Journal of Financial Stability 14 (2014) 23–34

Contents lists available at ScienceDirect

Journal of Financial Stability

journal homepage: www.elsevier.com/locate/jfstabil

Collateral composition, diversification risk, and systemically important merchant banks

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ARTICLE INFO

Article history:
Received 27 December 2012
Received in revised form 18 October 2013
Accepted 6 March 2014
Available online 15 March 2014

JEL classification:
G24

Keywords:
Collateral
Systemic risk
Merchant bank
CoCos

ABSTRACT

The impact of collateral diversification by non-financial firms on systemic risk is studied in a general equilibrium model with standard production functions and mixed debt-equity financing. Systemic risk comes about as soon as firms diversify their collateral by holding claims on a big wholesale (merchant) bank whose asset side includes claims on the same producer set. The merchant bank sector proves to be fragile (has a short distance to default) regardless of competition. In this setting, the policy response, consisting in official guarantees for the merchant bank's liabilities, entails considerable government loss risk. An alternative without the need for public sector involvement is to encourage systemically important merchant banks to introduce a simple bail-in mechanism by restricting their liabilities to contingent convertible bonds. This line of regulatory policy is particularly relevant to the containment of systemic events in globally leveraged economies serviced by big international banks outside host country regulatory control.

1. Introduction

Financial instability and crises are inseparably tied to the phenomenon of default. Crises can start with mass defaults on the micro level, as occurred in the U.S. subprime mortgage market breakdown case of 2007. They also often result in default, including by financial intermediaries, as we have seen in most manifestations of the latest financial crisis in the U.S. and Europe following the summer months of 2008. At their worst, they give rise to a vicious circle of defaults involving banks, the non-banking private sector, and the government, so that funds borrowed to prevent insolvency in one sector push the rescuer itself toward insolvency, as in the current EU periphery sovereign debt impasse. This makes default, particularly if it happens on a systemically important scale, the main adversary of prudential policy.

However, as if totally unaware of this dismal record, the available economic theories of default offer a much less dramatic picture. Agents enter into debt contracts conscious of the possibility that the payment obligation will not be honored, and there is a whole spectrum of methods, from elementary to highly sophisticated, describing how the non-payment contingency can be reflected in the price of a debt claim. In popular terms, forewarned should be forearmed, so where are the arms of rational creditors? If default is so universally bad, why are there perfectly sensible theories telling us how the debtor chooses to default optimally, or how the creditor optimally calls an insolvency procedure in advance of a credit event (e.g. Leland, 1994, or Leland and Toft, 1996)? Unfortunately, economics has not yet developed a comprehensive picture of default costs and their genesis and structure, or of ways of containing them. These matters are mainly explored by practitioners. From the point of view of the latter, including policymakers, the disastrous effect of default on economic activity and welfare comes from two sources: the legal complexity of debt workout procedures, and the destruction of value, such as human capital and other assets, as a result of forced changes of ownership and control. Neither of these areas has been sufficiently investigated by mainstream financial economics, the language of which is usually employed to formulate policy. Therefore, we have little more than an informal understanding that both private and social default costs are significant enough to be acted against. This understanding has a very long tradition and may have been the principal force behind the custom, existing since ancient times, of equipping loan agreements that show a material default probability with the provision of recourse to collateral. Accordingly, without dwelling

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http://dx.doi.org/10.1016/j.jfs.2014.03.001
1572-3089/

excessively on the question of why, the economics of debt and investment includes collateral as a standard element of its models. As an unintended consequence, since financial crises and their spillovers to the real economy are crises of risky debt, and the latter has collateral attached to it (with the objective to reduce risk), what we face are, essentially, crises of collateral markets. This observation has been gradually finding its way into the formal theory in the work of Morris and Shin (2004), Brunnermeier and Pedersen (2009), and Geanakoplos (2010), among others.

The objective of this paper is to examine in what ways heterogeneous collateral and the origin of its different subspecies can generate systemic risk. This is a question earlier macroeconomic models have not covered sufficiently, and it requires a more detailed specification of financial assets and contracts.

I start by formulating a model of production financing in which the Modigliani–Miller law does not hold for capital scarcity reasons. Those who have the knowledge and authority to invest (firm shareholders) do not have their own funds, whereas those who can bring investors and production opportunities together (merchant banks) first need to convince at least some of the potential investors to become their depositors as well, since there is no one else to turn to. Although firms are credit-constrained, they can find it attractive for risk management reasons to hold assets unrelated to their own business (i.e., to diversify into merchant bank claims, which serve as outside collateral). However, a firm cannot acquire enough of those claims without borrowing from some other party (commercial banks) first, and such loans are risky. This economy can only operate with leverage, and with leverage comes a systemic risk threat.

