Bankruptcy Resolution and Credit Cycles: Some Empirical Evidence

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Debt contracts play a central role in macroeconomics and finance. The enforcement of debt contracts is essential for resource allocation when firms encounter distress (e.g., whether viable companies can survive and non-viable companies get shut down), and for debt capacity determination ex ante (e.g., what can be enforced ex post affects what contracts can rely on). Legal institutions such as bankruptcy systems are key to the implementation of debt enforcement, but their broader impact has received limited attention in macroeconomics research.

In the traditional view that has influenced many macroeconomic models, firms pledge physical assets in order to borrow, which creditors can seize in the case of default. In practice, however, default resolution has evolved beyond seizing physical assets. For instance, US business bankruptcy features Chapter 11 restructuring, where viable firms continue to operate (instead of being liquidated) and creditors' payoffs are given by the "going-concern value" (i.e., the value of cash flows from ongoing operations) of the company post reorganization as verified and approved in court. Indeed, the "automatic stay" provision of US bankruptcy prohibits asset seizure by creditors to prevent disruptions to orderly restructuring. Well-functioning restructuring systems can reduce inefficiencies from liquidation ex post, such as the loss of valuable organizational capital (Corbae and D'Erasmo, 2021; Crouzet, Eberly, Eisfeldt, and Papanikolaou, 2022); it can also affect how firms borrow ex ante (Lian and Ma, 2021).

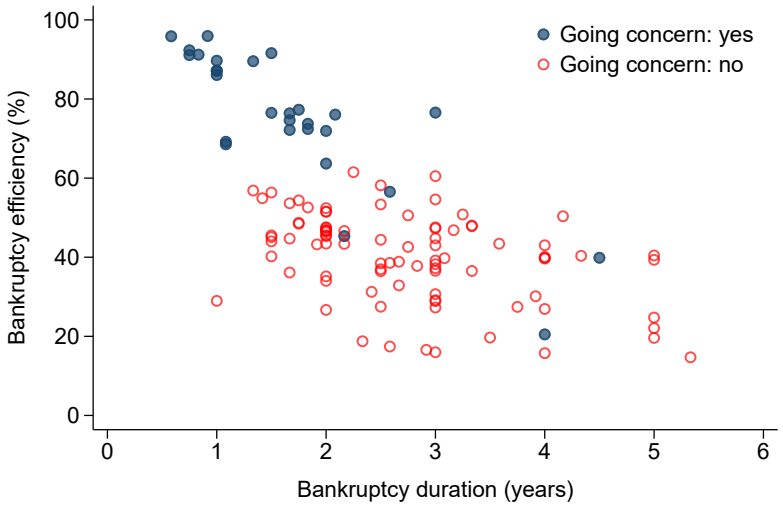
In this paper, we present evidence that the institutional foundations for debt enforcement have

important macroeconomic effects. We build on previous work to measure the quality of the business bankruptcy system in a country. These measures assess the amount of value that can be preserved for a viable company in financial distress. Bankruptcy systems typically have higher efficiency if a viable firm can survive as an operating business (instead of having to shut down and liquidate), and the restructuring procedure does not take too long or incur too much costs. We find that countries with better bankruptcy systems support a higher amount of business credit relative to GDP, yet are less vulnerable to credit cycles. For example, they experience milder recessions following business credit booms. This can result from more efficient resolution of firms' financial distress in economic downturns. It can also result from these countries relying less heavily on real estate for business credit as real estate boom-bust cycles tend to be more pernicious.

Motivating Facts A starting point of our work is the literature that shows that financial crises are associated with severe long-lasting effects on output (Reinhart and Rogoff, 2009). These crises tend to be preceded by credit booms, and followed by abrupt credit crunches (Schularick and Taylor, 2012). Such credit cycles are particularly salient in open economies that experience periods of capital inflows followed by Sudden Stops (Mendoza and Terrones, 2008).

