framework: Issues in Financial Market Development.....	24
A. Nascent Financial Markets.....	26
B. The Bond Market	27
C. Asset-Backed Securities.....	34
D. The Equity Market	39
E. Derivatives.....	44
F. The Loan Market and the Role of Banks.....	47
V. Concluding Remarks.....	50
References.....	53

Humans attempt to use their perceptions about the world to structure their environment in order to reduce uncertainty in human interaction. But whose perceptions matter and how they get translated into transforming the human environment are consequences of the institutional structure, which is a combination of formal rules, informal constraints, and their enforcement characteristics.

Douglas North (2005).

I. INTRODUCTION

Financial market development and economic growth influence each other positively.² One way to view the role of finance in economic growth is that at certain times, financial markets play a key role in providing the conditions necessary for innovations in technology and economic organization to occur (see, for example, Baskin and Miranti (1997)). At other times, financial market development is a by-product of economic expansion, which creates wealth and opportunities that in turn provide an impetus to enlarge and further develop the financial system.

Developed financial markets, when they function properly, allow the transfer of resources from savers to investors, and contribute to making the economy more robust to shocks by enabling risks to be allocated appropriately. Anecdotal evidence suggests that developed and well-functioning financial markets can prolong economic expansions.³ There is also some

² The idea that financial markets catalyze and promote economic growth is not new and can be found in works by Bagehot (1873) and Schumpeter (1912). Early modern attempts to capture this relationship can be found in Gurley and Shaw (1955), Goldsmith (1969), and McKinnon (1973). Recently, a vigorous research program has examined the relationship and a summary of the literature, Levine (2005), concludes that there is a robust, positive correlation between financial market development and growth. Causality is difficult to establish, though some recent work suggests that financial development may at times drive economic growth rather than vice-versa (King and Levine 1993, Rajan and Zingales (1998), and Rousseau 2003). Mishkin (2007) is a clear statement of the advantages of integrating into the international financial system. For a more general examination of the relationship between institutions and growth see, for example, Acemoglu, Johnson and Robinson (2005), Eicher and García-Peñalosa (2006), IMF (2003), Lin and Nugent (1995), North (1990, 2005), and Rodrik (2007).

³ For example, Lindsey (2000) and Schlesinger (2000) make such an argument for the U.S. economy. And at the very least, the Asian crisis, the Japanese banking crisis, and the global financial crisis of 2007-2009 illustrate that a weak or malfunctioning financial system can lead to protracted and severe disruptions in economic activity.

evidence that financial market development brings real benefits to the poorest members of society and reduces income inequality.⁴

Thus, recently there has been considerable interest among policymakers to develop financial markets—loan, bond, equity, asset-backed, and derivative markets. Three practical questions are asked by policymakers: which new financial instruments are needed, how should they be introduced, and in what order should the different types of markets and related institutions be developed.

Despite an abundance of research on financial market development, much less has been done on examining the process of financial market development *per se*.⁵ This paper proposes a framework for analyzing the process of financial development and shows how it can be useful for formulating responses to the three questions raised above. Our methodology can be characterized as New Institutional (North (2005), Williamson (2000)) and is in the spirit of the Functional and Structural Finance (FSF) approach put forward by Merton and Bodie (2005) that synthesizes neoclassical, new institutional, and behavioral perspectives to analyze the design of financial systems.

The Merton-Bodie analytical framework takes the functions of the financial system as its conceptual anchor.⁶ The key insight of the FSF framework is that the functions performed by

⁴ Honohan (2004) shows that financial deepening is negatively correlated with headcount poverty. Beck, Demirgüç-Kunt and Levine (2004) find that the incomes of those in the lowest income quintile tend to grow faster than GDP in countries with better-developed financial systems.

⁵ The research literature does provide insights into the determinants of financial market development. One strand of research has focused on the quality of institutions. For example, LaPorta, Lopez-de-Silanes, Schliefer and Vishny (1997) argue that the character and quality of legal institutions, particularly with respect to the investor protection they afford, are useful in explaining cross-country differences in financial market development. Galindo and Micco (2004) focus on creditor protection and show that it has a significant influence. Another strand finds that, independent of the legal system, geographic endowments have had a significant and lasting impact on financial market development (see, for example, Beck et al (2003)). Lessons on financial development can also be gleaned from historical studies of individual markets and institutions. For example, Baskin and Miranti (1997) apply the tools of modern finance to uncover some of the driving forces behind the emergence and evolution of both corporate financial practices and financial markets between the 15th and 20th centuries, and Sylla (1998) provides a good overview of the literature on the development of U.S. capital markets. There is also a literature comparing the strengths and weaknesses of bank-based and market-based financial systems, exemplified by Allen and Gale (2000) and Rajan and Zingales (2001), that provides insights into why bank-based financial systems developed before market-based financial systems, and what features of the bank-based system may present obstacles to the development of financial markets.

⁶ The core functions performed by the financial system are the following: (i) transferring resources through time and across space; (ii) clearing and settling payments; (iii) pooling resources and subdividing firm ownership; (iv) price discovery and price information for decentralized decision making; (v) managing risk; and (vi) dealing with incentive problems stemming from asymmetric information. See, Crane et al (1995).

financial markets are well defined and constant, while the instruments and institutions that perform these functions change over time, and are endogenously determined by prevailing conditions, including transactions costs, social factors, and behavioral considerations. Our approach is consistent with the FSF view of financial system design in that the specific identities of the agents and institutions performing financial functions may vary over time.

At the same time, however, our approach is based on the belief that development ultimately depends on the presence and actions of market participants, and can only be properly understood in terms of their incentives, constraints, and opportunities. Thus, our framework is based on analyzing four important players whose activities are essential for well-functioning financial markets. The actions taken by these four types of agents—borrowers, lenders, liquidity providers, and regulators—determine whether and how markets develop in a particular environment.

In our framework, financial contracts (instruments) are the means through which the financial system carries out its functions. The nature of the contracts used to perform the functions of the financial system depends on the preferences of each agent as well as the economic, legal, social, and technical constraints that prevail at a particular time. While different financial instruments embody different concessions by borrowers and lenders, we focus on two key compromises that determine the nature of many financial instruments: the maturity-collateral compromise and the seniority-control compromise. The process of financial market development is seen as being embodied in the creation, execution, and enforcement of contracts. This defines a set of interactions among the four players that can be described and analyzed using the tools of economics. And critical interactions can be examined to see whether they advance or retard market development.

Briefly, the view of financial market dynamics underlying our framework can be expressed as follows: if borrowers and lenders are willing and able to contract, and liquidity providers find conditions conducive to trading the instruments that are created, then financial markets will develop. The regulatory structure can support this process by removing obstacles that make potential borrowers, lenders, and liquidity providers unwilling or unable to play their roles, and by creating the right incentives for each agent to fulfill their end of the bargain.

This view leads naturally to the following process of analyzing financial market development and the design of policies. First, the players must be identified. Who are or will be the borrowers, lenders, and traders for an instrument? What are the specific goals and objectives of the various players? What is the nature and extent of regulation required, and how is it to be provided by the government and/or the private sector? The next step is to decipher the obstacles that discourage or prevent the potential borrowers, lenders, and liquidity providers from participating in the markets. Finally, policies that address the obstacles must be proposed and evaluated based on how well they accommodate the needs of the players in the markets.

The paper is organized as follows. The next two sections present the framework. Section 2 considers the four key players involved in the building of modern financial markets, including their actions, incentives, and constraints. Section 3 examines the fundamental compromises among the players that influence the evolution of instruments and markets. Section 4 uses the framework to address sequencing issues in financial market development. Concluding remarks are presented in the last section.

II. THE FRAMEWORK: KEY PLAYERS AND THEIR INCENTIVES

Financial instruments are contracts between borrowers and lenders that govern the transfer, use, and repayment of funds. And financial markets are the “arena” where potential borrowers and lenders “meet” and agree on the terms of these contracts. This implies that the most fundamental building blocks of financial markets are the two parties to the contract: borrower and lender. As in most contracting situations, the two parties generally have opposing goals and must necessarily make compromises in order to reach an agreement. Financial widening takes place when borrowers and lenders forge new types of compromises as embodied in new instruments, and financial deepening when they increase the use of existing instruments. Therefore, any analysis of the process of financial market development should start by discussing the goals of borrowers and lenders, and the difficulties they face in designing, entering, and enforcing contracts.⁷

A. Borrowers

The demand for funds can be motivated by one of three purposes: purchase of a good, a service or an asset; funding an investment project (including the accumulation of financial assets); or substituting a new financing arrangement for an existing one. Regardless of purpose, most borrowers have a common set of preferences with respect to the terms of their borrowing. It goes without saying that borrowers prefer to pay the lowest cost for the funds. In addition, borrowers want the freedom to pursue their interests in the best way they see fit, without outside interference—that is, they like control over the use of funds (choice of project, risk-return combination) with minimal conditions attached. They prefer not to pledge collateral because it is costly to accumulate eligible assets, and because they dislike the possibility of having to forfeit such assets. They also like maturities to be compatible with their needs and intermediate payments (of interest, for example) to be infrequent, so that the projects have adequate time to become successful. In addition, each borrower will have preferences and demands specific to her situation, and she must decide how to trade off

⁷ Cross-border financial transactions follow the same logic as domestic financial transactions, possibly with additional risks arising from the use of different currencies and institutional mechanisms. We do not examine currency (or foreign exchange) markets because these are essentially “derived markets” in that their development depends on the development of a country’s commercial and financial sectors, and its trade in goods, services, and assets.

particular preferences against each other, in order to achieve the most favorable compromises possible.

For example, corporate finance theory has long focused on the costs of borrowing as a way to explain capital structure, the mixture of instruments that borrowers choose to finance their projects. The objective is to fund investment projects in such a way as to maximize the value of the firm, given the menu of financing alternatives—internal finance, debt, or equity. One way to do this is to choose the least-cost combination of funding the firm. In the highly stylized world of the Modigliani-Miller theorem, where there are no taxes, transaction costs, or information problems, the firm would be completely indifferent between the items on the menu. But once transactional, informational and regulatory costs, as well as taxes, are introduced, the firm has to rank the different funding methods by their costs. This is the fundamental idea behind the so-called “Pecking Order” theory of capital structure.

According to this theory, internal finance is always the first choice of the firm, because the firm has complete flexibility in the use of these funds, and it incurs no explicit information or issuance costs. There is an implicit opportunity cost, but such costs are more appropriately associated with the capital budgeting or investment decision rather than the financing decision. Debt is more costly than internal finance, because of the interest costs and the costs associated with issuing debt through an intermediary. However, in many countries debt is offered some tax relief in the form of deductions for interest payments. These deductions can substantially reduce the effective interest cost of debt, and make it the next best financing choice compared to internally generated funds.

Equity is a much more costly method of financing the firm. First, there is the cost of paying dividends and managing the firm in a way that assures investors about profitability in the future. Since equity is the most risky of the three instruments, investors will demand the highest expected return. In addition to this, shares are generally more costly than debt to issue. A common commission rate in the U.S. for share underwriting (on a firm-commitment basis) is seven percent of the value of the issue. But equity issuance is actually even more costly, due to information costs. Because of the information asymmetry between the managers of the firm and the investing public, there is an additional cost of equity. Basically, the managers of the firm know more about the true or intrinsic value of the firm than does the investing public. Thus, the managers may have a better idea of when the shares are over- or undervalued, relative to the current market price of the shares. The managers have the incentive to issue new equity at precisely the times when the shares are overvalued, in order to take advantage of favorable market conditions. But the investors realize that the firm’s managers have this incentive, so that they interpret a share issuance as a signal from the managers that the firm’s shares are overvalued. Thus, they sell shares and place downward pressure on the firm’s stock. Mikkelson and Partch (1986), for example, show that the fall in share price leads to a loss in value of the overall firm equivalent on average to 30 percent of the value of the issuance. This is in addition to any decrease in value from dilution, which

spreads the earnings over a greater number of shares. Thus, the total or all-in cost of equity is quite substantial, especially relative to debt. It is so costly, in fact, that mature firms tend to issue new equity only as a last resort.

The Pecking Order theory is consistent with our framework, in that it analyzes financial market outcomes by focusing on the needs of one of the key players. And the theory does have implications for the order in which financial instruments develop. But to the extent that the theory assumes that a menu of instruments already exists, and borrowers simply choose from this menu, it is not a theory of financial development.

B. Lenders

The second building block of financial markets is the lender. By definition, lenders are agents who have an excess of funds over and above their immediate needs. Like borrowers, lenders have preferences over risk-return combinations for the funds they loan. One way to look at the lender's decision is that lenders compare the returns and risk from lending with those from internal investments. Thus, although it is extremely unlikely that a given lender's preferences match a given borrower's preferences, there may be room for compromise over the terms of a loan that would make the lender better off than would the next best internal investment.

In order to achieve a desired combination of risk and return, lenders try to monitor the use of loaned funds with the purpose of maintaining some control over how the funds are deployed. They generally place specific covenants in the lending contracts stating what the borrower may do with the funds, and require the disclosure of information that will enable the lender to verify that the funds are being used properly. Short maturities are preferred, both in order to limit the risk of the loan as well as to provide a lever to control the behavior of the borrower: the loans will be rolled over only if the borrower behaves according to the terms of the contract. Finally, for insurance, the lender prefers that the loan be backed by a pledge of collateral of some kind—and the more stable the value of the pledged asset, the better.

Based on this simple discussion of borrowers and lenders, we can already make several important observations about financial market development. The first is that financial markets will arise spontaneously whenever borrowers and lenders for a particular instrument are plentiful, and willing and able to contract with each other. For example, in Thailand from 1955-1998, the government limited the number of banking licenses it granted. But because there existed plenty of business opportunities, and households were willing to lend, nonbank finance companies arose to intermediate between borrowers and lenders. The finance companies issued interest-bearing promissory notes to obtain funding, and made loans to businesses and households. In fact, many banks in Thailand established finance companies in order to evade the restrictions on their banking operations that prevented them from taking advantage of these lending opportunities. Finance companies outnumbered banks and were a

driving force in Thailand's financial markets up to the 1997 crisis, after which they were closed.

In general, when markets fail to develop, it is because borrowers or lenders are not present, or they are not willing to contract. The development of the commercial paper market in the U.S. is an excellent case in point. Although short-term, unsecured corporate debt known as commercial paper had been in existence since the early 19th century, the market remained small and unimportant until the 1970s, when issuance began to grow rapidly. Corporates wishing to issue commercial paper were always plentiful, but until the 1970s there were few lenders for such an instrument. This shortage was resolved by the creation of money-market mutual funds (MMFs). These funds were themselves created in order to avoid deposit interest rate ceilings imposed on banks. MMFs accepted deposits from firms and households and invested them in high quality, short-term debt instruments. Commercial paper was a natural instrument for the MMFs to hold, and they formed a critical link between household lenders and the money market—a market that few households had been able to participate in before because of the minimum investment size. With the lenders in place, the commercial paper market grew rapidly and now accounts for over \$1 trillion in outstanding debt.⁸ The development of this market also facilitated the growth of U.S. nonbank finance companies, institutions that funded themselves through issuance of commercial paper.

The above analysis suggests four major obstacles to developing financial markets. First, sufficient borrowers or lenders for an instrument may not be present. Second, the lenders and borrowers may have opposing goals in many dimensions, and arriving at a mutually beneficial contract may be complicated. Third, borrowers and lenders have to achieve their goals in an environment characterized by a fundamental asymmetry in information: the lender always has less information than the borrower about the latter's opportunities, actions and intentions. Finally, continuous monitoring of the borrower may be expensive or simply not possible. These last two obstacles mean that direct verification and enforcement of contracts may be difficult if not impossible, so that either more complex contracts have to be constructed, which can be demanding and expensive, or the contracting process will fail because of insufficient assurance of performance.

