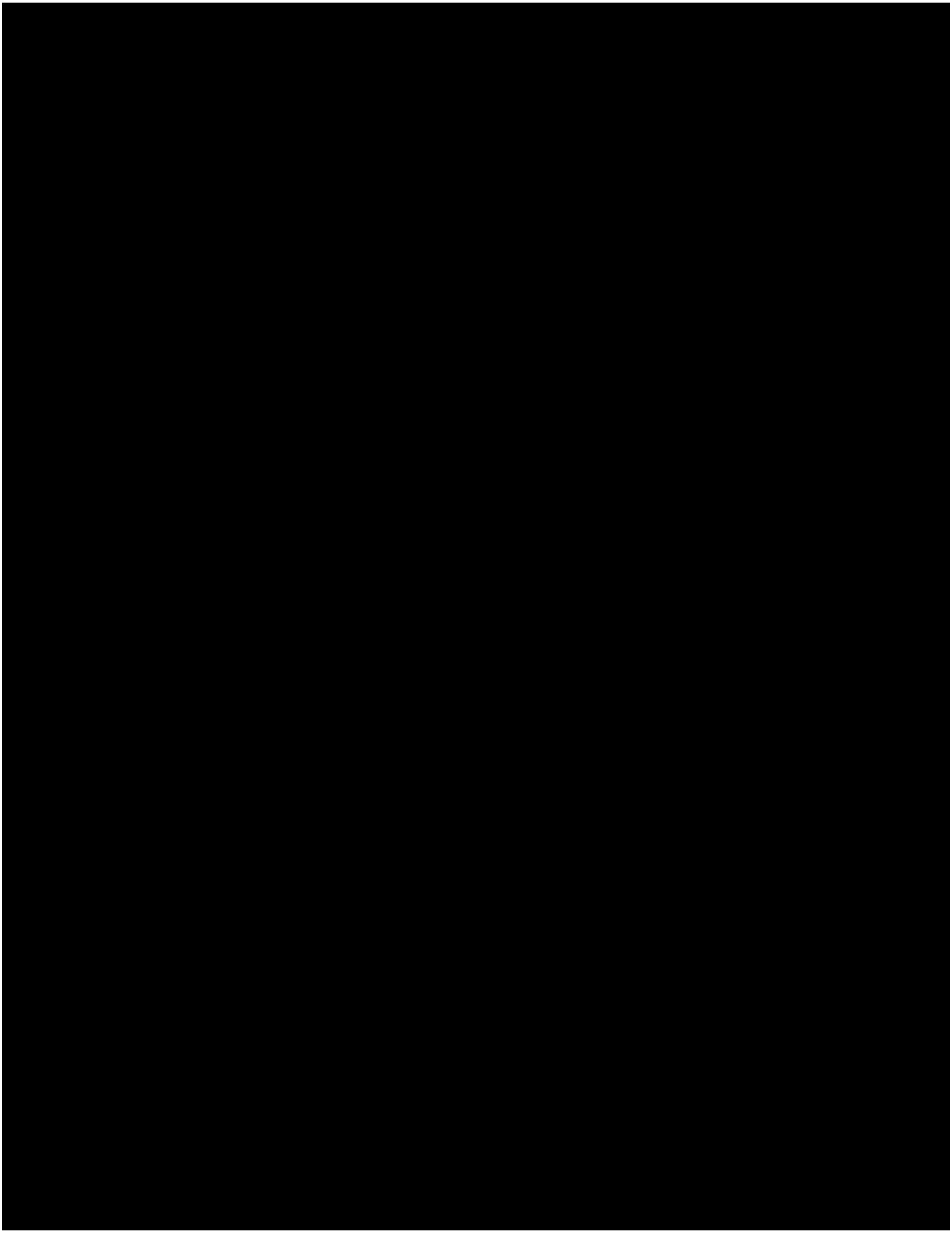

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Lending Standards and Output Growth

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Abstract

While some credit booms are followed by economic underperformance, many are not. Can lending standards help separate good credit booms from bad credit booms contemporaneously? To observe lending standards internationally, I use information from primary debt capital markets. I construct the high-yield (HY) share of bond issuance for a panel of 38 countries. The HY share is procyclical, suggesting that lending standards in bond markets are extrapolative. Credit booms with deteriorating lending standards (rising HY share) are followed by lower GDP growth in the subsequent three to four years. Such booms deserve attention from policy makers.

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Lending standards and output growth

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1 Introduction

A large literature shows that credit booms can go wrong: they are often followed by slow growth, recessions, and crises (Jordà, Schularick & Taylor 2011, Schularick & Taylor 2012, Jordà, Schularick & Taylor 2013, Jordà, Schularick & Taylor 2017, Reinhart & Rogoff 2009, Baron & Xiong 2017, Mian, Sufi & Verner 2017, Dell'Ariccia, Igan, Laeven & Tong 2012, Bordo, Eichengreen, Klingebiel & Martinez-Peria 2001). While many booms turn out to be bad with the benefit of hindsight, not all do. For example, Dell'Ariccia, Igan, Laeven & Tong (2012) document that more than a third of credit booms are not followed by economic underperformance. Telling good booms apart from bad booms contemporaneously is clearly important for policy. Unfortunately, efforts to do so using macroeconomic indicators have had limited success. Lending standards might help: indeed, these might contain information not in quantities or even prices (Fostel & Geanakoplos 2008, Fostel & Geanakoplos 2014). The key challenge to using this approach is that lending standards are hard to observe, particularly in a cross-country setting.

