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# Notes on Financial System Development and Political Intervention

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## Abstract

The paper studies the impact of political intervention on a financial system that consists of banks and financial markets and develops over time. In this financial system, banks and markets exhibit three forms of interaction: they compete, they complement each other, and they co-evolve. Coevolution is generated by two new ingredients of financial system architecture relative to the existing theories: securitization and risk-sensitive bank capital. The authors show that securitization propagates banking advances to the financial market, permitting market evolution to be driven by bank evolution, and market advances are transmitted to banks through bank capital. Then they examine how politicians determine the nature of political intervention designed to expand credit availability. The authors find that political intervention in banking exhibits a U-shaped pattern, where it is most notable in the early stage of financial system development (through bank capital subsidy in exchange for state ownership of banks) and in the advanced stage (through direct lending regulation). Despite expanding credit access, political intervention results in an increase in financial system risk and does not contribute to financial system evolution. Numerous policy implications are drawn out.


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# Notes on Financial System Development and Political Intervention*

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There is strong evidence that the development of the financial system – consisting of banks and financial markets – positively affects real-sector growth through the efficient mobilization and allocation of capital. This point was recognized at least as far back as Gurley and Shaw's (1955, 1956) discussions of the relationship between financial system development and growth in the real sector. Gurley and Shaw (1955) note, "... conventional theories of income, interest, and money have given insufficient attention to important reciprocal relationships between real development and financial development... An additional complexity is that development of financial institutions, including nonbank intermediaries, is both a determined and a determining variable in the growth process." More recently, this point has been made by various authors. For example, Gertler (1988) points out the financial system matters because it impinges on the resolution of informational asymmetries that have real effects, and that financial contracts and institutions are determined simultaneously with real variables. This view is well exemplified in the following statement by Levine (2010) in a debate on the role of the financial system: "Finance is powerful... the last few centuries demonstrate that financial innovation is crucial, indeed indispensable, for sustained economic growth and prosperity."

This recognition of the role of the financial system in economic development notwithstanding, it is less clear whether the effect of the financial system can be attributed to the development of capital markets or banks and other financial institutions, or even whether the architecture of the financial system (i.e., the configuration/mix of markets and institutions within a financial system) matters for the real-sector growth. Complicating this picture is the fact that political intervention in credit markets seems to be ubiquitous, and often has telling consequences (Brown and Dinç 2005; Calomiris and Wallison 2009). This raises interesting questions about the manner in which financial systems evolve, how they affect economic growth, and the *endogenous* nature of political

intervention at different stages of financial system development. The purpose of this paper is to theoretically address these questions.

To put our research in perspective, it is useful to begin by briefly reviewing the existing literature on financial system architecture, which deals with the mix of bank and market financing in the overall allocation of credit. Financial systems are typically classified as bank-based or market-based, depending on the relative shares of financing activities performed through banks and other financial intermediaries as compared to those conducted through capital markets.[1] An important issue in this regard has to do with which system maximizes real-sector economic growth, but on this the empirical evidence is mixed. For example, Beck and Levine (2002), Demirgüç-Kunt and Levine (2001), and Levine (2002) show that the positive impact of financial system development on economic growth is unaffected by whether the evolution of the financial system is due to bank or financial market development, and the correlation between a country's economic growth and the architecture of its financial system is rather low. Deidda and Fattouh (2008) find, however, that a change from a bank-dominated system to one with both banks and markets can actually hurt economic growth.[2]

The theoretical literature on financial system architecture has been largely focused on examining how banks and markets compete for borrowers and the comparative capital allocational efficiencies of bank-based systems versus market-based systems, in terms of providing risk sharing (Allen and Gale 1997), generating information feedback from security prices (Boot and Thakor 1997a; Subrahmanyam and Titman 1999), creating financial innovation incentives (Boot and Thakor 1997b), resolving asset-substitution moral hazard (Boot and Thakor 1997a), and protecting borrower proprietary information and strengthening R&D incentives (Bhattacharya and Chiesa 1995; Yosha 1995).[3]

This "banks versus markets" distinction, based on the dominant view that banks and markets compete, clearly has powerful policy implications. It means that regulators must make choices of focus to seek the right balance between the two sectors when attempting to influence the trajectory of financial system development. However, this neat distinction between banks and markets, rooted in historical patterns of financial system evolution from many decades ago, seems to be rapidly losing relevance in an era in which securitization and widespread use of capital market financing by banks have largely eroded the boundaries between banks and markets, if not dissolved them completely.

Mindful of these contemporary developments, we pose the following specific questions about financial system development:

1. What are the various forms of interaction that banks and markets engage in at different stages of development of the financial system; and

2. What forms of *endogenously-determined* political interventions in the financial system should we expect in these different stages and what are the potential consequences of such intervention?

To address these questions, we develop a theoretical framework in which we do not restrict the interaction between banks and markets to competition, but permit them to interact in a richer manner. Our analysis reveals that banks and markets exhibit three forms of interaction. They compete, they complement each other, and they co-evolve. Strong institutions like banks are necessary for markets to perform well, and well-functioning markets are essential for banks to be induced to be sufficiently well capitalized to expand credit availability to borrowers without exposing themselves to excessive risk. Thus, the notion that one part of the financial system takes precedence over the other at a particular stage in terms of the development focus of policymakers is rendered obsolete.

Our analysis pivots on two key frictions that impede a borrower's ability to obtain external financing and influence the cost of this financing. One is the "certification friction," which arises from the fact that there is imperfect information about borrower credit quality. As a result, a creditworthy borrower may be erroneously denied credit were it not be "certified" as worthy of credit. The other is the "financing friction," which arises due to uncertainty about the availability of opportunities for the borrower to enhance its project payoff. This means that good investment opportunities may be passed up, which increases a borrower's cost of obtaining funds from the capital market.

