Credit Deepening: Precursor to growth or crisis?

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ABSTRACT
There are two areas of economic research that are closely related but have until recently developed independently. The first is the literature on the finance growth nexus that has shown how countries with greater financial depth grow more rapidly. The second is the literature on credit and financial crises that has shown that financial crises and recessions are usually preceded by rapid expansion of credit. Thus, credit deepening and credit booms are sometimes beneficial and sometimes not. In the last few years, there have been efforts to reconcile the two literatures. This paper reviews the two literatures and describes recent efforts to reconcile the two relationships. Much more work is required but it is important for policy makers to be able to distinguish good, growth enhancing credit booms from bad, crisis inducing ones.

Like many things in economics, the finance-growth nexus has been a moving target as long as it has been in existence. It sprang out of the growth literature about 30 years ago and quickly entered the canon of modern economics. However, by the turn of the century economists began to note that it is hard to distinguish between financial sector deepening that increases the rate of growth and credit booms that increase leverage and weaken financial institutions which often results in banking crises and deep economic contractions. For about 20 years, the empirical literatures on the finance-growth nexus and on financial crises developed in parallel and without much interaction. More recently, a number of articles have tried to bridge the gap between the literature on the finance growth nexus and that on the boom crisis nexus. My purpose here is to characterize the two literatures and explore the efforts to bridge the gap between them.

A short history of the finance growth nexus

There have long been wide differences among economists regarding the role of finance in economic growth (see Levine 1997). Some, such as Schumpeter, recognized the role of financial institutions in identifying innovative and productivity enhancing projects and channeling resources to
them. While others as diverse as Joan Robinson and Robert Lucas demurred. In any event the role of finance in economic growth got scant attention in both discussions of economic development and of explanations of economic growth. Growth theory begins with the Harrod-Domar Keynesian approach in the early post war period which is followed a decade later by the neoclassical Solow-Swan model; although very different, both approaches emphasize the role of capital accumulation. The early development literature emphasized planning mechanisms and financial repression and left no role for resource mobilization and allocation by market-oriented financial institutions.

There were, of course, economists on the fringes who were interested in financial intermediation and aware of its importance. Coming from an historical approach, Raymond W. Goldsmith’s 1969 book Financial Structure and Development, for example, often receives only passing attention in reference lists of articles using modern data and techniques. It is deeply representative of the tradition that views a balanced combination of data and narrative as the path to better understanding of not just whether but how financial factors influence growth. Other pioneers such as John G. Gurley and Edward S. Shaw (1955), and later Ronald I. McKinnon (1973), coming from development economics, emphasized how institutional change can loosen bottlenecks that impede the smooth flow of credit that is so crucial for modernization.

Goldsmith collected data on financial intermediary activity in 35 countries for long time periods and documented the relationships between the depth of financial intermediation and economic wellbeing in what might be called the first paper on the finance-growth nexus. Levine (2005) notes Goldsmith’s caution: he did not claim causality, he did not control for other determinants of growth and he asked whether the depth of intermediation is an appropriate measure of financial sector activity.

Data driven studies of the determinants of economic growth around the world began to appear in the early 1990s as more data on growth and country characteristics became available (see importantly, Barro, 1991 and Levine and Renelt, 1992). King and Levine (1993) added financial sector measures to the standard cross section framework and concluded (p. 734) that “indicators of the level of financial development—the size of the formal financial intermediary sector relative to GDP, the importance of banks relative to the central bank, the percentage of credit allocate to private firms, and the ratio of credit issued to private firms to GDP—are strongly and robustly correlated with growth, the rate of physical capital accumulation, and improvements in the efficiency of capital allocation.” They addressed the issue of causality by regressing decade average growth rates on initial levels of the financial variables. Other papers introduced newly developed panel VAR estimation and instrumental variables techniques to deal with causality (Levine et. al., 2000 and Rousseau and Wachtel, 2001).

Although the finance growth nexus driven by the evidence from cross section and panel studies was widely accepted by the turn of the century, it was not without critics (see Trew, 2006, Wachtel, 2001). The major concern involved the fact that it is difficult to distinguish idiosyncratic differences among countries from the finance growth relationship. However, the criticism was muted by other studies which utilize historical data over long periods of time.

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1 Robinson argued that finance followed entrepreneurial development rather than caused it. Lucas said that economists over emphasized the role of finance in growth.

2 Standard GDP data for large numbers of countries consistently compiled by the international organizations starts in 1960 or later.
Wachtel and Rousseau (1995) and Rousseau and Wachtel (1998) used long data series to establish the finance causes growth hypothesis in industrial countries. Rousseau and Wachtel (1998) use vector error correction models to establish the quantitative importance of long-run relationships among measures of financial depth, real per capita levels of output and the monetary base. Granger causality tests indicate a leading role for the financial depth variables in real sector activity.