In this paper, I use information from primary debt capital markets to observe lending standards internationally. I summarize lending standards by the high-yield share of issuance, building on Greenwood & Hanson (2013) and López-Salido, Stein & Zakrajšek (2017), who respectively construct and show the macroeconomic relevance of this measure for the US. Lending standards in bond markets move in tandem with survey measures of bank lending standards, and are procyclical. Lending standards do help separate good booms from bad booms in a cross-country setting: booms with deteriorating lending standards are followed by slower growth over subsequent years. Prices can also be observed from bond markets (Krishnamurthy & Muir 2016), and are also informative. While this simple approach abstracts from many details that might matter, it may be a useful first step to going beyond credit quantities.

I use detailed data on bond issuance to construct a measure of lending standards for a broad cross-country sample. Using bond level data from Dealogic on issuance, I construct an unbalanced panel of 38 countries, with coverage for some advanced economies starting in the early 1980s. Figure 1 visually summarizes sample coverage. I focus on issuance by non-financial corporates and governments, and assign issues to countries based on issuers' countries of operations. The

sample consists of roughly 110,000 bonds. Importantly, I observe whether these bonds are rated as investment grade or high yield. My main measure of lending standards is the high-yield (HY) share of issuance, constructed at the country year level. The HY share of issuance is a simple, intuitive measure of lending standards. When this share is higher, lenders are willing to allocate a higher share of credit to less credit-worthy borrowers, suggesting that lending standards are looser. Greenwood & Hanson (2013) construct a long time series of the HY share for the US, and López-Salido et al. (2017) show that increases in the HY share forecast reduced economic activity for the US. I combine this information on lending standards with data on aggregate credit from the BIS. Price based measures such as credit spreads can also be constructed from bond issuance. Krishnamurthy & Muir (2016) show that credit spreads have forecasting power in a cross-country setting.

I begin by documenting two stylized facts about lending standards, as measured by the HY share of bond issuance. The first stylized fact is that lending standards in bond markets move in line with survey measures of bank lending standards, when both are available. As external finance is more bank-centric, rather than market-centric, in many countries, extending work using survey measures of standards in individual countries, such as Bassett, Chosak, Driscoll & Zakrajšek (2014), is a natural possibility to consider. Central banks in many countries conduct surveys of senior loan officers at banks, typically asking questions about the evolution of credit standards. Unfortunately, in a cross-country setting, it is difficult to use these surveys as the primary measure of lending standards due to limited coverage.[1] It is not obvious that lending standards in bond markets should move together with bank lending standards: in principle, banks may become more cautious even as bond market investors remain sanguine about credit risk. However, when both the HY share and bank loan officer surveys are available together, they do move in line with each other: the HY share tends to be falling when survey respondents report tightening credit standards. The average correlation for these 14 countries, scaled to be positive, is close to 0.4. The HY share is therefore a reasonable measure of lending standards more broadly.

The second stylized fact is that lending standards are procyclical: the HY share tends to be

[1] These surveys are available only for 14 of the 38 countries in my sample, and generally begin in the early 2000s.

rising in periods when growth is rising, and falling when growth is falling. From a theoretical perspective, it is not clear whether lenders' behavior should serve to amplify or dampen shifting market conditions (Fostel & Geanakoplos 2014, Bernanke & Gertler 1989, Kiyotaki & Moore 1997). Empirically, lending standards in bond markets loosen during economic booms, and tighten during busts. This dynamic is consistent with the narratives of Minsky (1977), Minsky (1986) and Kindleberger (1978), and suggests that lenders expect booms to continue. One potential concern is that the HY share may mechanically appear procyclical if younger, growing, firms are only able to issue high yield bonds. High yield issuers do not seem to be systematically younger in the few countries where I am able to match the sample to information about firms.

Given a credit boom, subsequent output growth contains substantial variation that does not seem to be driven by credit quantities, suggesting that there is room for lending standards to help explain the path of growth. I define credit booms as country-years where the five year growth in the credit to GDP ratio is above the 75th percentile of the international experience in the previous ten years. Unconditionally, episodes of high growth in credit to GDP ratios from year $t-5$ to t tend to be followed by low output growth from t to $t+3$. This is consistent with the large literature, focused on credit quantities, arguing that credit booms can be bad. However, it does not seem to be the case that booms followed by the poorest macroeconomic performance are simply the biggest. Conditional on credit booms, substantial variation remains in subsequent growth. This variation does not seem to be related to how big the boom was.