C. Liquidity Providers

The provision of liquidity is essential for financial deepening, and liquidity in certain instruments can also catalyze the development of other markets. There are many markets in which borrowers and lenders are present, the instruments used are agreeable to both parties, and yet the market has little activity beyond primary issuance and redemption. For example, many of the nascent government bond markets around the world are simple “buy and hold”

⁸ See Federal Reserve (2007).

markets. While such markets help achieve the fiscal policy goals of the government, they do not lead to financial market deepening and its accompanying benefits. This is because there is no trading in the instruments, and in particular no agents making a secondary market in the securities.

The need for liquidity stems from the needs of the lender. In many cases, the lender's investment horizon will be shorter than the maturity of the instrument she is considering for purchase. And there always exists the possibility that the lender will have a sudden need for liquidity and will therefore wish to exchange the financial instrument for cash. If the lender can be confident that she can sell the instrument at a fair price at any time after purchasing it, then she will be more willing to purchase the instrument. Indeed, a key aspect of making a financial instrument of any kind attractive is to make sure that there is an exit strategy for the lender: an easy way to exchange the instrument for cash.

Strictly speaking, it is not necessary to have a specialized agent supply liquidity. But because they do not face the same constraints as borrowers or lenders in the particular instrument, specialized liquidity providers who are distinct from borrowers and lenders, can be useful in many markets. These agents include brokers and dealers.

An obvious way to provide assurance to the lenders that they can exchange their instruments for cash is to have dealers who are willing to buy and sell the instrument at posted prices. Therefore, a major step in the development of most financial markets is the emergence of dealers, whose activities make the instrument significantly more attractive to lenders and borrowers. If a dealer accumulates an inventory of a newly introduced instrument and stands willing to make a market, this serves as an indication to lenders that the instrument is relatively liquid. For example, in developed financial markets, when a financial institution creates a new instrument, it has a strong incentive to serve as a dealer and even guarantee to repurchase the instrument from the buyers at predetermined prices for an introductory period. The accumulation of inventory in a new and relatively unknown instrument may expose the firm to significant risks.

But the innovating institution has sufficient incentives to act as a dealer. The successful introduction of a new financial instrument by a private firm leads to temporary market power in the instrument. Before other firms mimic the security, the innovator is able to command a premium in terms of both underwriting fees and secondary market prices for the instrument. An example of this was the successful introduction in the 1980s of synthetic Treasury strips, or zero-coupon bonds. These were special trust receipts issued by intermediaries, who purchased Treasury securities and effectively offered receipts representing claims against individual cash flows from the underlying Treasury bonds⁹. The first dealer to offer the

⁹ See Stigum (1990) for details.

product named it a “TIGR,” and soon the market was filled with similar products, with names such as “LIONs,” “CATs” and so on.

While dealers provide liquidity by seeking to profit from the bid-ask spread on their inventory, traders who wish to profit from short-term fluctuations in financial market prices also provide liquidity to the market. These agents, who typically close out their positions daily or carry minimal inventory, provide a steady source of turnover for dealer inventories and hence revenues for the dealer. They effectively serve as counterparties who increase the number of agents with whom borrowers and lenders can contract. But they are distinct from borrowers and lenders, in that their trades are motivated by views about the relative values of different instruments and the future trends in these values.

Trading also facilitates price discovery. But problems may occur if, singly or collectively, traders can exercise power over pricing. Although this danger lessens as the size of the market increases, even the largest financial markets can have problems with market manipulation. For example, in the U.S. Treasury auctions, the firm Salomon Brothers was found to have manipulated the outcomes of several Treasury bill auctions in the 1980s. The U.S. Treasury had set limits in terms of the market share that each primary dealer could accumulate from each issue, and Salomon submitted false orders on behalf of clients to seize control of over one third of several issues. The point of this example is that market manipulation will be a danger no matter how deep and developed the financial markets become. Traders should not be discouraged, but rather monitored and regulated in a way to gain the benefits from their presence and minimize the likelihood of manipulation and disruption.

Like borrowers and lenders, liquidity providers have needs that must be satisfied in order to attract them. In general, market conditions and instrument characteristics must be conducive to trading. Three market conditions are critical. First is a critical mass of borrowers and lenders. A large number of borrowers and lenders implies more opportunities for liquidity providers to serve as counterparties. Second is the set of rules governing trading, such as whether securities borrowing and lending are allowed, and whether there exist impediments to short selling. Unduly restrictive rules may reduce the liquidity providers’ potential profits and hence drive them away. Third is the trading mechanism itself, as well as the clearing and settlement system that supports it. High transactions costs, including the opportunity cost of slow trade execution or settlement, can make it difficult if not impossible for brokers and dealers to make reasonable profits.

Several characteristics of instruments are essential for supporting liquidity providers. First, the size of the issue must be large enough to satisfy both those who wish to buy and hold to maturity and those who wish to buy for the purpose of market making or trading. Often, a “buy and hold” market comes about because there is an insufficient supply of investment-quality paper for the lenders in the market. As a result, lenders scramble to obtain what they

can get, and hold it to maturity. In order to support liquidity providers, the supply must be sufficient for dealers to build and maintain an inventory.

Another desirable characteristic is that the instruments have a sufficiently high combination of “trading life” and potential turnover rate. Trading life refers to the time over which an instrument remains essentially unchanged. It is important for liquidity providers to work with similar or identical instruments over time, because this is the way that they learn how to manage their positions and make profits as market conditions change. Learning this skill has a cost, and if an instrument changes significantly in response to market conditions or the passage of time, the cost must be incurred again. For example, a five-year note reacts very differently to market conditions when it is issued, versus when it has only three months remaining to maturity. Thus, in this view, fixed-income securities are sequences of securities with fairly short trading lives, which require significant investment on the part of liquidity providers to learn how to manage each of these securities efficiently.

Liquidity providers compare these learning, trading, and financing costs with the revenues they can make from executing their strategies. The trading life of the security must be long enough, and the turnover rate high enough, to recoup costs and earn a reasonable net return on the investment. There is of course a tradeoff between trading life and turnover rates: frequent trading of the instrument effectively shortens the minimum trading life necessary to satisfy potential liquidity providers. A simple way to increase the turnover rate of an instrument is for it to have many uses that generate strong and recurring demand for it. For example, government securities are often posted as collateral, used in repurchase agreements, and held as temporary investments by firms with excess cash. All of these different uses imply that there will be high turnover rates in government securities.

There are two main ways in which instruments can have a long enough trading life to be attractive for dealers and traders. First, the instruments can have a very long maturity. For example, even though equity tends to be issued very infrequently by a firm, its infinite maturity provides ample time to learn how equities react to economic conditions and creates a long period during which to profit from this learning. A second strategy is to have recurring issues of an instrument with a finite maturity. Multiple issuance effectively reintroduces an identical security in to the market, and enables liquidity providers to use what they learn about the behavior of the security from previous issues to find profitable opportunities and manage the trading risks in on-the-run securities.

If multiple issuance is regular, or otherwise predictable, then this further enhances the instrument’s appeal to liquidity providers. Dealers can alert their customers, assess the potential demand for the issue, and be ready to absorb it. Traders can model the impact on the market for future issues and adjust their trading strategies accordingly. From this perspective, the regularization of Treasury security issuance that took place in the U.S. in the 1970s, and in many other countries subsequently, greatly facilitated the development of bond

markets. The introduction of an issuance schedule lengthened the trading lives of securities, and enabled market participants to plan their investment and trading strategies, which in turn enabled liquidity providers to manage the risk of their business much more effectively. This ultimately made the business of dealing in government securities much more attractive, which enhanced the liquidity of the market.

A final characteristic is that instruments have a risk profile conducive to dealing and trading, especially when the market is new. Liquidity providers attempt to isolate and manage a particular risk in order to earn profits, essentially transforming liquidity risk into some other type of risk. In nascent markets, this other risk is generally market risk. As markets develop, tools become available for liquidity providers to isolate and profit from other risks, but the typical developing market does not have adequate tools to accomplish this. Since risk-management tools are not widely available in developing markets, at first the instrument itself must have limited exposure to credit and other risks, so that liquidity providers have a relatively pure play on market risk. Therefore, in countries where many borrowers are perceived to have low creditworthiness, it will be extremely difficult to get dealers interested in carrying costly inventories of financial instruments issued by these borrowers. For example, in some countries with a history of high inflation, governments have resorted to indexing their debt obligations to inflation or foreign currencies. Such instruments partially assuage the fear of investors that fiscal and monetary discipline will not be maintained. But, if policy is not disciplined eventually, even indexation may not be sufficient to generate a demand for government debt.

D. Regulators

Contractual design and enforcement are central to the functioning and development of financial markets. If participants in financial transactions can be confident that contracts will be enforced, and in the case of a dispute, the legal system will adjudicate fairly, then they will be more willing to write significant compromises into their contracts. Borrower-lender compromise makes it easy to see why issues such as transparency and governance of institutions are important. These features mitigate the obstacles to contracting by increasing the confidence of borrowers and lenders in the contracts they write.

An important job of the regulator is to establish a supportive infrastructure for contract enforcement and dispute resolution. This infrastructure has many concrete as well as abstract features, but collectively these aspects have come to be known as the “rule of law.” Luis Rubio (2001) argues that the rule of law in financial markets has three essential features. First, it includes both political and legal guarantees of civil liberties and property rights. Second, it presumes an efficient judicial system that cuts transaction costs and limits predatory behavior. Rubio calls the third feature legal security, which means that citizens can plan toward their goals in the context of well-known rules that will not be changed arbitrarily. When taken together, these three elements serve to give borrowers and lenders the

confidence they need to modify existing instruments and pursue the fashioning of new and innovative financial contracts.

Beyond establishing the rule of law, governments must also support market development through regulation and supervision. Asymmetries in information (and also expertise, resources and power) between market participants, and the externalities stemming from the failure of financial agents to live up to their contractual obligations create a need for public regulation and supervision of markets and financial institutions.¹⁰ Based on these considerations, three reasons are given for public regulation: (i) providing retail customers with protection; (ii) ensuring systemic stability; and (iii) protecting the taxpayer who ultimately provides many of the formal and informal guarantees that shore up the financial system.

However, it is important to realize that regulation and supervision play a supplementary role in market development. Supervisors and regulators cannot develop the markets directly; only borrowers and lenders can do this. This distinction is not always appreciated, and governments at times go too far in their efforts to facilitate financial market development. This is apparent in the most common strategy for government-led financial market development, which is the “Build It and They Will Come” approach. In this approach, the government introduces not only the legal infrastructure but also particular instruments and exchange mechanisms, in the expectation that private players will rush into the ready-made markets. The problem in many cases is that few agents actually come to play and often there is limited activity in these new markets.

Regulators typically need to play an active role in financial market development, especially when the conditions necessary for trading certain contracts are not present and the conditions cannot be effectively created by borrowers and lenders themselves. In other words, it generally takes two hands to develop financial markets: the invisible hand, and a “helping hand”. The tasks performed by the helping hand is to remove obstacles, create the necessary support structure for financial markets, and possibly coordinate market development. We consider each of these activities in turn.

Removing obstacles includes correcting market failures and dealing with externalities and distortions that prevent financial markets from developing. The payment system, for example, is a public good essential to financial market development that usually requires government subsidy or provision. Accounting and disclosure standards can be thought of as

¹⁰ It is worth differentiating sometimes between regulation (the setting of specific rules and behavior) and supervision (seeing that the rules are obeyed and that financial counterparties conduct themselves in certain desirable ways). Unless the context demands, we will use the term regulation to encompass both. For a more detailed account of the rationale for regulation and supervision of financial markets see, for example, Goodhart et al (1998) and Llewellyn (1999).

public goods that may require two types of regulatory intervention: first, to ensure that the standards embody the right incentives for all concerned; and second, to coordinate adoption of such standards. Distortions caused by market power may also inhibit potential borrowers and/or lenders from participating in certain segments of the financial system.

Outmoded or ill-conceived laws and regulations may present obstacles to financial activity. For example, in many countries, only real assets—land and fixed structures—can be pledged as collateral. This restriction may have been intended to protect lenders by only allowing immobile assets with stable values and legally recognized titles to be pledged, but it constitutes a fundamental barrier to borrowing, particularly for small businesses whose main assets are durable equipment rather than land or structures. Another restriction that regulators sometimes place on capital markets is to prohibit the borrowing and lending of securities. These laws are often intended to prevent fraud and market manipulation, but end up reducing liquidity and imparting an upward bias to prices.

Creating a supporting environment for financial market development, which is the second task of the regulator, has many dimensions. First, policymakers need to provide the necessary conditions, including macroeconomic stability, to enable the financial markets to develop. The health of financial intermediaries and markets is crucially dependent on the health of the private and public sectors. Second, there are potentially many types of infrastructure that governments need to build: the legal system, including bankruptcy procedures; a modern payment system for clearing and settling securities transactions, retail payments, and large-value payments; instruments, in the sense of legal definition and recognition; and markets, including rules and possibly physical infrastructure for the operation of primary and secondary markets. Another essential part of the environment that must be built is an educated public, which understands the fundamental rules, the benefits, and the potential pitfalls of participating in the financial system.

Finally, regulators may also need to provide coordination and direction for market development. Often, market participants will perceive a problem or know that the industry ought to move in a certain direction, but individual firms will be unwilling to take unilateral action to make this happen. In these situations, regulators may have to issue directives that overcome the collective action problem. For example, private action has helped the European Union make significant progress toward the goal of a single capital market for Europe, but regulators have had to coordinate the clearing and settlement procedures of individual exchanges to reduce the cost of cross-border trading for creating a truly unified EU-wide trading platform and market. Regulators may also need to have a vision for the future direction a market should take. For example, NASDAQ was created in the 1970s as the result of the SEC's efforts to create a national market for stocks in the U.S. Such efforts continue today as regulators contemplate what the future of secondary markets should be now that a large fraction of trading takes place electronically, and electronic communication networks (ECNs) compete with formal exchanges.

The above discussion shows that a variety of regulatory services are needed to support financial market development. This raises two questions. First, who will provide the regulatory services? And second, will the agencies providing them have sufficient resources and, more importantly, the proper incentives to do so.

The job of regulation may be performed by the borrowers and lenders themselves, and indeed self-regulation was important in the early development of financial markets. And even in most countries today, though the government provides the bulk of regulatory services, a good portion is still provided by market players acting through self-regulating organizations (SROs). The advantage of self-regulation is that the people making the rules are those with specialized knowledge and an interest in maintaining product quality and market integrity. Insider knowledge, combined with the ability to draw on the intellectual resources of the members, is a virtue that is hard for any government or quasi-government agency to match.

But there is an obvious drawback: self-regulation leaves the fox in charge of the hen house. Self-regulation may prove inadequate because inherent conflicts of interest may lead the SRO to put the welfare of its members ahead of the welfare of customers and the general public. To begin with, SRO incentives to expose and deal with problems in the industry are weakened by the fact that such revelations adversely affect public perceptions of SRO effectiveness.¹¹ Hence, SROs may be slow to correct problems, taking necessary action only after significant damage has been done. A case in point is the development of self-regulation in the Czech asset-management industry during the country's transition to a market-based economy. It was only after asset management funds had caused a nationwide crisis of confidence in the stock market through asset stripping and other misappropriations that SROs promulgated codes of good conduct for the industry (see Czech Capital Market Association (2008)).