At the sectoral level, previous work by Mian, Sufi, and Verner (2017) shows an intriguing finding that business credit booms appear to have less adverse effects on economic growth compared to household credit booms. One possibility is that institutions for business bankruptcy tend to be better developed, which can contribute to this result for at least two reasons. First, such institutions may streamline the resolution of financial distress (e.g., alleviate debt overhang) and improve the allocation of resources (e.g., non-viable firms should exit while viable firms should fix their financial and operational structures). In comparison, mechanisms to alleviate debt overhang for households, for example, are more limited. Second, institutions for business bankruptcy may also improve the verifiability and contractibility of firms' cash flows, which can make it easier for business to borrow on the basis of their cash flows (and correspondingly the merit of their operations). In comparison, households predominantly rely on borrowing against physical assets like housing, and real estate boom-bust cycles can be especially messy for a variety of reasons (e.g., more scope for speculation and financial acceleration). Indeed, recent work by Jordà, Kornejew, Schularick, and Taylor (2022) find that greater frictions in corporate debt resolution are associated with slower recoveries during economic recessions. Jordà et al. (2022) have

Figure 1. Bankruptcy Outcomes across Countries



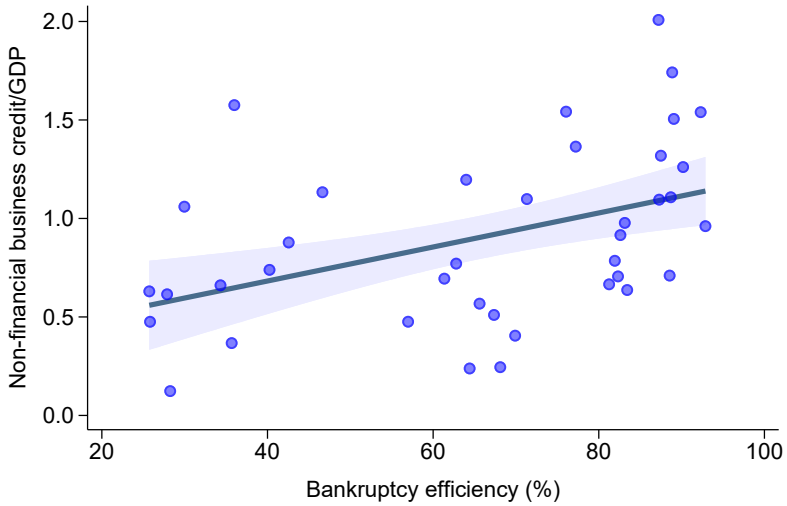
Notes: This figure shows a scatter plot for 118 countries in 2015, where each dot is a country. The data come from the World Bank Doing Business database following the methodology of Djankov et al. (2008). The blue dots represent countries where the business can continue to operate as a going concern, and the red dots represent countries where the business is expected to be liquidated. Bankruptcy efficiency uses the fraction of economic value that can be preserved in bankruptcy. It measures total recovery less bankruptcy costs, discounted by resolution duration divided by the going concern value (100).

focused on recoveries conditional on recessions, and we aim to flesh out the patterns throughout the credit cycle.

Measurement of bankruptcy efficiency We measure the quality of business bankruptcy systems for 40 advanced and emerging market economies building on Djankov, Hart, McLiesh, and Shleifer (2008) and Jordà et al. (2022). Djankov et al. (2008) study debt enforcement in 88 countries. They present a standardize case to legal professionals in each country. The case features a medium-sized hotel company, which has senior debt from a bank and junior debt from dispersed creditors. The company has a going-concern value of 100 if it continues to operate and a piecemeal liquidation value of 70. Legal professionals in each country assess the likely bankruptcy outcomes for such a company, including the total value that can be preserved, the type of procedure (e.g., liquidation versus reorganization), the duration, and administrative costs. The original data was collected in 2004, and the World Bank continued to conduct the survey annually afterwards.

We focus on the total value preserved (net of legal costs) to measure bankruptcy efficiency. Figure 1 plots the total recovery and the likely duration of the bankruptcy case across countries. The blue dots indicate countries where the business can stay as a going concern and the hollow red dots indicate countries where it will be liquidated. We see that the business is expected to stay a going concern

Figure 2. Bankruptcy Institutions and Size of Credit Market



Notes: Each dot represents one out of 39 advanced and developing countries in 2015. Bankruptcy efficiency is defined as the fraction of maximal economic value that could be realised in bankruptcy as measured by World Bank Doing Business following the methodology of Djankov et al. (2008). Credit data sourced from the BIS. Shaded area marks 90% confidence bounds for linear prediction. The relation is robust to controlling for income per capita.