Lending standards do help separate good booms from bad booms: booms with deteriorating lending standards are followed by worse growth. To incorporate the evolution of lending standards over the course of the boom, I use the average change in the HY share from year $t-5$ to t (the same period over which the boom is defined). Both the definition of the boom and the measure of the evolution of lending standards therefore only use information available at year t. I use Jordà (2005) local projections to study the impact of lending standards and credit quantities on subsequent output growth. Conditional on a credit boom, increases in the HY share (deteriorating lending standards) are followed by worse growth over subsequent years. Subsequent three year cumulative growth is lower by 1.5 percentage points for a one standard deviation increase in the HY share over

the course of the boom.[2] Consistent with this timing, López-Salido et al. (2017) find that increases in the HY share in the US forecast lower growth with a lag of two to three years.

The long lag after which growth seems to be affected by changes in lending standards, and the procyclical nature of the HY share, make it unlikely that reverse causality drives these results. A natural concern when using market based measures is that they might reflect market expectations, not causes, of future developments. If this were the case here, it would not be clear that policy should try to target lending standards. In this instance, however, this anticipation-based interpretation is somewhat less natural: market participants would have to be willing to allocate a greater share of their investments to high yield bonds in anticipation of an economic downturn. Given that the HY share is procyclical, it seems more plausible that market participants simply expect the boom they are experiencing to continue (Minsky 1977, Minsky 1986, Kindleberger 1978). Bordalo, Gennaioli & Shleifer (2016) suggest that expectations continue to build up until they become unsustainable, endogenously generating a reversal. Indeed, Greenwood & Hanson (2013) show that spreads tend to be low when the HY share is high, but subsequently widen, and López-Salido et al. (2017) use this predictable reversal in spreads to forecast economic activity in the US.

The dynamics of credit spreads suggest credit supply plays a role in explaining my results. For each bond in the sample I observe, or can calculate, the yield to maturity. I define credit spreads based on the gap between the 90th and 10th percentile yields within a country year. Credit spreads generally compress as credit grows during credit booms, consistent with Krishnamurthy & Muir (2016) and Mian et al. (2017). Spreads compress less for booms with a rising HY share, but do not seem to rise enough. Even for credit booms with a rising HY share, spreads do not increase much more than if there was no credit boom, suggesting a role for credit supply.[3] Two further results also point to credit supply: first, booms that coincide with deteriorating global lending standards are also followed by lower growth. Second, increases in the HY share generally reverse over subsequent years. This is consistent with the view that credit booms driven by temporary increases in credit supply might be unsustainable.

[2] A simple non-parametric exercise shows that the conditional probability of low subsequent growth is higher for credit booms with a rising HY share.

[3] Spreads do move in the right direction within credit booms: credit booms with rising spreads (relative to the typical boom) are followed by lower growth.

I present various additional results and robustness checks in the paper; I briefly summarize four here. First, the precise manner in which credit booms are defined does not drive the results. For example, defining credit booms using the 75th percentile of five year growth in the credit to GDP ratio in the full sample, rather than over the previous ten years, produces very similar results. This definition leads to an absolute threshold of five year growth in credit to GDP of about 22 percent. Second, the results are stronger in advanced economies. This could reflect the fact that the sample includes more advanced economies with longer coverage, or a different role for market finance in emerging markets. Third, deterioration in lending standards, as measured by the HY share, is also informative conditional on a boom in household credit.[4] Fourth, my results are robust to controlling for several additional variables, including house price appreciation, the level of credit to GDP, and credit gaps.

This paper makes two main contributions: first, it constructs the HY share to measure lending standards internationally, and second, it shows that the HY share helps separate good booms from bad booms. As the discussion so far acknowledges, my analysis particularly builds on Greenwood & Hanson (2013), López-Salido et al. (2017), and Krishnamurthy & Muir (2016). The first two sets of authors construct and show the relevance of the HY share for macroeconomic forecasting for the US respectively, and the third set use credit spreads in a cross-country panel setting.[5] Together with this literature, my results suggest that booms with deteriorating lending standards, likely driven by outward shifts in credit supply, can be bad for subsequent growth. An older and continuing literature shows that bond prices and spreads help forecast macroeconomic variables (Mishkin 1990, Friedman & Kuttner 1992, Stock & Watson 2003, Hatzius, Hooper, Mishkin, Schoenholtz & Watson 2010, Bordo & Haubrich 2010, Gilchrist & Zakrajšek 2012, Adrian, Boyarchenko & Giannone 2016).[6] Some papers do also consider the role of lending standards in individual countries, e.g. Bassett et al. (2014).

My results suggest that going beyond quantities is likely to be helpful when monitoring credit

[4]Consistent with Mian et al. (2017), credit booms that are also household credit booms are followed by lower subsequent growth in my sample.

[5]The panel I construct here is broader (38 countries), but shorter, as the sample begins (for some countries) in 1980. Krishnamurthy & Muir (2016) use secondary market prices, including from historical sources that allow earlier episodes to be studied.

[6]This literature includes work on Financial Condition Indices (FCIs), which typically incorporate credit spreads.

booms. My approach is very simple, and abstracts from many potentially important features of the economic context. However, it shows that useful, real-time, measures of lending standards can be constructed from data currently available. Moreover, lending standards do help separate good booms from bad booms: credit booms with deteriorating lending standards are followed by worse growth. Policy makers should pay particular attention to such booms.

