

Tracking Relevant Measures of Credit Creation in a Market-Based Financial System

Carolin Schellhorn

Saint Joseph's University, USA

The growth of the shadow banking system has allowed credit risk to grow outside the purview of traditional bank regulation. Despite lacking relevant information and control over shadow banks, the magnitude of the recent financial crisis required the Federal Reserve to backstop their activities. Going forward, the Dodd-Frank Act offers opportunities for improved information collection and supervision of shadow banks and traditional banks. In addition to reforming and extending traditional bank regulations, relevant measures of credit creation and credit risk may be needed so that credit quantity targets can be formulated that vary with changes in economic conditions.

JEL classification: G20; G21; G28

Keywords: Banking, Financial Intermediation, Money, Credit, Regulation

1. Introduction

The recent financial crisis in the United States revealed the failure of the regulatory system to evolve along with innovations in the financial system. A market-based system of financial intermediation had developed since the mid 1980s and, as part of that system, "shadow banks" and the securitization process, which created a variety of new structured financial instruments, became increasingly important.¹ Yet, these non-depository financial institutions, and the asset-backed securities they traded, remained largely unregulated so that credit creation and credit risks were growing outside the purview of the regulators. Nonetheless, when credit risks expanded to the point where they became threats to the stability of the financial system, the Federal Reserve was forced to backstop the market-based intermediation without having previously been provided with adequate information or supervisory powers. Since then, the volume on the markets for securitized assets has shrunk. Asset-backed security issuance continues to depend on government guarantees and central bank purchases (Blommestein et. al., 2011).

In the summer of 2010, Congress responded to the financial crisis and its consequences by passing the *Wall Street Reform and Consumer Protection Act* (the "Dodd Frank Act"). The Act is broad in scope and promises major changes in almost all areas of financial services regulation (Cluchey, 2011). The newly created Financial Stability Oversight Council ("Council"), which includes the Secretary of the Treasury and the Chairman of the Federal Reserve along with eight other heads of federal agencies, will be of critical importance in identifying and responding to emerging threats to the stability of the financial system both inside and outside of the traditional banking system. Among other new agencies, the Dodd Frank Act also created the Office of Financial Research ("OFR"). The OFR is charged with gathering and analyzing data from banks and other financial institutions to help the Council determine which financial firms need to be monitored more closely and at what point regulatory action is required. While the exact responsibilities this new office will take on are still being negotiated and defined, Taub (2011) points out that, in order to succeed, the OFR will have to gather not just more, but relevant, information. Together with the Council, the OFR will have to come up with suggestions for effective action that is truly stabilizing without making existing problems worse by setting the wrong incentives.

¹ Examples of shadow banks include finance companies, credit hedge funds, money market mutual funds and securities lenders, among others (see Pozsar et.al., 2010).

Given the opportunity to design a regulatory framework for shadow banks and the securitization process while simultaneously improving the regulation of traditional banks – all of which are critical for continued and sustainable economic growth – this paper suggests developing metrics that measure aggregate credit creation and aggregate credit risk both inside and outside traditional banking. A case is made for monitoring and limiting credit creation to stabilize the financial system, similar to the way the Federal Reserve currently monitors and limits the growth of the money supply.

The paper is organized as follows: Section 2 summarizes the results reported in the literature regarding the effects of market-based intermediation by the shadow banking system on credit creation and credit risk, as well as recent proposals for the regulation of shadow banks. Section 3 compares risk-taking incentives in the traditional banking system with those in the shadow banking system, arguing that quantity constraints on aggregate credit creation may have to be imposed along with an extension of traditional bank regulations to shadow banks. Section 4 provides support for this approach by pointing out parallels between the need to control the growth of credit to stabilize the financial system and the need to control the growth of the money supply to maintain price level stability. Section 5 concludes.

2. The Need for Regulating Shadow Banks

With the development of shadow banks since the 1980s, the traditional banking business has evolved from an originate-to-hold model to an originate-to-distribute model of financial intermediation involving loan sales and securitizations.

Shadow banks engage in maturity, credit and liquidity transformation, but unlike traditional banks, shadow banks do not necessarily retain an exposure to the risk of the loans they create. Shadow banks are not insured by a federal government guarantor, nor do they have access to public liquidity through the discount window of the Federal Reserve (Pozsar et. al., 2010). Financial intermediation conducted by shadow banks is largely unregulated and unsupervised. Similar to the temptation to debase a commodity-linked currency and increase its quantity, incentives exist to relax credit screening, reduce loan quality and increase lending. In the shadow banking industry, these incentives have remained unchecked.

