

Discussion of Macrofinancial History and the New Business Cycle Facts

Mark Gertler
New York University and NBER

June 2016

1 Introduction

This paper is part of an interesting and important research agenda by the authors that examines the link between financial aggregates and economic activity. This work has its roots in the classic work of Gurley and Shaw (1967) and Goldsmith (1968), which analyzed the link between financial development and growth. The authors work with a much cleaner data set than was available earlier. The data set consists of a variety of information from relatively homogenous advanced economies over a long period time. The data further contains a very rich set of financial and real variables. In addition, they use more advanced statistical methods than were readily available to earlier researchers (witness bin scatter plots!) The net result is that the authors are able to put together a much sharper and exhaustive set of a facts than what the early literature has provided. No doubt these facts will provide an important guide for future research.

The paper lays out the facts in a very clear organized manner and makes a convincing case for robustness. Accordingly, rather than summarizing the results, I will instead focus on three sets of issues that involve identification and interpretation: The first involves the general problem of identification with aggregate credit quantities and real sector data. The second involves the need for incorporating information about credit prices (e.g. spreads) as well as quantities in order to interpret the evidence. The third involves the how to interpret the leading indicator properties of household debt for financial crises. The authors appear to suggest that it implies that financial distress was largely confined to the household sector. This, however, ignores the central role that banking distress played in the crisis. In addition, I show that it ignores evidence that the nonfinancial business sector felt significant financial distress as well.

2 Credit Quantities and Identification

It is not at all a criticism of the authors to point out that identification is an issue with the kind of evidence they present, but rather a note of caution to suggest that more work needs to be done before a decisive interpretation of the facts is possible. Indeed, identification issues have been front and center in this literature from the beginning. For example, both Gurley and Shaw (1967) and Goldsmith (1968) present two robust findings. First per capita GDP is positively correlated with the ratio of credit to GDP, D/Y , and, second, it is positively correlated with the ratio of nominal output to money PY/M , otherwise known as the velocity of money. Both D/Y and PY/M measure financial development. (Velocity measures financial development since it rises with increased availability of money substitutes.) Accordingly, the results make clear a positive relation between financial and economic development.

The evidence, however, is silent on causality. One could well imagine mutual feedback. Improved credit markets raise real activity. But at the same time, a greater level of real activity can generate more credit market activity. Ideally one would like to know the relative causal importance of each factor. Unfortunately, it is not possible to answer this question from aggregate data alone. One possible way out is to use disaggregated data. For example Rajan and Zingales use industry data to show that financial development can cause growth. In particular, they find that credit-dependent industries grow faster than other industries as the financial sector develops.

A kind similar of identification issues arises with several of the authors' findings. For example, the authors show that there is a negative correlation between financial deepening as measured by credit to GDP and growth. One possibility is that high credit to GDP could reflect inefficient over-development of the financial sector, leading to lower growth. But causality could go in the other direction. The countries in the data set are relatively advanced. As advanced economies mature, growth rates tend to decline, implying a negative correlation between per capita output and growth. Indeed, the basic Solow models yields this prediction: capital deepening over time leads to higher per capita output and lower growth. Accordingly, what the data could be capturing is simply that financial markets tend to deepen as economies mature. The aggregate data alone is not sufficient to sort out causality. Perhaps the use of disaggregated data could be helpful in this regard, along the lines of Rajan and Zingales.

3 Interpreting Cyclical Co-movements in Credit and Monetary Aggregates

Another set of facts involves cyclical co-movements. The authors show that the correlation between output and credit aggregates has increased over time, while it has decreased for monetary aggregates. These are facts that should guide model-building. But it is important to recognize that in the absence of further information, they do not provide any clear implications for the importance of

either monetary policy effectiveness or credit market frictions.

Modern theory stresses that monetary policy transmits through the economy via interest rates. Central banks use a short term interest rates as the instrument of monetary policy. They adjust the money supply to hit the target rate. The correlation between output and the money supply accordingly reflects the central bank accommodating money demand. Why then might this correlation have declined over time? Increased availability of money substitutes likely introducing variation in the relation between output and various monetary aggregates. Note, however, that this variation has no implications, however, for interest rate setting or policy transmission.

Similarly, to interpret the correlation between credit aggregates it is necessary to disentangle demand versus supply. Doing so requires information on credit prices (e.g., credit spreads) as well as credit quantities. I illustrate with the following simple framework:

Let R^b be the borrowers' gross required return, R the gross riskless rate, Y aggregate output, and L working capital loans. Then suppose that aggregate demand varies inversely with the cost of capital, as follows:

$$Y = \Psi(R^b)e^\varepsilon \tag{1}$$

with $\Psi' < 0$, and where ε is a random disturbance to demand. Next suppose that firms need working capital loans to finance production: The demand for working capital loans varies positively with output, as follows:

$$L = \phi Y \tag{2}$$

with $\phi > 0$. Notice that because credit demand varies positively with output, Y and L will co-move positively. However, to determine the extent to which financial factors matter for aggregate activity, information about credit prices is also necessary.