The remainder of this paper is organized as follows. Section 2 provides more detail on the data and construction of key variables. Section 3 outlines stylized facts about lending standards, as measured by the HY share. Section 4 shows that lending standards do help separate good credit booms from bad booms, and presents various additional results. Section 5 concludes.

2 Data

This section summarizes the data used in this paper. I combine data from four main sources to study credit booms and lending standards together. First, bond level data on bond issuance across a sample of countries, from Dealogic. Second, data on overall credit, and credit to different sectors of the economy, from the BIS. Third, data on nominal and real GDP from the IMF World Economic Outlook (WEO) Database. Fourth, results from surveys of bank loan officers collected from central bank websites.[7]

I construct a panel of 38 countries with sufficient bond issuance and data on credit. I associate issuers with countries based on their reported country of operations. Dealogic covers bond issuance from 1980-2016, for bonds issued by firms operating in 81 countries. I exclude bonds issued by financial issuers (focusing on non-financial corporate and government bond issuance), money market instruments, and floating-rate bonds from the sample.[8] I exclude any country with more than five years in which no bonds were issued (after the first year Dealogic reports issuance for that country). I exclude countries with fewer than ten years with at least ten issues and at least one non-financial corporate issue. I begin the sample for each country in the first year with at least ten issues and at least one non-financial corporate issue. These filters restrict the sample to 41 countries. The

[7] For a few countries, I am also able to match bond issuance to data on individual issuers from Worldscope.

[8] Dealogic reports the yield to maturity for most bonds, or provides enough information to calculate it. I also exclude bonds where I am unable to calculate the yield to maturity.

BIS provides data on 43 countries, of which 38 have sufficient bond issuance.[9] The sample consists of about 110,000 bonds for issuers operating in these 38 countries. Importantly, Dealogic reports whether these bonds are rated investment grade or high yield.

Figure 1 and Table 1 summarize coverage of the 38 countries in the sample. Table 1 shows the year in which each country enters the panel, ranging from 1980 for France and the US, to 2002 for China and India. Coverage begins by 1985 for 16 countries. As the sample extends until 2016, the number of years available for each country ranges from 37 to 15. A handful of country years are missing (no bond issuance). Table 1 also shows the number of distinct issuers, the number of issues, and proceeds raised from bond issuance as a share of GDP. While the number of distinct issuers and the number of issues is small for some countries, information on lending standards from primary debt capital markets is available for a fairly broad cross-section of countries. The table also partitions the countries in the sample into advanced economies and emerging markets.

Four main quantities are of interest for my analysis. All are at the country year level. First, the IMF WEO series on real GDP growth. Figure 2 shows GDP growth for a number of countries, for the years these countries are in the sample: Panel A shows GDP growth for a selection of advanced economies, and Panel B for a selection of emerging markets. Second, the credit to GDP ratio, in percentage points. This is the ratio of the BIS series on credit obtained by private non-financial borrowers to the IMF WEO GDP series, both nominal, and in dollars. Third, the high-yield (HY) share of issuance, my measure of lending standards. This is proceeds from high yield issues, as a share of proceeds from all issues, in percentage points.[10] Figure 3 shows the HY share for a number of countries in the sample: Panel A shows a selection of advanced economies, and Panel B a selection of emerging markets.[11] Fourth, price based measures, i.e. credit spreads, constructed

[9]The BIS reports total credit obtained by domestic resident borrowers. The BIS has recently added data for a 44th country, Colombia.

[10]Dealogic provides a dummy variable for investment grade issues, which does not always match the actual rating provided. My results are similar if I construct the HY share based on the rating instead of the dummy.

[11]My construction builds on the Greenwood & Hanson (2013) HY share for the US. Beyond different data sources, there are two main differences between our series. First, I assign issues to countries based on issuers' countries of operations. Second, I include government bonds. There are also two minor differences: I use the level, rather than the log, of the HY share, and I define the share based on funds raised rather than principal amounts to be repaid. Figure 4 shows a comparison between our series. It shows a US series excluding government bonds as well as a global HY share. The two US series are fairly close after the early 1990s. A rise in the global HY share in the early 1980s may account for some of the differences in that period.

from the distribution of yields for bonds in the sample. I define the credit spread as the difference between the 90th percentile yield and the 10th percentile yield within country year, divided by the mean of this difference by country over the full sample. The HY share and spread are winsorized at the 5th and 95th percentile, and imputed with lags when missing.

For clarity, I explicitly describe the transformations of these quantities I use in my analysis here. The literature on credit booms generally uses growth of credit relative to GDP over a number of years. I use growth in the credit to GDP ratio over five years (the log change, multiplied by 100). I define credit booms as country years where this growth is high. To be useful for policy, it is important for this definition to be constructed in a backward looking manner. I label as credit booms country years where five year growth in credit/GDP is above the 75th percentile of this quantity in the previous ten years, for all countries with data on credit.[12] Table 1 shows the number of years classified as credit booms for each country in the sample.[13] To study the role of lending standards, I look at the evolution of lending standards over a similar period. Specifically, I use the average change in the HY share over the previous five years. For credit spreads, I use the five year change in the spread. Table 2 summarizes these definitions for reference.