The combination of cross section studies with post 1960 data and historical studies with data going back a century, both using modern econometric techniques, provided a firm empirical basis for the finance growth nexus. By the early 2000s, the number of published papers reached into the hundreds (for surveys see Levine 2005, Ang, 2008 and Panizza, 2014). The success of this literature is undeniable, yet a less sanguine undercurrent continues to question whether the policy prescriptions informed by such studies are too simple and whether a “one-size-fits-all” approach to financial development can be as harmful to growth in some cases as it can be helpful in others.

Rousseau and Wachtel (2002) show that the relationship is affected by a country’s experience with inflation. There is a threshold between annual inflation rates of 13 and 25 per cent where the effect of financial deepening on growth disappears completely. Rioja and Valev (2004) showed how the size and strength of the nexus relationship varies with the level of economic development. It is strongest among middle income countries and weakest among poor countries. Recent work by Arcand, et.al. (2012) and Law and Singh (2014) indicates that the nexus weakens when financial depth exceeds a threshold of about 100 per cent of GDP.

Finally, and importantly, Rousseau and Wachtel (2011) show that the nexus relationship weakened with the passage of time; the robust relationships seen in the initial panel studies that used data for the period 1960-89 largely disappears with data for 1990-2004. There are several possible explanations for this which we will examine below when we turn to efforts to bridge the gap between the finance growth nexus and the boom-crisis (or leverage fragility) nexus.

Credit booms, crisis and growth

Economic historians have always had an interest in financial crisis. The financial panics of the 19th century as well as the Great Depression have been examined many times. However, the historical approach tends to look at them as unique events (the Panic of 1873, the Great Depression) rather than examples of a recurring phenomenon. It is only in recent years that there have been systematic efforts to look at the universe of crisis experiences and relate them to economic growth. Reinhart and Rogoff (2009) provide a history of both historical and modern crises and defaults. Their Figure 13.1 (p. 205) provides a hint of why the finance growth nexus emerged without any attention paid to crisis events. The figure shows the percentage of countries experiencing a banking crisis (weighted by their world income share) from 1900 to 2008. Not surprisingly, the peak, almost 45%, is reached in the Great Depression though the late 1990s Asian crisis and the 2008 financial crisis come close, about 25%. The data bounce around throughout the century with the exception of a 25 year period from the late 1940s to the early 1970s when the data flat lines at zero. Economic research can be rather myopic, the focus on the finance growth relationship emerged at a time when crises had temporarily disappeared. There
are reasons why this period was different – the dominance of the US dollar, robust post War growth, financial repression, capital controls – but all of these factors began to disappear in the 1970s with the end of the Bretton Woods era. However, the experience was strong enough to allow a line of research to develop with important relationships ignored.

The return of financial crisis experience around the world, in particular the Asian financial crises in 1997-8 and the global financial crisis of 2007-9, shifted research priorities. Researchers first at the World Bank (Gerald Caprio and Daniela Klingebiel) and then at the IMF (Luc Laeven and Fabian Valencia) compiled chronologies with modern data (since 1970) for a large number of countries. Crisis dating schemes with historical data since 1870 for a limited number of counties were compiled by Bordo et. al. (2001), Reinhart and Rogoff (2009) and Schularick and Taylor (2012).

Research on crises often takes the identified crisis experiences as the unit of observation and starts with efforts to predict crises (Kaminsky and Reinhart, 1999 is an early example). In the finance growth literature the unit of observation is a country year. As a result the two lines of research developed with little interaction among scholars until very recently.

Jorda, Schularick and Taylor (JST, 2016) look at credit growth from 1870 to the present in 17 countries and relate it to their own dating scheme for systemic financial crises. They estimate logit models for the crisis indicator and find that the strongest predictor of crisis is a 5-year moving average of the change in private credit to GDP ratio. Neither the change in the public debt ratio or the levels of the ratios is a significant determinant. While increases in public debt are not a significant crisis predictor, high levels of public debt are associated with a slower recoveries (similar to the findings of Reinhart and Rogoff). JST observe that in three quarters of the episodes where the total credit to GDP ratio increased by more than 30 percentage points over a five year period, a systemic financial crisis ensued. In other words large credit booms often lead to crisis and deep recessions. Moreover recessions that come after a credit boom tend to be longer and deeper than recessions that are not associated with a boom. In a normal recession, real GDP per capita falls by 1.5 percent it takes 2 years to recover the previous peak. In a crisis associated recession, the fall in output is closer to 5 percent and the recovery takes over 5 years.