I test this construction by checking that it generates intuitively expected outcomes with regard to the reaction of credit, investment, and output to expanding leverage through outside collateral. On the downside, I find that the threat of a systemic collateralization breakdown is significant not just conceptually, but also quantitatively. A few notoriously salient stylized facts accommodated in the model are responsible for this outcome.

First, although it is an empirical fact that firms usually hold certain assets not immediately related to their own business, and put these assets up as collateral on their loans, their owners do not normally conduct sophisticated risky investments in financial markets on their own. When they decide to purchase liquid collateral other than a sight deposit, they have no choice other than to become clients of the investment banking industry. Second, investment banking tends to be oligopolistic, with significant economies of scale.[1] Despite the turbulent structural overhauls they regularly go through, mature financial centers catering to corporate clients are invariably dominated by a few big companies, for which I will employ the term merchant bank.[2] Third, no matter how much the merchant bank would like to fund its liabilities by a well-diversified asset portfolio, in a globalized (i.e., essentially closed) economy it cannot avoid buying liabilities connected to, ultimately, the same universe of firms whose deposit money it accepts. The chain from some firm's excess cash invested in a certificate of deposit of a merchant bank to a private equity fund holding shares in that very firm may have multiple links, but it can be invariably traced down. Accordingly, by aggregating the merchant bank sector into one entity and inspecting that entity's balance sheet, I feel it justifiable to stylize the analysis, initially, to the case of just a few firms (I will have two in the quantitative examples of this paper) holding claims on one merchant bank who, in turn, holds a tangible portion of the equity of those same firms.

Not surprisingly, in such an environment, the aggregate productivity threshold below which default of the merchant bank occurs is much higher than the same threshold for an individual producer. The merchant bank has to pay sufficiently high deposit rates to its investors to be attractive as a collateral provider. Therefore, there is a clear bound on the merchant bank's profit regardless of competition in the industry. The situation of a commercial bank lending to the same producers is qualitatively different, as its market power depends mainly on informational exclusivity in relation to the client and is only limited by the productivity characteristics of the latter.

The merchant bank can offer claims on itself as diversified collateral to the firms only as long as it is solvent, but the solvency buffer size, i.e., the merchant bank's profit, is limited by the need to make the collateral worth something. Consequently, diversified collateral in the form of deposits (or bonds) is much more susceptible to systemic impairment than liabilities of standalone producers. Under this structure of financial services, the more one tries to diversify, the more fragile is the leverage one creates, and the harsher are the aggregate consequences.

Can an appropriate policy provide a remedy? The most immediate one (also tried many times) would be to provide an official guarantee of the merchant bank's liabilities. However, the fiscal costs may be untenable, as the Irish and Spanish examples of the near past make clear. Going back to default treatment in the earlier mainstream microeconomics, a merchant bank default would be no problem at all if its pecuniary implications were transferred one-to-one to the ultimate creditors and did not receive an institutional spin in the form of a value-destroying bankruptcy procedure. In a frictionless world, this could be achieved if the merchant bank were mandated to issue only equity as liabilities. Even so, merchant bank equity may be unsellable to firms for the reason explained in Townsend's (1979) costly state verification (CSV) model: the impossibility for a small shareholder to establish the appropriate value of the dividend that a big and complex merchant bank owes him. Therefore, I suggest an alternative, inspired in equal measure by Townsend (1979) and by the Black and Scholes (1973) and Merton (1974) treatment of risky company debt. Recall that under the Black–Scholes–Merton approach the company assets in default are transferred one to one to the creditor. The same thing happens under the debt contract considered in Townsend (1979). This is tantamount to the creditor becoming a shareholder. The resulting liability is a fixed-income debt instrument in good times and equity in bad times, i.e., essentially, a convertible bond. An important formal difference from the classical understanding of the latter is that its covenant makes conversion the decision of the holder. In our setting, the conversion trigger is exogenously tied to the merchant bank's solvency (the current model is sufficiently simple in this respect, so that one can assume automatic conversion whenever the bank is unable to pay the original deposit rate, without further procedural details). Essentially, our construction is a variety of the so-called contingent convertible (CoCo) bond. In our view, the most important advantage of this bond covenant is that a shareholder of a living company has a much stronger legal standing in what concerns state verification than a creditor of a defaulting company. So, the key proposition we want to exemplify with our formal exercise is that an insolvent merchant bank should not be sent into bankruptcy, but rather should exchange its fixed income liabilities for shares and then distribute whatever (little) it actually

[1] This property is usually explained, among other things, by diversification benefits positively related to size, the soft "closed club" human expertise of investment monitoring and information processing, or the high fixed costs involved, and sometimes also by political clout going hand in hand with network externalities.

[2] Our use of the term is motivated by its inclusiveness in the sense that features such as catering to the corporate sector instead of retail clients, cross-border operations, involvement in private equity investment, and substantial market power are, or were in the past, all typical of this type of financial institution. A historical overview of the subject can be found, for example, in Craig (2002).