My measure of lending standards, given the manner in which I construct it, is necessarily focused on market finance. Bond markets typically account for a small portion of credit, and only large, established firms can issue bonds. Table 1 shows that proceeds, on average over the sample period, are a small share of GDP. In many economies, bank lending to firms and households accounts for the majority of credit. Measures of lending standards based on detailed information on banks' loan portfolios might therefore be helpful. However, data availability forces me to limit attention to lending standards in bond markets. Far more information is available about bonds, which are publicly traded, than is available about banks' loan portfolios, particularly across countries. Some central banks do survey bank loan officers about the evolution of credit standards. These surveys are available for a smaller set of countries, typically with a short time series. As Section 3 discusses

[12] I also present some analysis using a similar definition but using a threshold based on the full sample, rather than a rolling historical window. These definitions are similar, as the thresholds are similar over time. Appendix Figure A.3 shows the rolling and full sample thresholds. The full sample threshold is five year credit/GDP growth of 22% over five years.

[13] This process does not classify any of the US history in my sample as a credit boom. Also see Section 4.2.

in more detail, the HY share moves in line with these surveys when both are available together.[14]

To summarize, I am able to construct a fairly broad panel of countries for which I have information both on overall credit and on the evolution of lending standards. As one of the main contributions of this paper is to construct the HY share internationally, I begin by documenting some stylized facts about lending standards as measured by the HY share.

3 HY share as a measure of lending standards

Having constructed a measure of lending standards for a cross country sample, in this section, I document two stylized facts about these lending standards. First, lending standards in bond markets broadly move in line with survey measures of bank lending standards, when both are available together. Second, lending standards in bond markets are procyclical: they tend to loosen during economic booms.

Many central banks conduct surveys of bank loan officers to monitor lending standards; unfortunately, these are not available widely enough to use as the primary measure of lending standards. Absent loan level data on bank balance sheets, these surveys might seem to be an attractive source of information on lending standards. For example, Bassett et al. (2014) use the Federal Reserve's Senior Loan Officer Opinion Survey (SLOOS) to study the macroeconomic impact of changes in lending standards in the US. The HY share necessarily measures lending standards for market finance, and while of interest in its own right, might not accurately reflect lending standards for other kinds of credit. In a cross country setting, however, loan office surveys provide narrower and shorter coverage than the HY share. Of the 38 countries in the sample, these surveys are available for 14. While the US SLOOS has been conducted since 1990, series for most countries begin in the early 2000s. Appendix Table A.1 provides details on the coverage, survey questions, and sources. Most surveys ask questions about credit standards for approving new loans.

When bank loan officer surveys are available together with the HY share, these measures of lending standards move in line with each other. Figure 5 shows the net share of respondents in

[14]Syndicated loans are another potential source of data to consider. Unfortunately, international datasets on these loans have incomplete coverage of interest rates and covenants.

the US SLOOS reporting tightening standards and the US corporate investment-grade (IG) share of issuance. The figure shows the IG share to align the direction of the two measures. The two measures generally move together. Table 3 shows the correlation between the HY share and loan officer surveys for the 14 countries with common coverage. While Figure 5 shows the corporate IG share, Table 3 uses the overall HY share (including government bonds). Panel A shows the 11 countries that, like the US, provide indices that rise when standards tighten. As expected if these two measures move in line with each other, survey measures in these countries are negatively correlated with the HY share (the HY share falls when standards tighten). Panel B shows the remaining three countries that scale their indices in the opposite direction, and here correlations are positive, as expected.

Although the narratives of Minsky (1977), Minsky (1986) and Kindleberger (1978) lending standards might be procyclical, the literature is not clear on whether lending standards amplify or dampen business cycles. For example, while Fostel & Geanakoplos (2014) argue that in periods of low volatility lenders might be willing to allow much higher leverage, other models of leverage incorporate the dampening effects of arbitrage (Bernanke & Gertler 1989, Kiyotaki & Moore 1997). There is also an active debate on whether deteriorating lending standards played a role in generating the Great Recession in the US. For example, the Financial Crisis Inquiry Commission suggests that "collapsing lending standards" in mortgage markets were a relevant factor (FCIC 2011). While some researchers associate the crisis with issues related to credit extended to subprime borrowers (Mian & Sufi 2009, Mian & Sufi 2017, Dell'Ariccia, Igan & Laeven 2012), others point to large scale, proportional, credit expansion for all borrowers (Adelino, Schoar & Severino 2016, Adelino, Schoar & Severino 2015, Foote, Loewenstein & Willen 2016).