The positive and negative effects of this profound change in the nature of financial intermediation have been extensively documented in the recent literature. Loutskina and Strahan (2009) point out that, as financial integration has diminished the importance of local lenders, the risk of market-wide contagion has increased. Further, loan sales and securitizations facilitate risk sharing through diversification, but they simultaneously weaken incentives to assess credit risks carefully. Several studies provide evidence of reduced incentives to screen out bad loans (Jiang et. al., 2010; Keys et. al., 2009 and 2010; and Nadauld and Sherlund, 2009), particularly for non-reputable lenders (Bushman and Wittenberg-Moerman, 2009). These results support the notion that the expansion of shadow banking has contributed to the recent financial crisis.

Using European data, Altunbas et. al. (2009) point out that banks' loan supply no longer depends on excess reserves and traditional monetary policy because loan sales and securitizations allow financial institutions to replenish their liquidity and transfer credit risks unfettered to investors in financial markets. Thus, it appears that traditional monetary policy has lost control over credit creation in the economy, which has led to increases in systemic risk. The authors argue that the focus of monetary policy needs to shift to stabilizing economic conditions and the risk profiles of traditional banks and shadow banks in order to safeguard a stable credit supply.

A number of recent research studies suggest regulating shadow banks by adapting and extending existing regulations for traditional banks. Adrian and Shin (2009), for instance, advocate fine tuning capital requirements to restrain leverage at the peaks of business cycles, implementing forward-looking loan loss provisions, and increasing capital ratios for all systemically important financial institutions. Ricks (2010) proposes short-term liability insurance for financial firms below a specified asset volatility threshold while barring financial firms above the risk threshold from

access to the money markets.

This paper adds another perspective to the existing proposals for financial-statement-based regulations and short-term liability insurance subject to risk limits. In addition to stabilizing the financial system with methods akin to traditional banking regulation, the regulators might consider tracking and, at times, restricting growth in the aggregate quantity of credit. They would, thus, be implementing a regime similar to monetary policy that tracks and controls the growth of the money supply.

The following section compares the payoffs and risk-taking incentives of reputable and non-reputable traditional banks with those of reputable and non-reputable original lenders in a shadow banking system. In order to focus on differences between the originate-to-hold model of traditional banking and the originate-to-distribute model of shadow banking, we analyze these two modes of operation assuming the absence of any government intervention.

3. Credit Creation by Traditional Banks versus Shadow Banks

As long as lenders are able to charge borrowers with limited access to capital markets for loan originations, incentives exist to increase credit creation in both the traditional and shadow banking systems. In both banking systems, there also exist opportunities for reputable original lenders to charge premiums for certifying good (but unknown) borrowers when making a loan, as these borrowers often find that their financing costs in financial markets drop after a loan agreement from a reputable lender is secured (Cook, Schellhorn and Spellman, 2003; and Preece and Mullineaux, 1994). Building a high-quality reputation requires consistent lending to excellent borrowers. However, resource constraints limit the supply of good credit risks in an economy at any given time. Therefore, opportunities to build reputations for high-quality lending, which are prerequisites for certification charges, are limited. To the extent original lenders are able to build high-quality reputations, the threat of losing their reputations and the associated certification premiums largely prevents them from making bad loans and limits credit creation in both the traditional and shadow banking systems.

Although non-reputable original lenders do not risk losing a valuable reputation when making bad loans and are, therefore, more inclined to do so, other constraints in the traditional banking system impose limits on credit creation and risk. Traditional banks tend to keep many of the loans they make in their asset portfolios, so their uninsured security holders are exposed to the risk of losses from bad loans. As a result, investors have an incentive to monitor risk-taking by the bank and exercise market discipline by selling their securities when risk-taking is deemed excessive. In addition, reserve requirements, asset quality standards and capital requirements for traditional banks are effective limits on the quantity of bad loans a traditional bank can create and hold.

Non-reputable original lenders in the shadow banking system, on the other hand, are able to move loans off their balance sheets through sales and securitizations. Hence, their security holders are much less exposed to losses from the loans these lenders originate. As they remain shielded from the risks created when loans are made and then sold, investors in these firms have little incentive to exercise market discipline by selling their securities when credit creation exceeds reasonable limits. Moreover, the absence of regulatory balance sheet constraints for shadow banks facilitates increases in credit creation that are potentially very damaging to the stability of the financial system.