The second problem is lax enforcement of rules. An SRO may give preferential treatment to the larger firms that account for the bulk of SRO revenues, or generally exercise forbearance toward members. Further, internal conflicts within SROs (stemming from the fact that the members compete against each other in the market) may make it difficult for the SRO to penalize one or a few members, even when it is for the good of all. Rules then provide assurance without actually providing protection. Hence, there is a role for public oversight of SROs to ensure that the stated rules are upheld.¹²

¹¹ In the U.S., allegations that SROs were less than vigilant have been brought against the New York Stock Exchange and the National Association of Securities Dealers in the context of industry practices that led to Wall Street's US\$ 1.4 billion settlement regarding analysts' conflicts of interest. For a somewhat pessimistic verdict on self-regulation of markets based on the U.K. experience, see Davies and Green (2008).

¹² It is worth noting the awkward position SROs have in the legal system. For example in Canada, although their authority is bestowed by provincial commissions, they are not bound by the same rules as government

(continued...)

Because of the shortcomings of self-regulation, countries have government agencies for overseeing the markets and the SROs: securities and exchange commissions, financial services regulators, and central banks. However, the creation of government regulatory agencies is no guarantee of effective regulation. They too face a variety of challenges that can limit their ability to provide the regulatory services that markets need in order to develop and function properly.

Sandwiched between the politicians (the representatives of the taxpayers) to whom they are agents, and the financial sector to whom they are principals in charge of regulation and supervision, government regulators are party to two major principal-agent problems and as a result subject to a variety of incentives, constraints and temptations. In the first, the politicians and legislators design the regulatory structure and hold the government agencies accountable for providing appropriate regulatory and supervisory services. In the second, the regulators devise the rules and supervisory framework to create the right incentives for private players and institutions to act in certain socially desirable ways—following conduct of business rules, maintaining solvency, and minimizing systemic risk. Like other principals, the regulators are thwarted in achieving their goals by information asymmetries coupled with resource constraints. On the other hand, like other agents, they may also have their own personal interests in mind when deciding on policy and enforcement actions.

As principals in charge of promoting the public interest, regulators would like to have the following: (i) reporting requirements on the financial sector that minimize information asymmetries and allow them to make appropriate assessments of financial activities and institutions—conduct of business, profitability, risk measurement and management systems, capital sufficiency; (ii) legal authority and the required resources to attract qualified people for designing regulations and enforcing them; and (iii) the political backing to do their job, which at times involves clashing with politically powerful institutions and players. Of course, in reality these requirements are unlikely to be fully met.

As Goodhart et al (1998) state, regulators face at least three information gaps: (i) a degree of imprecision in the knowledge about the internal risk management of financial firms; (ii) imperfect knowledge about whether firms are following the rules; and (iii) some residual risk no matter how good the managers of the firm. This information asymmetry makes it especially difficult to mitigate the agency problem through monitoring, making it all the more important for regulators to design incentive-compatible regulation.

bodies. In the U.S., SROs are not subject to the same constitutional constraints as government agencies, while at the same time courts make it difficult to sue the SROs, providing them with effective immunity. In the UK, SROs enjoy statutory immunity.

To make a difficult situation worse, these agency and related incentive problems have to be dealt with in the context of what Kane (1988) calls the regulatory dialectic (regulation, avoidance, re-regulation) that is part of the evolution of the financial system—instruments, processes, organizational forms, institutions—driven by changes in technology and the evolution of societal, economic, political, and regulatory structures. Regulated entities attempt to reduce their regulatory burden (or enhance the subsidies) through adopting new ways of doing business, redefining their turf, and lobbying in response to existing regulation, while regulators formulate rules and devise supervisory and enforcement processes in response to changes in the financial landscape in an attempt to serve the public interest and their own self-interest. In short, the regulator is always trying to keep up with a shifting financial landscape.

Additional complications arise from the incentives that drive the “market” for regulation.¹³ The demand for regulation comes from consumers, firms, unions, industry associations, and politicians. Each group attempts to extract rents from regulation. Similar to the classic public expenditure problem there is an excessive demand for regulation because the costs are paid by every citizen rather than just those who seek specific regulatory measures. The suppliers of regulation (who may reap benefits from its provision) include politicians, government regulators, and the SROs. Here again there is a tendency to excess supply. For politicians, the payoff may be political gains in exchange for economic rents bestowed, or political cover in reacting to events and failures. For regulators, the rewards may include enhancements to their missions, budgets, staff, careers, public stature, as well as other pecuniary and non-pecuniary benefits. SROs may gain the ability to restrict entry to the industry or increase industry profits at the expense of the public good.

Related to the demand and supply of regulation is the issue of regulatory capture: the process through which special interests and market players influence, or in extreme cases, dictate regulation and regulatory interventions. The provision of bribes or future industry employment can be used to influence regulatory conduct. Also, the possibility that firms may target individual regulators and cause reputational damage may be a disincentive to truth telling, especially when employment durations for regulators are short or there are term limits. Much of the design of regulatory institutions and policy is shaped by the need to resist capture, the degree of which is affected by information production requirements, procedures on information flows among stakeholders, employment rules (revolving doors, term limits), pay structures, and the funding of regulatory agencies, and the rules governing political donations and lobbying. Lack of independence due to political control of funding, or just

¹³See, for example, Stigler (1971), Laffont and Tirole (1993), Hardy (2006), and the recent overviews by Dal Bò (2006) and Helm (2006).

weak funding of regulatory agencies may mean that regulated firms are able to out compete the regulators in the market for ideas and influence.

A more subtle form of the agency problem is that of regulatory forbearance—refraining from enforcing certain rules or from intervening in the operation of markets and institutions. The ex ante incentives for following rules may be quite different from following them after a regulatory or risk management failure. It may not be optimal for a regulator to enforce regulations after a shock when markets and institutions are in trouble. Reputations of regulatory agencies are adversely affected if problems become known to the public, and in addition there may be pressures from political and financial lobbies to deviate from the rules. Renegotiation of the regulatory contract is done in the hope that with some help the problems can be fixed or at least contained, and the problem may not be revealed till after the government or the regulators have changed. Such considerations lead to regulatory forbearance instead of prompt and corrective action.

The effectiveness of forbearance is difficult to judge because the cost-benefit analysis is done ex post and there is not enough experience of extreme events to provide sufficient data for an assessment. While forbearance may be justified in certain circumstances, if used too often it can lead to creating moral hazard in the system. Experience has shown that a commitment to enforce regulations is very important. Many countries now have rules that require regulators to take prompt and corrective action, and forbearance can be provided in extreme cases only after special approvals are obtained.¹⁴ Monitoring, surveillance, and the ability to intervene are important precisely because it is difficult to write rules for all contingencies and design regulations that work in normal times and also suffice for dealing with stress in extreme circumstances.

These challenges make it difficult for governments to provide the helping hand that is so often necessary for financial market development. In practice, regulation and supervision of financial markets is likely to be perpetually demanding: information asymmetries cannot be fully removed, accounting standards have shortcomings and are open to interpretation, legal authority is accompanied by operational constraints, and the public support needed may not always be available. And self-interest and self-preservation, combined with the temptations of power, influence, and money may distort the incentives of politicians and government officials to work for the public good.

III. THE FRAMEWORK: COMPROMISES THAT DEFINE FINANCIAL INSTRUMENTS

The framework presented above identified four players that play a key role in financial market development—borrowers, lenders, liquidity providers, and regulators. Having

¹⁴ See, for example, the US Federal Deposit Insurance Corp. Improvement Act (FDICIA).

examined the objectives and preferences of these players, in this section we further develop the framework by examining how the players with differing incentives forge compromises that essentially define the characteristics of the various financial instruments and the markets in which they are traded. We discuss what the main compromises are, and we show how they affect the nature and functions of the financial instruments. Then we turn to the process of financial market evolution, examining what compromises are possible at different stages of development, as well as how new agreements between borrowers and lenders can be successfully created.

A. The Space of Financial Contracts

The objectives, constraints, and abilities of market players shapes their willingness to compromise in fashioning financial contracts. This, combined with limits imposed by the rules and technologies for gathering information, the existing financial infrastructure, and the regulatory framework, defines the set of feasible contracts.

If the actions of borrowers and lenders were perfectly observable, then contracting would be vastly simplified. Negotiation between borrower and lender would settle on the amount and types of risks that the borrower would be allowed to undertake, and the rate of compensation that the lender would earn. In other words, contracts would focus on simple risk-return tradeoffs. But in the presence of information asymmetries between borrowers and lenders, and the related adverse selection and moral hazard issues, such tradeoffs are harder to deal with.¹⁵

In the presence of asymmetric information, lenders and borrowers use many mechanisms to forge a compromise. To prevent the misuse of funds and to increase the probability of repayment, lenders generally require some oversight and control. This is done through specific characteristics of the financial instrument (maturity, seniority, covenants, contingent clauses) and various norms and practices by which lenders exert influence over the actions of borrowers. For example, when the maturity of a loan is short, the borrower is likely to need the lender to roll over the loan at intermediate stages of a long-term project. The threat of cutting off funds can be used as a device to discipline the borrower. Covenants written into the contract may specify conditions that the borrower must fulfill. For example, in many debt contracts the borrower is required to furnish periodic financial statements to the lender and to satisfy certain measurable standards of financial performance. Control mechanisms may also grant certain rights to the holders of a financial instrument. For example, the equity contract

¹⁵ For example, the price mechanism may fail because of the adverse selection problem: as the lender charges higher and higher interest rates on the loan, only riskier and riskier agents are willing to borrow. As Akerlof (1970) and Stiglitz and Weiss (1981) show, lenders know this and respond by rationing credit and/or using non-price mechanisms to screen potential borrowers.

gives the shareholders the right to elect the Board of Directors, which in turn selects the managers of the firm.

While each financial instrument embodies a different set of concessions by borrowers and lenders over control mechanisms and other characteristics, two “grand compromises” are worth focusing on because they are common to many financial instruments, and responsible for some of the major differences between them.

B. The Maturity-Collateral Compromise

The first is what we call the maturity-collateral compromise. The terms of this compromise are that both the borrowers and lenders are willing to accept relatively short-maturity instruments which are uncollateralized or backed with little collateral, while longer-maturity securities generally require greater provision of collateral. Such a compromise is acceptable because a shorter maturity gives the lender control (through the rollover threat) and helps compensate for the increased risk stemming from the unsecured nature of the debt. On the borrower side, avoiding the obligation to pledge collateral is a significant benefit, but it comes at the cost of having to constantly demonstrate creditworthiness to the lender. Another explanation for this compromise is that it is a risk sharing arrangement—some of the default risk faced by the lender is transformed into a risk for the borrower that under certain circumstances the funding may not be renewed.

It is important to realize that the various control mechanisms are not perfect substitutes for one another, and hence there are limits to which different tradeoffs can be pursued. In particular, at the very short end of the maturity spectrum, reputational capital or a successful track record is generally needed to achieve a compromise. For example, in the money market, where maturities are less than one year and the instruments can be unsecured or partially secured, only the largest and most reputable players participate. This occurs because with unsecured debt, the short maturity may not be enough of an assurance against default. The issuing firm must use its reputation for financial strength as collateral for securing a loan. Even in the most developed markets, for example, there are only two categories of commercial paper (CP)—the prime or A1-P1 paper, which is as close to default free as private bonds get, and A2-P2 paper, which is still high-quality paper comparable roughly to AA-rated bonds. The issuers of A1-P1 commercial paper are the bluest of blue-chip firms in the economy. The lack of lower-rated CP categories is evidence that only a credible reputation for financial strength is sufficient to count as reputational collateral. In addition, one slip up is sufficient to destroy this collateral and drive the issuer from the market for extended periods, if not permanently.

Reputational collateral is used by all borrowers to extend the maturity of an unsecured security. That is, a borrower who behaves well and pays off short-term debt on time builds up a reputation for repayment. The stronger and more widely held the reputation, the more valuable it is. This is an essential part of financial market development. Again, as is to be

expected, there are constraints on this reputational collateral. A borrower who has successfully borrowed and repaid (rolled over) a 3-month unsecured obligation for several years may find that lenders are willing to make a 6-month unsecured loan, but perhaps not a 1-year or 2-year unsecured loan. As the borrower track record develops, extensions in maturity are more likely to take place.

The maturity-collateral compromise also explains the distinction between money market and capital market instruments. While the one-year maturity cutoff separating the markets may at first appear to be arbitrarily drawn, it reflects the terms and limits of the maturity-collateral tradeoff. Debt with a low rate of collateralization will have a short maturity, and completely unsecured debt will have an even shorter maturity and be backed by substantial reputational capital. Therefore, the money market requires a special type of borrower and has a particular set of rules. This is not to say that the one-year maturity is a universal and permanent boundary between the markets. For the very best credits, the money-capital market frontier can move to longer maturities. The emergence of medium term notes (MTNs), which are essentially longer-maturity commercial paper, illustrates how reputation can be used to extend maturity without a significant increase in collateral.

C. The Seniority-Control Compromise

We call the second grand compromise the seniority-control compromise. This compromise is based on a tradeoff between seniority of claims and explicit control rights. Securities with high seniority generally assign few explicit control rights to the lender, while securities lower down the seniority ladder assign more such rights. Money market debt is in effect a very senior claim because of its short maturity—it must be paid off when due or the firm could be forced into bankruptcy. But money market debt grants no explicit control over the firm to the lender, except in case of bankruptcy. Bank loans and bonds represent claims that are effectively junior to money-market claims, but may often include clauses that establish relatively higher seniority. In particular, many bank loans and bonds require future borrowings of the firm to be subordinated to them. In compensation for a lower seniority position, banks and bondholders demand some control rights over the firm. These are passive control rights, in the sense that they are simply rules and stipulations about the use of the firm's assets and place restrictions on the actions of the borrowers. They are enforced by acceleration clauses that require repayment of the entire outstanding debt in case of any covenant violation. And as in the case of money market debt, bonds and bank loans have significant contingent control rights that can be exercised if the firm comes close to or enters into bankruptcy. Finally, common stock holders are the last in line as “residual claimants” on the firm's assets and cash flows, but have explicit control rights over the election of the Board of Directors and hence over the firm's managers.

From a lender's perspective, the seniority-control compromise works as follows: seniority reduces default risk by increasing the chances of being paid in full, and/or by increasing the amount that the lender expects to recover in the case of default. Short maturity debt

(especially bank loans) is the most senior. But lenders will accept control rights over the use of the firm's assets as a substitute for seniority. Control also reduces default risk, but through a different mechanism. Explicit control rights enable lenders to force the borrower to take actions to decrease the probability of default. Seniority and control are imperfect substitutes for lowering the risk of losing money, and lenders take this into consideration when designing financial instruments. Another way to view such tradeoffs is that high-seniority and high-control securities represent different investment strategies that lenders can choose. Investors in high-seniority securities earn high returns by lending to firms that promise payments that are large relative to the probability of default. Investors in high-control securities earn high returns by managing the firm's operations more profitably.

On the other side of the transaction, the borrower views the assignment of seniority and control rights to the lender as costs associated with financing. High seniority claims are costly to the borrower because she must use cash flows to make interest and principal payments rather than pay the cash out to herself or invest it in profitable projects. While the borrower (assuming she is at least a partial owner of the firm) desires to maximize the firm's value, the main concern of high-seniority lenders is repayment in full regardless of the value of the firm. Giving up control rights and allowing outsiders to dictate the firm's actions is costly to the borrower, and hence the borrower has to make a decision on the seniority-control continuum. High-seniority securities attract lenders by promising fixed cash flows or "almost certain" returns. High-control securities attract lenders by giving them an appropriate return combined with some input into the management of the firm.

