

Special Feature B

Regulation, Technology and the Banking Sector

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Intermediation in the lending market has undergone a dramatic shift from traditional banks to shadow banks, i.e., non-depository institutions that fall outside the scope of traditional banking regulation. I trace the growth of shadow banks to the increased regulatory burden faced by traditional banks and financial technology adopted by shadow banks. Assessing financial stability in this new era involves understanding the business model of FinTech shadow banks and traditional banks, the industrial organisation of the credit market, and the equilibrium interaction of intermediaries. I conclude by illustrating and emphasising that a regulatory policy analysis requires the impact of the policy on banks and shadow banks to be examined side by side.

1 Introduction

Financial regulation and supervision, in large part, concerns itself with traditional banks. This “banking-centric” view works under the belief that a well-functioning and stable banking system is critical for channelling funds from savers to users in any economy. Banks generally engage in maturity transformation, taking in funds that are typically short-term, such as deposits, to fund loans that are longer-term. Regulatory policy is expected to generate outcomes based on these beliefs. For instance, when regulators raise the capital requirement to curtail risky lending, the expectation is that credit supply in the economy would contract as banks cut lending. I argue that this approach to policy analysis gives an increasingly incomplete picture and requires a serious rethink.

The reason that such policy analysis fails is that intermediation in the lending market has undergone a dramatic shift due to the entry and growth of shadow banks (Claessens *et al.*, 2018; Seru, 2019). These non-banks are not funded by depositors and therefore are not subject to traditional bank regulation. They also rely on technology and data analytics as being central to their business model (BIS, 2019). Moreover, because they compete with banks on price and non-price dimensions in some markets and not in others, it is critical to understand the industrial organisation of the credit market to better appreciate their equilibrium interaction. Thus, any regulatory policy analysis requires that the impact of the policy on banks and shadow banks be analysed side by side.

In this article, I start by discussing the dramatic changes in the lending market due to the growth of shadow banks. I argue that the growth of shadow banks can be traced to the

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increased regulatory burden faced by traditional banks and to the technological changes adopted by shadow banks, which also explain changes in credit markets around the globe. I then illustrate why assessing financial stability in this new era involves: (i) understanding the business model of shadow banks, many of them FinTech shadow banks, and traditional banks; (ii) the industrial organisation of the credit market; and (iii) the equilibrium interaction of intermediaries. I conclude by emphasising these elements in the context of capital regulation and unconventional monetary policy changes, taking the US as an example.

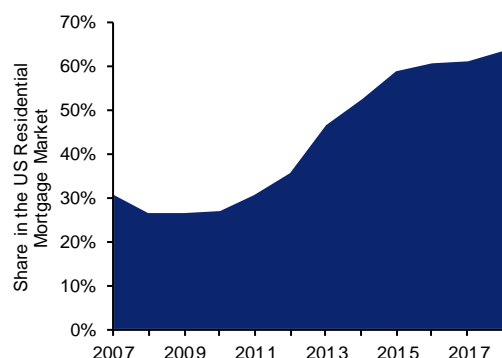
2 Intermediation in Lending Market: The Rise of Shadow Banks

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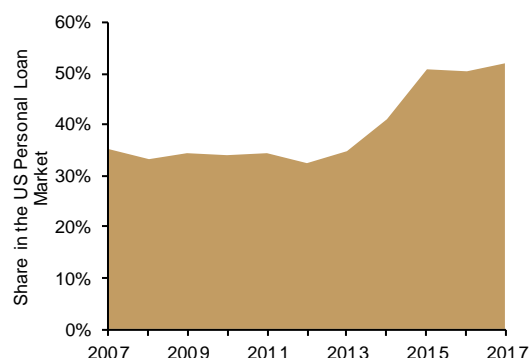
General Trends

In the last decade, the consumer finance market has undergone a dramatic change. As a starting point, consider the residential mortgage market in the US, which is the world's largest consumer finance market. More than 50 million residential properties currently have mortgages outstanding with a combined debt of about US\$10 trillion. As can be observed, the market share of shadow banks in residential mortgages has more than doubled from 2007 to 2017 in **Chart 1**. A substantial portion of this growth is from online "FinTech" lenders that rely on technology. **Chart 2** shows that a similar trend is visible in the US consumer personal loan market.