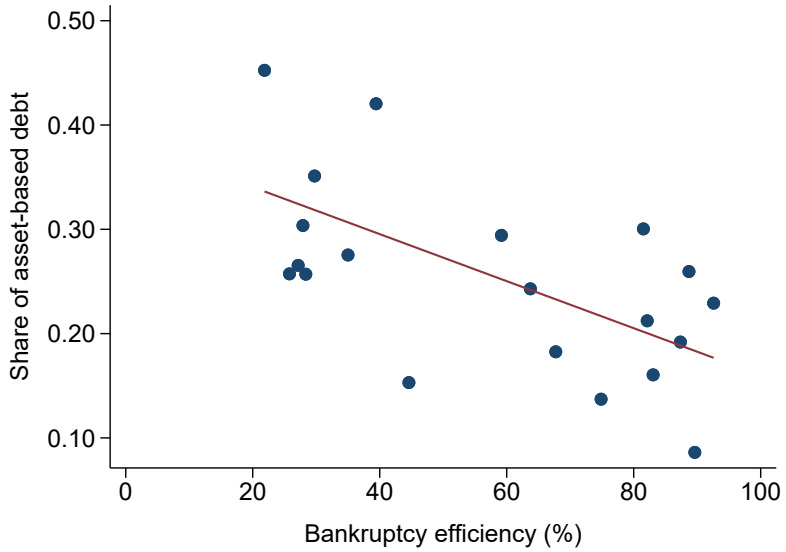
in only about half of the countries, where recovery is naturally higher. In many cases, the business cannot remain a going concern and yet the bankruptcy case is expected to take a long time. Accordingly, recovery is very low.

To support panel data analyses with a longer series, we follow Jordà et al. (2022) to construct bankruptcy efficiency measures going back to 1978 using additional data from Djankov, McLiesh, and Shleifer (2007). Djankov, McLiesh, and Shleifer (2007) measure the protection of senior debt claims using a four-point index. We combine data from Djankov et al. (2008) and Djankov, McLiesh, and Shleifer (2007) to obtain an indicator variable of high efficiency bankruptcy, which equals one if recovery rates in Djankov et al. (2008) are higher than 80% (2004-2019) or the creditor rights index in Djankov, McLiesh, and Shleifer (2007) is at least three (1978-2003).[1] For each series, these thresholds correspond to their 75th percentile in our sample.

Credit market characteristics In countries with higher bankruptcy efficiency, we observe both a higher amount of business credit to GDP and less reliance of business credit on physical assets like real estate. Figure 2 shows, for the cross section of 2015, the relationship between bankruptcy efficiency in a country and the size of the credit market. Figure 3 shows the relationship with the composition of

[1] Our binary indicator not only varies across countries but also within countries across time, as country-specific series do cross the corresponding thresholds over our sample period.

Figure 3. Bankruptcy Institutions and Composition of Business Lending



Notes: This figure shows binscatter plots for 48 countries in 2015. The share of asset-based debt in total debt is taken from Lian and Ma (2021), using data from CapitalIQ. Bankruptcy efficiency uses the fraction of economic value that can be preserved in from bankruptcy measured by the World Bank Doing Business database following the methodology of Djankov et al. (2008).