Table 1 below highlights differences in payoffs and risk-taking incentives between the originate-to-hold model of traditional banking and the originate-to-distribute model of shadow banking *when neither system is subject to any government regulation*. In this illustration, borrowers applying for loans from financial institutions have limited access to capital markets and, therefore, are willing to pay a loan origination fee, f_t .² Borrowers are classified into three homogeneous

² For simplicity, all economic actors are assumed to be risk-neutral, and the risk-free rate of time preference is zero. All revenues, costs and loan losses are stated as a rate per standardized financing unit. Loans have a maturity of one period.

quality classes: “excellent,” “good” and “bad,” based on their risk of default. The excellent borrower always pays its debt obligations so that the time t expectation of the loan losses in the subsequent period from lending to the excellent borrower, $E_t(L^{e_{t+1}})$, equals zero. Since the lender never incurs any losses from a loan to an excellent borrower, the excellent borrower pays the zero risk-free interest rate, $r_f = 0$.

Table 1
Payoffs and Risk-Taking Incentives of Original Lenders in Traditional Banking versus Shadow Banking

<i>Original Lender Type</i>	<i>Borrower Quality</i>	<i>Originate-to-Hold Model of Traditional Banking</i>	<i>Originate-to-Distribute Model of Shadow Banking</i>
ROL	Excellent	$f_t - s_t + r_f - E_t(L^{e_{t+1}}) = 0$	$f_t - s_t = 0$
ROL	Good	$f_t - s_t + r^g_t - E_t(L^{g_{t+1}}) + c_t = c_t$	$f_t - s_t + c_t = c_t$
ROL	Bad	Reject*	Reject*
NOL	Excellent	No match**	No match**
NOL	Good	$f_t - s_t + r^g_t - E_t(L^{g_{t+1}}) = 0$	f_t
NOL	Bad	$f_t - s_t + r^b_t - E_t(L^{b_{t+1}}) \leq 0$	f_t

Notes: ROL denotes the reputable original lender, and NOL represents the non-reputable original lender; f_t is the loan origination fee; s_t is the screening expense; c_t is the certification premium; r_f is the risk-free rate, which is assumed to be zero; r^g_t and r^b_t are the loan rates charged the good and the bad borrowers, respectively; $E_t(L^{e_{t+1}})$, $E_t(L^{g_{t+1}})$ and $E_t(L^{b_{t+1}})$ are the time t expectations of the excellent, good and bad borrowers' loan losses during the subsequent period, respectively.

* According to Bushman and Wittenberg-Moerman (2009), the breakdown of incentives to screen out unacceptable credit risks in the shadow banking system affects primarily NOLs; ROLs likely reject bad borrowers even if given the opportunity to sell the loans to other shadow banks.

** NOLs have difficulty attracting excellent borrowers because excellent borrowers look for a long-term relationship with a ROL.

The number of excellent borrowers at any given time for any given set of economic circumstances is limited due to resource constraints. Not all original lenders are able to attract excellent borrowers. While lending to excellent borrowers enhances an institution's reputation for quality lending, the payoff from loans to excellent borrowers is zero.

In contrast, the lender can expect loan losses from the good borrower and the bad borrower. The good borrower defaults on its debt some of the time but, on average, is able to pay for these defaults with a risk-adjusted rate $r^g_t = E_t(L^{g_{t+1}})$ greater than zero. The bad borrower should not be able to qualify for a loan because this borrower, on average, is not able to pay a rate commensurate with its risk so that $r^b_t < E_t(L^{b_{t+1}})$ with $r^b_t > r^g_t$. At any given time, there is an unlimited supply of bad borrowers. In order to distinguish excellent, good and bad borrowers, the original lender must incur a screening expense, s_t , every time a new loan is made.

Original lenders are classified into two homogeneous classes: reputable original lender (ROL) and non-reputable original lender (NOL). ROLs differ from NOLs in that they always reject bad borrowers in order to build and preserve their quality reputations.³ Given a quality reputation, a ROL is able to extract a certification premium, c_t , when lending to a good borrower in return for the benefits this borrower derives from the certification, such as lower financing costs in financial markets. The excellent borrower does not pay for the certification, because the bank's reputation

³ It is difficult to define what constitutes a reputation for quality lending or how it may be acquired. Cook et. al. (2003) find that cumulative measures of a lender's long-term performance, such as third-party quality ratings or lender size, may be considered indicators of a quality reputation.

and certification capability depend on loans made to excellent borrowers.⁴ If a ROL lends to a bad borrower, it loses its reputation for quality lending and is no longer able to charge for certification. Therefore, Table 1 excludes this possibility in both the traditional banking system and the shadow banking system.