The growth of shadow banking has been visible beyond consumer finance. **Table 1** provides data on the rising prominence of shadow banks in small business lending, leveraged lending (loans to non-investment grade businesses), and commercial real estate consumer lending. It also provides information on mortgage loan market (both origination and servicing), personal loans and student loans. As of 2015, these six key lending segments (with US\$12 trillion loans outstanding) had around 40% of loans that were associated with shadow banks. I now elaborate on a few of these markets in some more detail.

Chart 1 Shadow banks in the US residential mortgage market

Note: This figure shows the shadow bank origination share in the US residential mortgage market. It plots shadow bank origination share as a fraction of total originations for all mortgages in Home Mortgage Disclosure Act (HMDA) data between 2007 and 2018. The method used to construct this figure is based on Buchak *et al.* (2018a).

Chart 2 Shadow banks in US personal loan market

Note: This figure shows the shadow bank origination share in the personal loan market in the US. It plots shadow bank issuance shares as a fraction of total personal loans. The data comes from a large credit bureau.

Table 1 Shadow banks across different markets in the US

Type	Market Size (US\$ Billion)	Market Type	% Inside Banking System	% in Banking System at Risk	Select Disruptors/ New Entrants	Competitive Advantage
Unsecured personal loan	843	Loans Outstanding	81	31	Lending Club, Prosper	Regulatory, technology
Small business loan	186	Loans Outstanding	95	100	On Deck, Kabbage	Technology (time, convenience)
Leveraged lending	832	Loans Outstanding	7	34	Alternative AM, BDCs	Regulatory
Student lending	1,222	Loans Outstanding	5	100	SoFi, Earnest, CommonBond	Regulatory, technology, convenience
Mortgage origination	1,169	Annual Volume	58	100	Quicken, PFSI, Freedom	Regulatory, convenience
Mortgage servicing	6,589	Loans Outstanding	73	6	OCN, NSM, WAC	Regulatory, cost
CRE lending	2,354	Loans Outstanding	56	9	Commercial REITS, alternative lenders	Regulatory, market dislocation
Total	13,195	-	59	20	-	-

Note: This table shows the breakdown of banks and shadow banks market size in different markets: unsecured personal loans, small business loans, leveraged loans, student loans, residential mortgage loans and commercial real estate loans. The fourth column presents estimates of how much of the lending as of 2015 is done by traditional banks. The fifth column presents estimates of how much of the lending by traditional banks is at risk by shadow banks. Data are based on Goldman Sachs Global Investment Research.

US Corporate Loan Market

The corporate lending market has seen a big change in the aftermath of the financial crisis. In particular, there has been an increase in leveraged loans over the last decade. Leveraged loans are debt taken by firms with below investment grade credit ratings. As the name suggests, these loans are often granted to companies with a high leverage ratio. The market for new leveraged loans in the US has increased by over 40% between 2013 and 2017, when a record high of US\$1.03 trillion were issued. Much like other parts of the lending landscape, non-banks have accounted for a substantial portion of this increase, especially the most aggressive kinds. Prominent non-bank financial firms, such as Jefferies, Macquarie, KKR and Nomura have together claimed more than 10% of the market in 2017.

Regulators have closely watched the lending in this market by banks. For instance, in 2013, the Federal Reserve, OCC and FDIC issued guidance on what was acceptable leverage, restricting firms such as JPMorgan and Bank of America from participating in the riskiest deals. This regulation constrained banks and allowed shadow banks to step in when banks retreated. In addition, the non-bank lenders tend to provide borrowers a greater choice of debt products, such as those with equity-like features, than what banks have typically offered.