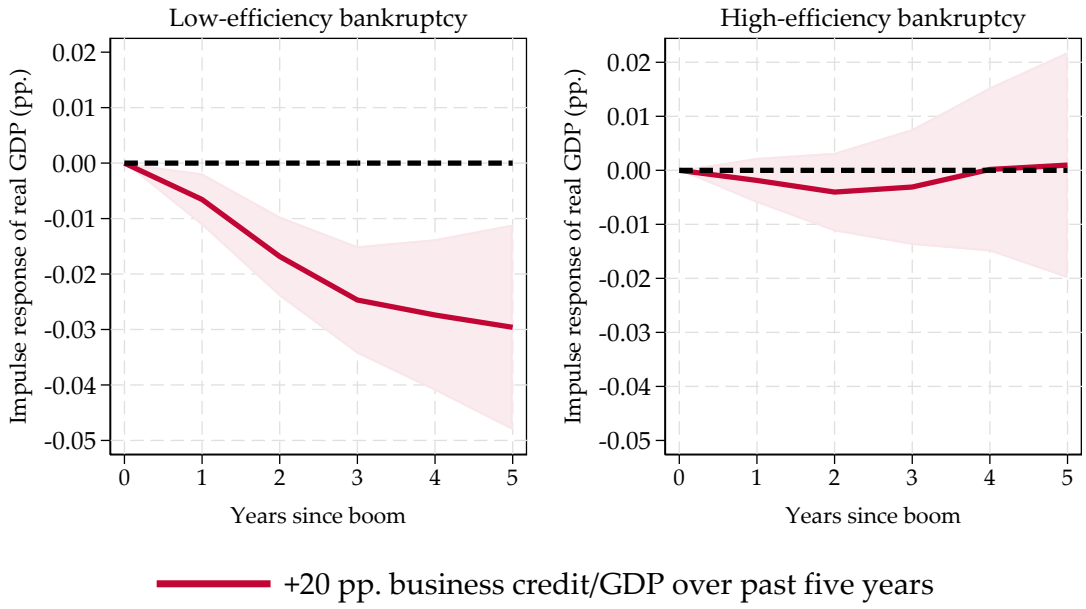
business lending. In particular, if it is difficult to preserve viable firms as operating businesses, then business lending is likely to have a stronger focus on pledging physical assets (such as real estate).

Lian and Ma (2021) analyze debt composition among companies in 56 countries between 2003 and 2018, using CapitalIQ data to classify firms' outstanding debt contracts into a) those backed by physical and other separable assets (real estate, equipment, working capital, etc.), where creditors have security interests in these particular assets and claims against their values, and b) those backed by the value of the business as a whole, where creditors have security interests in the company as a whole (e.g., blanket liens) or in its equity or general unsecured claims. They refer to these two groups as "asset-based debt" and "cash flow-based debt," respectively, which build on common terminologies among creditors.[2] We observe that business lending has a stronger focus on pledging physical assets in countries with low bankruptcy efficiency and vice versa.

Credit cycles We document that the macroeconomic consequences of business credit booms differ for countries with weaker versus stronger bankruptcy institutions. We build on the sample of Mian,

[2]As they explain, this analysis across countries faces a number of challenges and is inevitably imperfect (e.g., CapitalIQ data is restricted to public companies and sometimes information on the characteristics of debt contracts is incomplete). Nonetheless, despite imperfections that mostly will noise up true cross-country differences, they find that countries with weaker bankruptcy institutions have a higher share of asset-based debt.