The critical question is how the JST research relates to the historical work on the finance growth nexus. Rousseau and Wachtel (1998) use very similar data, albeit for a smaller number of countries and they only use data prior to 1929. Their work (see above) does support the effect of financial deepening on growth over the long run. To my knowledge there has been no direct comparison of the data and techniques involved in these historical studies. If both are correct it must be that the growth enhancing effects of financial deepening during long credit driven expansions offsets the negative shock of even a systemic crisis. Countries with financial deepening grow rapidly during expansions but often have the growth interrupted by financial crises and deep recessions. Countries with less financial deepening have both slower growth during expansions and less severe recession shocks. The historical time series evidence seems to suggest that crisis risks are worth taking.

Panel studies with modern data have addressed these issues more directly and reached the same conclusion. Loayza and Ranciere (2006) offer two empirical approaches with data from 1960-2000 for a large group of countries. In their first approach, they estimate a long run growth-financial

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3 The data bases have been revised since they first appeared and can be readily accessed on the internet.
depth relationship that includes a short run error correction mechanism. They find that financial deepening has a large and significant long run effect on growth rates which is offset by a short run negative effect. The model structure is econometrically sophisticated but not very informative about the impact of deepening on crises. Their second approach is a standard panel estimate with five year average data periods. The effect of financial deepening is similar to earlier studies, a one standard deviation increase in financial depth leads to a 0.9 percentage point increase in the growth rate. However, this is offset when countries are crisis prone; a one standard deviation increase in the fraction of time spent in crisis reduces the growth rate by 0.7 percentage points.

Roussseau and Wachtel (2011) address the question differently in an effort to provide a clear picture of the influence of crisis on the nexus relationship. They estimate standard growth equations with five year average data in a panel of 84 countries from 1960 to 2004. As noted above their initial observation is that the strength of the effect of deepening on growth weakens over time. Since the incidence of crises increases over time, they hypothesize that the effect of financial deepening on growth exists as long as a country is not in crisis. The financial depth coefficient is positive and significant for non-crisis periods but is largely offset when the five year observation period includes a major financial crisis. The difference is significant at the 5% level but only for major crises. Additional results suggest that the reduced influence of financial deepening over time is not related to financial liberalizations that have led to more open capital markets nor is it related to an increased role of equity market financing around the world. The paper makes a strong case that financial deepening continues to drive growth as long as it does not lead to a major financial crisis.

One literature teaches us that financial deepening is beneficial while another literature shows that credit expansion (another term for the same thing) often culminates in a crisis. The challenge is clear: how do you distinguish credit deepening from crisis prone credit booms?

**Good booms and bad booms**

Recent work has shifted the focus or unit of observation from crisis incidents to credit booms. To begin a decision rule is used to identify credit booms. Approaches differ but in each instance it is clear that credit booms are not unusual. All countries experience them and, depending on the definition, might be in a credit boom about one-third to one-half of the time. Further, many credit boom episodes end with financial crisis. Thus, the research question in recent papers has been how can we distinguish between credit booms that end in crisis (bad booms) and those that do not (good booms). And further, are the impacts of good booms large enough to outweigh the effects of bad booms and preserve the finance growth nexus?

Rousseau and Wachtel (2017) use data for 17 countries from 1870-1929 and the crisis dates found in the on line appendix to Schularick and Taylor (2012). A simple decision rule is used to identify credit boom episodes: a credit boom occurs when the ratio of M2 to GDP has increased by at least 30 percent over the previous decade. Deepening episodes are slightly more frequent than crises but on average each country has about three of each. There are as many crises associated with an episode of credit deepening as there crises that are not. Further, there are many episodes of deepening without a financial crisis. The paper includes estimates of standard growth equations with five year average data

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4 An alternative measure is that a deepening episode occurs when the ratio increases by at least 20 percentage points in 10 years. M2 is used in this study instead of bank loans or private credit because more data are available.
observations. The usual effects of credit deepening on growth are enhanced during credit booms that are not associated with crisis; episodes of credit deepening are beneficial except when they are associated with financial crises.

Dell’Ariccia et. al. (2016) examine credit booms with modern (post 1970) data for an exhaustive sample that includes 170 countries. They have a complex definition of a credit boom. It will suffice here to summarize it as follows: a credit boom occurs when there has been a very rapid growth in the credit to GDP ratio over the past ten years or a large deviation of the credit to GDP ratio from its trend over the past ten years. About 11% of country-year observations are in a boom and the median length of a boom is three years. GDP grows more rapidly in boom years and there is a financial crisis within three years of the end of one-third of the booms.