We show that banks are better at diminishing the certification friction due to their credit-analysis expertise, whereas capital markets are superior at resolving the financing friction by providing a trading venue through which informed investors' private information about the project payoff enhancement opportunity is (noisily) impounded into security prices, thereby lowering the probability that valuable investment opportunities are passed up. Banks and markets compete to attract borrowers based on their relative advantages in resolving the two frictions.

Relative to the existing theories of financial system architecture, the recipe for our analysis includes two new ingredients: securitization and (risk-based) bank capital. Securitization blends the roles of banks and markets by involving the bank in the origination and screening of the loan and the market in the provision of financing. This, in turn, generates a positive feedback loop from bank development to market development. Improvements in the bank's screening technology, as a result of bank evolution, increase the confidence that capital market investors have in a securitized borrower's credit quality, which stimulates greater informed trading in the capital market. This lowers the financing friction and spurs capital market evolution.

Bank capital connects the two sectors in a different way. As the capital market evolves, informed trading in the market increases, which reduces the financing friction for all seeking market financing,

including banks which now confront a lower cost of equity capital. This enables the bank to raise additional equity from the capital market to extend riskier loans that were previously eschewed, and expands the banking sector's lending scope. Moreover, as banks lend to riskier borrowers with lower prior credit qualities, they find it privately optimal to improve the precision of their screening to better distinguish creditworthy borrowers from those who are not creditworthy. This stimulates evolution of the banking sector. That is, advances in the capital market are propagated to the banking sector through bank capital.

The analysis thus uncovers not only competition and complementarity between bank and market financing, but also co-evolution. Bank evolution spurs capital market evolution, and capital market evolution in turn spurs bank evolution. That is, banks and capital markets co-evolve with each other. The limitation of the standard approach that views banks and capital markets as competitive tubs on their own bottoms in the analysis of financial system development becomes starkly apparent.

Securitization plays a key role in the co-evolution of banks and markets in our analysis. Thus, the shadow banking system, where securitization-related activities are featured prominently, is of pivotal importance for the issues we examine. In a sense, our analysis highlights the "bright side" of the interaction between banks and markets through shadow banking. But the shadow banking system also played a key role in the recent financial crisis (see, for example, Stein 2010). Gennaioli, Shleifer, and Vishny (2011) present a formal model of the link between securitization and trading of asset-backed securities in the shadow banking sector and show that securitization forges market-based connections between banks, leading to a reduction in idiosyncratic risk but an increase in systemic risk. This may be viewed as the "dark side" of shadow banking.

In addition, our framework also provides a setting in which we can investigate the role of political intervention in financial system development, something with potential ramifications for financial crises and stability. This is virgin territory in the theory of financial system architecture.

Nonetheless, political intervention in the financial system is not only commonplace but appears to be on the rise. Credit markets are hard for politicians to resist intervening in because expanded credit availability for potential voters can generate large perceived political benefits. It has been empirically documented that in emerging markets, cozy ties between bankers and politicians as well as state ownership of banks allow for a great deal of political influence in credit markets (e.g., Brown and Dinç 2005; Dinç 2005; La Porta, Lopez-de-Silanes, and Shleifer 2002). And the recent financial crisis has shown that even advanced financial systems, such as the one in the U.S., are not immune to political influence. See Calomiris and Wallison (2009), for example, for a discussion of how political influences on securitization agencies like Fannie Mae and Freddie Mac, as well as on credit rating agencies and banks, gave shape to some of the initial forces that influenced the course of the 2007-09 financial crisis. Giving politicians a choice of how to intervene in the financial system, we endogenize the manner of political intervention at different stages of financial system development, where the political goal is to expand credit availability.

We find that in the early stage of financial development, when both the certification friction and the financing friction are large, political intervention to expand credit availability takes the form of government ownership of banks in exchange for direct capital subsidies to banks. In the intermediate stage, there is little political intervention. In the advanced stage, political intervention returns, but this time takes the form of direct lending regulation that mandates that banks invest in low-quality, high-risk (excluded) borrowers, even if doing so imposes a loss on the banking sector. The reason for this stage-dependent intervention is that the value of capital subsidies depends on the cost of equity capital for banks, which in turn depends on the stage of development of the capital market. Moreover, bank profitability is also dependent on the stage of financial market development, so the feasibility of enacting regulations that impose losses on banks is also stage dependent. In the intermediate stage, neither is bank capital sufficiently costly to make an equity

subsidy attractive to banks, nor are the banking sector's profits sufficiently high to absorb the losses imposed by direct lending regulations. Thus, political intervention in banking exhibits a U-shaped pattern: it is most notable in underdeveloped and highly developed financial systems, but it takes different forms. Differences in form notwithstanding, the effect of political intervention is the same – an increase in financial system risk.

The rest of the paper is organized as follows. In Section I, we describe the theoretical framework. Section II analyzes the three forms of interaction between banks and markets. Section III examines political intervention at different stages of financial system development. Section IV concludes with a discussion of policy implications of our analysis.

## I. THE FRAMEWORK

In this section, we describe the economic framework, with a minimum of mathematical details. The reader is referred to Song and Thakor (2010, 2011) for more formal treatments of these ideas, including proofs of results. The focus here is on explaining the logical structure that leads to these results and the economic intuition underlying them.

### *Agents and Economic Environment*

Consider an economy where each borrower needs outside finance to invest in a project. The success of the investment depends on the borrower's type. The borrower may be either authentic or a crook, and only an authentic borrower will invest in the project, whereas a crook will just abscond with the funds, leaving nothing for the financiers. Each borrower's type is its private information. The credit quality of a borrower, $q \in [0, 1]$, is simply the common prior assessment about the probability with which the borrower is authentic, with a higher $q$ representing a better credit quality. An authentic borrower will have an opportunity to enhance its project payoff, given a particular macroeconomic state; this will be discussed in more detail shortly.