Incidentally, the rise of shadow banks is visible not only at the risky end of the corporate bond market. Irani *et al.* (2018) study the rise of shadow banking in the corporate syndicated loans market and show that shadow bank funding rose from about 20% in 1992 to 70% in 2014. The study also finds that capital regulation on banks played an important role in the rise of non-bank funding: non-banks stepped in for loans with higher capital requirements and at times when capital is scarce. While more non-bank funding may suggest that risks have declined in the banking sector, risk may simply have moved to investors' pension funds, mutual funds and insurance.

Shadow banks have also made headway in corporate loans for small and medium business enterprises. Small businesses make up almost two-thirds of all new private-sector jobs, but typically have smaller needs. For instance, a US\$100,000 loan is too small for big banks to bother with, but too large for a personal loan for most business owners. Online lenders like Kabbage have stepped into this untapped market. Many traditional banks deny customers with limited or no credit history as well as those with no credit history. Kabbage, instead, looks at credit score but also uses big data on the health of businesses in its determination for approval. Its model considers a company's sales, shipping costs, business software, cash flow information of suppliers and customers and activity on social media, including its online "reputation". Analysing this data enables them to obtain a better picture of business health. The assessment of alternative factors beyond the facades of credit history can often supplement those with limited credit history or mitigate concerns about those with questionable credit. In addition, fully automated lending solutions from online lenders removes the age-old hurdle of normal business hours, offering companies 24/7 access to working capital online. Data science and technology-based solutions have thus simplified arduous financial processes and expanded the market.

Other Markets:

Shadow Banking in China

Estimates from various sources (e.g., Moody's) suggest that the shadow banking sector holds about a third of all banking assets in China. According to the Financial Stability Board,

China's shadow banking has grown by more than 30% per year over the last three years compared with 10% in the rest of the world. In terms of composition, a large share of shadow banking involves wealth management products (WMP) which have grown rapidly in the last five years. This growth outside the banking supervision orbit has been attributed in part to regulation (Hachem, 2018).

The picture on China's shadow banking would be incomplete without touching on the rapid growth of FinTech firms that have relied on technology. The quintessential example here is Yu'eobao, owned by Alibaba Group. Yu'eobao, as a money market fund, has removed the entry barriers that bar most small investors from getting returns higher than bank deposits. Thanks to the absence of barriers, one can invest as little as 0.1 yuan, which would be unimaginable for conventional funds that retail through bank branches. Yu'eobao retails through the PayPal-like Alipay platform of Alibaba. Alipay, the payment tool of choice for hundreds of millions of online shoppers who use Alibaba's online marketplace Taobao, functions as a virtual wallet and provides an entry point for many of Yu'eobao's investors.

Another important aspect contributing to the rise of China's FinTech firms is credit scoring using digital footprints. For example, Sesame Credit in China, run by Alibaba affiliate Ant Financial, is the leading Chinese "social credit" rating firm with 520 million users. Sesame Credit gives users a score based on five dimensions of information: personal information, payment ability, credit history, social networks and online behaviour. Together with Tencent, which has also pioneered a credit score, these FinTech firms have exploited high mobile penetration in China and opened online markets for a large unbanked population in China.

3 Why the Rise of Shadow Banks?

As was evident in the discussion of various markets in the US and elsewhere, the growth of shadow banks and FinTech lenders in the lending landscape has been attributed to two main factors—increased regulation on the financial sector, especially in the aftermath of the Great Recession, and breakthroughs in technology related to big data and data analytics.

Regulatory Burden

The broad idea here is that in the aftermath of the crisis, tightened regulation, increased supervision and heavy fines and penalties prompted banks to cut risky lending, invest in more liquid assets and maintain higher equity capital. As a result, banks were reluctant to lend to less-than-stellar credit users. Shadow banks operating in a relatively lightly regulated environment seized the opportunity and have fulfilled the pent-up consumer demand.