Dell’Ariccia et. al. identify pre-boom macroeconomic characteristics (e.g. an index of financial liberalization) and performance measures (e.g. capital inflows) that might help predict booms. They conclude that the variables “are far from giving definitive signals...identifying causality is problematic” (pp.315-6). The paper attempts tries to distinguish credit booms that lead to crisis or a period of sub-par economic performance from others. The find that booms that are longer or start with higher initial credit to GDP ratio are more likely to be bad booms. However, regression estimates to distinguish bad booms from good booms were largely uninformative: “statistical evidence to pin down ahead of time whether a boom is a good or a bad one is underwhelming” (p. 319). As much as policy makers would like to apply macroprudential policies in crisis prevention efforts, there is little evidence to guide their use.

Another paper with a different methodology for defining credit booms but with similar results is Gorton and Ordoñez (2016). In their work a credit boom occurs when a country experiences three consecutive years of credit growth above a threshold and ends when there are at least two years of credit growth below a lower bound. With data for 34 countries from 1960 to 2010 they find that counties are in a credit boom experience 55% of the time and that 39% of credit booms end in a systemic financial crisis. They look to the dynamics of productivity growth to distinguish between good booms and bad booms. Booms that involve larger productivity growth are less likely to be bad.

The Rousseau and Wachtel (2017) paper with historical data as well as the two papers described above with panel data sets do not have any information on the characteristics that might show how booms differ from one another. The characteristics of the boom might determine whether it is good or bad. The story is more nuanced than the relationship between credit deepening and growth.5

The recent availability of more extensive historical financial data for a large number of countries makes such exploration possible (see Jorda, Schularick, and Taylor, 2017). Jorda, Schularick, and Taylor (2016) show that a large part of the modern expansion of credit is due to mortgage lending. Further, they ask whether credit expansions from mortgage or non-mortgage lending are more strongly associated with crises. There is some weak evidence that crises are associated with real estate credit booms, particularly in the post War period when mortgage lending expanded dramatically.

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5 The use of financial depth to measure financial activity was a concession to limited data availability. There are other aspects of the financial system such as the equity market which was shown to have an equally important influence on growth (Rousseau and Wachtel 2000). Further, other measures of financial system output have also been explored such as value added and employment.
Richter, Schularick and Wachtel (2017) make use of the historical data base to explore the distinction between good booms and bad booms. The richness of the data set provides an opportunity to provide more answers than some of the earlier work cited above. They identify a credit boom when there is a large deviation from trend which is estimated using a new econometric technique that uses only available data. The procedure avoids the pitfalls of the commonly used Hodrick-Prescott filter and the arbitrariness of decision rules. They identify 144 credit booms in the 17 countries since 1870. A credit boom is bad if a systemic financial crisis occurs during the boom are within three years of its end. With this definition, 26% of the booms are bad. Using the credit boom as the unit of observation, the paper investigates the determinants of bad booms with logit analysis.

The analysis is able to identify macroeconomic factors that distinguish credit booms that end in crisis from those that do not. In addition to the size of the boom itself, the most important determinants of a bad boom are the liquidity of the banking sector (measured by the loan to deposit ratio), a boom in housing prices and the inflow of foreign capital (measured by the current account balance). The analysis holds up as well with a real time analysis where the likelihood of a credit boom being bad is examined with data available when the boom starts. They also present out of sample forecasts for the 11 booms (6 good and 5 bad) after 2000 in their data. The predicted probability of the boom being bad is greater than 0.4 for 4 of the 5 bad booms and for one of the good booms. Thus, Richter, Schularick and Taylor provide some promising results for policy makers who need to make well-informed decisions about the nature of the credit boom (is it good or bad) as it unfolds.

It should be possible to develop rich macroeconomic data sets for many countries for the last 50 years which would allow researchers to examine the underlying forces that drive good and bad credit booms in developing as well as developed economies in the modern era. To the best of my knowledge this has not been done.

Conclusion

The role of finance in economic growth was hardly given any attention 35 years ago. This changed rapidly in the 1990s but the paradigm was shaken by the realization, starting with the Asian crises, that credit growth is also closely associated with the incidence of crisis. Countries with deeper financial systems grow more rapidly but credit expansions often end with financial crises and deep contractions. In this paper we looked at recent efforts to reconcile these observations and connect the two strands of the literature. In just the last few years, there has been promising research indicating that it is possible to identify the macroeconomic characteristics that determine whether a credit boom is good or bad.

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REFERENCES


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