Lending standards, as measured in bond markets, are procyclical: the HY share tends to rise during periods of rising growth, and tends to fall during periods of falling growth. To look at how lending standards behave differently in economic booms and busts, for each horizon k, I split the sample by whether growth was rising or falling, on average, from year $t-k$ to t.[15] I vary k from 1 to 5, and compute the average change in the HY share from $t-k$ to t based on whether growth was

[15] To be precise, I split the sample based on the second derivative of output.

rising or falling. Figure 6 shows that the HY share is procyclical: on average, it rises during periods of rising growth, and falls during periods of falling growth, over all horizons from 1 year to 5 years. Figure 7 shows this procyclicality in more detail at the one year horizon. Increases in the growth rate coincide with increases in the HY share, and vice versa. Lending standards in bond markets therefore tend to loosen during economic booms, and tighten during busts, likely amplifying the cycle. These dynamics are consistent with the idea that lenders expect booms to continue and are sanguine about credit risk, as in Minsky (1986):

> *"Current views about financing ... reflect the past and, in particular, the recent past. A history of success will tend to diminish the margin of safety that business and bankers require ... [while] a history of failure will do the opposite."*

Regressions with macroeconomic controls also show the procyclicality of the HY share. Table 4 shows these regressions. Panel A shows regressions that include country fixed effects, but not year fixed effects. Panel B shows regressions that include both country and year fixed effects. Columns vary the horizon k from 1 to 5. The dependent variable is the average change in the HY share from $t-k$ to t. The main independent variable is a dummy for whether growth was rising from $t-k$ to t. As with most regressions to follow, controls include five year growth in credit/GDP, and two lags of GDP growth. Standard errors are clustered at the country level, and t-statistics are shown in parentheses. Panel A shows strong procyclicality of the HY share (a higher average change in the HY share during periods of accelerating growth) at all horizons. Some of this procyclicality is synchronized across countries: Panel B, which includes year fixed effects, has smaller coefficients, with statistical significance only at a horizon of five years.

One potential concern is that lending standards might mechanically seem to be procyclical if younger, growing, firms drive growth during booms, and are only able to issue high yield bonds. While I am only able to match issuance to information about issuers in a limited set of countries, this does not seem to be the case. I match issuers to firms covered in Worldscope, and have significant coverage of both investment grade and high yield issuers in five countries: the US, Canada, India, Japan, and Korea. In these countries, issuers of high yield bonds are not substantially younger: the average differences in age are around two years, with small differences in the fraction of firms

older than five years.[16]

The HY share therefore seems to be a reasonable measure of lending standards in a cross-country setting. Lending standards in bond markets are procyclical, with standards loosening during booms. While lending standards in bond markets are themselves of interest, they directly reflect only a small portion of credit. However, the HY share does also move in line with survey measures of credit standards of bank lending when both are available together. Next, I look at whether lending standards can help separate good credit booms from bad ones.

4 Main results

This section lays out the main results of the paper. I begin with some summary statistics to guide the analysis. Section 4.1 then shows that lending standards do help separate good booms and bad booms: booms with deteriorating lending standards are followed by worse growth. Within credit booms, spreads do rise for booms with deteriorating lending standards, but do not seem to rise enough, pointing to a role of credit supply. Section 4.2 presents various additional results, including further evidence on credit supply, a discussion of how I define credit booms, the relative strength of my results for advanced economies, and household credit booms. Section 4.3 looks at information in spreads.

Consistent with the literature focused on credit quantities, summary statistics show that episodes of high credit growth tend to be followed by lower output growth. Panel A of Table 5 shows summary statistics for the full sample, splitting the sample into quintiles by subsequent cumulative three year real GDP growth. The rows show averages of subsequent three year GDP growth, five year growth in the credit to GDP ratio, and the average change in the HY share over the previous five years, $\Delta\overline{HY}_{t,t-5}$, for each quintile of subsequent growth. There is substantial variation in subsequent growth. There is a monotonic negative relationship between prior credit growth and subsequent output growth, consistent with the literature suggesting that credit booms can be bad (Jordà et al. 2011, Schularick & Taylor 2012, Jordà et al. 2013, Jordà et al. 2017, Reinhart &

[16] As Worldscope does not provide firms' age, I use the number of years since the firm was first covered in Worldscope as a proxy for age. Established high yield issuers are sometimes added to the sample in recent years.

Rogoff 2009, Baron & Xiong 2017, Mian et al. 2017, Dell'Ariccia, Igan, Laeven & Tong 2012, Bordo et al. 2001). Unconditionally, there is no clear relationship between the evolution of lending standards and subsequent growth.

Summary statistics conditional on credit booms suggest that lending standards may help distinguish good credit booms from bad credit booms. Panel B of Table 5 repeats the exercise from Panel A, but conditions on credit booms. Section 2 discusses the backward looking way in which I define credit booms, using the 75th percentile of five year credit growth over the previous ten years.[17] The columns of Panel B split the sample into quintiles of subsequent growth, after conditioning on credit booms. Each row of Panel B leads to interesting observations. First, there is substantial variation in subsequent growth even after conditioning on a credit boom, reflecting the fact that not all booms are followed by economic under-performance (Dell'Ariccia, Igan, Laeven & Tong 2012). Second, the worst booms are not simply the biggest. After conditioning on credit booms, there is no clear relationship between how much credit grew and subsequent GDP growth. Third, the evolution of lending standards over the course of booms might help flag booms that are likely to problematic. Booms that are followed by the worst growth are accompanied by rising HY shares, and the change in the HY share monotonically falls across the columns of Panel B as subsequent growth rises.