NOLs are unable to build a reputation for quality lending and, therefore, are unable to extract any certification premiums when lending to good borrowers. NOLs have difficulty attracting any of the few excellent borrowers that exist in an economy at any given time. Excellent borrowers have a choice of lenders and would most likely prefer ROLs, which are more likely able to offer long-term, stable relationships. In the traditional banking system, NOLs that lend to bad borrowers incur losses in their asset portfolios that, ultimately, lead to insolvency.

Table 1 allows a comparison of payoffs to original lenders in a traditional banking system versus a shadow banking system. In a traditional banking system, both ROLs and NOLs hold loans in their asset portfolios. In order to avoid bad credit risks and insolvency, both ROLs and NOLs must incur the screening expense, s_t , which allows them to distinguish between borrower types. This expense is passed on to the borrowers in the form of an origination fee, f_t , that borrowers are willing to pay due to their inability to secure sufficient funds in financial markets. Original lenders may increase their payoffs if they develop a reputation for quality lending that allows them to attract excellent borrowers and charge good borrowers for certification. Due to the limited number of excellent borrowers and the ability of these borrowers to choose a ROL, NOLs are largely confined to lending to good borrowers *without* the ability to charge for certification. Competition among NOLs insures that payoffs do not rise above zero. If NOLs lend to bad borrowers, the resulting loan losses drive them out of business. In summary, both reputable and non-reputable traditional banks have incentives to avoid bad borrowers. This limits credit creation and credit risks in the traditional banking system even without bank regulation.

The shadow banking system introduces a chain of non-bank financial institutions that connects the original lender with the investors supplying funds in financial markets. However, the direct connection between the borrower and the ultimate credit provider is severed. The original lender is able to distinguish among borrower types as long as the screening expenditure is made; but once the loan is sold or securitized, this information is unavailable to the ultimate investor. It is this feature of the shadow banking system that creates the temptation for the original lender to continue charging for loan originations while increasing credit quantity and foregoing the screening expense. As long as the original lender sells the loan, any credit risk and loan losses are passed on to other investors in financial markets. Bushman and Wittenberg-Moerman (2009) find that this breakdown of screening incentives in the shadow banking system is particularly severe for NOLs. As shown in Table 1 above, NOLs are able to generate a positive payoff, f_t , in return for originating loans to any borrower, regardless of credit risk, when they withhold the screening expense. In the absence of screening, a NOL is unable to identify and reject bad borrowers. And in the absence of credit quantity limits or other regulatory constraints, NOLs may create an ever-increasing supply of credit to bad borrowers.

In contrast, ROLs in the shadow banking system likely continue to screen and reject bad borrowers. They have an incentive to maintain their reputations for quality lending because it allows them to charge good borrowers for certification. As long as the certification premium, c_t , exceeds the loan origination fee, f_t , ROLs are likely to self-regulate, i.e., choose to maintain their reputations for quality lending by screening out bad borrowers. In this case their payoffs in both the traditional banking system and the shadow banking system equal their revenues from certification. On the other hand, if loan origination fees, f_t , exceed certification premiums, c_t , then ROLs' incentives to self-regulate likely break down, and their behavior becomes indistinguishable from that of the NOLs as they, too, contribute to destabilizing increases in credit risk. The latter

⁴ While lenders do not report the identity of their borrowers, disclosures in financial statements and in the financial press made by the borrowers frequently reveal information about agreements reached between a borrower and a particular lender.

situation may occur, of course, in periods characterized by speculative bubbles, when financial markets become less discerning regarding credit risks and lender certification provides good borrowers with few cost advantages relative to bad borrowers in financial markets.

4. Credit Creation and Money Creation

Interesting similarities exist between the temptations of credit creation and those of money creation. The rationale for limiting the aggregate quantity of credit derives from the close relationship between money and lending⁵ and the lessons learned from the evolution of fiat money that led to control of the money supply by a government's central bank. Borrowed funds are usually spent right away no matter whether the money is lent by a traditional or shadow bank. Thus, measures of credit creation, it may be argued, are just as relevant as measures of the money supply when trying to gauge the impact of lending activity on systemic risk and price level stability.⁶ The Federal Reserve currently tracks various measures of credit creation in the *Flow of Funds Accounts of the United States*. Yet, little is known about the relationship between these measures of credit quantity and the stability of our financial system.