Differences in seniority and control are the key to distinguishing between debt and equity, and also the roles played by these instruments in corporate finance. Consider a high-seniority instrument such as a money-market loan. Both lender and borrower expect full repayment. Control mechanisms are not used to influence the rate of return on this instrument. The relatively low rate of interest on these instruments makes them attractive to the borrowers and helps to offset the implicit cost of the seniority. In addition, borrowers have adapted to the high seniority position of money-market debt by rolling over these debts when they come due. Thus, money-market loans play an important role in the ongoing financing of firms that have the capacity to borrow in this market.

On a standard bond contract, borrower and lender are less certain of repayment in full, because of the longer maturities and the lower seniority of the claim (say, relative to a money-market loan). The promised payments on the loan represent the maximum return the lender can expect to receive. In order to ensure that the lender receives the maximum return, restrictive covenants are included in the bond indenture that both prescribe and proscribe specific borrower actions. With appropriate covenants in place, bonds can be issued with a variety of maturity and seniority characteristics, and by borrowers of various credit quality.

With the equity contract, lenders agree to accept explicit (though indirect) control over the use of the assets in exchange for holding the most junior of claims against the firm's cash flows. This assignment of control completely changes how borrowers and lenders view the transaction and the resulting instrument. The purchasers of equity or stock do not consider themselves lenders, but owners of the firm. Likewise, the firm views an equity issue as a means of obtaining funds by selling an ownership stake in the firm. The firm is expected to provide a return to equity holders, but is not obligated to provide a particular set of cash flows. And, if the stock holders believe that the firm has not acted in ways that create sufficient value, they can exercise their control rights to change the utilization of the firm's assets, or if that fails, sell their equity rights. Because the issuance of equity affects control over the firm, equity issuance is not taken lightly by its existing shareholders and as a consequence it is not used as an everyday source of finance. These reasons reinforce the implication of the Pecking Order theory of capital structure that equity is used only as a last-resort financing tool.¹⁶ In many cases, especially for mature firms, equity may not be a primary source of finance, but an instrument for allocating control rights.

It should be noted, however, that equity issuance is not last-resort funding for those firms issuing shares for the first time through initial public offerings (IPOs). The special circumstances surrounding the IPO make the issuance of equity attractive to both lenders and borrowers, in this case. Going public conveys a positive signal about a firm's recent accomplishments and future growth prospects, which attracts lenders. This stands in direct contrast to the negative signal associated with seasoned equity issuance. From the borrower's perspective, an IPO is attractive because it is a partial exit strategy that enables the borrower to realize some cash returns from her investment while preserving both control and additional future returns. The borrowers are able to retain control after the IPO despite the sale of a large (perhaps majority) ownership stake because the buyers are a diversified and dispersed group of investors. This means that the founders of the firm effectively retain control because their remaining equity stakes are still large, relative to those held by other investors. Therefore, the equity market is an important financing source at least once during a public firm's lifetime. After the IPO, the primary function of equity is to serve as the means to exert control over the firm's assets in the so-called "market for corporate control."

IV. APPLYING THE FRAMEWORK: ISSUES IN FINANCIAL MARKET DEVELOPMENT

In this section, we use the framework described above to study the important question of sequencing in financial market development, and in this context address other issues that may determine the evolution of a financial system. The framework is applied in the manner suggested in the introduction: first, the key potential players are identified; second, the

¹⁶ See, for example, Brearley and Myers (2006).

critical needs of the players are understood; and third, the space for creating and forging contracts is examined.

The Sequencing Question

Sequencing refers to the order in which instruments, markets, and intermediaries should be developed—deciding the order in which primary and secondary markets for bonds, equities, and derivative securities should be introduced and encouraged, and what particular instruments should be introduced when. For financial regulators, given limited resources, the sequencing problem is quite often an important issue. If an instrument is introduced at the right time, not only will the market for the particular instrument flourish, but this success may spur the development of other instruments and markets. A failure not only reduces momentum, but may also create obstacles for further market development.

The sequencing problem can be illustrated by a few examples. The first example deals with building primary and secondary markets. The introduction of primary dealers and regular government bond issuance to develop the primary bond market also facilitates the development of the secondary bond market. However, “develop the primary market first” need not be a good principle. Indeed, for the example on medium-term notes mentioned earlier, the success of the primary market depended on the creation of a secondary market for providing liquidity. Venture capital offers a similar example from the equity market. Venture capitalists (VCs) provide funding and management skills to companies, with the goal of making an initial public offering of shares. In order to have an active venture capital market, there must first exist a liquid secondary market for shares. VCs are not generally interested in long-duration, illiquid investments. Rather, their objective is to profit from taking companies public in a reasonable amount of time, obtain cash from the transaction, reinvest the resources in another firm, and repeat the process. A liquid secondary market for shares provides the VC with the desired “exit strategy.” This suggests that development of reasonably deep and liquid secondary equity markets may be necessary for the emergence of venture capital, a primary market instrument.

Another example is the development of derivative markets. Historically, derivatives have been introduced well after the markets for the underlying securities have been developed. When fixed-income derivatives, such as bond futures and options, were introduced in the 1970s and 1980s one of the consequences was an increase in the liquidity of the secondary market. The reason for this was that the availability of derivatives allowed dealers and other holders of bond portfolios to hedge their exposures much more easily and efficiently. In addition, derivatives facilitated the pricing of instruments by making it easier to repackage risks and exploit arbitrage opportunities. This made the holding of government bonds much more attractive, and the introduction of derivatives contributed to the development of secondary markets in the underlying bonds. Hence, the presence of derivatives can quicken

market development in the underlying, and if the infrastructure and regulatory framework is available, their introduction need not be delayed.

These examples make clear one of the fundamental challenges of sequencing: the interdependence of markets makes it difficult to specify an order in which particular instruments and markets should appear and develop. Indeed, the examples may be interpreted as saying that financial markets need to develop more or less simultaneously. This places a tremendous burden on the policymaker, and explains why financial markets have been slow to develop even in countries that make considerable efforts to do so.

As the above examples indicate, instruments that meet the current needs of market players can be successfully introduced right away. The problem is that the feasible set of financial instruments—that is, possible contracts that reflect the condition of the financial infrastructure and the capabilities of the key players—do not meet the needs of the borrowers *and* the lenders. The policy challenge is to support the creation of an intersection between the set of desired instruments and the set of feasible instruments, and to enlarge it over time. Often, this intersection must be created by eliminating or overcoming obstacles that prevent an instrument from being introduced or used.

A. Nascent Financial Markets

Consider an economy with nascent financial markets in which there are some potential borrowers and lenders. What kinds of instruments are likely to first emerge? In order to answer this question, think of the most important and pressing needs of borrowers and lenders. It seems reasonable to suppose that in nascent markets the lender's greatest concern is credit risk—the simple question of whether the borrower will repay the loan—since default arguably represents the largest potential loss to the lender. If credit risk were precisely measurable, then lenders and borrowers could negotiate contracts with appropriate covenants to reach a mutually acceptable price for the lending transaction. In such a setting, it is difficult to predict the order in which instruments would appear. Indeed, neither of the two grand compromises between borrowers and lenders discussed above implies any prediction or prescription about sequencing, as long as information about credit risk and collateral values enable maturity to be traded for collateral, and seniority can be exchanged for control according to the preferences of borrowers and lenders.

But the situation in a new financial market is characterized not only by risk, but by a high degree of uncertainty, in the sense that risks cannot be measured very well—neither the individual default probabilities nor the overall distribution of default risk. This occurs because information about credit risk comes from several sources, but the most reliable is the actual performance of the borrower over time. In a new market, lenders must rely on less accurate measures of credit risk, such as the borrowers' financial characteristics, until they accumulate information on actual borrower behavior and performance.

In developing economies, it is difficult to gather financial information on the borrowers. Credit reporting agencies may not exist or even if they do, there may not be sufficient historical information to make reliable assessments. Even banks, who arguably have the most information on the corporate sector, may have been lending based on considerations other than the credit risk of the borrowers, and hence lending *per se* may not be a good surrogate signal of creditworthiness.

A key implication of these informational problems is that compromises such as the maturity-collateral compromise are difficult to strike in nascent markets. In response to the high level of uncertainty, lenders provide funding only to borrowers with very low credit risk. In a market where credit risk is hard to measure, lenders realize that use of a price mechanism to screen borrowers leads to an adverse selection problem. Most lenders thus screen borrowers on their perceived credit risk, and offer credit (at some spreads) to potential borrowers who appear to have lower credit risk than some predetermined threshold. As the precision with which risk can be measured decreases, the optimal level of this credit risk threshold falls.

The borrowers' main concern, on the other hand, would appear to be the cost of borrowing, relative to the cost of waiting to accumulate sufficient internal funds to finance their projects. This suggests that borrowers who face high costs of waiting to accumulate funds, or who cannot afford to wait at all, will be the parties most willing to contract. Generally speaking, several types of nonbank borrowers face high costs of waiting: firms in financial distress, which must raise funds to satisfy their obligations or face possible liquidation; firms with risky projects, whose expected returns may be high; and governments, which face continual mismatches between tax revenues and fiscal outlays.

The implication of the above discussion is that lenders can be induced to lend, if the perceived credit risk of the borrower is sufficiently low. Borrowers may also exist whose external financing needs are so immediate that they prefer not to wait for internally generated funds to accumulate. And, as a consequence, there may exist some potential for borrowing and lending to take place. But only one type of borrower is likely to satisfy both criteria—the government. Both firms in financial distress, and firms with high-yielding projects, will be too risky to satisfy lenders' desire for low credit risk. Thus, the most likely candidate for borrowing will be the government, which implies that the most likely security to appear first in nascent markets is the government bond.

B. The Bond Market

Introducing a Risk-Free Asset

Uncertainty with regard to creditworthiness in nascent markets implies that lenders will set their upper bound for risk at low levels. Hence, the development of a "risk-free" asset is a key first step in financial market development. The government is often thought of as the entity with the lowest credit risk in an economy, because it can credibly guarantee repayment

based on its ability to levy taxes. Government paper is perceived as the “risk-free” asset and the government debt market is generally the first security market to develop.

The development of financial markets in many countries is hindered by the fact that the government is perceived to be a highly risky borrower, and few, if any, relatively safe borrowers exist. In some countries, the leaders in developing the domestic debt market have been subsidiaries of foreign firms. For example, in Hungary, one of the earliest corporate borrowers was the local subsidiary of McDonald’s Corporation, which was widely perceived to have a better credit rating than the government.

If a government is perceived to be of sufficiently low risk, then chances are that it can successfully issue securities, though the maturities may be shorter than those desired by policymakers (we present a discussion on developing the yield curve below). But if the government is not very creditworthy, then there are two possibilities to pursue. An obvious one is that the government must improve its creditworthiness. This will probably entail reforming the fiscal institutions, increasing the tax base and changing the fiscal practices of the government to reduce its borrowing needs and enhance its ability to pay. Typically, this is a difficult process, and politicians and policymakers have to learn from experience about the adverse consequences of crowding out the private sector and repressing the development of private markets.

The second possibility is to search for an alternative risk-free asset. One candidate is the municipal bond, since it is typically associated with public utilities that have dependable cash flows from providing water or electricity. These bonds are also called revenue bonds because their cash flows are derived from revenues obtained from the underlying projects funded. Other municipal bonds, such as general obligation bonds, are backed by the general tax levying authority of the local government issuing the bonds. General obligation bonds may have the same problem as federal government securities, and indeed it is unlikely that state and local governments are good general obligation borrowers in countries where the central government is not creditworthy. Thus, revenue bonds represent the most probable alternative asset, and even for such bonds the government’s ability to collect tariffs may be an issue.

While municipal revenue bonds may satisfy investor desire for low-risk securities, this may not lead to bond market development for reasons that have to do with satisfying the needs of lenders and liquidity providers. The foremost of these is the size of the issues. In general, a revenue bond issue is limited by the size of the project financed, and these may not be sufficiently large to satisfy the market demand for risk-free assets, let alone provide liquidity to support trading in these instruments. Such bonds cannot be issued regularly, since the issuance would depend on the existence of multiple revenue-generating projects. In general, public works are also characterized by decreasing marginal returns like other investment projects, and hence repeated issuance of revenue bonds will eventually raise questions of creditworthiness. However, as a first step toward financial market development the issuance

of a standardized short-maturity bond backed by municipal revenues may be feasible given a large number of projects. Eventually, the central government will have to make itself more attractive to investors in order to take over the position of risk-free issuer in the economy.

Developing the Risk-Free Yield Curve

The historical development of financial markets suggests that, given some experience with a risk-free security, lenders proceed incrementally to riskier instruments that better meet their desire for higher yield. But this process is not necessarily smooth or automatic. Borrowers and lenders may not be able to reach agreement on how to increase the riskiness of the lending arrangement, or by how much.

In the initial stages of market development, given the information problems discussed above, lending to riskier borrowers may not be feasible or attractive to investors. One way is to extend the maturity of the “risk-free” government paper.¹⁷ The process of extending the maturity of risk-free paper and developing the yield curve can be gradual and require a long period of time during which the government “earns” its risk-free designation for progressively longer maturities. A common failure in the sequencing process is the attempt to rush the development of the government securities yield curve. If the longest current maturity is, say, six months, then even moving to a two-year note represents a quantum leap in the amount of risk the lenders have to bear. Needless to say, most lenders are not prepared to make this leap and the attempt to introduce the two-year note (often the jump is even larger, say 3 to 5-year bonds) is not successful.

In order to address this failure, we must ask why lenders are currently willing to lend only for short periods to the government. This may point to underlying fiscal problems: perhaps the government’s revenue base cannot sustain the current and planned expenditures; perhaps the government has defaulted in the past, or repeatedly resorted to inflationary finance. This situation highlights an important feature. Financial market development cannot make up or compensate for deficiencies in other policy areas. In fact, the demands of financial markets are such that the attempt to develop them focuses attention on existing economic and structural weaknesses, and occasionally exposes new ones as well. In the long run, the underlying economic problems will have to be addressed for robust financial markets to emerge. The need to develop financial markets can be used as an additional justification for addressing the underlying problems. And even when there are serious deficiencies, it may still be possible to make some limited headway in developing the financial system.

Governments should be able to lengthen the yield curve by increasing maturities in small but standard increments such as three months for money market instruments and six months for

¹⁷ World Bank (2001) provides a discussion on developing benchmark issues.

notes. The underlying process is an example of the maturity-collateral tradeoff discussed above: the government builds up reputational capital for repayment that the lender accepts as collateral for riskier, longer-term loans. The initial accumulation of reputational capital is often slow. But once confidence is established, the government can probably extend maturities by larger increments.

Sometimes other mechanisms can also be used to extend maturity. In Hungary, for example, government bonds of longer maturity were introduced successfully when they contained the following provisions: the bonds were redeemable at predetermined prices well before maturity, and the return on the bond was higher the longer the investor held it. These provisions gave lenders two things they desired: an assurance that the government would redeem the bonds at the “usual” maturity, if desired; and an incentive to hold the bonds for a longer period. Such a mechanism has an important signaling role in a developing market. The government is making a public commitment to the lenders, much in the same way that private dealers do to their customers when they introduce a new instrument.

