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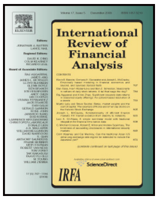

Financial liberalization and contagion with unobservable savings☆

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ABSTRACT

How does the presence of decentralized market-based channels for borrowing and lending affect financial integration and financial contagion? To answer this question, I develop a two-country model of financial intermediation, where banks have access to country-specific investment technologies, and agents can borrow and lend in an international hidden market. In this environment, the possibility of hidden borrowing and lending has three main effects. First, it improves welfare with respect to the autarkic equilibrium, by allowing gains from "hidden" financial integration. Second, it halts the process of "official" financial integration. Third, it lowers the resilience of the economy to unexpected shocks to fundamentals.

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1. Introduction

In the last few decades, the debate on the future directions of the financial system has been influenced by some quite dramatic events. First, as a consequence of financial innovation, we witnessed the rapid development of the so-called "shadow banking system", a whole new set of instruments, institutions and channels that the individual investors have used to by-pass the "official" financial system to make their investments. Until recently, no estimate existed of the dimension of the shadow banking system, but we can draw some evidence by taking a measure of total financial assets as a proxy.[1] The data show that, for the shadow banking system, this value grew from US$ 2.5 billion in the early 1990s to US$ 24 billion in 2007. This tenfold growth is even more noteworthy if we take into account that the total financial assets of the U.S. commercial banks have not increased at the same pace: in fact, while the ratio of shadow banking to commercial banks' total financial assets was around 52% at the beginning of the 1990s, it peaked at around 200% in 2007.

Together with this evolution, the last twenty years have also featured two more facts. First, as highlighted by the IMF, the process of financial integration around the world has faced a slowdown, both in the developing and developed world (Abiad, Detragiache, & Tresse, 2008). Second, there is some evidence that financial contagion has increased in conjunction with financial integration.[2] In that respect, the 2007–2009 financial crisis is full of anecdotes, as a period of financial distress that spread from the U.S. to the rest of the world, leading to massive financial losses.[3]

In the present paper, my aim is to connect these three facts by addressing the following issue: how does the presence of decentralized market-based channels for borrowing and lending affect financial liberalization and financial contagion? To answer this question, I develop a theoretical environment based on the seminal work by Diamond and Dybvig (1983). In their model, financial intermediaries (or more commonly, banks) provide insurance to their customers against the realization of an idiosyncratic shock, which makes them either patient

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[1] The data are taken from the Flow of Funds Accounts of the United States.

[2] See, for example, Hartmann, Straetmans, and de Vries (2005), van Lelyveld and Liedorp (2006) and Degryse and Nguyen (2007).

[3] According to a report by the Mediobanca Research Department (2010), the United States administration spent around US$ 2 trillion in bailing out the financial system, while the United Kingdom alone spent more than 900 million euros.

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or impatient to consume. For this purpose, the banks collect deposits, invest in short-term (liquid) assets and in long-term (illiquid) assets, and sign a contract with their customers which states the amount of “early” consumption that they will receive if they are impatient, and the amount of “late” consumption if they are patient.

I extend the basic model in two directions. First, I assume a two-country environment, where the banks enjoy a comparative advantage in one of the available investment technologies: the foreign country has a higher yield in the long-term asset than the home country. We can see this difference as stemming from different regulatory environments, or different production technologies that are available in the two countries, and use this assumption to provide a rationale for financial integration. I will compare different cases where banks in one country either are or are not allowed to make deposits in banks in the other country, as a proxy for autarkic versus fully-integrated financial systems.

As a second extension, I instead introduce unobservable savings. That is, I assume that the individual depositors can borrow and lend among themselves in a hidden bond market, i.e. without being observed by their banks. The unobservability of these trades is a standard way of introducing the concept of “non-exclusivity” of the financial contracts in economic theory, and is a plausible assumption for two main reasons: first, because it is difficult to imagine that a bank can preclude its customers from contacting other intermediaries, or can make its contracts contingent on that; second, because, in this way, I introduce an unobservable channel in the model, which is similar to the shadow banking system, not only because of its unobservability, but also because the exchanges are cleared at a market price that is determined in equilibrium. The unobservability of these trades implies that the terms of the banking contract must satisfy an incentive compatibility constraint: the present value of the consumption bundle that the banks promise to each depositor must be constant, regardless of whether the depositor is patient or impatient to consume.