Figure 4. GDP following Business Credit Booms

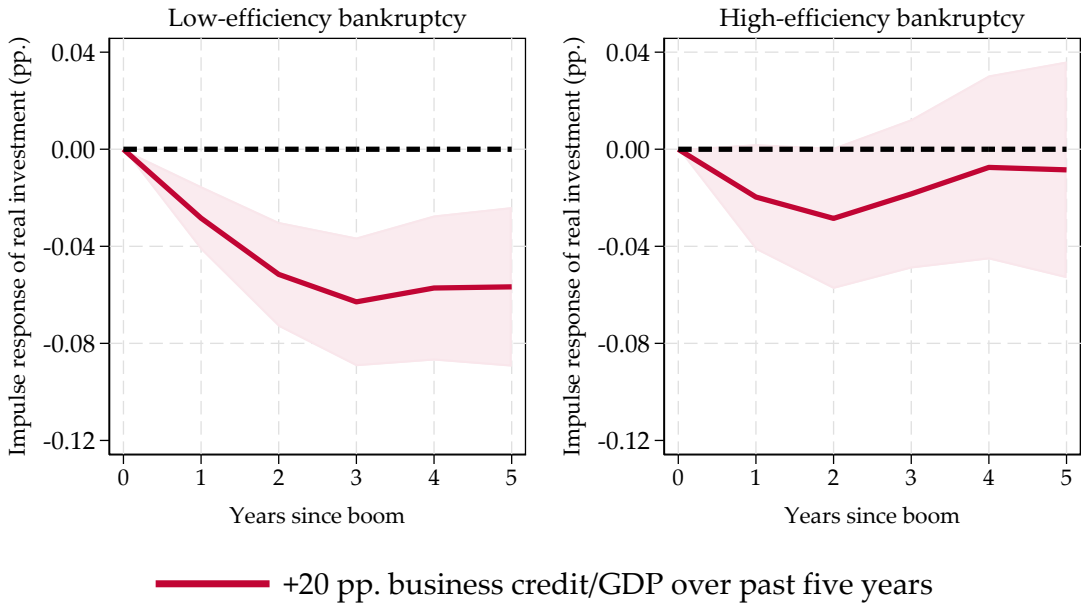


Notes: This figure shows the GDP trajectory following a 20 percentage point increase in the business credit-to-GDP ratio over the preceding five years. We estimate state-dependent local projections: $\Delta_h \log(\text{real GDP}_{i,t+h}) = \alpha_{i,h} + \beta_{1,h} B_{i,t} + \beta_{2,h} \Delta_5 c_{i,t} + \beta_{3,h} (B_{i,t} \times \Delta_5 c_{i,t}) + \boldsymbol{\gamma}_h \boldsymbol{x}_{i,t} + \epsilon_{i,t}$ for $h = 1, ..., 5$ where $c_{i,t}$ denotes business credit relative to GDP for country i in year t and $B_{i,t}$ is the bankruptcy quality indicator. Controls include horizon-specific country fixed effects $\alpha_{i,h}$ and a vector $\boldsymbol{x}_{i,t}$ of contemporaneous and five lags of real GDP growth and real investment growth, as well as the cumulative change in household credit relative to GDP since $t-5$. The sample contains annual data from an unbalanced panel of 40 advanced and emerging economies, including all countries covered by Mian, Sufi, and Verner (2017). The sample period is 1978 to 2019. Shaded areas mark 90% confidence intervals.

Sufi, and Verner (2017) which contains 30 countries, and extend it to all 40 countries for which both bankruptcy measures and BIS credit data are available (we use countries with population above five million); the results are similar if we use the original sample of Mian, Sufi, and Verner (2017).

Figure 4 shows that in countries with strong bankruptcy institutions (left panel), business credit booms are followed by mild declines in GDP for about two years. In countries with weak bankruptcy institutions (right panel), however, business credit booms are followed by prolonged and substantial declines in GDP. Indeed, countries with stronger bankruptcy institutions can both support more credit relative to GDP (Figure 2) and suffer less from credit boom-bust cycles. In addition to GDP, we observe that investment is persistently lower and unemployment is persistently higher in countries with weak bankruptcy systems, as shown in Figures 5 and 6. We check that our results are not driven by the development status of the countries; for example, the estimates are robust to controlling for (various transformations of) GDP per capita and its interaction with business credit booms.

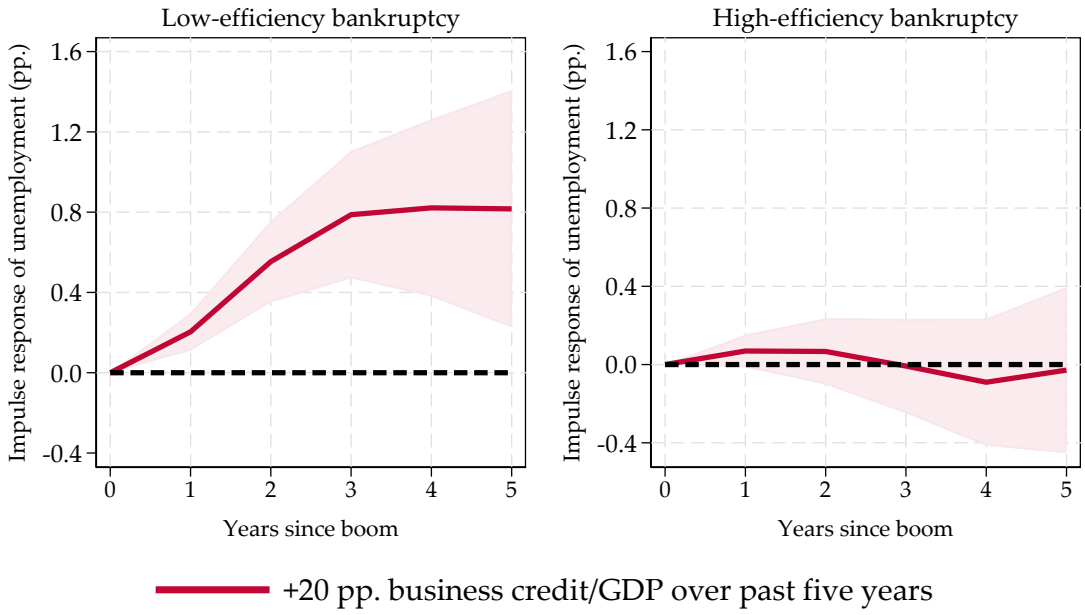
Figure 5. Investment following Business Credit Booms