This observation is supported by empirical analysis. For instance, Buchak *et al.* (2018a) exploit regional variation in different types of regulatory and supervision pressure faced by banks engaged in mortgage lending from 2008 to 2016, including the implementation of Basel III with respect to mortgage servicing rights, and find that shadow banks increased their market share across regions during this time period (see Seru, 2019). However, banks reduced mortgage lending more in regions where regulatory and supervisory pressure on banks was higher. These were also regions where shadow bank activity was highest.

This type of finding—that regulatory pressure on banks lead to growth of shadow banks—is evident for other markets as well. For instance, see Irani *et al.* (2018) for evidence from the

corporate loan market in the US and Hachem (2018) for shadow banking related to WMPs in China.

Technology Improvement

The argument here has been that improvements in technology have allowed FinTech firms to provide banking services in different ways from traditional banks. Broadly, improvements in technology have allowed some FinTech firms to provide the same services cheaply and to create new markets by expanding their borrower pool. This has involved attracting consumers to banking services by using mobile phones and convenience apps as an entry point. For instance, consumer-to-consumer payment apps such as PayPal and Venmo initially attracted millennials due to the ease of phone transactions and eventually moved to providing deposit-like services.

Data science has also been shaping the lending market, opening doors that were previously closed to credit-constrained consumers with limited or tarnished credit histories. With big data and AI, FinTech lenders are able to use different information, such as their digital footprint on social media, in the underwriting process to evaluate borrowers' default likelihood. This has allowed both credible borrowers to pay a lower interest rate as well as opened doors for the unbanked population. Another new market that has been made possible due to technology and data science is "peer-to-peer" lending. This breaks away from the conventional investor-borrower framework, drawing resources from a large number of ordinary people to fund others with financial needs. Consumers can participate on both sides of the market as investors or as borrowers.

Finally, FinTech have leveraged on technology and data science to provide new services to existing customers. In particular, they have been able to offer "convenience" to consumers who might have high willingness to pay for such services. For example, Venmo offers consumers who want to make payments to other consumers the ability to pay swiftly via their mobile phones without having to go through a cumbersome process of writing and cashing checks or wiring money through banks. Similarly, Quicken Loans climbed to become the largest US residential mortgage lender by 2017 through the use of its convenient "Rocket Mortgage" product that enables a full online application process and allows consumer to provide all "relevant" information quickly. Buchak *et al.* (2018a) show that all this translates into Quicken Loans being able to substantially cut down the time it takes to originate and sell the loans relative to traditional lenders. In addition, Fuster *et al.* (2018) show that FinTech lenders process mortgage applications faster and adjust supply more elastically than other lenders in response to mortgage demand shocks, which suggests that technological innovation may have improved the efficiency of financial intermediation in the mortgage market.

4 A Proposal for Financial Regulation

I have traced the rise of shadow banking and, in particular, FinTech lenders and argued that regulation on banks and technological improvements are likely the two most important factors behind this growth. How should regulatory policy targeted at financial stability be designed in such an environment?

In the spirit of the famous Lucas critique, I argue that such an endeavour needs to: (i) understand the business model of FinTech shadow banks and traditional banks; (ii) the

industrial organisation of the credit market; and (iii) the equilibrium interaction of intermediaries. Such an approach will help us better understand what activities will migrate between banks and shadow banks in response to different policies. It will also allow a quantitative assessment of the extent of this migration and the reasons for it.

Let me illustrate the importance of these steps through the example of the US mortgage market where data availability allows us to delve deeper into these issues.

Illustration: US Mortgage Market

Business Model

Traditional banks take deposits and use them to make loans, including mortgages. At the same time, they are heavily regulated and subject to strict requirements to hold capital against the loans they keep on their balance sheets. In the mortgage market, they have a choice: They can sell mortgages to government-sponsored enterprises (GSEs), collecting an origination fee and, in some cases, a fee for servicing the mortgages. Or they can hold mortgages on their balance sheets, collecting interest and principal until the loans are paid off, but take the risk that borrowers will default. The better capitalised they are, the greater their capacity to hold mortgages.