We study a financial system in which there are two frictions affecting an authentic borrower's ability to obtain external finance and the cost of this financing.

1. The first is a *certification friction*, which arises due to imperfect information about borrower type. As a result, even a creditworthy (i.e., authentic) borrower may be (erroneously) denied credit.

2. The second friction, *financing friction*, arises as follows. Each borrower's project value depends on whether the borrower invests in costly payoff enhancement. The investment in payoff enhancement achieves its goal only if the macroeconomic condition turns out to be favorable (e.g., a strong consumer demand for the borrower's product, and a viable supply of labor force). Absent information about the macroeconomic condition, an authentic borrower finds it privately unprofitable to invest in payoff enhancement, since the expected return from such an investment is less than its cost, where the expectation is calculated based on the borrower's *prior assessment* about the macroeconomic condition.

   There are traders in the capital market who find it personally profitable to invest in acquiring information about the macroeconomic condition that is useful to authentic borrowers for making their payoff-enhancement investment decisions. The motivation for the informed traders is that acquisition of this information can be used by these traders to take profitable long positions in the security issued by the borrower when the traders learn the macroeconomic condition is conducive to making the project-payoff enhancement decision. In addition to informed traders, there are also liquidity traders who are uninformed about the macroeconomic condition and trade for pure liquidity needs in the capital market. Trading by liquidity traders introduces noise in the price formation process and masks informed trades, but the informed traders' information will still be (noisily) transmitted to borrowers through the equi-

librium prices of securities traded in the capital market. To see this more clearly, suppose the informed traders first observe a favorable macroeconomic condition that they conjecture the authentic borrower will exploit to enhance the project payoff, and then they take long positions in the borrower's security that (noisily) reveal their conjecture. By observing capital market trading and the market-clearing price for its security, the authentic borrower infers the macroeconomic state and decides to make the payoff-enhancement investment, thereby rationalizing the informed traders' initial conjecture. That is, the capital market provides borrowers valuable information through the feedback effect of security prices.

The larger the number of informed traders, the greater the impact of their trading on the price of the security, so security prices become more informative about the macroeconomic condition when there are more informed traders present in the capital market. Hence, the authentic borrowers' investment in project-payoff enhancement becomes more efficient when there are more informed traders. However, to become an informed trader requires personal investment in information acquisition by the trader, which is costly. This cost will be greater the less developed the financial system. As the financial system develops, an increasing amount of payoff-relevant information is available in the public domain for investors, so it costs less to acquire additional information. This induces more investors to become informed in more advanced financial systems, making borrowers' payoff-enhancement decisions more informative. Think of the larger number of informed and sophisticated traders in the U.S. compared to say Zambia.

*Banks and Capital Markets*

Banks are better than markets at diminishing the *certification friction* because of their expertise in credit screening that may help to attenuate asymmetric-information problems (e.g., Allen 1990;

Boyd and Prescott 1986; Coval and Thakor 2005; Ramakrishnan and Thakor 1984). Specifically, bank screening yields an informative signal that *noisily* reveals the borrower's type, where the precision of the signal is increasing in the bank's investment in a screening technology, which is privately costly to the bank. Banks may also arise to reduce state-verification costs that endogenously give rise to debt contracts (Townsend 1979). Nonetheless, not all information asymmetries may be eliminated by banks, so credit market distortions associated with practices like credit rationing, that do not resemble standard Walrasian market-clearing outcomes, may persist (Stiglitz and Weiss 1981). This may create a role for capital market financing in different forms to provide amelioration that is unattainable with bank-intermediated contracting.

Capital markets are better than banks at resolving the *financing friction* by providing a setting in which security trading leads to the (noisy) impounding of informed traders' private information about the macroeconomic condition. As explained earlier, this friction is dissipated to a greater extent in more developed financial systems, where borrowers learn more accurately about the macroeconomic condition and make more efficient investment decisions.

We have modeled the financing friction resolved by the capital market purely in terms of the feedback effect of market prices as, for example, in Boot and Thakor (1997a). However, the literature has highlighted various other economic functions served by markets. For example, Allen and Gale (1999) show how markets can aggregate divergent opinions about new technologies.[4] This can enhance synergies between financial system development and real-sector development, as shown by Laeven, Levine, and Michalopoulos (2012). Such information aggregation may be particularly important when equity rather than debt is used for financing, since opinions may diverge more about the *upside* potential of a new technology. Thus, markets may rely on equity to a greater extent than banks do, even if banks were allowed to take equity positions in borrowers.[5] Viewed in this light, the resolution of the financing friction by the market may be viewed more broadly as

the resolution of an information aggregation problem. Nonetheless, our specification of the role of markets as communicating valuable payoff-relevant information to firms is entirely consistent with this alternative aggregation-of-diverse-opinions viewpoint, since it is precisely this form of aggregation that paves the way for the market to generate information that may not be readily available even to the firm's manager.

*Financing Sources*

Each borrower has three sources from which it can choose to finance its project: (1) borrow directly from the capital market by issuing a debt security; (2) let a bank screen and certify its credit quality first and then borrow from the capital market via securitization; or (3) take a loan from a bank.

With *direct capital market financing*, the bank is out of the picture, so there is no "bank certification" provided to the borrower. With *securitization*, the bank screens the borrower's credit quality first, and then seeks financing for the borrower from the capital market via securitized debt only if the screening yields a favorable outcome. The bank incurs a fixed cost to set up a trust for securitization.

With a *bank loan* too, the bank screens the borrower's credit quality first, and then extends the loan only if the screening outcome turns out to be favorable. Of course, since the screening is noisy, the bank's credit decision is subject to both Type-1 and Type-2 errors. Thus, with both securitization and bank financing, the borrower's credit quality is "certified" by the bank, albeit with the recognition that the certification is not perfect. A key difference between a direct bank loan and securitization is that, with the former, the bank has to raise funding for the loan, whereas with the latter, the funding comes from the capital market. For the bank loan, there is a risk-sensitive capital requirement that is increasing in borrower risk. The bank funds the rest of the loan from deposits. Deposit gathering is costly due to the cost of setting up branches, employing

tellers, etc, and the total cost of deposit gathering is increasing in the amount of deposits raised by the bank.