For example, suppose that financial markets are frictionless, so that $R^b = R$ (to a first order). In this case, Y and L are the following functions of ε and R :

$$\begin{aligned} Y &= \Psi(R)e^\varepsilon \\ L &= \phi Y \end{aligned} \tag{3}$$

where we assume R is given by monetary policy. In this instance, output Y and credit L co-move but financial frictions are completely irrelevant to output dynamics. The strong co-movement of Y and L reflects only the passive response of credit demand.

Now suppose that there are frictions in financial markets that drive a wedge between the required return on capital and the riskless rates. Let ρ denote the external finance premium that arises due to credit market frictions. Then we can express R^b to a first order as

$$R^b = \rho + R \tag{4}$$

Combining (4) with (1) and (2) then yields solution for Y and L given ρ and R :

$$\begin{aligned} Y &= \Psi(\rho + R)e^\varepsilon \\ L &= \phi Y \end{aligned} \tag{5}$$

A financial crisis is then a disruption of intermediation that leads to an increase in the external finance premium ρ . The increase in ρ in turn leads to a contraction in both L and Y . In this instance the co-movement between credit and output reflects financial factors. The increase in the credit spread signals that financial factors are work. In this way, credit prices help disentangle whether credit supply or credit demand factors underlie the co-movement between credit and output.

4 Households Leverage as a Predictor of Financial Crises

From some (cool) bins scatter plots, the authors show that a high ratio of bank debt to GDP is associated with lower variance of GDP growth but greater tail risk. In particular, as debt to GDP increases, the distribution of output becomes skewed to the left, with the worst possible outcomes lower. A sensible interpretation of the facts is that in normal times, deep credit markets facilitate borrowing to smooth spending, which in turn smooths output, leading to reduced output volatility. At the same time, high leverage exposes the economy to infrequent financial crises that can lead to a catastrophic drops in output. Indeed, the facts and story fit well post war output dynamics for advanced economies. As credit markets deepened beginning in the early 1980s, most advanced economies entered a "Great Moderation" phase, where the volatility of output dropped. By the late 2000s, however, a housing/credit bubble paved the way for the global financial crisis that precipitated the Great Recession.

A second set of facts that the authors emphasize is that is that in the post war it has been largely households debt that has surged prior to a financial crisis. Mortgage debt, in turn, has largely accounted for the pre-crisis expansion of household debt. There is no doubt that the origins of the Great Recession involve the behavior of mortgage lending. A decline in global long term interest rates beginning in the early 2000s in conjunction with a significant decline in lending standards led to a boom in house prices, housing construction and mortgages. As the house price boom began to reverse itself, mortgage defaults began, ultimately triggering the financial crisis that led to the Great Recession.

The buildup of household leverage was unambiguously important for Great Recession. The authors do a nice job of organizing the data to make this point. However, they leap a bit overboard by drawing the conclusion that financial constraints on the household sector alone are sufficient to explain the financial and real crisis. A recent paper by Midrigan and Phillippon (2016) make clear why borrowing constraints on households alone cannot provide a full accounting

of the crisis. The authors develop a macroeconomic model where households can borrow to finance nondurable consumption using housing as collateral. In addition, the model economy consists of different regions that produce traded and nontraded goods. Accordingly, the framework can produce the Mian and Sufi cross-section evidence on regional credit growth and consumption and employment. Midrigan and Phillipon then show that while a model with only financial constraints on households can account for the cross-sectional evidence, it cannot come close to matching the severity of the output decline during the Great Recession. The impact on consumer nondurable spending is simply too modest. While household debt can help explain the persistence of the spending decline, other factors are needed to account for the severity of the economic contraction.

Key to any financial crisis is the exposure of the banking system. The recent financial crisis was no exception. Banks (broadly defined) are critical conduit of credit to all sectors. When banks are subject to financial distress, the flow of credit is impeded to the broad spectrum of non-financial borrowers, including firms as well as households.

Figure 1 illustrates the interconnection between household, firm and bank and bank balance sheets. (I simplify a bit for expositional purposes). For households, assets consist of housing and financial assets. Liabilities are loans from banks and net worth. Loans to households along with loans to firms are bank assets. Bank liabilities are deposits and equity. In turn, loans along with equity are on the liability side of firm balance sheets, while assets consist of capital.