By contrast, shadow banks do not take deposits and are lightly regulated. They generally lack the balance sheet capacity to keep the mortgages they originate. Their business model is “originate-to-distribute”, that is, to make mortgages and sell them to the GSEs. Shadow banks sell virtually all their loans to GSEs while traditional banks only partially do so (Seru, 2019). Finally, given the business model of FinTech shadow banks, as noted earlier, they are more active in the refinancing market, where they are better able to exploit their comparative advantage with data.

Industrial Organisation

While the US residential mortgage market constitutes the world’s largest consumer finance market, its structure is very unique and reflects the special role the federal government plays in promoting home loans. To make mortgages more widely available, Congress created Fannie Mae and Freddie Mac, private GSEs that buy home loans from lenders and package them as mortgage-backed securities (MBS) for sale to investors, guaranteeing payment if borrowers default. However, the GSEs only buy loans up to a limit, called the conforming limit, that has varied over time and by geography. Mortgages above that limit are classified as jumbo loans and are not eligible for purchase by the GSEs. Before the GFC, these loans could be sold to private investors, including investment banks such as Lehman Brothers. However, the market for selling these loans has evaporated since the crisis. Instead, jumbo mortgages are usually held by lenders on their balance sheets.

The differing structures of banks and shadow banks has had an important implication on where shadow banking has expanded. In particular, banks have lost a significant share to shadow banks in the conforming loans market because the latter can sell mortgage loans to GSEs. However, this is not true in the jumbo loans market where, as noted earlier, the market for “selling” the loans is non-existent. The share of banks in the jumbo loan market remained relatively stable after 2007 and only began to decrease slightly over the last five years (Seru, 2019). However, where GSE financing is available, banks have a much lower share.

Finally, there is an interesting interaction of these patterns with the financial health of traditional banks. Well-capitalised banks tend to keep more loans on their balance sheet, holding regulation constant. We therefore see that traditional banks altered their business model to retain more loans on their balance sheet as their capitalisation improves. These facts reinforce the claim that understanding the industrial organisation of the market and business models of banks and shadow banks is critical to gain insight on the type of activities that will migrate from traditional banks to shadow banks.

Equilibrium Interaction

A quantitative policy evaluation requires one to take the information on different business models and industrial organisation of lending and embed these in a framework where we can study this equilibrium. I will describe briefly one such framework that is formalised in Buchak *et al.* (2018a and 2018b).

We model the supply side by considering different types of lenders who compete for mortgage borrowers—traditional banks, non-FinTech shadow banks and FinTech shadow banks. Following our discussion, these lenders differ on several dimensions: the regulatory burden faced by traditional banks, origination costs due to different funding structure and operations, and product quality (for instance, convenience). Traditional banks have access to lower funding costs (from deposits) than shadow banks, but face higher regulatory costs. On the demand side, borrowers choose mortgages from the three types of lenders to maximise utility, which depends on the mortgage interest rate and non-price attributes such as convenience/quality.

Equilibrium pricing by each lender and the mark-ups are determined endogenously as lenders try to maximise their profits given demand. Shadow banks sell all the loans they originate while traditional banks decide whether to sell or retain the loans on their balance sheet, depending on their funding costs (among other things), which in turn depend on their financial health. Shadow banks compete on price and non-price attributes with traditional banks in some segments (conforming market) but not in others.

In Buchak *et al.* (2018a) we are able to exploit the joint movements of banks' market share and relative pricing to estimate important parameters of this model. Two parameters in the model are important for explaining patterns in the share of shadow banks and FinTech shadow banks over time. The first characterises the regulatory burden on banks while the second represents product quality (e.g., convenience) of FinTech shadow banks.