As we will discuss in more depth later, bank certification will influence the credit terms that the borrower can obtain from the market with securitization. Moreover, bank certification also impinges on how many traders choose to become informed in the capital market and hence the accuracy of the payoff-relevant information that the borrower can infer from security prices.

## II. RESULTS

In this section, we discuss two main results arising from our analysis of the model described in the previous section. The first result concerns the borrower's choice of financing source. The second result characterizes the interaction between banks and capital markets: how does the evolution of one sector of the financial system affect the other sector, and how does a financial system evolve as a whole?

### *Borrower's Choice of Financing Source*

We first analyze a borrower's choice of financing source. We focus on authentic borrowers, as crooks will make the same financing choices as authentic borrowers in equilibrium to avoid being identified. First, consider borrowers with the lowest credit quality, i.e., borrowers in cohorts with the highest probability of having crooks. It is clear that as a borrower's credit quality ($q$) declines, a bank's expected payoff from lending to the borrower declines as well due to the increasingly high likelihood of lending money to a crook; this is because the bank's screening is noisy. Thus, there exists a credit quality cutoff, call it $q_l > 0$, below which a borrower cannot obtain financing. This cutoff determines the banking sector's lending scope, with a lower cutoff corresponding to a broader lending scope.

To examine the borrower's choice of financing source beyond the credit exclusion cutoff of $q_l$, it is useful to introduce a little notation. The benefit to the borrower of having its loan originated by the bank is that the bank provides screening and hence "certifies" an affirmatively-screened borrower as creditworthy, which reduces the borrower's cost of credit. Let $V_S$ represent this screening benefit. It is clear that $\partial V_S/\partial q < 0$, i.e., the certification benefit declines as the borrower's observable quality improves. This screening benefit is available only with a bank loan and securitization.

Bank certification produces another benefit for the borrower if it chooses securitization. Since a certified borrower is more likely to be authentic, the project-payoff enhancement conjectured by informed traders who observe a favorable macroeconomic state is more likely to be realized with a certified borrower; note that a crook will not invest in payoff enhancement even if the macroeconomic condition is favorable. This means that when a borrower is bank-certified and has securitized its debt, a larger number of capital market investors will acquire information about the payoff-enhancement-relevant macroeconomic condition than if the borrower finances in the capital market without bank certification. Thus, bank certification enables an authentic borrower to make a more informed decision about its investment in payoff enhancement. Let $V_{PE}^m$ be the value of payoff enhancement to the borrower with direct market financing, and $V_{PE}^{sec}$ be the value of payoff enhancement with securitization. Our arguments above indicate that $V_{PE}^{sec}(q) > V_{PE}^m(q)$, $\partial V_{PE}^{sec}(q)/\partial q > 0$, and $\partial V_{PE}^m(q)/\partial q > 0$. Moreover, since the borrower's bank-certification benefit will get smaller as $q$ increases, we expect $\partial[V_{PE}^{sec}(q) - V_{PE}^m(q)]/\partial q < 0$.

Recall that bank financing is also associated with a deposit-gathering cost that is increasing in the amount of deposits gathered. Denote this cost by $D(q)$. Since the bank faces a risk-sensitive (equity) capital requirement that is decreasing in $q$, it follows that $\partial D(q)/\partial q > 0$.

With these preliminaries, we can write down the incremental value of bank financing *relative* to capital market financing as:

$$\Delta_{bank} = V_S(q) - D(q) - V_{PE}^m(q), \tag{1}$$

and the incremental value of securitization *relative* to capital market financing as:

$$\Delta_{sec} = V_S(q) - F + V_{PE}^{sec}(q) - V_{PE}^m(q), \tag{2}$$

where $F$ is the fixed cost of setting up the securitization trust.

Let us now focus on borrowers who are not subject to credit exclusion, i.e., $q \geq q_l$. For these borrowers, if $q$ is relatively low, then $V_S(q)$ is relatively high. Moreover, for low $q$, banks face high capital requirements, so $D(q)$ will be relatively low. The low $q$ also implies that $V_{PE}^m(q)$ will be relatively low; $V_{PE}^{sec}(q)$ will be low too but higher than $V_{PE}^m(q)$. Hence, for low $q$, both $\Delta_{bank}$ and $\Delta_{sec}$ will be strictly positive. But if $F$ is large enough, we will have $\Delta_{bank} > \Delta_{sec}$.

Now, as $q$ increases, we see that

$$\frac{\partial \Delta_{bank}}{\partial q} = \frac{\partial V_S(q)}{\partial q} - \frac{\partial V_{PE}^m(q)}{\partial q} - \frac{\partial D(q)}{\partial q} < 0, \tag{3}$$

$$\frac{\partial \Delta_{sec}}{\partial q} = \frac{\partial V_S(q)}{\partial q} - \frac{\partial V_{PE}^m(q)}{\partial q} + \frac{\partial V_{PE}^{sec}(q)}{\partial q} < 0. \tag{4}$$

Since $\partial D(q)/\partial q > 0$ and $\partial V_{PE}^{sec}(q)/\partial q > 0$, we see that $|\partial \Delta_{bank}/\partial q| > |\partial \Delta_{sec}/\partial q|$. Thus, as $q$ increases, the benefit of bank financing relative to market financing falls faster than does the benefit of securitization relative to market financing. This is intuitive. As observable borrower quality improves, banks need to keep less capital and therefore gather more deposits, which is costly and diminishes the advantage of bank financing relative to market financing. Moreover, the certification benefit of bank origination also declines as observable borrower quality goes up; this decrease in the relative advantage of bank financing over market financing also occurs with securitization. However, since the fixed cost of setting up securitization trust ($F$) is invariant to

borrower quality, the advantage of securitization relative to market financing does not decline as fast as the relative advantage of bank financing. *Figure 1* depicts these pictorially.