Notes: This figure shows the investment trajectory following a 20 percentage point increase in the business credit-to-GDP ratio over the preceding five years. We estimate state-dependent local projections: $\Delta_h \log(\text{real investment}_{i,t+h}) = \alpha_{i,h} + \beta_{1,h} B_{i,t} + \beta_{2,h} \Delta_5 c_{i,t} + \beta_{3,h} (B_{i,t} \times \Delta_5 c_{i,t}) + \boldsymbol{\gamma}_h \boldsymbol{x}_{i,t} + \epsilon_{i,t}$ for $h = 1, ..., 5$ where $c_{i,t}$ denotes business credit relative to GDP for country i in year t and $B_{i,t}$ is the bankruptcy quality indicator. Controls include horizon-specific country fixed effects $\alpha_{i,h}$ and a vector $\boldsymbol{x}_{i,t}$ of contemporaneous and five lags of real GDP growth and real investment growth, as well as the cumulative change in household credit relative to GDP since $t-5$. The sample contains annual data from an unbalanced panel of 40 advanced and emerging economies, including all countries covered by Mian, Sufi, and Verner (2017). The sample period is 1978 to 2019. Shaded areas mark 90% confidence intervals.

As mentioned earlier, what can be enforced ex post by bankruptcy institutions also affects the ex ante characteristics of corporate debt contracts. With weak bankruptcy institutions, business lending relies more on pledging physical assets, which creditors can count on even without sophisticated procedures for default resolution. A heavy reliance of business lending on physical assets then ties business credit booms to fluctuations in real estate values. In Figure 7, we show that aggregate business credit is more responsive to house prices in countries with weaker bankruptcy institutions. Recent work by Müller and Verner (2023) documents that business credit booms tied to non-tradable sectors have more adverse impact on subsequent GDP growth. A substantial fraction of firms in the non-tradable sector are related to real estate (e.g., construction), and therefore credit booms in non-tradable sectors tend to have a closer relationship with the real estate market. While Müller and Verner (2023) do not investigate issues related to bankruptcy institutions, their findings are consistent with the observation that real estate related credit booms appear more pernicious.