By assessing changes in market share and differences in relative pricing of traditional banks relative to shadow banks, one is able to get insights on the regulatory burden faced by banks. For instance, one might imagine that the increase in market share of shadow banks relative to traditional banks might be due to their lower prices (due to differences in funding costs). However, all else equal, one finds no differences in prices between banks and shadow banks. The increasing regulatory burden on banks over time can, instead, explain the pattern of increasing shadow bank share without directly mediating through prices (Seru, 2019).

Similarly, one can successfully explain the rise of FinTech market share through the higher product quality these lenders offer. For instance, one might imagine that the increase in market share of FinTech shadow banks relative to non-FinTech shadow banks might be due to their lower prices. However, all else equal, one finds that prices of FinTech shadow banks are in fact higher than those of non-FinTech shadow banks. The increasing product

quality by FinTech shadow banks over time can, instead, explain the pattern of increasing FinTech shadow bank share, without directly mediating through prices (Seru, 2019).

Using the model, one can thus isolate how much of the increase in market share of shadow banks was due to the regulatory burden on banks and how much to improvements in technology that allowed for improved product quality. Our estimates in Seru (2019) suggest that regulation accounts for roughly two-thirds of the growth while technology accounts for roughly the remaining one-third.

Counterfactual Policy Analysis

Regulation and technology played a crucial role in the shadow bank market penetration of the mortgage lending market, driving the equilibrium interaction between traditional and shadow banks. Shadow banks strategically compete more in markets where they have a technological advantage and where traditional banks are hampered by regulatory burden. Shadow banks also compete with traditional banks in markets where they are able to operate their “originate to distribute” model. Finally, banks exploit their comparative advantage of “balance sheet capacity” by deciding whether to finance loans themselves or by following an “originate to distribute” model like shadow banks. This *integrated view* of financial intermediation has important implications for the role of policy in ensuring financial stability. I will illustrate this by discussing their importance in the context of two important policy levers used in recent times.

Changes to Bank Capital Requirements

As one illustration, consider the effects of changing bank capital requirements on risk in the traditional banking system (loans retained on bank balance sheet) as well as overall lending in the economy.²

Raising capital requirement blunts the comparative advantage of traditional banks in balance sheet capacity, and they shift from retaining loans on their balance sheet to selling them. Since selling of mortgages is only available for conforming loans, this shifts bank lending from the jumbo to the conforming market and lowers the share of mortgages retained on bank balance sheets. While the policy may appear to lower risks on bank balance sheets, it may not have reduced systemic risk in the financial system.

To illustrate this, we simulate a capital requirement increase from 6% to 7.5% in our model, with results shown in **Table 2**. We see a significant decrease in bank’s balance sheet lending. However, most of the reduction is compensated by: (i) banks moving from originating and holding to instead selling to GSEs (on conforming mortgage side); and (ii) shadow banking increasing lending volume. As a result, total lending decreases only by a modest US\$13 billion.³ Tightening capital requirements force banks to move from loan retention to adopting the originate-to-distribute model of shadow banks, while shifting lending activity from traditional banks to shadow banks. Overall, considering bank behaviour alone overstates the reduction in overall mortgage volume.

² Buchak *et al.* (2018b) examines this using the integrated model of intermediation discussed above.

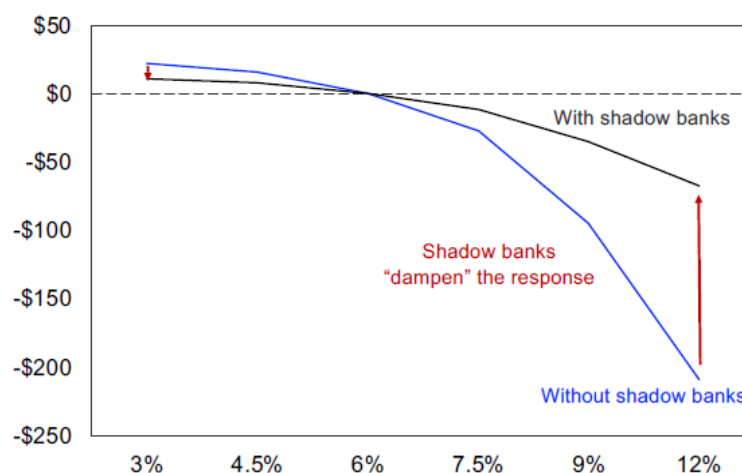
³ Since shadow banks would become more dominant, higher capital requirements would also move mortgage credit risk off bank balance sheets to the GSEs and indirectly to the US Treasury.