The above discussion on building the yield curve both illustrates the fundamental difficulty that underlies most sequencing problems and suggests a general solution. Market development comes to a halt whenever the incremental risk of moving from one type of borrower to another, or from one type of instrument to another, is too large, relative to the risk tolerance of the lenders. Let us call this difference between the increment in borrower risk and the increment in lender’s risk tolerance the risk gap. The general solution to sequencing problems lies in finding a way to shrink the effective size of the risk gap. There are many possible ways to do this, and the choice will depend on circumstances. Securities can be designed to bridge the risk gap. Sometimes the redesign is quite simple, as in incrementally lengthening the maturity of government bonds by weeks or months rather than years. At other times, the design of the security must be more creative, as illustrated by the Hungarian example where embedded options were used to attract investors to longer-term securities.¹⁸

Repurchase Agreements

One instrument that can bridge the risk gap mentioned above, and contribute to bond market development in other ways, is the repurchase agreement, or repo. The repurchase agreement is legally a sale and matched forward purchase. In its economic essence, it is a short-term loan collateralized by an underlying security. The borrower in a repo transaction agrees to sell to the lender a security today and then to repurchase the security at a fixed price at some future date. The maturity could be as short as the next day or a much longer term, including an open repo which has an indefinite maturity.

¹⁸ See Neftci and Santos (2003) for the use of puttable and extendible bonds.

Repos bridge the risk gap by basing the loan on collateral whose value is generally recognized, easily calculated, and hence readily accepted by lenders. While any security can potentially be used as the underlying security in a repo agreement, the most commonly used security is government debt. Thus, a repo is doubly attractive as a candidate for early introduction into financial markets, since it can leverage the initial development of the government bond market into further financial market development in many ways.

Repos have many uses for the borrower and lender, including short-term liquidity management and a low-cost source of funding. But from the perspective of financial market development, repos have two significant effects on the government securities market. The first effect is that they increase demand for government securities by nonfinancial firms who may use such securities for liquidity management purposes. If it has access to repos, a company can store its extra cash in government securities earning a nonzero return and turn to the repo market whenever it has an unexpectedly high demand for cash. The company avoids transaction costs of buying and selling the bonds outright, which may discourage a firm from holding government securities as a cash management device. Financial intermediaries such as banks and mutual funds also use repos to meet unexpected withdrawals instead of having to make costly outright sales and purchases. Note that this strategy makes investors more willing to hold longer-maturity securities. As long as the repo market is available, the holder of a long-maturity security can go to the repo market to meet temporary liquidity shortfalls while retaining control of the underlying security. This mitigates the liquidity risk of holding long-maturity securities, making them more attractive.

The second effect of having a repo market is that it provides an incentive for financial institutions to maintain portfolios of government bonds for the purpose of trading. Repos also open up opportunities for liquidity providers to emerge. Institutions may find it profitable to become dealers and run a “repo book” in which it lends to institutions through repos at a relatively high rate and turns around immediately and borrows from other entities through repos at a relatively low rate. The institution earns a spread on this “matched book,” or it can profit by taking a view on the direction of interest rates by running a mismatched book. On the other hand, a bank may accumulate a portfolio of government bonds by serving as a custodial bank participating in so-called “tri-party repos.” In these transactions, an intermediary, generally a custodian bank or international clearing organization interjects itself into the usual repo transaction. The repo borrower leaves the collateral at all times with the custodian and simply assigns the collateral to the lender. This can increase the speed and security of repo transactions, and create further volume and liquidity in government bond and

repo markets.¹⁹ As a custodian, the intermediary accumulates a portfolio of government bonds that can be used as a basis for a trading portfolio.²⁰

It is the accumulation of securities for the purpose of trading that is the key step in developing a secondary market. Many developing economies find it difficult to make this transition, even when the primary market is arguably quite successful. Somehow, the market must be transformed from a “buy and hold” market into a trading market. In order to make this transition, the current holders of the securities must be given an incentive to trade. Repurchase agreements give holders of a security an incentive to trade, in the sense that repo borrowers temporarily surrender their securities to repo lenders. More importantly, banks that are repo dealers or offer custodial services have the incentive to trade in order to put otherwise idle securities to work in earning profits for the bank. Banks, therefore, are candidates for becoming important liquidity providers in the government securities market.

Introducing repurchase agreements also has an effect on the conduct of monetary policy and through that on market development. Conducting monetary policy through indirect instruments, particularly open market operations, is an important goal for central banks in developing economies. Repurchase agreements enable a central bank to conduct open market operations without losing control over the composition of its portfolio of government securities, which is a considerable advantage over outright bond purchases and sales. In addition, repos are tailor-made for temporary injections and withdrawals of liquidity. The main impact in terms of market development comes from the presence of the government as a sizable repo counterparty. Higher trading volumes further encourage banks and other liquidity providers to hold portfolios of government securities. This has been the experience in the U.K. since 1996, when the Bank of England first began to conduct open market operations using repos.

The introduction of repos appears to be a useful early step in the development of the bond market. The secured nature of the transaction avoids the main problem in many developing markets—high credit (or counterparty) risk. The availability of repo facilities increases the demand for longer-maturity securities, thus contributing to the development of the yield

¹⁹ Of course, as the recent crisis illustrates, tri-party repos should take account of the risks posed by the use of custodian banks and other intermediaries.

²⁰ The role of repos in developing the government securities market is similar to a 17th century innovation known as the “Fund of Credit.” The Fund of Credit referred to the issues of government securities that companies would agree to purchase in order to secure government monopolies over trade. In addition to obtaining monopoly trading rights, the firms who took part in this arrangement would possess portfolios of government securities that they would in turn pledge as collateral against loans advanced to them. Thus, the stocks of government securities held by the favored firms were used in the same manner as government securities are used today in repo transactions (less the monopoly rights). See Baskin and Miranti (1997).

curve. The development of the repo market also leads to the accumulation of portfolios of government securities and the emergence of liquidity providers (in this case, dealers), and this in turn leads to enhanced trading opportunities in the securities themselves. This has been a common pattern in government bond markets, even in those that were relatively developed before the introduction of repos.

Although the repo is a potentially attractive instrument to introduce early in the sequencing process, care must be used to ensure that the instrument is introduced in a way that preserves its attractiveness to borrowers and lenders. Two practical issues are especially important.²¹ First, repurchase agreements require a well defined legal framework to support them. In particular, the repo transaction must be defined in the law as a pair of outright sales of securities. In addition, the law must be clear that should the borrower become bankrupt, the lender retains the collateral without having to pursue this claim in the bankruptcy courts. Fortunately, there exist very good models of this legal structure for countries to imitate or tailor to their own markets. For countries with an Anglo-Saxon common-law tradition, the ISDA Master Agreement and reforms embodied in the 1986 Securities Act in the U.S. and similar acts in other European nations provide a solid foundation for the transaction. For countries whose legal systems are based on a civil code, it is interesting to note that France quickly became the second-largest repo market in the world after instituting the Convention Cadre de Pension Livre, which is a law that defines repo transactions, specifies clearly what happens in bankruptcy, and affirms the absolute transfer of ownership embodied in the repo transaction.²² This French law is distinct from the ISDA Master Agreement and the 1986 U.S. Securities Act mentioned above, illustrating that it is possible to have a strong repo market that is nonetheless customized to local conditions.

The second practical issue surrounding the development of the repo market, as well as all money market instruments, is that reserve requirements and taxes levied against transactions in these instruments will usually be sufficient to stifle their development. Repos, like other money market instruments, are standardized transactions that quickly become commoditized if they are introduced properly. The fees earned by traders and dealers are driven to low levels by competition. Traders and dealers are able to transact in large volumes and earn a small fee on each transaction. In such an environment, requiring reserves to be held against repo inventories, as if they were ordinary loans, or transaction taxes such as stamp duties levied on repos, will be sufficient to prevent the market from developing because it may further squeeze the narrow margins on which traders and dealers operate.

²¹ On establishing a framework for governing repo transactions see World Bank (2001).

²² See Banque Paribas (1997).

C. Asset-Backed Securities

Repos partially bridge the gap between risk-free and risky commercial lending, in that borrowers who hold government (or other high-grade) securities can post these securities as collateral for short-term financing. But admittedly, this is likely to satisfy only a small and specialized portion of borrower needs. There remain large gaps between collateralized short-term borrowing through repos (which is secured) and commercial paper (which may be unsecured), as well as between repos (which are short-term) and standard bonds (which are relatively long-term), and these gaps may be particularly difficult to bridge.

In order to gain insight into fixed income instruments that can narrow the risk gap, it is useful to review how banks overcome this obstacle. Banks face the same fundamental problems as other potential lenders, but they are able to mitigate the problems associated with credit risk assessment in two ways. First, they have better information on borrower quality because they can observe the activity in client transaction accounts. Second, banks reduce risk through pooling and asset diversification.

A possible strategy for successful bond market development, therefore, is to focus development on instruments that replicate, as closely as possible, these successful bank lending strategies. The instrument that comes closest to mimicking the bank's risk-management strategies is the securitized cash flow, or what is called the asset-backed security (ABS). An ABS represents a claim on the cash flows generated by an underlying pool of assets. The assets in the pool can be cash flows from other financial transactions or revenue-generating activities. For example, the assets can be home or commercial mortgages, which generate monthly payments of principal and interest. They can also be accounts receivable from individuals or businesses, or revenues from toll roads or bridges. Theoretically, any set of regular and reasonably homogeneous cash flows can be pooled and repackaged into an ABS.

Asset-backed securities can overcome the information problem by carefully selecting the types of cash flows that can be securitized, and by standardizing the cash flows or the underlying assets generating the cash flows. The more predictable and dependable the cash flow, the more willing lenders are to purchase bonds that represent bundles of these cash flows. For example, it was no accident that the first asset-backed bonds in the U.S. were based on the cash flows from home mortgages. Home mortgage payments in the U.S. have had a predictable pattern and a low default rate—a long-run average of under four percent. Potential lenders in the bond market with no direct experience in mortgage lending were convinced that the underlying cash flows carried low risk of default, and were therefore willing to hold these securities. Supporting the choice of dependable cash flows in the securitization process are standardization requirements: criteria that cash flows and assets must satisfy in order to be eligible for pooling. Again, the example of home mortgages in the U.S. is illustrative. In general, a home mortgage can be included in a pool only if it is a single-family, detached home on a parcel of land neither too large nor too small, and with a

conventional mortgage of less than a certain amount. This standardization ensures that the cash flows being pooled will have similar properties, so that investors will not be surprised by poor performance of some subset of the pool of assets.

Asset-backed securities mimic a bank's diversification strategy rather directly. This diversification enables investors to be confident that the behavior of the cash flows that make up the bonds they hold will conform to the documented average behavior of the assets. In addition, securitization offers an additional risk-reduction tool: overcollateralization. This is the practice of including more cash flow producing assets in the pool than there are total claims against cash flows. This provides extra insurance against unusual default experience within the particular pool of assets.

Because of their risk reduction aspects that make them more attractive to lenders, asset-backed bonds appear to be a good place to focus development efforts in the bond market, particularly when trying to foster a corporate bond market. There are two practical issues. First, what are the available assets or cash flows that could potentially be pooled and packaged into bonds? In terms of the framework, who are the borrowers? Can banks and finance companies become ABS borrowers by securitizing mortgage payments, loans, or credit-card receivables? Can nonfinancial firms securitize retail installment contracts, accounts receivable, and rental or lease payments? Second, does the existing legal, financial and payment infrastructure allow available assets or cash flows to be bundled and securitized? Do business, legal and contractual practices have to be modified to enable securitization? For example, a "lockbox" mechanism must be in place in businesses that securitize their receivables. Finally, as with the development of any financial market, well-defined bankruptcy rules and reasonably efficient bankruptcy procedures must be available.

Asset-backed commercial paper (ABCP) can offer opportunities to jump-start or deepen the corporate bond market. As argued earlier, sequencing tends to run from shorter to longer maturities. This suggests that short-term corporate debt would be a good way to start the corporate debt market, but the standard short-term corporate debt instrument is unsecured commercial paper (CP). Lenders may not be attracted to unsecured CP, and may require collateral beyond reputational capital. On the borrower side, there may be an unwillingness to risk the forfeiture of valuable collateral for obtaining short-term funding. However, ABCP presents an alternative that allows pledging cash flows rather than specific assets of the firm. Firms with large and dependable cash flows may find this an attractive way to borrow, and even smaller firms may be able to take advantage of this instrument, provided that an intermediary exists who is willing and able to bundle the cash flows from many small firms.

The introduction of asset-backed bonds, including ABCP, has the potential to serve as an intermediate step in the sequence between repo borrowing and issuing traditional corporate bonds. Asset-backed bonds will naturally focus investor attention on the particular cash flows being securitized, and hence on the businesses that generate these cash flows. Creation of

asset-backed bonds will also help the firms that securitize their cash flows to build their reputations in the bond market. Both of these mechanisms serve to increase the information about borrowers and reduce the uncertainty regarding credit risk, if not improve perceptions of creditworthiness. The accumulation of information about individual borrowers should ultimately enable borrowers and lenders to take advantage of the maturity-collateral and seniority-control tradeoffs by issuing traditional bonds backed by the productive assets of the firm (rather than the cash flows generated by the assets) or by the firm's unsecured promise of repayment.

The development of securitization, and structured products more broadly, requires certain legal, accounting and regulatory elements—a legal framework for defining, creating and operating special purpose vehicles (SPVs), contractual flexibility in the terms and irrevocable / non-recourse transfer of financial assets, and appropriate accounting and balance sheet treatment of securitized assets.²³ Aside from reliable counterparties, a market for securitized products requires instruments for managing the risks associated with ABS—credit (default, service performance), market (interest rate, prepayment, exchange rate), liquidity, operational, legal (commercial, tax, regulatory), and possibly sovereign risks. Effective risk management for securitized products requires the legal, market and regulatory infrastructures needed for derivatives markets. These can be developed in tandem with the ABS market.

Creation of asset-backed securities generally requires a chain of players—brokers, originators, SPVs, rating agencies—with financial and legal expertise to construct, structure, and issue the ABS. Problems can occur at every link of the chain as the crisis in the US subprime sector has amply demonstrated. Information gaps exist at each link and if not bridged may lead to an erosion of market discipline and a mispricing of risk.²⁴ Appropriate information, including on borrower and loan characteristics of the underlying asset pool, needs to be collected and passed down the chain. And, starting with the lending and origination procedures, the rules should create the right incentives for each player to conduct the required due diligence.

²³ See, for example, Ghosh (2006) and Kothari (2006). In its widest sense, securitization is a process of converting a financial relation into a transaction. Its common usage refers to a process or device by which an entity pools its claims on identifiable cash flows over time, and transfers these to investors with or without the support of additional collateral. One can interpret it as “financing” and/or the “sale of a stream of cash flows.” Structured finance is broader and refers to financial instruments that are tailored to meet the risk-return and maturity needs of different investors. Depending on the structuring or tailoring, the products can be relatively simple (as in pass-through securities or vanilla ABS) or considerably more complicated (as in the wide varieties of collateral debt obligations (CDOs)).

²⁴ The Bank of England (2007) points to no fewer than seven steps in the ABS process that can go awry because of information-linked failures. See, Crouhy, Jarrow and Turnbull (2008) and Gorton (2008) for a discussion of the failures in the US subprime mortgage and ABS market.

Structured products, of which ABS are an important segment, raise the issue of investor protection along a number of dimensions—disclosure requirements, communications during the offering process, investor understanding of the various fees and embedded costs, responsibilities of the seller to ensure the products are suitable for the investor, and the transactions costs associated with making a sale in the secondary market. Products may have important benefits for the investor, but generally come with complexity, relative opaqueness, and illiquidity.²⁵

Due to the complexity and variety of structured products, credit rating agencies play an important role in influencing the views of most investors on pricing and risk assessment. It is essential that investors understand the precise meaning of the credit rating for a structured product, the assumptions on which the ratings is based, and how the product would behave under market stress. Credit ratings are not sufficient statistics for risk assessment and should not be misinterpreted as the sum of possible risks associated with a structured product. That said, a strong set of credit rating services, free from conflicts of interest, is important for market development.