[Figure 1 about here]

Summarizing, we have our first result:

**Result 1.** *An authentic borrower chooses its financing source in equilibrium as follows:*

1. *There exists a low quality cutoff, $q_l > 0$, such that an authentic borrower with $q < q_l$ cannot obtain financing.*

2. *There exists a high quality cutoff, $q_h > q_l$, such that an authentic borrower with $q \geq q_h$ directly borrows from the capital market and the one with $q \in [q_l, q_h)$ approaches a bank.*

3. *There exists a medium quality cutoff, $q_m \in (q_l, q_h)$, such that an authentic borrower with $q \in [q_l, q_m)$ prefers a bank loan and the one with $q \in [q_m, q_h)$ prefers securitization.*

*In equilibrium, every crook within a prior quality cohort $q$ chooses the same financing source as the authentic borrower in that cohort.*

Note that the equilibrium above is pooling in the sense that the observationally-indistinguishable crooks *within* any observable quality cohort always choose the same financing source as the authentic borrowers in that cohort. This is a sequential equilibrium that satisfies the universal divinity refinement of Banks and Sobel (1987), as proved in Song and Thakor (2010). The basic idea is that the set of pricing responses that would induce defection of the crooks from the equilibrium has a larger measure than the set of responses that would induce defection of the authentic borrowers from the equilibrium. Thus, financiers would view a defector to be more likely to be a crook, and this means the defector would receive a worse price by defecting than staying with the equilibrium. Thus, "hiding in the crowd" is an optimal strategy for the crooks.

As for the financing-source-choice dichotomy, the intuition can be summarized as follows. Both bank screening and capital market information revelation give rise to noisy signals, and the noise-to-information ratio increases as the borrower's observable credit quality declines. Thus, when this credit quality ($q$) is sufficiently low, the borrower is deemed insufficiently creditworthy to receive credit from *any* source. Borrowers of very high quality go directly to the capital market. These are borrowers who may be viewed as having sufficiently high credit reputations that they do no need bank certification. For example, we know that the highest-credit-quality firms are able to avail of commercial paper as a source of direct market financing, but this is not available to lower-quality firms. The intuition here is when observable credit quality is high, not only is the marginal value of bank certification low, but the incentives for investors to become informed in the capital market are high, so market prices are very informative to the managers of firms in making real decisions. This quality-cutoff division between bank and market financing also appears in previous research (Bolton and Freixas 2000; Boot and Thakor 1997a). However, our analysis goes a step further to argue that borrowers of intermediate quality prefer to take bank loans that are then securitized. This allows them to take advantage of bank screening and certification, which stimulates information production in the capital market and hence elevates price informativeness, while at the same time avoiding bank funding which embeds the bank's cost of complying with capital requirements.

One might wonder if the result that it is the borrowers of *intermediate* quality who are securitized is consistent with the observed securitization of highly-risky subprime mortgages preceding the recent financial crisis. There are two points to note on this. First, the securitization of subprime mortgages is a relatively recent phenomenon, and for much of the time period over which mortgage securitization has existed, only qualifying prime mortgages were securitized, whereas riskier mortgages were not. Moreover, government subsidies and various other forms of political intervention played a role in the emergence of subprime-mortgage securitization, an issue that we explicitly

discuss later in our analysis. Second, the term "intermediate quality" is a *relative* term. These could still be fairly risky borrowers. The point is that there are even riskier borrowers who are served by bank loans that stay on the books of banks.

*Co-evolution of Banks and Markets*

Our previous analysis highlights competition between banks and markets. In this section, we discuss a richer form of bank-market interaction and examine collaboration and co-dependence between banks and markets, and how a financial system evolves as a whole.

Our framework shows that markets and banks are linked in the manner of co-dependence through two channels: securitization and risk-sensitive bank capital requirements. Let us explain the intuition. With securitization, the bank certifies a borrower's credit quality via credit analysis and the capital market finances the borrower, so each sector of the financial system operates at its best – banks focus on credit analysis and markets focus on providing financing. Improvements in the bank's credit analysis technology, as a result of development in the banking sector, enhance the capital market investors' confidence in a securitized borrower's credit quality. This, in turn, encourages greater informed trading in the capital market, since payoff enhancement is more probable with an authentic borrower, which then improves the information conveyed by the market price of securitized debt regarding the payoff-enhancement-relevant macroeconomic condition. The consequence is a lowering of the financing friction and a spurring of capital market evolution. That is, securitization propagates banking advances to the capital market, permitting market evolution to be driven by bank evolution.

We next examine how development in the capital market affects banks. Note that banks need to raise costly equity capital from the market to support their lending, which forges a natural link between banks and markets. When the capital market develops, there is an improvement in the infrastructure for information acquisition and processing, so it costs less for investors to become

informed, leading to an increase in the number of informed traders. With greater informed trading, the informativeness of the price of traded claims increases, which enables the authentic borrower to extract more precise information about the payoff-enhancement opportunity. Better investment decisions by the borrower result in a lowering of the cost of equity capital for the bank lending to the borrower. This allows the bank to raise additional equity capital (that is mandated by the risk-based capital requirement) to extend riskier loans that were previously eschewed. That is, advances in the capital market enable banks to expand their lending scope (i.e., $q_l$ decreases) and lend to riskier borrowers that were previously excluded from credit availability.