Table 2 Counterfactual analysis: change in lending in response to change in capital requirement faced by traditional banks from 6% to 7.5%

Lender	Loan Type	Financing Source	Change (US\$ Billion)
Total	-	-	-13
Bank	Jumbo	Balance Sheet	-38
Bank	Conforming	Balance Sheet	-204
Bank	Conforming	GSE	+215
Shadow Bank	Conforming	GSE	+14

Note: This table shows the change in mortgage origination volume (in US\$ billions) by banks and shadow banks when capital requirement increases from 6% to 7.5% based on the model calibrations described in the text. The table further breaks down the mortgage volume change into jumbo and conforming loan volume change. Data are based on calculations in Buchak *et al.* (2018b).

A more general aggregate lending volume change in response to changes in capital requirements for traditional banks is illustrated in **Chart 3**. As can be seen, an integrated view that considers the behaviour of both banks and shadow banks side by side reveals a quantitatively large *dampened* effect of the policy relative to one that only focuses on effects of the policy on traditional banks.

Chart 3 Counterfactual analysis: lending response to changes in capital requirements of traditional banks

Note: This figure shows the aggregate mortgage origination volume (in US\$ billions) across various bank capital ratio requirements (in %) based on the model calibrations described in the text. The model follows Buchak *et al.* (2018b). The blue line is the mortgage origination by banks only, while the black line is the mortgage origination by banks and shadow banks together.

QE Monetary Policy

In another illustration, consider how unconventional monetary policy might impact risk inside the traditional banking system as well as overall lending in the economy. The Federal Reserve policy of buying mortgage-backed securities (MBS) under a quantitative easing program tends to push down mortgage interest rates for loans sold to GSEs, raising conforming lending volumes significantly. For example, if quantitative easing were to trim

MBS interest rates by 0.1 percentage point, this would impact both traditional banks and shadow banks (**Table 3**).

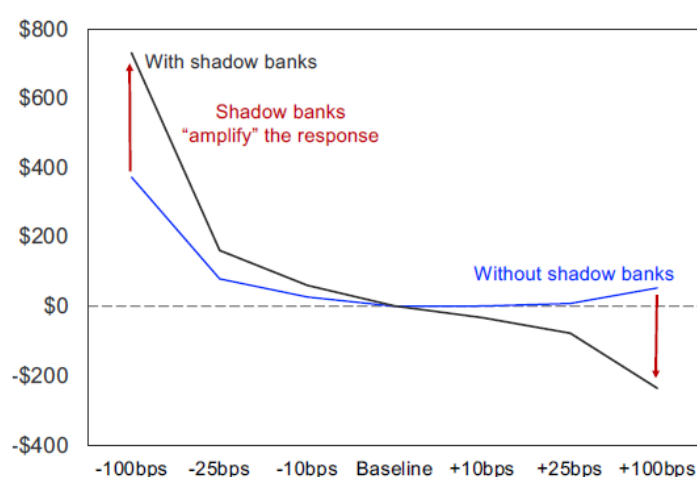
Table 3 Counterfactual analysis: change in lending in response to decrease in GSE financing cost by 10 bps

Lender	Loan Type	Financing Source	Change (US\$ Billion)
Total	-	-	+61
Bank	Jumbo	Balance Sheet	-4
Bank	Conforming	Balance Sheet	-357
Bank	Conforming	GSE	+389
Shadow Bank	Conforming	GSE	+33

Note: This table shows the change in mortgage origination volume (in US\$ billions) by banks and shadow banks when GSE financing cost decreases by 10 bps based on the model calibrations described in the text. The table further breaks down the mortgage volume change into jumbo and conforming loan volume change. Data are based on calculations in Buchak *et al.* (2018b).