A major hurdle in nascent markets is likely to be the lack of private underwriting and liquidity support for the initial ABS issuances. The government may wish to take on the role of market maker, but as experience shows, designing the appropriate role for the government can be fraught with difficulties. A government may not wish to underwrite ABS that will compete with its own securities. In addition, government issuance of ABS may convey an implicit guarantee on repayment of the bonds, regardless of government statements to the contrary. One partial solution is the creation of quasi-government funding corporations, such as the US government-sponsored enterprises (GSEs) Fannie Mae, Freddie Mac, and others. If this route is chosen, the nature of the relationship between the government and the corporation, if any, should be explicitly and precisely stated.

One way for the government to make ABS attractive, yet limit its involvement in the market, is to restrict the GSE to the sole business of providing payment guarantees on the ABS. For example, the Government National Mortgage Association (Ginnie Mae) in the US does not own mortgages or participate in the pooling and securitization process. Instead, Ginnie Mae simply provides a government guarantee of repayment for specific asset-backed securities. This guarantee is publicly funded, which is justified by the fact that Ginnie Mae guarantees ABS backed by government-guaranteed mortgages for low-income households. But a government corporation could also be created that charges actuarially fair insurance premia on private ABS, in order to facilitate the development of this market.

²⁵ See Bethel and Ferrell (2007) for a discussion.

The development of ABS markets requires legal structures and support services that may not be available in a nascent financial market. Because of fewer legal and technical hurdles that must be overcome, a related instrument known as a covered bond may be more feasible and desirable, especially in bank-dominated developing countries. For a covered bond, the assets being securitized remain on the balance sheet of the original lender and, unlike an ABS, do not have to be sold to an SPV. Thus, the covered bond obviates the need for much of the legal structures and support services associated with ABS.

In order to create a covered bond, a lender, such as a bank, legally segregates a pool of its assets (say, for example, home mortgages) from the rest of its balance sheet and issues bonds which are claims against this particular pool. Although other creditors of the covered bond issuer (CBI) cannot make claims against these assets, the investors in the covered bonds do have recourse to the CBI's other unpledged assets if it goes bankrupt or the cash flows from the cover pool prove insufficient to meet the terms of the bonds issued. This is unlikely, however, for two reasons. First, it is normal (often required by law) to overcollateralize the bonds. Second, the covered bond pool is dynamic in the sense that the CBI may substitute assets within the pool or augment the pool if the assets decline in value. This is another significant difference between covered bonds and asset-backed securities which generally use a static pool of assets.

The creation of a covered bond market depends first on the existence of high-quality lenders who are able to issue bonds based on their own reputations. Banks are the obvious choice in most developing markets. In addition, a legal framework must be in place to enable the segregation of assets and to require the issuers of covered bonds to maintain asset quality over the life of the series of covered bonds issued. In practice, covered bonds can be issued without specific legislation, provided that the basic commercial code enables CBIs to segregate and pledge assets in the manner described above. For example, CBIs in the U.K, Netherlands, the U.S. and Canada issued covered bonds on this basis between 2003 and 2007.²⁶ But most countries with vibrant covered bond markets eventually create a legal framework that specifies: (i) the institutions that are allowed to issue covered bonds; (ii) the assets that may be securitized; (iii) the standards for collateralization; and (iv) the rights of claimants and the procedures to be followed in case of issuer default.

Other features of covered bonds may also make them more desirable than ABS. For lenders, covered bonds provide greater assurance based on the CBI's reputation and recourse to the assets in the cover pool as well as the issuer's other unpledged assets. For borrowers, especially banks, covered bonds represent an attractive means of funding new loans without

²⁶ See Fitch Ratings (2008). For the Euro area legislative framework, see the 1988 Directive on Undertakings for Collective Investments in Transferable Securities (UCITS) and the new 2006 Capital Requirement Directive (CRD).

having to compete for deposits, which incur both resource and regulatory costs. They also enable banks, at least temporarily, to maintain their leading role in financial markets while still participating in the development of an asset-backed market.

The sequencing program for bond markets implied by this discussion can be summarized as follows. First, low-risk bond markets should be developed. Second, instruments with shorter maturities will develop earlier, and the maturity extensions will probably be gradual in the initial phases, but accelerate as confidence is established. Finally, collateralized bonds such as repo and relatively simple covered and other asset-backed bonds could be introduced early to facilitate the accumulation of information about borrowers that may be necessary for the development of the markets for “traditional” fixed income instruments and more complex structured finance products.

D. The Equity Market

Equity markets represent a paradox, in that they can be (and indeed history shows that in many cases such as Holland, the UK, Brazil, Thailand, and India, they have been) introduced very early on in the financial market development process. But the equity market will most likely be the last market to develop into a liquid and well functioning market. The reasons for this are suggested by the preceding discussions of the seniority-control compromise, and sequencing in the bond market. For lenders, equity is the riskiest of the standard securities because of the asymmetric information problem, indefinite maturity, and low seniority. From the borrower’s perspective, captured in the pecking order theory, equity is the most costly market to borrow in. Therefore, while equity may be issued by firms, the full development of a stock market may take a long time.

Many countries established stock exchanges very early in their development process and experienced the failure of the “Build It and They Will Come” approach. Having built the physical infrastructure and defined the rules, many countries found that firms shun the equity market—the number of publicly traded and exchange-listed firms is typically quite low, relative to the number of firms in the economy. In addition, the market became a forum for speculative activity. The two problems are related, in that a small number of listed firms, who also generally have low “floats,” or number of shares actually available for trading, is a virtual invitation to speculators. Thus, the core issue to address in the sequencing of the equity market is why firms avoid using the equity markets as a source of capital. That is, why don’t the equity markets meet the needs of borrowers? There are several reasons for this.

First, as we discussed above, firms generally prefer to fund themselves internally, through retained earnings, to meet the vast majority of their investment goals. Retained earnings are a relatively inexpensive and flexible source of financing. However, such funding may not be sufficient for firms in a rapidly growing economy. But this is precisely the question that the government needs to ask. To what extent do firms in the economy need outside financing?

Are small and medium-sized firms particularly handicapped by the lack of external finance? And finally, how are entrepreneurs obtaining finance for new and risky ventures?

A likely possibility is that banks are already meeting the external financing needs of the businesses in the economy. If bank loans are generally available when needed at reasonable rates, then the firms in the economy may have no interest in listing on an exchange because they have no need for credit beyond what the banks are willing to offer. It is important to note, for example, that part of the reason why the capital markets developed in the United States is because of its peculiar history of bank regulation. For most of its history, the U.S. states had imposed branching restrictions on the banks that severely limited their size. Therefore, during the process of economic development, the manufacturing and other companies in the economy became larger than the banks and their credit needs could not be met by loans from the relatively small banks. Thus, the firms turned to bond and equity markets out of necessity.

In many developing economies, there are a few banks and these banks are large relative to the firms in the economy. Therefore, the credit needs of the business sector can be met by the banks, and there is no compelling reason for firms to turn to alternative sources of financing. This should not be construed to imply that bank credit is necessarily easy to obtain, even by well established firms. Small firms, especially startup firms, are significantly more risky than large firms and they generally have a very difficult time obtaining external funds of any kind. Banks are better at resolving this problem for small firms than the capital markets, because they have access to the information derived from the firm's transaction accounts held at the bank. But the problem of providing finance to small and medium-sized enterprises is present in even the most developed financial markets, though venture capital and other private equity instruments have increased the amount of nonbank financing to some types of firms, particularly in the technology sector.

While the first two reasons for the slow development of the equity market focus on the borrowers' need for equity financing, the third reason deals with the costs of equity financing. In particular, it is costly for borrowers to take on the duties and responsibilities of a public company in exchange for equity financing. In order to raise money in the equity markets, firms must satisfy the listing requirements of stock exchanges for publicly traded companies, as well as the financial reporting and control requirements imposed by securities market regulators. These requirements impose significant explicit compliance costs on publicly held firms. In addition, borrowing on equity markets has several costly implications for corporate governance. First, the actions of the firm's managers become much more visible as the firm's financial data is disclosed through financial statements and other required filings. Second, another layer of management is imposed on the firm, in the form of a board of directors. And finally, the firm must devote time and effort to managing its relationship with the shareholders. All of these responsibilities imply a nontrivial cost and a loss of control for the owners and managers of the firm.

Family Businesses and Equity Market Development

The magnitude of the nonpecuniary costs to the borrower are especially large in the case of family firms—which happen to represent the vast majority of firms in developing economies. In most economies, the smaller firms tend to be family owned and operated, and in many countries even the large firms may be family controlled. Business families generally prize control and privacy. They may be wary of allowing “outsiders,” that is, non-family members, into the management of the firm. Beyond the flexibility that family control offers—often, the founder or a descendent of the founder is in complete control of the firm—the business becomes an extension of family identity.²⁷ This attitude toward keeping businesses within the family is exemplified by the large and successful businesses of the so-called “overseas Chinese” throughout southeast Asia and in other parts of the world as well. The reliability and trustworthiness of a business colleague is expressed in a hierarchy in which members of the immediate family are the most reliable, followed by members of the extended family, people from the same village or province, other Chinese, and finally non-Chinese. Part of the explanation for this attitude is that kinship and affinity are seen as mechanisms to resolve the asymmetric information problems that beset business operations. Another reason is that family and cultural ties may be intrinsically valuable.

The loss of family control dramatically raises the total cost of borrowing on the equity market and this makes family firms resist going public. Therefore, incentives to encourage listings on the stock markets may prove ineffective unless they are quite large. For example, at one time the Thai government offered a lower income tax rate to firms that listed on the Stock Exchange of Thailand (SET), but this did not prove very successful in attracting new listings. The above analysis suggests that when the family firms’ owner-managers compared the tax savings to the permanent loss of control they would experience, the tax compensation seemed inadequate.

In many instances, the large family owned firms in an economy enjoy substantial market power, which further reduces their incentive to list. Such firms consider listing only when other funding sources have been exhausted, and they perceive that they could fall behind competitors who can take advantage of stock issuance. If increasing the number and quality of listed firms is a government priority, leveling the playing field and opening up the doors to competition may be the best way to induce these firms to list. Privatization of state-owned enterprises, for example, may be a means of raising the level of competition while also directly increasing the number of publicly traded firms in the economy.

²⁷ See Chami (2001).

Preferred Shares as a Transitional Equity Instrument

Given the importance of control to a family business, it is clear that the requirements of going public may go against the desires of the family owners. Therefore, equity will be issued by these firms only if it becomes absolutely necessary or if some compromise can be reached by using an equity instrument that preserves the family's control. One such instrument is the non-voting or so-called "B" share, which enables the family firm to raise equity without giving up control. Since B-shares are nonvoting shares, they do not threaten the family's control. The sole reason to issue them, therefore, from the firm's perspective, is for the one-time flow of financing at issuance of new shares. This may be attractive to family firms that wish to pursue large growth opportunities. However, this presumes that other forms of financing, including internal financing and bank loans, are insufficient (or unattractive). The lack of strings attached to B-shares, however, may make them attractive when compared with the covenants that govern bank loans or bond indentures.

In most cases, the attraction of B-shares is simply the possibility for gains either through dividends or share price appreciation. Successful family firms find that the attraction of capital gains is strong enough to attract investors to their B-shares, even when they pay little or no dividend. The initial public offering of Google in 2005 is an illustration of this. Google's shares promised no dividend and vastly diminished voting rights relative to the shares held by founders of the company, which constituted a different class of shares. The possibility of capital gains attracted more than enough investors to fully subscribe the offering.

But B-shares present two significant problems, from a public policy perspective. First, if they do not pay dividends, it is easy for them to become tools of speculation, particularly since they do not convey any control rights over the firm. In addition, the lack of control rights means that B-shares will not place any meaningful pressure on firms to improve their corporate governance practices or be responsive to shareholder concerns. Thus, many regulators and policy analysts discourage the issuance of B-shares. It is clear that common, dividend-paying equity is extremely unattractive to most family firms and will not be used. As in the case of bonds, there is a large gap between the desires of borrowers and lenders. Again, instrument design may hold the key to solving this problem. The question is whether the B-share can be modified to make it attractive to firms and investors, and hence support equity market development.

History suggests an answer to this question. Before the rise of the common share as the main equity instrument in the 20th century, the preferred share was the most important equity instrument. For example, the Dow Jones Industrial Average was originally an index of preferred shares. Preferred shares are actually a hybrid instrument, having some aspects of common equity and some characteristics of bonds. In particular, preferred shares pay a set dividend (or yield) and their claim to the firm's cash flows takes a higher precedence than

common equity. This plays out not only in bankruptcy, but also in the payment of dividends. The corporation must meet its dividend obligations to the preferred shareholders, including any arrears, before it pays a dividend on common stock. In addition, preferred shares may be callable by the firm, or convertible to common shares at a predetermined rate. Preferred shares generally do not have the voting rights of common shares, but they typically have some voting power.

The introduction of preferred B-shares may be attractive to family firms, investors, and regulators hoping to develop the equity markets. The dividend payments on preferred shares should make them particularly attractive to those investors who are risk-averse or are looking for income-producing investments. Family firms may find the issuance of preferred shares attractive, despite their claim on the firm's earnings. Here the appropriate comparison is to bonds and bank loans, which also make such demands on the firm. Dividends on preferred shares are more flexible than bond payments, since the firm is not contractually obligated to pay the dividend. If earnings are negative, the firm must find some way to make its bond payments, but does not have to pay out its promised dividend, waiting instead until earnings recover. Finally, the fact that preferred shares explicitly promise a dividend makes them easier to value than non-dividend paying shares. This makes it easier to discern when the price of preferred shares is being driven out of line with fundamentals, and hence may limit speculative excess.

One strategy to sequence the development of the equity market, therefore, may be to encourage the issuance of B-shares by family firms, but require that all B-shares be preferred shares that pay an explicit dividend (or a yield based on the issue price of the shares). Firms that issue preferred shares and meet their dividend obligations will build up reputational capital that will make it easier for them to issue bonds to the public—hence there may be some synergies in developing equity and bond markets. Further, as family firms get more comfortable in dealing with outside investors, it is more likely that they will consider issuing (voting) common stock for expansion. It is also possible to require that preferred shares be converted to common shares, or called by the firm within some time interval after their issuance.

Our discussion of equity indicates that the development of this market can be sequenced in parallel with the development of the bond market, and indeed there may be beneficial spillovers and feedbacks between the markets. In addition, there is a well documented “tombstone effect” in which the extension of a loan or the floatation of a bond is announced to the markets via an advertisement in the financial press (known as a tombstone). The publication of the tombstone usually leads to an increase in the value of the borrowing firm's equity, because the announcement of the loan or bond issue releases positive information to the market about the creditworthiness of the borrower. In a similar way, the development of the publicly traded equity market facilitates bond market development by requiring the release of standardized information about borrowers in the form of financial reports. This

increases the flow of information to potential nonbank lenders, making them more willing to enter into lending contracts with financially sound firms.