Moreover, as banks lend to riskier borrowers, they find it privately optimal to improve their credit analysis precision to distinguish more accurately between authentic borrowers and crooks, even in the absence of a general improvement in information technology. That is, development in the capital market feeds the development of the banking sector through risk-sensitive bank capital. This means that it is through (risk-sensitive) bank capital that market advances that diminish the financing friction end up being transmitted to banks, permitting banks to more effectively resolve the certification friction for borrowers and expand their lending scope.

These feedback loops generate a virtuous cycle in which each sector of the financial system benefits from the development of the other, so banks and markets not only act as competitors as Result 1 shows, but also as collaborators that complement each other. To summarize, we have:

**Result 2.** *Bank evolution spurs capital market evolution, and capital market evolution spurs bank evolution: banks and markets co-evolve with each other.*

The key to this co-evolution result is two-fold. On the one hand, banks need equity capital to support on-balance-sheet loans, and the capital market is the source. Advances in the capital market make this equity capital cheaper, benefiting banks and permitting an expansion in lending scope. On the other hand, banks act as "filters" for the capital market, screening out egregiously-

bad credit risks and thereby increasing the marginal return to information production for investors, leading to more efficient security prices and capital market evolution.

In this sense, our analysis complements the important observation by Laeven, Levine, and Michalopoulos (2012) about the synergies between financial development and real-sector development. In their analysis, real-sector development makes financial-sector screening technologies obsolete. So profitable investments are not financed, unless screening-technology innovations allow the financial sector to catch up. The contrast is that we focus on the interaction between banks and markets *within* the financial system, whereas they focus on the interaction between the financial system as a whole and the real sector.

## III. POLITICAL INTERVENTION

In this section, we examine how political intervention can play a role at various stages of the financial system development.

### *Why Do Politicians Intervene? Objective of Political Intervention*

Why do politicians want to intervene in the financial system? One reason is that politicians seek to increase their wealth and power.[6] This is achieved by increasing the likelihood of getting re-elected, since a longer tenure in office allows for greater accumulation of power and influence and better opportunities for wealth accumulation both while holding office and after. In turn, this may be facilitated by increasing the number of borrowers receiving credit from the financial system, which then creates an incentive for politicians to intervene in the financial system to expand credit availability. The idea is as follows. Being able to tout expanded credit availability as a benefit generated for potential voters provides politicians with a way to curry favor with their voter base and increase the odds of being re-elected. Even apart from such private benefits, politicians may be philosophically aligned with the idea that having credit available to a broader set of people is

a good social goal. As an example, the idea of universal homeownership for Americans has been appealing to many U.S. politicians, and this may induce them to push banks to expand credit availability to more Americans to enable a higher number of home purchases. Specifically, in our framework the objective of political intervention is to expand the lending scope of the financial system, i.e., to decrease the credit exclusion cutoff, $q_l$: recall only borrowers with credit qualities $q \in [q_l, 1]$ are able to access the financial system for credit (either from the banking sector or the capital market), so a lower $q_l$ corresponds to a wider lending scope. Having said this, we wish to emphasize that there are plausible circumstances in which such a goal is consonant with the goal of maximizing power and wealth.

*How Do Politicians Intervene?*

What kind of intervention do politicians engage in? In terms of specific strategies for political intervention, we consider two sets of strategies. First, politicians may expand the lending scope of the banking sector by providing capital subsidies to banks in exchange for government ownership. The capital infusion is subsidized in the sense that the ownership taken by the government is smaller than what its equity infusion would justify in a competitive capital market. Because banks receiving subsidized equity capital have more capital to satisfy risk-based capital requirements, they are willing to lend to riskier (lower-quality) borrowers that were previously excluded. That way, politicians can influence the financial system to expand its lending scope.

Alternatively, politicians may enact direct lending legislation that requires banks to expand lending scope and extend credit to riskier borrowers, even if doing so imposes losses on the banking sector. Banks failing to obey the regulations face revocation of their licenses to operate. As long as banks are sufficiently profitable, the licenses will be valuable and banks will comply.[7]

To analyze political intervention at different stages of financial system development, we use the cost of acquiring information about the payoff-enhancement-relevant macroeconomic condition as

a measure of the stage of financial system development, with the cost declining as the financial system develops from a primitive stage to an advance stage. The idea is that this cost is high in the early stage of financial system development because the necessary infrastructure for obtaining information about firms' investment condition is still primitive and processing information can be quite costly. By contrast, in an advanced financial system, there is considerable information that can be acquired and processed at a relatively low cost.

*Political Intervention at the Early Stage of Financial System Development*

At the early stage of financial system development, the high cost of becoming an informed investor leads to a relatively small number of informed traders. With low informed trading, market prices are not very informative, so the borrower is more likely to pass up value-enhancing investment opportunities, which in turn drives up the cost of equity capital for the bank lending to the borrower. This relatively high cost of bank equity reduces the bank's profit, which leads to denial of credit to high-risk (low-quality) borrowers, i.e., the bank's lending scope is narrow at this stage ($q_l$ being relatively high). This narrow lending scope prompts politicians to intervene in the banking sector to expand its lending scope. What form of intervention will politicians find optimal?

First, consider direct lending regulation in which politicians enact regulations that force banks to expand the lending scope without any subsidy. This strategy of intervention is unlikely to work out at the early stage, because banks' profits from lending are too low to absorb the losses such risky lending imposes on banks. If politicians force banks to lend to low-quality borrowers, the loss to the banks may lead them to voluntarily surrender their banking licenses and quit the banking industry.

A second approach for politicians is to induce each bank to increase its lending scope to lend to low-quality borrowers who were initially denied credit access (i.e., those with $q < q_l$) by "compensating" the banks. We consider government ownership in exchange for subsidized equity as a

tool to achieve this. Specifically, the subsidy manifests itself through a government ownership of the bank that is smaller than what is justified by the amount of equity capital subsidized, if the subsidized capital were to be raised from a competitive capital market. Note that equity capital is more costly at the early stage due to less informed trading in the financial market, so each bank will value subsidized equity capital relatively highly. Clearly, a larger capital subsidy corresponds to a larger increase in the banks' lending scope, which increases the private benefits that politicians obtain from broader credit access.