Lower cost of selling leads to a significant increase in originate-to-distribute lending for traditional banks, as funding loans using balance sheets becomes less lucrative. Not surprisingly, for shadow banks that are reliant on selling to GSEs, a lower cost leads to a significant increase in their lending. However, because the GSEs do not buy jumbo loans, this market is left relatively unaffected. Thus, focusing only on banks, which operate significantly on the jumbo side as well, would understate the true impact of the policy, and miss the substantial policy effects on shadow banks. A more general aggregate lending volume change in response to changes in unconventional monetary policy of the form considered is illustrated in **Chart 4**. As can be seen, an integrated view that considers the behaviour of both banks and shadow banks side by side, reveals a quantitatively large *amplified* effect of the policy relative to one that only focuses on effects of the policy on traditional banks.

Chart 4 Counterfactual analysis: lending response to changes in GSE financing costs



Note: This figure shows aggregate mortgage origination volume (in US\$ billions) across various changes to the GSE financing costs relative to the baseline (in basis points) based on the model calibrations described in the text. The model follows Buchak *et al.* (2018b). The blue line is the mortgage origination by banks only, while the black line is the mortgage origination by banks and shadow banks together.

Overall, the two illustrations show that focusing only on the banks might result in amplified or dampened effects on outcome variables—such as aggregate risky lending in the economy—depending on the policy. In the context discussed above, focusing only on banks may overstate the true response to policies that impact funding of traditional banks directly. In contrast, focusing only on banks may understate the true response to policies that impact funding in the secondary market.

5 Conclusion

Intermediation in the lending market has undergone a dramatic shift from traditional banks to shadow banks, which are non-depository institutions that fall outside the scope of traditional banking regulation. I trace the growth of shadow banks to the increased regulatory burden faced by traditional banks and to the financial technology adopted by shadow banks. I argue that these factors explain changes in credit markets around the globe. Assessing financial stability in this new era involves understanding the business model of FinTech shadow banks and traditional banks, the industrial organisation of the credit market and the equilibrium interaction of intermediaries. I emphasise that a regulatory policy analysis requires the impact of policy on banks and shadow banks to be analysed side by side.

Importantly, while the detailed illustration focused on the US mortgage market, the lessons that emerge may be quite general. For instance, consider the case of shadow banks in China. A policy change, such as a monetary tightening, again demands an “integrated view of financial intermediation”. The presence of a large shadow banking sector is likely to play an important role as financial capital might flow to WMPs and internet finance products (see BIS Annual Report 2019, Chapter III; BIS, 2019). However, understanding the net effect of such a policy would require an equilibrium model of the kind I discussed since a large chunk of resources from Internet finance products are reinvested with banks.

I conclude with a few potentially important elements that have been missing from the discussion. In recent work (see Jiang, Matvos, Piskorski and Seru, 2020), we examine the sources of shadow bank funding. We find that their funding largely comes from short-term bank loans. Consequently, the risk in the traditional banking sector that is assessed just based on consumer credit that remains on bank balance sheet is incomplete for another reason. A more complete integrated view of the type I am advocating would need to consider the fact that banks might be, in large part, financing shadow banks.

In addition, while research has assessed the nature of risky lending extended by shadow banks and traditional banks, most of this work uses empirical data from a period of low default rates. Moreover, I have not discussed potentially interesting interactions between shadow banks and traditional banks based on changes in monetary policy following the work of Drechsler *et al.* (2019) and Xiao (2019). How changes in monetary policy or macroeconomic conditions might impact the nature of risky lending extended by shadow banks and traditional banks through various channels remains a fruitful area of investigation.

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