E. Derivatives

Similarly, the development of markets for simple derivatives can be sequenced in parallel with the bond and equity markets. Of course, derivatives markets rely on the existence of underlying assets, so it is reasonable to initiate derivatives market development after the markets for the underlying cash securities exist and are reasonably liquid. However, waiting until the markets for the underlying assets are “fully” developed may not be optimal. First, derivatives often increase lenders’ willingness to buy and hold a bond, stock, or other lending instrument. For example, the availability of options enables equity holders to write covered calls on their equity holdings, generating additional income from their equity portfolios at minimal risk. This increases the attractiveness to lenders of making long-term investments in equities. Indeed, entire mutual funds have been created for the explicit purpose of generating income via the covered call strategy. Further, as the experience of derivatives on U.S. government bonds shows, the existence of derivatives can significantly raise the liquidity of the markets for the underlying products and encourage their development. Interestingly, traders of securities hedge their exposures by trading in derivatives, and traders of derivatives hedge their positions by trading in the underlying securities.

Derivatives can also contribute to the development of securities markets through financial engineering. In both bond and equity markets, embedded options can make bonds and preferred shares more attractive to lenders. This may seem surprising, if we consider the complexity of pricing the embedded options, but it makes sense if we consider the flexibility and insurance features that embedded options can give to a structured product. Including structured products as part of the sequencing strategy may hasten the development of the market for the underlying security, and hence it may be desirable to introduce options markets early in the development process.

It is not strictly necessary that the underlying product be present in a country’s market. For example, derivatives on the Nikkei 225 stock index are actively traded on the SGX exchange in Singapore. These derivatives got their start in the Singapore market because at the time of their introduction, they were not available in Japan. A similar case is the development of the Eurodollar derivatives market in Chicago. The key seems to be that the derivatives market serves the needs of the borrowers and lenders in the underlying asset. If local borrowers and lenders are using a financial product that is offered in another country, then it is reasonable to have a local derivatives market to meet the risk management needs of the local players. Seen in this light, it is understandable why foreign exchange derivatives are often the first financial derivatives to arise in the process of development and liberalization.

Derivative markets are useful for institutional and individual risk management since, in principle, they allow the re-allocation of risks to those most able and willing to bear them.

Recent experience has shown that two issues are critical for the development of derivative markets and the maintenance of financial stability. First, since derivatives allow agents to hedge exposures by either fixing prices for future transactions or providing financial insurance, it is imperative that the writers of the derivative contracts are creditworthy and there is little counterparty risk. Second, since most derivative instruments have payoffs that are contingent on certain events, the design of the contracts should minimize legal uncertainty associated with the definition of expected payoffs and the events that trigger their payments. Further, efficient contract enforcement requires that the documentation associated with these relatively new instruments is properly done, and the procedures are in place for minimizing risk in the clearing and settlement process.

Counterparty risk is simply the risk that because of bankruptcy the other party to the contract will be unable to keep its side of the bargain—generally, deliver cash or the underlying asset. For exchange-traded derivatives, this risk is very small because of the presence of a clearing house or a centralized counterparty (CCP). But for over-the-counter (OTC) derivative trades, which account for a substantial portion of all outstanding derivative contracts, counterparty risk may be an important consideration. One way to control this version of credit risk is to restrict dealings to highly-rated counterparties. In the early 1990s, several large banks and other financial intermediaries created subsidiaries called Derivative Product Companies (DPCs) that were separately capitalized from their parent firms in order to achieve AAA ratings from the major credit rating agencies despite the fact that their parent firms were rated single-A or below.²⁸ The most common way that counterparty risk is controlled, however, is through the use of margin, exposure limits, and collateral.²⁹

Clearing and settlement of transactions is the process in which the details of a trade are confirmed and the exchange of assets stipulated in the trade is carried out, either in physical or electronic form. Settlement risk, therefore, is the risk that a problem in this process will prevent the final exchange of assets from being completed. As McPartland (2005) points out, the main risk in clearing and settling trades in underlying securities such as stocks, bonds, and currencies is that one of the counterparties fails to properly deliver the cash or securities promised in the trade agreement. This is a failure in the last step of the clearing and settlement process. The settlement risk in derivatives transactions, on the other hand, often originates in the initial steps of the process, which involve documenting trades properly and completely. This happens because derivative trades generally require the maintenance of an

²⁸ See Remolona, Bassett and Geoum (1996). Interestingly, DPCs never grew to prominence in the derivatives market, but some derivatives users insist on dealing only with AAA-rated counterparties.

²⁹ According to the 2008 ISDA Margin Survey, 63% of all OTC derivatives trades include collateral agreements, and 65% of derivative credit exposure is covered by collateral. This fraction has grown steadily since 2003, when about 30% of OTC derivative trades and credit exposures were collateralized.

open position over a long period of time before cash or securities are exchanged. The consequences of improper documentation, therefore, are not felt immediately.

The centralized counterparty (CCP) has been an effective mechanism for managing settlement risk in exchange-traded derivatives. The CCP documents trades promptly and also limits delivery failures by requiring accounts to be marked-to-market and by enforcing margin (collateral) requirements. Contract standardization of exchange-traded derivatives also limits settlement risk by shrinking the number of parameters that must be verified. On the other hand, every OTC derivatives trade originates in a phone call or email exchange. Once the traders reach an agreement, the trade must be formally documented and the details of the trade formally confirmed by each counterparty. Most of the burden of confirmation of OTC trades falls on the traders themselves, who have an incentive to move on to arranging the next trade rather than spend time documenting the last one.³⁰

An additional source of settlement risk in derivatives is created by novation. Novation is the replacement of one of the counterparties to a derivatives contract with a new counterparty. This practice does not pose a problem in itself, as long as the remaining counterparty agrees to the novation. Novating a contract without the consent of the remaining counterparty, however, creates risks for both the remaining original counterparty and the transferee. The novated agreement may not be enforceable, and proper management of counterparty risk is impossible when contracts are novated without the consent of the remaining counterparty.³¹

In the aftermath of the financial crisis of 2007-09, many regulators are calling for a strengthening of recording and reporting requirements for OTC derivative transactions. Besides the maintenance of an audit trail, they would like to have mandatory reporting of all trades that are not centrally cleared to a centralized trade reporting system. Such a central data repository would allow financial regulators to make a better assessment of positions and associated risks.

³⁰ See BIS (2007) for a complete description of the OTC derivatives trade process. Unconfirmed trades can prevent final settlement from occurring because they may contain errors or discrepancies in their terms that will not be detected until later. In addition, unconfirmed trades may not be eligible for netting, and legally enforceable. At the very least, such problems impose extra costs on the counterparties.

³¹ OTC credit derivatives during the 2001-2005 period illustrate how settlement risks can mount in a rapidly growing market. During this time, the volume of credit derivative trades rose over 600 percent, the backlog of unconfirmed credit derivative trades rose dramatically. For example, Wessel (2006) reports that by mid-2005, one firm alone had accumulated over 18,000 unconfirmed trades, and by September 2005 there were still at least 97,000 trades that had been unconfirmed for more than 30 days. In addition, regulators found that many of the unconfirmed trades were novations for which consent of the remaining original counterparty had not been obtained. A novation protocol was approved by the International Swaps and Derivatives Association (ISDA) in 2005 (see Raisler and Teigland-Hunt (2006)), and by end-2006 the combined efforts of the regulators, SROs, and market participants reduced the backlog of unconfirmed trades by over 70 percent.

More generally, there is a call for a comprehensive framework for governing both OTC derivative dealers and markets: derivatives dealers could be subject to registration, capital, margining, reporting and recording requirements, and conduct of business rules; markets could be encouraged to have exchange based trading and central clearing to the extent possible; and regulators given the authority to impose position limits, including aggregate limits, on the trading of OTC derivatives. The goal is to promote market integrity, efficiency and transparency, and to lower systemic risk.³²

F. The Loan Market and the Role of Banks

A discussion of financial market development would not be complete if it did not consider the loan market and the role of banks. Generally, banks dominate the financial system in most developing countries, and the early stages of financial development, including that of securities markets, takes place through them. Hence, it is important to understand what role the banks can play to facilitate financial market development, why banks may not be willing or able to play this role, and what regulators can do to enlist their cooperation.

The reasons why banks are early to appear, and why they come to dominate the financial systems of developing economies, have been widely studied.³³ Because a bank is simultaneously a borrower, a lender, and a provider of payment services, it possesses a significant information advantage over specialized borrowers and lenders, particularly in a developing market where information is scarce. Banks are in a unique position to monitor the financial activities of those who lend to them, which facilitates credit analysis. Using this information, the bank can then screen or recruit the best potential borrowers from among its set of lenders (depositors). As a lender, a bank has control tools available that are more effective than those available to other lenders. For example, banks generally require their loan customers to maintain deposits in the bank (compensating balances) that can be confiscated in case of a borrower default. In addition, as providers of transaction accounts, banks have privileged access to the cash flows of its borrowers. The informational and control advantages imply that banks are more willing and better able, as lenders, to reach compromises with borrowers in a setting characterized by risk and uncertainty. This naturally leads to their emergence as the primary lenders in developing economies.

This dominance implies that banks are in many ways ideally positioned to lead the development of securities markets. Since they are the primary lenders, they possess both the

³² The new credit default swap (CDS) protocol implemented by the International Swap Dealers Association (ISDA) in April 2009 provides a framework for enhancing transparency and reducing operational and counterparty risks by introducing greater standardization in contract definition and in the pricing system used, more uniformity in settlement procedures, and facilitating centralized clearing of CDS contracts.

³³ See Allen and Gale (2000).

financial resources and the expertise necessary to create, fund, and trade new financial instruments, as well as play the role of liquidity providers in the over-the-counter (OTC) markets. As important borrowers, they can be the key intermediaries for channeling household savings into the securities markets. This means that banks can provide the distribution network for financial products. One way to take advantage of this position is to create and manage mutual funds that can be offered to the banks' depositors.

But the success of the banks also provides them benefits that they are loath to give up, since by facilitating financial market development, banks create competition for their deposits and loans. Thus, a key problem in the initial stages of development is that banks may not be convinced that participating in securities market development is in their interest. In fact, the recent experience of the most highly developed financial markets, such as the U.S. and U.K., suggests that financial market development since the mid-1970s may be harmful to commercial bank profitability. For example, the returns to traditional lending activities have fallen in the US over time and banks must have riskier loan portfolios to maintain profits.³⁴ In these countries, banks remain important but no longer play the dominant role they once did. As the bond and equity markets developed and competition from other intermediaries intensified, banks lost their comparative advantage in many types of commercial loans and saw an erosion of profitability. Hence, banks had to increase non-interest, fee-based income through making OTC markets and providing services in securities markets. This can be a difficult transition, and banks in emerging markets can use their political and economic clout to delay or stifle certain changes.

The financial regulators may need to use moral suasion and other incentives to persuade bank managers that even though they may lose their dominant position in lending, the development of the financial markets will lead to increased opportunities for those banks that can adapt to the new environment. One of these possibilities is to become an innovative underwriter in the securities markets. Underwriting security issuance is a lucrative business in itself that is very similar to bank lending. And, as discussed above, the first players to offer a new product (and/or serve as a dealer for it) often reap supernormal profits for at least a short while until competition drives the profits back to normal levels. Another possibility is that banks become liquidity providers, especially dealers, and earn fee income. Yet another opportunity is wealth management for individuals and families, which includes investing household savings in a wide spectrum of asset markets.

Regulators can offer banks certain concessions in exchange for their willingness to facilitate financial market development. For example, in many developing countries, banks are still subject to directed lending. The burden of these requirements could be reduced or eliminated in exchange for cooperation, such as becoming a primary dealer in government bonds.

³⁴ See, for example, Streeter (2006).

Another strategy could be to allow participation in the securities markets as a reward for banks that are adequately capitalized and have sound risk management systems. This is the practice, for example, in the U.S., where only the elite money-center banks are allowed to operate securities subsidiaries.

Foreign competition in the banking and securities markets can also be used to facilitate market development. In some small, open economies such as the Baltic nations, most domestic banks have been purchased by foreign banks (primarily Swedish and Finnish), but have retained their identities as local banks. This step has not been regarded as a negative outcome by the regulators or the citizens in these markets, but as a necessary and unavoidable outcome of market forces. The foreign owners have transferred technology, expertise, and a willingness to pursue opportunities in the securities markets. Not all regulators will need or want to follow this strategy, but in many countries, the introduction of foreign ownership and competition can catalyze changes in the attitudes and activities of domestic institutions.

Banks can be obstacles to development in other ways. Despite attractive lending opportunities, and a tradition of commercial and industrial lending, a shortage of bank credit for the private sector develops and persists for years. Attractive rates on government paper make the banks willing lenders to the government, to the exclusion of private borrowers. Typically, the high interest rates on government paper are due to large borrowing requirements that stem from recurrent deficits. These are in turn due to inadequate controls on expenditures coupled with a narrow revenue base and a weak tax administration. The size and dominance of banks in the economy also gives them the market power to keep the risk premium on government bonds relatively high. The result is a risk-return profile for government bonds that is preferable to what can be achieved through lending to the private sector. In essence, banks begin to operate as bond mutual funds that take customer deposits and invest them in government securities. This is profitable since banks can earn a large income without the expense of credit analysis and credit risk management. In addition, until recently, Basel capital standards (Basel I) provided an incentive for banks to shift their assets into government securities, since these had a zero risk-weighting.

In these situations, a combination of strategies may work. First, the high rates on government paper are due to the government's crowding out of private borrowers. Therefore, the borrowing requirement of the government may need to be reduced. Second, the banks in such countries are benefiting from lack of competition in both borrowing and lending. Thus, another strategy consists of introducing competition for the banks: (i) providing retail investors direct access to government securities; (ii) introducing mutual funds that invest in government paper; and (iii) allowing the entry of nonbank financial intermediaries and foreign banks. Competition from other intermediaries on both the borrowing and lending sides will reduce bank spreads and force banks to return to their original mission of private lending.

V. CONCLUDING REMARKS

The paper presents a framework for analyzing and formulating policies to develop and sustain financial markets. It concentrates on four types of agents—borrowers, lenders, liquidity providers, and regulators—that play crucial roles in the proper functioning of financial markets. It views financial instruments as contracts embodying compromises that govern the transfer, use and repayment of funds, and financial market activity as the designing, exchanging, fulfilling, and enforcement of these contracts. Hence, the focus is on understanding the incentives, constraints, and opportunities available to market participants.

Financial market development is seen as both the wider use of existing financial instruments and the process of creating and adopting new financial contracts for intermediating funds and managing risk. A key aspect is that development occurs when market players are able to reach mutually acceptable compromises regarding the terms of financial transactions. Agents strike grand compromises, such as those between maturity and collateral, and between seniority and control, as well as myriad smaller ones. Failure of a financial market to develop is generally because the instrument traded does not meet the requirements of some of the players.

The framework provides a methodical way of diagnosing existing or emerging problems: identify the agents who are or likely to be the borrowers, lenders, liquidity providers, and regulators; examine their preferences, constraints, and incentives; investigate why their needs are currently not being met by existing contracts; and revamp or introduce policies and institutions that make it possible to use existing contracts, or create new ones that meet the requirements of all the players. The paper applies the approach to devising an appropriate strategy for sequencing the development of financial markets. It argues that instruments that require simpler and more easily verifiable compromises will probably appear first. It also shows that market reform may require parallel changes in interrelated markets and policies, and partial reforms may not get the desired results. While clearly the path of development that emerges will depend on economic, legal, political, institutional, and cultural factors, the framework prompts policymakers to ask the right questions in diagnosing the deficiencies and hurdles, and provides some guidance for designing suitable policies for the development and functioning of financial markets.