Fiat money, which is backed only by the credibility of a government's central bank, is a relatively recent phenomenon in the long history of money. For most of its history, money consisted of a valuable commodity that was generally accepted as a medium of exchange. Velde (1998) argues that fiat money evolved from commodity money as the result of a long-term optimization process. A major advantage of commodity-based money is that it naturally stabilizes the price level. A major disadvantage of commodity-based money emerged when trade grew and the use of multiple denominations became necessary. The costs of producing a small-denomination coin were about the same as the costs of producing a large-denomination coin. As the costs of coin production per unit of silver content fell with increases in the denomination of the coin, there was little incentive to produce small-denomination coins, and there were never enough of them available. To deal with this problem, convertible bank notes and tokens were issued that were not full-bodied so that their market values exceeded their intrinsic values. The incentive to produce small-denomination coins was accompanied by the temptation to debase the currency and increase coin production and profits which, in turn, brought the risks of inflation and counterfeits. The government naturally emerged as monopolistic issuer of fiat money to control its supply and prevent counterfeits.

Analogously, the current changes in financial intermediation involving loan sales, securitizations, financial crises and regulatory changes may be part of a long-term optimization process that started with the earliest beginnings of the traditional banking business of deposit-taking and lending. The automatic money supply constraints inherent in a monetary system based on full-bodied commodity money are similar to the automatic constraints placed on credit creation by traditional banks that make loans and hold them on their balance sheets. The incentives to debase the currency and to produce more coins and, ultimately, fiat money correspond to the incentives to lower credit quality and increase the supply of credit. The former are generally understood to pose inflation risk while the latter have proven to increase credit risk with the potential to destabilize the financial system. Clearly, these two risks are neither mutually exclusive nor independent.

Based on the analogy between money and credit, it seems useful to understand the relationships between various measures of credit creation and systemic risk better. Relevant measures of credit quantity could be identified, and policy targets could be set that vary with the

business cycle. Quantity thresholds would trigger regulatory audits to spot-check the credit quality of financial institutions and financial instruments. If there were limits on the quantity of

⁵ With a loan a borrower receives an amount of money which has to be repaid with interest. Lending may thus be viewed as a reallocation of money over time. See also Parguez and Seccareccia (2000) and Levinthal and Zeira (2009) for discussions of the close relationship between money and lending.

⁶ Indeed, the importance of focusing on credit rather than money was pointed out well before the onset of the recent crisis (Marks, 2004).

credit along with credit quality standards, lenders could increase payoffs only by building a quality reputation that would allow them to charge for certification. This would give original lenders an incentive to become more selective and encourage a better allocation of credit across the credit quality spectrum, thus reducing bad credit risks and threats to the financial system.^{7,8}

5. Conclusion

Credit creation by a traditional bank is naturally constrained by the bank's exposure to the risk of losses from its loan portfolio. In addition, government regulations of assets and capital restrict the ability of traditional banks to increase the quantity of credit and credit risk in the economy. Similar brakes on credit creation are absent in the shadow banking system.

The only stabilizing element that is common to both banking systems is a lender's incentive to build a high-quality reputation that allows the lender to charge the borrower for certification. This incentive is fragile, however, especially in the shadow banking system where it depends on the relative size of the certification premiums. These premiums may decline during periods of speculative bubbles, when markets become less discerning of credit risks and lending standards are relaxed. It is during these times, of course, that restraints on credit creation are most needed.

To reign in uncontrolled credit creation through loan sales and securitizations, extending traditional banking regulation to the shadow banking system may not be enough. Similar to restrictions on the growth of the money supply, the government may need to track and control growth in the supply of credit. Relevant measures of credit creation are required with policy targets that vary with economic and market conditions. The intent of the Dodd-Frank Act and the associated regulations is to strengthen and stabilize the financial system. Understanding and controlling credit creation in the shadow banking system must be an integral part of this effort.

⁷ To help with the construction of new credit creation measures, the IMF's *Monetary and Financial Statistics Manual* (2000), pages 66-69, and its *Monetary and Financial Statistics Compilation Guide* (2008) provide a basis for discussion.

⁸ A related proposal by Nakamura (2010) suggests expanding the Federal Reserve's Flow of Funds accounts by adding detailed information about financial instruments and their holders. The author envisions the construction of a large macro-micro database that would allow regulators to complement the regulation of financial institutions with the regulation of financial instruments.

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