The point of the figure is that it is misleading to analyze the balance sheet position of one sector of the economy independently of the others. Unquestionably, the crisis was preceded by a rapid buildup of mortgages, which appear as household liabilities. But mortgages also appear on the asset side of bank balance sheets. Further, the lion's share of the growth in mortgages since the late 1990s was absorbed by the thinly capitalized shadow banking sector. Indeed, securitized mortgage loans, more than other type of asset, accounted for the huge expansion of shadow banking. Accordingly, while the mortgage boom increased the vulnerability of household balance sheets, it also significantly increased the fragility of the banking system. The subsequent collapse of the banking system in turn greatly impeded the flow of credit to both households and firms

Indeed, it is not possible to accurately characterize the contraction in economic activity during the Great Recession without explicitly taking into account the financial collapse. There were two key episodes. (See Gertler, Kiyotaki and Prestipino, 2015 for details). First, starting in August 2007, the asset-backed commercial paper market began to unravel steadily. The triggering events were an initial wave of defaults on sub-prime mortgages that led to concerns about the quality of securities that were tied to these types of assets. The contraction in this type of intermediation raised the financing costs loans that were typically securitized such mortgages, autos, and credit car.debt. This initial disruption contributed significantly to the slowdown in economic activity that began in the fall of 2007. (See, e.g., Benmelech, Meisenzahl and Ramacharan, 2014).

The second major event, and the most pivotal, was the unraveling of the entire investment banking system in September 2008 that followed in the wake of the Lehmann Brothers bankruptcy and the run on money market funds. The collapse of the shadow banking sector also weakened commercial banks that in many cases had implicit commitments to absorb investment bank assets. The net effect was a severe disruption of intermediation, reflected in skyrocketing credit costs across the board. The jump in borrowing costs led to huge drops in economic activity in the fourth quarter of 2008 and first quarter of 2009.

Figure 2 illustrates how financial distress hit the non-financial business sector. Both panels plot the spread between the returns on an index of corporate bonds and similar maturity government bonds as an indicator of credit costs faced by non-financial firms (See Gilchrist and Zakrajsek, 2012). This credit spread clearly sky-rocketed during the Great Recession. The top panel shows how the spread co-moves with the senior loan officer survey of the percent of banks that are tightening credit terms each period. Note that during the Great Recession the survey shows an unusually high degree of tightening. The increase in the credit spread, further, mirrors the degree of tightening, suggesting the latter was a contributing factor to the former.

The bottom panel plots the debt-equity ratio of the nonfinancial business sector against the credit spread. Much of the variation in this ratio is due to fluctuations in the market value of equity. The panel shows that during the Great Recession, firm balance sheets weakened considerably: there was a sharp increase in the debt-equity ratio, which was likely another important factor contributing to the rise in the credit spread. Even though a runup in firm debt did not lead the recession, there was a significant weakening of firms' financial positions that likely raised the cost of credit access. For panel data evidence the non-financial firms indeed face tighter borrowing constraints, see Giroud and Mueller, 2015).

In sum, even though a runup in household debt clearly led the Great Recession, it does not follow that only financial frictions in the household sector were relevant to the crisis. Frictions in both banking and the non-financial business sector were relevant as well.

5 Is the Past Prologue?

Household leverage led the recent financial crisis. Will it lead the next? The history of financial regulation goes as follows: Design regulations to fight the last war. Markets then find their way around the regulations. This leads to a new crisis that differs in nature.

The regulatory system that predated the Great Recession was a product of the US commercial banking crisis of the late 1980s. What made the banks vulnerable was excessive investment in risky commercial real estate. The regulatory response under the Basel Accord was to tighten capital requirements on commercial banks. While the capital requirements made commercial banks safer, they also precipitated the growth of the shadow banking system. Rather

than hold mortgages directly on commercial bank balance sheets, it was possible to avoid capital requirements by securitizing and then selling them to shadow banks, setting the stage for the next crisis.

The recent Dodd-Frank regulation has similarly reduced the likelihood of a crisis exactly like last one. The question then is whether, once again, regulatory arbitrage may lead to a new kind of crisis. At least according to the BIS this is a definite possibility. The new financial hockey stick noted by the BIS is dollar-denominated borrowing by private corporations in emerging market economies. Though still at manageable levels, leverage in this sector has been growing rapidly. The broader point, though, is past correlations of certain types of debt with economic activity may not provide a guide to the future.

6 Concluding Remarks.

John Gurley once said "Money is veil but when the veil flutters the economy sputters." What we learn from Jorda, Moritz and Taylor is to replace the word money with credit.