4.1 The HY share and output growth

These summary statistics suggest that the evolution of lending standards over the course of credit booms might be informative. Next, I ask whether lending standards are informative in a regression setting, with macroeconomic, year, and country controls. The main finding of the paper is that lending standards do help separate good credit booms from bad booms. Credit spreads generally compress in the buildup to credit booms. They compress less for booms with a rising HY share, but do not seem to rise substantially.

I use a Jordà (2005) local projection approach to explore whether booms with deteriorating lending standards are systematically worse. The baseline regressions broadly follow Krishnamurthy

[17] Appendix Figure A.1 shows the typical path to a credit boom at date t. In preceding years, GDP is typically growing, with credit growing faster. Bond market proceeds tend to grow even faster.

& Muir (2016), and take the following form:

$$\ln \frac{y_{i,t+h}}{y_{i,t}} = \alpha_i + \alpha_t + \beta \times \Delta\overline{HY}_{t,t-5} + \gamma \times \mathbf{1}_{\text{Credit boom}} + \delta \times \mathbf{1}_{\text{Credit boom}} \times \Delta\overline{HY}_{t,t-5} + \epsilon_{i,t+h} \quad (1)$$

Real GDP for country i in year t is $y_{i,t}$. The dependent variable is therefore cumulative subsequent real GDP growth at horizon h. $\mathbf{1}_{\text{Credit boom}}$ is a dummy for country years that are credit booms. As the focus is on the evolution of lending standards during booms, δ is the coefficient of interest. If booms with deteriorating lending standards (rising HY share) are worse, δ should be negative. I construct an impulse response by varying the horizon $h \in [1, 5]$ (columns of regression tables show different horizons). Regressions include year and country fixed effects, and control for five year growth in credit/GDP, and two lags of real GDP growth (controls are not shown in Equation 1). I cluster standard errors at the country level. I scale $\Delta\overline{HY}_{t,t-5}$ to have unit variance, so that coefficients show the response to a one standard deviation change.[18]

Booms with deteriorating lending standards are worse: they are followed by lower growth in subsequent years. Table 6 shows regressions following Equation 1. The interaction coefficient, δ, which shows the effect of a rising HY share over the course of a boom, is negative, and statistically significant out to four years. The peak effect is three years ahead. To emphasize the timing, this suggests that a credit boom from year $t-5$ to t, with the HY share rising from $t-5$ to t, is followed by worse growth from year t to $t+3$. Figure 8 shows the impulse response, combining coefficients across horizons. Given a credit boom, a one standard deviation increase in the HY share over the course of the boom is followed by cumulative growth lower by nearly 1.5 percentage points three years later. The timing of the effect is consistent with López-Salido et al. (2017), who find that increases in the HY share in the US forecast a reduction in economic activity two to three years ahead. Magnitudes are also comparable to their results from the post-war sample.

Figure 9 shows that the HY share helps separate good credit booms from bad credit booms by performing a simple non-parametric exercise. It looks within the sample of credit booms, and shows the probability that subsequent three year real GDP growth is within the lowest quintile, based on the evolution of the HY share over the previous five years. The horizontal axis splits

[18] A one standard deviation move in the average change in the HY share is around 4 percentage points per year.

out 'good HY indicator' (lowest quintile average change in HY share), 'bad HY indicator' (highest quintile average change in HY share), and intermediate changes in the HY share. The conditional probability of subsequent growth being in the lowest quintile is three times higher given a 'bad' HY indicator relative to a 'good' HY indicator. This figure shows that my results hold in a simple non-parametric setting. It also shows that much of the information is in the tails of the distribution of changes in the HY share given a credit boom.

As the effect on output peaks several years later, and as lending standards are procyclical, it seems unlikely that reverse causality drives these results. Variables that are associated with the path of output growth several years into the future are, at a minimum, useful indicators. However, if these variables are based on market outcomes, they might simply reflect market participants' expectations based on other features of the context. In the latter case, while lending standards may be a useful indicator, it would not necessarily follow that policy makers should attempt to improve lending standards. However, the interpretation that lending standards are set in anticipation of economic downturns is not natural here: as Section 3 shows, lending standards as measured by the HY share are procyclical. It does not seem plausible that lenders would be keen to extend credit to lower quality borrowers if they expect a downturn in subsequent years.

This discussion links to the broader question of why credit booms might lead to recessions or crises in the first place. One view, starting with more classical assumptions, emphasizes the role of financial frictions that amplify shocks (Bernanke & Gertler 1989, Kiyotaki & Moore 1997). Externalities explain why market participants allow themselves to be vulnerable to these shocks, e.g. Stein (2012). Another view builds on more behavioral narratives, in which market participants expect the booms they are participating in to continue (Minsky 1977, Minsky 1986, Kindleberger 1978).[19] Bordalo et al. (2016) suggest that these building expectations eventually lead to disappointment, endogenously causing reversal. Consistent with the idea that market participants extrapolate rather than anticipate, López-Salido et al. (2017) emphasize that the forecasting power of the HY share in the US comes from its ability to predict reversals in credit spreads. Bordalo et al. (2016) point to survey evidence that when spreads are low, market participants under predict credit spreads.

[19] López-Salido et al. (2017) provide a clear summary of the literature on both views.