Modern markets are complex structures that must be supported and maintained.³⁵ To function well, markets need institutional mechanisms for lowering and containing the frictions associated with information and enforcement costs.³⁶ Moving from simple to more complex

³⁵ See, for example, Rajan and Zingales (2003) and Vogel (2007).

³⁶ In his Nobel lecture, Coase (1992) argues that “without the appropriate institutions no market economy of any significance is possible.” The New Institutional Economics sees the institutions of governance as an attempt to
(continued...)

contracts adds complications: length of contracts increase, regular information provision becomes important, monitoring is essential, penalties for breaching contractual terms have to be worked out, and dispute settlement mechanisms put in place. Policies that are not market specific are needed to establish complementary conditions for sustaining markets—macroeconomic stability, corporate reforms, various forms of insurance and institutions for risk reduction, and levels of security and transparency that lead players to accept market outcomes. Also, private and public institutions have to cultivate norms of trust, efficacy, and legitimacy.

Market development is in many ways a creative process. The transition to, and maintenance of, a reasonably robust market system requires the building and nurturing of market institutions, and a recalibration of rules and regulations as the system evolves.³⁷ Effective policies not only need to be well-crafted, but they also have to evolve as markets change with technology and innovation. Hence, the goal is to increase competition, openness and innovation while maintaining adequate oversight, appropriate incentives and needed constraints. So as the financial sector evolves, it is necessary to have oversight mechanisms in place that continuously monitor the evolution of markets, examine the incentives faced by the players, and analyze the implications for financial stability.³⁸

Experience has shown that financial liberalization and the emergence of new markets and institutions in the absence of adequate oversight and an adaptive regulatory structure, can lead to the malfunctioning of financial systems. Also, in this context, the regulation versus competition dichotomy can be misleading, if not inaccurate. Often, fostering competition may require more regulation rather than less.³⁹ This is especially the case in the initial stages of development, when the government has to create the basic infrastructure to support markets. Nascent markets may require the strengthening of rules that foster competition and the removal of rules and practices that impede it.

Recent scandals and financial crises have reemphasized that the doctrine of self-interest, which is central to the functioning of markets, does not always encourage playing by the rules (Landy and Levin (2007)). A neutral set of competitive rules does not necessarily mean

craft order, mitigate conflict and realize mutual gain. Besides ex ante incentive alignment in the design of contracts, what is needed is ex post monitoring and contract enforcement (Williamson (2000)). See Shiller (2008) for a recent discussion on ways to improve the information infrastructure.

³⁷ To understand the operation and efficiency of capital markets, Gilson and Kraakman (2003) argue for drilling more deeply into the agency and incentive structures that characterize market institutions through which arbitrage is carried out and the market value of a financial asset is determined. See also Langevoort (2003).

³⁸ See, for example, Rajan (2005).

³⁹ See, for example, Stiglitz (2001) and Vogel (2007).

that self interested players will rest content to play by them. Contractual incompleteness and opportunism give rise to a host of difficulties: adverse selection, moral hazard, and other incentive problems. Hence, contracts need to be supported by credible commitments, monitoring, and verification. Liberalization, development, and innovation by changing the financial environment often lead to the emergence of critical gaps in information available to different market players and distort incentive structures. The approach adopted in the paper, with its focus on the motivation and needs of market participants, can assist in rethinking the design of contracts, regulations, and the institutions that support the functioning of financial markets.

REFERENCES

- Acemoglu, Daron, Simon Johnson and James Robinson, 2005, "Institutions as the Fundamental Cause of Long-Run Growth," in *Handbook of Economic Growth*, eds. Phillipe Aghion and Steven Durlauf, (Amsterdam: Elsevier).
- Allen, Franklin, and Douglas Gale, 2000, *Comparing Financial Systems*, (Cambridge, MA: MIT Press)
- Akerlof, George, 1970, "The Market for Lemons," *Quarterly Journal of Economics*, Vol. 84 No. 3, pp. 488-500.
- Bagehot, Walter, 1873, *Lombard Street*, Homewood, IL: Richard D. Irwin, 1962 Edition.
- Bank of England, 2008, *Financial Stability Report*, No. 24, (October).
- Bank for International Settlements (BIS), 2007, "New Developments in Clearing and Settlement Arrangements for OTC Derivatives," CPSS Paper 77, (Basel: BIS).
- Banque Paribas, 1997, "France: A Special Report Prepared by Banque Paribas," *Euromoney*, (March), pp. 4.
- Baskin, Jonathan Barron, and Paul J. Miranti, Jr., 1997, *A History of Corporate Finance*, (New York: Cambridge University Press).
- Bethel Jennifer E. and Allen Ferrell, 2007, "Policy Issues Raised by Structured Products," in Yasuyuki Fuchita and Robert E. Litan, eds., *New Financial Instruments and Institutions: Opportunities and Policy Challenges*, (Washington, D.C.: Brookings Institution).
- Brearley, Richard A., and Stewart C. Myers, 2006, *Principles of Corporate Finance*, (New York: McGraw Hill).
- Beck, Thorsten, Asli Demirgüç-Kunt and Ross Levine, 2003, "Law, Endowments, and Finance," *Journal of Financial Economics* 70, pp. 137–81.
- _____, 2004, "Finance, Inequality, and Poverty: Cross-Country Evidence," World Bank Policy Research Working Paper 3338.
- Chami, Ralph, 2001, "What is Different About Family Business?" IMF Working Paper WP/01/70 (Washington: IMF).

- Coase, Ronald H., 1992, "The Institutional Structure of Production," *American Economic Review*, Vol. 82, No. 4, (September), pp. 713-719.
- Crane, Dwight B., Kenneth A. Froot, Scott P. Mason, Andre F. Perold, Robert C. Merton, Zvi Bodie, Erik R. Sirri, and Peter Tufano, (1995), *The Global Financial System: A Functional Perspective*, (Boston: Harvard Business School Press).
- Crouhy, Michel G., Robert A. Jarrow, and Stuart M. Turnbull, 2008, "The Subprime Credit Crisis of 2007," *Journal of Derivatives*, Vol. 16 (Fall), pp. 81-110.
- Czech Capital Market Association, 2008, "History"
<http://www.akatcr.cz/static.do?page=historie.html>
- Dal Bó, Ernesto, 2006, "Regulatory Capture: A Review," *Oxford Review of Economic Policy*, Vol. 22, No. 2, pp. 203-225.
- Davies, Howard and David Green, 2008, *Global Financial Regulation: The Essential Guide*, (Cambridge, U.K.: Polity).
- Eicher, Theo S., and Cecilia García-Peñalosa, 2006, *Institutions, Development, and Economic Growth*, (Cambridge, MA: MIT Press).
- Federal Reserve, 2007, Flow of Funds Accounts of the United States, Statistical Release Z.1, available at <http://www.federalreserve.gov/releases/z1/Current/>
- Galindo, Arturo, and Alejandro Micco, 2004, "Creditor Protection and Financial Markets: Empirical Evidence and Implications for Latin America," *Federal Reserve Bank of Atlanta Economic Review*, Second Quarter, pp. 29–37.
- Ghosh, Swati R., 2006, *East Asian Finance: The Road to Robust Markets*, (Washington, D.C.: The World Bank).
- Gilson, Ronald J. and Reiner Kraakman, 2003, "The Mechanisms of Market Efficiency Twenty Years Later: The Hindsight Bias," *Journal of Corporation Law*, (Summer), pp. 715-742.
- Goldsmith, Raymond W., 1969, *Financial Structure and Development*, (New Haven, CT: Yale University Press).
- Goodhart, Charles, Philipp Hartmann, David Llewellyn, Liliana Rojas-Suarez, and Steven Weisbrod, 1998, *Financial Regulation: Why, How and Where Now?*, (London: Routledge).

- Gorton, Gary B., 2008, "The Subprime Panic," NBER Working Paper # 14398, (Cambridge, MA: NBER).
- Gurley, John G., and Edward S. Shaw, 1955, "Financial Aspects of Economic Development," *American Economic Review*, 45, pp. 515–38.
- Hardy, Daniel C., 2006, "Regulatory Capture in Banking," IMF Working Paper WP/06/34, (Washington: IMF).
- Helm, Dieter, 2006, "Regulatory Reform, Capture, and the Regulatory Burden," *Oxford Review of Economic Policy*, Vol. 22, No. 2, pp. 169-185.
- Honohan, Patrick, 2004, "Financial Development, Growth and Poverty: How Close Are the Links?" in *Financial Development and Economic Growth: Explaining the Links*, ed. by Charles A.E. Goodheart (New York: Palgrave Macmillan).
- International Monetary Fund, 2003, "Growth and Institutions," *World Economic Outlook*, (Washington: IMF), April, Ch. 3, pp. 95-128.
- International Swaps and Derivatives Association, Inc., 2008, "ISDA Margin Survey 2008" available at http://www.isda.org/c_and_a/pdf/ISDA-Margin-Survey-2008.pdf.
- Kane, Edward J., 1988, "Interaction of Financial and Regulatory Innovation," *American Economic Review*, Vol. 78, No. 2, pp. 328-334.
- King, Robert G., and Ross Levine, 1993, "Finance and Growth: Schumpeter Might Be Right," *Quarterly Journal of Economics* 108, pp. 717–37.
- Kothari, Vinod, 2006, *Securitization: The Financial Instrument of the Future*, (Singapore: John Wiley (Asia)).
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Schleifer and Robert W. Vishny, 1997, "Legal Determinants of External Finance," *Journal of Finance* 52, pp. 1131-50.
- Laffont, Jean-Jacques, and Jean Tirole, 1993, *A Theory of Incentives in Procurement and Regulation*, (Cambridge, MA: MIT Press).
- Landy, Marc K., and Martin A. Levin, 2007, "Ceating Competitive Markets: The Politics of Market Design," in *Creating Competitive Markets: The Politics of Regulatory Reform*, ed. by Marc K. Landy, Martin A. Levin and Martin Shapiro, (Washington: Brookings Institution), pp.1-24.

- Langevoort, Donald C., 2003, "Foreword: Revisiting Gilson and Kraakman's Efficiency Story," *Journal of Corporation Law*, (Summer), pp. 499-502.
- Levine, Ross, 2005, "Finance and Growth," in *Handbook of Economic Growth*, eds. Phillippe Aghion and Steven Durlauf, (Amsterdam: Elsevier).
- Lin, Justin Yifu, and Jeffrey B. Nugent, 1995, "Institutions and Economic Development," in *Handbook of Development Economics*, eds. J. Behrman and T. N. Srinivasan, Vol. 3, Ch. 38 (Amsterdam: North-Holland).
- Lindsey, Lawrence B., 2000, "The 17-Year Boom," *Wall Street Journal Eastern Edition*, January 27, p. A22.
- McKinnon, Ronald I., 1973, *Money and Capital in Economic Development*, (Washington, DC: Brookings Institution).
- McPartland, John, 2005. "Clearing and Settlement Demystified," *Chicago Fed Letter*, January, No. 210.
- Merton, Robert, and Zvi Bodie, 2005, "Design of Financial Systems: Toward a Synthesis of Function and Structure," *Journal of Investment Management*, Vol.3, No.1, pp. 1-23.
- Mikkelson, W.H., and M.M. Partch, 1986, "Valuation Effects of Security Offerings and the Issuance Process," *Journal of Financial Economics* 15, pp. 31-60.
- Mishkin, Frederic S., 2007, *The Next Great Globalization: How Disadvantaged Nations Can Harness Their Financial Systems to Get Rich*, (Princeton, N.J.: Princeton University Press).
- Neftci, Salih N., and Andre Santos, 2003, "Puttable and Extendible Bonds: Developing Interest Rate Derivatives for Emerging Markets," Working Paper 3/201, (Washington: IMF).
- North, Douglas, 1990, *Institutions, Institutional Change, and Economic Performance*, (Cambridge: Cambridge University Press).
- North, Douglas, 2005, *Understanding the Process of Economic Change*, (Princeton: Princeton University Press).
- Raisler, Kenneth, and Lauren Teigland-Hunt, 2006. "How ISDA Took On the Confirmations Backlog," *International Financial Law Review*, February.

- Rajan, Raghuram G., 2005, "Has Financial Development Made the World Riskier," Working Paper No. 11728, (Cambridge, MA: NBER).
- Rajan, Raghuram G., and Luigi Zingales, 1998, "Financial Dependence and Growth," *American Economic Review* 88, pp. 559–86.
- _____, 2001, "Financial Systems, Industrial Structure, and Growth," *Oxford Review of Economic Policy* 17, pp. 467–82.
- _____, 2003, *Saving Capitalism from the Capitalists*, (New York: Crown).
- Remolona, Eli M., William Bassett and In Sun Geoum, 1996, "Risk Management by Structured Derivative Product Companies," *Federal Reserve Bank of New York Economic Policy Review*, vol. 2, no. 1 (April), pp. 17-37.
- Rodrik, Dani, 2007, *One Economics, Many Recipes: Globalization, Institutions, and Economic Growth*, (Princeton, N.J.: Princeton University Press).
- Rousseau, Peter L, 2003, "Historical Perspectives on Financial Development and Economic Growth," *Federal Reserve Bank of St. Louis Economic Review* 85(4), pp. 81–106.
- Rousseau, Peter L. and Paul Wachtel, 2000, "Equity Markets and Growth: Cross-Country Evidence on Timing and Outcomes," *Journal of Banking & Finance* 24, pp. 1933–57.
- Rubio, Luis, 2001, "A Rule of Law Emerges in Mexico, Slowly," *Wall Street Journal Eastern Edition*, 27 (April), p. A19.
- Schlesinger, Jacob M., "Why the Long Boom? It Owes a Big Debt to the Capital Markets," *Wall Street Journal Eastern Edition*, February 1, pp. A1, A6.
- Schumpeter, Joseph A., 1912, *Theorie der Wirtschaftlichen Entwicklung [The Theory of Economic Development]*, Leipzig: Dunker and Humbolt, translated by Redvers Opie, 1934 (Cambridge MA: Harvard University Press).
- Stigler, George, 1971, "The Economic Theory of Regulation," *Bell Journal of Economics*, Vol. 2, pp. 416-24.
- Stiglitz, Joseph E., 2001, "Principles of Financial Regulation: A Dynamic Portfolio Approach," *World Bank Research Observer*, Vol. 16, No. 1 (Spring), pp. 1-18.
- Stiglitz, Joseph E., and Andrew Weiss, 1981, "Credit Rationing in Markets With Imperfect Information," *American Economic Review* 71, pp. 393–409.

- Stigum, Marcia, 1990, *The Money Market*, (Homewood, IL: Business One Irwin, 3rd ed.).
- Streeter, Bill, 2006, “Why Fee-Based Banks Look So Good,” *ABA Banking Journal* 98 (May), pp. 7.
- Sylla, Richard, 1998, “U.S. Securities Markets and the Banking System, 1790–1840,” *Federal Reserve Bank of St. Louis Economic Review* (May/June), pp. 83–98.
- Vogel, Steven, 2007, “Why Freer Markets Need More Rules,” in *Creating Competitive Markets: The Politics of Regulatory Reform*, ed. by Marc K. Landy, Martin A. Levin and Martin Shapiro, (Washington: Brookings Institution), pp. 25-42.
- Wessel, David, 2006. “Capital: Wall Street Is Cleaning Derivatives Mess,” *Wall Street Journal*, February 16, p. A2.
- Williamson, Oliver E., 2000, “The New Institutional Economics: Taking Stock, Looking Ahead,” *Journal of Economic Perspective*, September, pp. 595-613.
- World Bank and International Monetary Fund, 2001, *Developing Government Bond Markets: A Handbook*, (Washington, DC: World Bank).