Figure 6. Unemployment Rate following Business Credit Booms

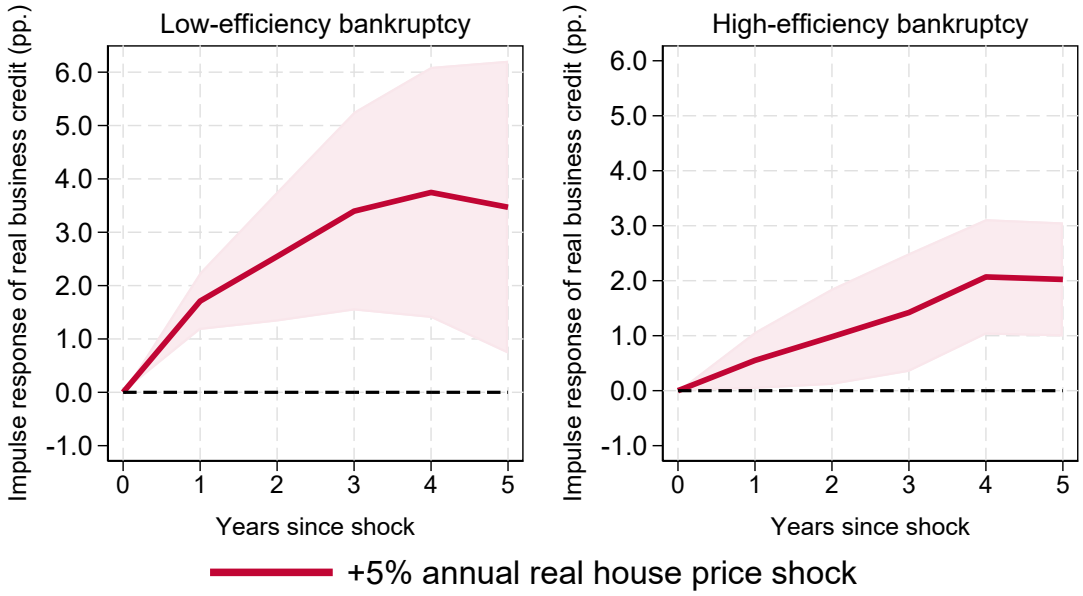


Notes: This figure shows the unemployment rate trajectory following a percentage point increase in the business credit-to-GDP ratio over the preceding five years. We estimate state-dependent local projections: $\Delta_h \text{unemployment rate}_{i,t+h} = \alpha_{i,h} + \beta_{1,h} B_{i,t} + \beta_{2,h} \Delta_5 c_{i,t} + \beta_{3,h} (B_{i,t} \times \Delta_5 c_{i,t}) + \boldsymbol{\gamma}_h \boldsymbol{x}_{i,t} + \epsilon_{i,t}$ for $h = 1, ..., 5$ where $c_{i,t}$ denotes business credit relative to GDP for country i in year t and $B_{i,t}$ is the bankruptcy quality indicator. Controls include horizon-specific country fixed effects $\alpha_{i,h}$ and a vector $\boldsymbol{x}_{i,t}$ of contemporaneous and five lags of real GDP growth, real investment growth and unemployment rate change, as well as the cumulative change in household credit relative to GDP since $t - 5$. The sample contains annual data from an unbalanced panel of 40 advanced and emerging economies, including all countries covered by Mian, Sufi, and Verner (2017). The sample period is 1978 to 2019. Shaded areas mark 90% confidence intervals.

As a further illustration, consider the example of real estate boom-bust cycles in Japan and the US. For Japan, business lending in the 1980s relied heavily on real estate, in part because creditors needed physical assets for debt enforcement. Firms then loaded up on real estate assets and borrowed heavily against them as real estate values soared, and such borrowings did not end well. For the US, business lending relied much less on physical assets and more on the merit of firms' operations (e.g., the cash flows they generate), in part because creditors can get paid according to firms' going-concern values in the event of default (some creditors may count on becoming owners themselves). Accordingly, US business lending commonly use metrics like debt to EBITDA (earnings before interest, taxes, depreciation, and amortization), which are more connected to the fundamental value of a company. When US experienced rising real estate prices in the early 2000s, major US firms did not load up on real estate assets or pile up debt backed by real estate, unlike US households or Japanese firms in the Japanese housing cycle.

Taken together, the evidence suggests that bankruptcy institutions are relevant for understanding

Figure 7. Sensitivity of Business Credit to House Price Growth



Notes: This figure shows the path of real nonfinancial business credit predicted by +5% annual growth of national real house prices estimated by state-dependent local projections: $\Delta_h \log(\text{index of real house prices}_{it+h}) = \alpha_{i,h} + \beta_{1,h} B_{i,t} + \beta_{2,h} c_{i,t} + \beta_{3,h}(B_{i,t} \times c_{i,t}) + \boldsymbol{\gamma}_h \boldsymbol{x}_{i,t} + \epsilon_{i,t}$ for $h = 1, ..., 5$ where $c_{i,t}$ denotes real business credit growth for country i in year t and $B_{i,t}$ is the bankruptcy quality indicator. Controls include horizon-specific country fixed effects $\alpha_{i,h}$ and a vector $\boldsymbol{x}_{i,t}$ of five lags of real house prices as well as contemporaneous and five lags of real business credit growth. Credit and house price data are from BIS databases. Annual data from an unbalanced panel of 28 advanced and emerging economies for the time period 1986-2019. Shaded areas mark 90% confidence intervals.

credit cycles and macroeconomic fluctuations. First, the overall macroeconomic consequences of business credit booms appear to differ across countries depending on the quality of bankruptcy institutions. Second, in terms of mechanisms, there is accumulating evidence that ex post resolution of distress depends on the quality of bankruptcy institutions, which can influence the severity of downturns to the extent credit booms go bust. There are also indications that weak bankruptcy institutions may foster more pernicious booms by forcing business lending to rely more on physical assets like real estate.

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