In this environment, I prove the following results. In the competitive equilibrium, the presence of the hidden markets always imposes a burden on the banks, which see their choice sets constrained by the incentive compatibility constraint. However, the hidden markets have different effects on the equilibrium outcome, depending on the level of integration in the “official” banking systems: when an international interbank market is not developed, cross-country borrowing and lending among the depositors, despite being unobservable, do increase welfare with respect to the case of financial autarky: this happens because the banks in each country cannot observe their depositors' behaviors, but know that they can borrow and lend across countries. Thus, they specialize in the asset in which they hold a comparative advantage, and let the depositors exchange resources unobservably, so that they enjoy gains from “hidden” financial integration. In contrast, when the banking systems of the two countries are fully integrated, the hidden markets only have a negative influence on welfare: in fact, if the hidden markets were closed, the competitive equilibrium would indeed be equivalent to the social optimum.

More importantly, I show that the unobservable savings halt the process of integration in the official interbank market. The intuition for this result is the following: in order to integrate, the two countries need to both agree that integration is welfare-improving with respect to financial autarky. Without hidden trades, this is obvious: the two countries create a common financial system, and the banks specialize in the asset in which they enjoy a comparative advantage and make cross-country deposits. However, when the two countries are in financial autarky, but the depositors are allowed to trade unobservably, the home country invests everything in the short-term asset (because it holds a comparative advantage in it) and let the depositors lend in the hidden market; in contrast, the banks in the foreign country invest all their capital in the long-term asset (in which they hold a comparative advantage) and let the depositors borrow. Upon integration, the equilibrium return on the hidden market increases, and this affects the welfare of the two countries in two opposite ways: the country specializing in the short-term asset (Home) is better off, because it lends at a higher rate; the country specializing in the long-term asset (Foreign) is, instead, worse off, because, after financial integration, it is borrowing at a higher rate. Hence, financial integration is no longer welfare-improving for the whole economy.

In order to study financial contagion, in the second part of the paper I instead analyze the resilience of the stylized economy to a perturbation: I introduce the state $\overline{S}$, in which one of the two countries is hit by an aggregate shock to fundamentals that, suddenly and unexpectedly, increases the number of impatient agents in the economy, and therefore also increases the demand for early consumption. In order to rebalance its budget, a bank in this situation can use a buffer: it is the extra resources that it can create by liquidating (at a cost) the long-term asset in portfolio, while still keeping sufficient resources to pay for the late consumption. As a consequence, a bank is “bankrupt” whenever the unexpected demand for early consumption is higher than the available buffer. When the two banking systems are integrated, the presence of cross-country interbank deposits creates a channel through which the value lost by one bankrupt bank can push the banks in the other country into bankruptcy as well, in which case we say that there is financial “contagion”. In a similar environment, but without hidden trades and comparative advantages, Allen and Gale (2000) show that bankruptcy and contagion arise if the unexpected shock to fundamentals and the deadweight losses from liquidating the long-term asset are “sufficiently high”. In the present environment, I instead show that unexpected shocks to fundamentals lead to bankruptcy and contagion only when the two banking systems are integrated. The intuition is that, as mentioned above, the possibility of hidden trades forces the banks to set up a contract such that the present values of the consumption bundle that the patient and impatient agents receive are equal. This means that the unexpected demand for early consumption and the extra long-term asset that can be liquidated in state $\overline{S}$ amount to the same number. However, the liquidation of the long-term asset comes at a cost and, therefore, the actual available buffer is always less than the unexpected demand for early consumption, i.e. there is always bankruptcy in the face of an unexpected shock to fundamentals. Moreover, bankruptcy always leads to contagion, because the banks in the other country do not hold any buffer in equilibrium.

The results of the theoretical analysis proposed in this paper are interesting because they provide a novel point of view on the crisis of the U.S. banking system between the end of the 1970s and the beginning of the 1990s, which took the name of “Savings and Loan (S&L) debacle”. The S&Ls were financial institutions whose main activity was the provision of savings accounts and residential mortgages. The strict interest-rate regulations of the 1960s and the 1970s did not prevent (or, more probably, encouraged) the “disintermediation” of the U.S. financial system, as many individual investors moved their resources away from the traditional banking sector, and towards new unregulated instruments, such as money market mutual funds, that offered higher returns. This situation resembles the theoretical environment presented here, where a regulated financial system coexists with an unobservable unregulated market. The model predicts that the system should be resilient to unexpected shocks to fundamentals, as long as the official financial system is in autarky. In fact, we observe a similar pattern in reality, as shown in Fig. 1: during the 1970s, a period of extreme financial instability, the strict regulation of the U.S. financial system (similar to autarky) prevented the emergence of big financial crises. The financial liberalization and deregulation of the 1980s, aiming at boosting the efficiency and the profitability of the financial system, did instead have the unintended consequence of a loss in the resilience of the overall system. This scenario resembles that in the theory, as the integrated equilibrium with hidden trades is more prone to crises than the autarkic equilibrium: any unexpected shock to fundamentals leads to bankruptcy and contagion.

The rest of the paper is organized as follows: in Section 2, I summarize the related literature. In Sections 3 to 5, I define the theoretical

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