References

- [1] Benmelech, Efraim, Ralf Meisenzahl and Rodney Ramacharan, 2014, "The Real Effects of Liquidity During the Financial Crisis: Evidence from Automobiles," mimeo.
- [2] Gertler, Mark, Nobuhiro Kiyotaki and Andrea Prestipino, 2015, "Wholesale Banking and Bank Runs in Macroeconomic Modeling of Financial Crises," Handbook of Macroeconomics, John Taylor and Harald Uhlig editors, forthcoming.
- [3] Gilchrist, Simon and Egon Zakresjek, 2012, "Credit Spreads and Business Fluctuations," *American Economic Review*.
- [4] Giroud, Xavier and Holger Mueller, 2015, "Firm Leverage, Consumer Demand, and Unemployment During the Great Recession," *Quarterly Journal of Economics*, forthcoming.
- [5] Goldsmith, Raymond, 1969, *Financial Structure and Development*, Yale University Press.
- [6] Gurley John and Edward Shaw, 1967, "Financial Structure and Economic Development," in *Economic and Cultural Change*, April.
- [7] Midrigan, Virgiliu and Thomas Phillipon, 2016, "Household Leverage and the Great Recession," mimeo
- [8] Mian, Atif and Amir Sufi, 2013, "Household Balance Sheets, Consumption and the Economic Slump," *Quarterly Journal of Economics*.

Figure 1: Sectoral Balance Sheets

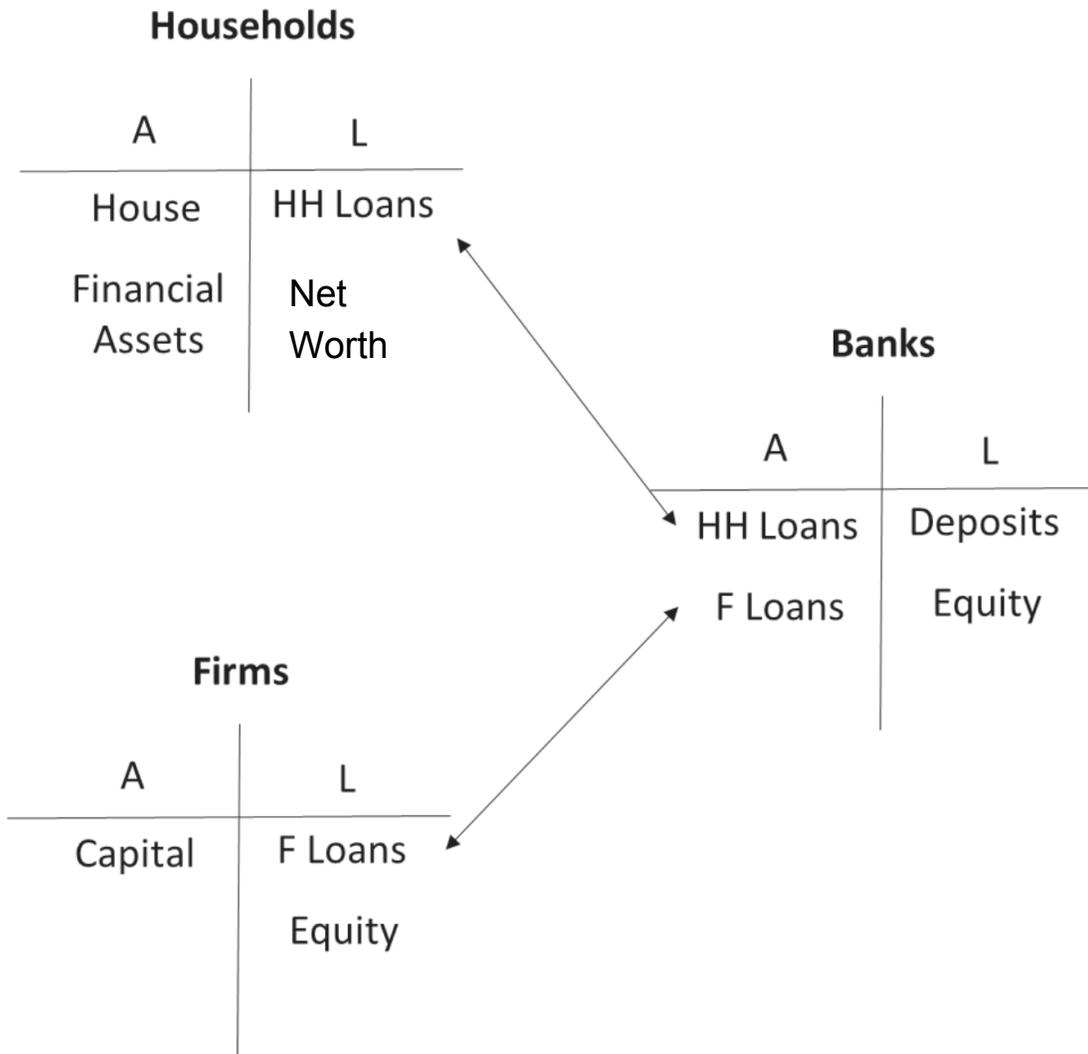


Figure 2: Credit Spreads, Terms of Lending and Firms Balance Sheets