What are the consequences of an expanded bank lending scope with a government equity subsidy? Will it also induce banks to increase their screening precision and hence spurs capital market evolution as it does without political intervention (see Section III)? To analyze this, note that, without a government equity subsidy, a bank finds it *privately* optimal to increase its screening precision as it lends to risky, previously-excluded borrowers, since the bank bears the entire cost of not being able to screen crooks accurately. With an equity subsidy, the government has part ownership of the bank and hence shares the cost of imprecise screening, so a bank's incentive to improve its screening precision is weakened. As a result, we do not get the same positive propagation of development from banks to capital markets, and the financial system does not experience the same evolutionary boost, despite its lending scope being expanded. In fact, the larger the government equity subsidy, the less likely it is that the banking sector will improve its screening technology. Thus, political intervention at the early stage of a financial system may retard its development, despite a broader lending scope. Moreover, since the expansion of the banking sector's lending scope is not accompanied by a concomitant increase in bank screening precision, systemic risk in the financial system increases as well.

*Political Intervention at the Intermediate Stage of Financial System Development*

The cost of becoming informed is lower at the intermediate stage, so there are more informed traders in the capital market than in the early stage of development. Thus, equity capital is less expensive for banks in the intermediate stage than in the early stage. As our previous analysis shows, the financial system's lending scope is broader (lower $q_l$) in the intermediate stage. Politicians, however, may want to expand the scope even further. But an equity subsidy is now less attractive to a bank, and for each unit of equity subsidized, the bank responds by increasing its lending scope less in the intermediate stage than in the early stage. An equity subsidy is thus less efficient for politicians in the intermediate stage than in the early stage. Direct regulation may not work either because banks are not yet profitable enough to absorb the accompanying losses.

Thus, at the intermediate stage, we see that political intervention is muted compared to the early stage. It is even possible that when equity capital is sufficiently less expensive for banks, an equity subsidy from the government may disappear altogether at the intermediate stage. At the same time, if banks' profits are still not high enough to absorb the loss associated with direct lending regulation, direct lending regulation that mandates lending to high-risk borrowers will not be feasible either. That is, there may be no political intervention at all at some specific intermediate stage of financial system development.

*Political Intervention at the Advanced Stage of Financial System Development*

At an advanced stage of financial system development, information acquisition in the capital market is the least costly, so the number of informed traders in the capital market is the largest. Thus, politicians view a capital subsidy as even less attractive now than at the intermediate stage.

The relatively low cost of bank equity generates relatively high profits for banks in this stage of financial system development. Direct lending regulations that mandate that banks lend to risky, excluded borrowers now become feasible. Banks comply because their high profits make their banking licenses valuable.

What are the consequences of the expansion of the banking sector's lending scope at this stage of financial system development? Note that although banks bear the full cost of imprecise screening as they lend to risky, previously-excluded borrowers under the lending regulation, they will *not* increase their screening precision by investing more in the screening technology. To see why, note that if banks were to improve their screening precision when they are compelled to expand their lending scope, they would have done so voluntarily even without such regulatory pressure. The reason why banks had chosen not to lend to those highly risky (previously-excluded) borrowers in the first place is because the marginal benefit of improved screening is outweighed by its marginal cost. Direct lending regulations compel banks to lend but do not fundamentally alter this benefit-cost tradeoff. As a result, political invention at the advanced stage of financial system development also increases financial system risk, as it does at the early stage. We can summarize this discussion as follow:

**Result 3.** *Political intervention in the financial system is stage dependent:*

1. *At an early stage of financial system development, when information acquisition and processing in the capital market are sufficiently costly so informed trading is sufficiently low and bank equity cost is sufficiently high, politicians intervene by providing subsidized capital to banks.*

2. *At an intermediate stage of financial system development, when information acquisition and processing cost in the capital market increases but banks' profit is still low, politicians avoid intervening with either equity subsidy or direct lending regulations.*

3. *At an advanced stage of financial system development, when information acquisition and processing cost becomes even lower and banks' profits become higher, politicians intervene by enacting direct lending regulations to force banks to expand lending scope to low-quality borrowers that create losses for banks.*

To capture the intuition for this result in a summary form, note that the choice of political intervention rests on the tradeoff between the cost to the taxpayers/voters of the chosen intervention and the effectiveness of the intervention in influencing banks to expand lending scope. At an early stage of financial development, bank lending scope is constrained by the high cost of raising the equity capital needed to support risky lending. Because capital is a costly resource, politicians are able to significantly influence banks by providing it at a subsidy via government ownership of banks. So that is the chosen mode of intervention. At an advanced stage, capital is cheap, so offering that as a carrot to banks to expand lending scope is far less effective. But banks are also more profitable at this stage, so a license to operate has high value, and politicians can simply enact regulations requiring banks to engage in risky lending (even at an expected loss) because there is a sufficient profit cushion for each bank to satisfy its participation constraint. It is in the middle – the intermediate stage of development – that capital is not costly enough and bank profits are not high enough to make either intervention strategy viable.

## IV. POLICY IMPLICATIONS AND CONCLUSION

In this paper we have discussed the theoretical underpinnings of financial system evolution. The main result is that banks and capital markets within the financial system exhibit three forms of interaction: competition, complementarity and co-evolution. This is in contrast to the standard view that banks and markets only compete with each other.

This new perspective is rich in implications about development policy, but as our analysis indicates, we should be careful to distinguish between policy interventions aimed at correcting market failures and those driven by political economy factors. In the past, development agencies have sometimes adopted the view that emerging capitalistic economies, like say Romania and other former Soviet-bloc countries, needed to develop capital markets first in order to have the financial systems needed to support vigorous economic growth (e.g., see Meyendorff and Thakor 2002). In

many instances, this led to considerable resources being devoted to developing stock exchanges and over-the-counter markets like RASDAQ, the Romanian version of NASDAQ, well before robust financial institutions were developed. What our analysis shows, consistent with the policy conclusions in Meyendorff and Thakor (2002), is that such a policy prescription is misguided. Banks and markets have to be developed together; focusing first on markets and not on banks actually *runs the risk of retarding capital market growth itself.* With a policy not focused on co-evolution, one may sacrifice the efficacy of *both* market and banking system development. Thus, in the interest of correcting potential market failure, development policy should focus on the *simultaneous* development of banks and markets. What is interesting is that this can also deal effectively with political economy forces, since it can make political intervention *less* likely as politicians would be unable to use the perceived failure of the financial system as a politically convenient reason to intervene.

This brings us to our examination of endogenous political intervention in financial system development. Such intervention can be broadly viewed as being one of two types – either motivated by the desire to correct a market failure or motivated by the selfish interests of politicians. An example of the former motivation is the liquidity-provision intervention by the Federal Reserve during the recent crisis when the private provision of liquidity in the shadow banking system dried up. Such intervention is ex post efficient in the sense that it minimizes market-failure-related distortions. This is *not* the kind of political intervention that our analysis focuses on. Specifically, the intervention in our analysis is motivated by the selfish interests of politicians – the desire to (inefficiently) expand credit availability to enhance the re-electability prospects of politicians. We showed that political intervention is just as likely in well-developed financial systems as it is in emerging, underdeveloped systems. In emerging financial systems, politicians provide subsidized equity in exchange for ownership of banks. In well-developed financial system, politicians enact regulations that mandate that banks lend to previously-excluded high-risk borrowers. In both cases, the effect

is the same – systemic risk of the financial system is increased. Thus, if the goal is to improve financial system stability, the discussion cannot proceed without explicitly considering political incentives to undertake initiatives that increase financial system risk. In case this increased systemic risk leads to a financial crisis, there may be an opportunity for political intervention that is aimed at correcting a market failure. There can thus be an *interaction* between the two motivations for policy intervention by the government. Purely politically-motivated intervention can increase the likelihood of intervention aimed at correcting market failures.

Also interesting is the potential *interaction* between policy mis-steps due to the failure to recognize that banks and markets must co-evolve on the one hand and the likelihood and nature of political intervention in the financial system on the other hand, an issue touched upon briefly earlier. This takes us beyond the issues analyzed earlier because the nature of political intervention now becomes less predictable, since it is likely to be targeted at whatever is perceived to be a failure in the financial system. This introduces a form of *endogenous uncertainty* into the financial system and further elevates systemic risk.

A key point emerging from our analysis is that securitization is one of the elements that is responsible for the virtuous loop that positively connects the co-evolution of banks and markets. Thus, if there is any government intervention that our analysis supports, it is in the form of encouraging the development of securitization markets, and *not* any direct intervention to expand bank lending either through government ownership of banks or direct lending legislation that compels banks to lend to otherwise-excluded high-risk borrowers.[8] The reason is that the encouragement of securitization helps to improve economic efficiency by reducing the impact of frictions related to asymmetric information that can lead to market failures (e.g., credit rationing or other forms of credit exclusion due to a limited scope of direct bank lending), whereas direct intervention to expand credit availability is motivated solely by political considerations and comes at the expense

of economic efficiency. In other words, politicians need to distinguish between market failures arising from coordination failures among profit-maximizing participants – that may be subject to attenuation through selective ex post government intervention – and those that are linked to the endogenous uncertainty created by government mis-steps.

We have not considered the impact of the judicial system on the interactions we have examined, so a few remarks on that are appropriate. As La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) have shown, legal systems and the implied property rights have important consequences for finance and growth. There are at least two major issues here. One is the impact of the judicial system on how much information about potential borrowers is available in the public domain. Laws differ across countries when it comes to how much credit information lenders, credit reporting bureaus and others can share about borrowers. Our analysis suggests that the more the judicial system permits the release and dissemination of such information, the smaller will be the (screening) advantage of banks over markets. Hence, capital markets will experience a greater share of total credit extension in economies with judicial systems of this sort. The other issue is creditor versus borrower (shareholder) rights. Again, legal systems differ in the extent to which they favor one group over the other (La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1998). Since the economic forces that propel banks and markets to develop further originate from creditors in our model, the analysis hints at the superiority of legal systems that favor creditor rights, at least in terms of correcting market failures and facilitating bank-market co-evolution. However, this is no more than a hint, so it would be an interesting one to examine in future research.

# Notes

[1]Typical examples of market-based systems are those in U.S. and U.K., and Japan and Eurozone countries like Germany are traditionally viewed as having bank-based systems.

[2]See also the growing body of other empirical research on financial system architecture as well as its impact on growth (Levine and Zervos 1998; Tadesse 2002).

[3]See also Allen and Gale (1999), Dewatripont and Maskin (1995), and von Thadden (1995).

[4]Other papers have also used heterogeneous prior beliefs to explore issues in banking, e.g., Song and Thakor (2007).

[5]Since credit rationing in models like Stiglitz and Weiss (1981) results from the use of debt contracts, the market can eliminate it by relying on equity.

[6]A direct, albeit crude, way to do this would be to accept bribes from certain groups and engage in other illegal activities. While this is a realistic alternative specification, we rule it out in our analysis.

[7]Clearly, the intervention strategy space of politicians is much richer in practice than the two strategies we have chosen to analyze. However, we believe those are two commonly deployed strategies, and analyzing a more complex set of strategies becomes analytically intractable.

[8]Clearly, our model does not argue that ex post efficient government interventions during financial crises are not worthwhile.

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FIGURE 1. Borrower's Choice of Financing Source