Similarly, the procyclicality of the HY share is more consistent with the latter view, and is harder to explain in classical models. However, given my results, the evolution of lending standards over the course of credit booms is of clear relevance for policy makers in either view.

Credit spreads do not seem to rise enough for booms with deteriorating lending standards, suggesting a role for credit supply. I define credit spreads as the difference between the 90th and 10th percentile yields within country year, scaled by the country mean of this difference. Table 7 presents regressions where the dependent variable is the change in the credit spread over the previous five years. Spreads generally compress in the buildup to credit booms, consistent with an outward shift in credit supply, and with the recent literature on credit cycles (Krishnamurthy & Muir 2016, Mian et al. 2017). The relationship between lending standards and credit spreads has the correct sign: spreads do rise when the HY share rises, particularly during credit booms. However, spreads do not seem to rise substantially for booms with deteriorating lending standards, they simply compress less. The average change in the HY share is scaled to have unit variance. The coefficient on the credit boom dummy and the interaction term in the second column of Table 7 balance each other out. On balance, therefore, credit booms with a one standard deviation increase in HY share have flat, not rising, credit spreads. Even for booms with deteriorating lending standards, spreads do not rise more than if there was no credit boom.

This joint movement of lending standards and credit spreads suggests that supply shocks play a role during credit booms. In principle, the HY share can move either because lenders evaluate credit risk differently, or because the composition of borrowers changes. If all borrowers become safer (for example, if the macroeconomic environment improves) the HY share might be expected to fall even if lending standards remain unchanged. As credit spreads do not rise enough for credit booms with deteriorating lending standards, supply shocks seem at least as important during credit booms as borrower composition shocks.[20]

It is perhaps surprising that an approach this simple works in a cross country setting. I abstract from many additional components of the economic context that might be relevant for forecasting

[20]Supply shocks seem important in the time series within country. Differences in borrower composition may dominate other dimensions of the data. For example, Appendix Figure A.2 shows that advanced economies with a higher average corporate HY share also have more volatile credit/GDP growth.

output. Beyond country and year fixed effects, I use only historical credit growth, the evolution of lending standards, and lagged growth. Nevertheless, the approach does perhaps represent a reasonable starting point to incorporating lending standards as well as credit quantities. It is possible to observe lending standards for a reasonably broad cross section of countries, with some time series visibility. This paper shows that the HY share can be constructed internationally, that lending standards in bond markets might be a reasonable measure of lending standards more broadly, and that these lending standards do seem to help separate good credit booms from bad credit booms.

4.2 Additional results and robustness

This section lays out several further results. I begin with additional evidence that credit booms followed by economic underperformance are driven by outward shifts in credit supply. I then discuss other ways the credit boom could be defined, and the robustness of my results vis a vis these alternative definitions. Next, I observe that my baseline results are stronger for the advanced economies in my sample. I show that my measure of lending standards is also informative given a boom in household credit. I show that my results are robust to various further modifications of my baseline specifications.

4.2.1 Further evidence on the role of credit supply

Two further sets of results point to the role of credit supply in bad credit booms. First, the evolution of global lending standards at the time of a credit boom in a given country is also informative about subsequent growth. Table 8 shows these regressions. Rather than focusing on the interaction of the credit boom dummy with the evolution of lending standards in a particular country, here I include an interaction of the credit boom dummy with the average five year change in the global HY share (as with my measure within country, weighted by proceeds). Credit booms that coincide with deteriorating lending standards globally are also followed by lower GDP growth in subsequent years. As the demand for credit or the composition of borrowers in any one country is unlikely to dominate lending standards globally, these results support the view that shifting credit supply is

the key factor.[21] On the household debt side, Mian et al. (2017) find that household debt booms synchronized with the global household debt cycle are more costly in terms of future growth. Table 8 also looks at whether global lending standards matter more in emerging markets (via a triple interaction). Coefficients suggest the average effect is larger in emerging markets, but the difference is not statistically significant.

Second, the HY share generally reverses over time. One explanation for why lending standards help separate good booms from bad booms is that outward shifts in credit supply do not last. Consistent with this intuition, increases in the HY share over the previous five years are generally followed by a reduction in the HY share over the subsequent five years (see Appendix Table A.2). The dependent variable for these regressions is the average change in the HY share over the subsequent 1-5 years. The change in the HY share on both sides of the regression is scaled to have unit variance. In terms of magnitudes, a one standard deviation increase in the HY share over the previous five years is followed by a one-third standard deviation reduction in the HY share over the subsequent five years. The overall size of the reversal grows over time. This reversal is a general phenomenon: the reversal is slightly larger given a credit boom, but the interaction coefficient is not statistically significant. Consistent with these results, López-Salido et al. (2017) find that increases in the HY share in the US are followed by a reduction in firms' reliance on debt relative to equity, suggesting that credit supply subsequent shifts inwards.

4.2.2 Definition of credit boom

To study whether lending standards can help distinguish between good credit booms and bad booms contemporaneously, it is important to use a backward looking definition of what is a boom in the first place. My baseline specifications therefore define credit booms in a backward looking way, using the 75th percentile of five year growth in credit/GDP over the previous ten years as the threshold. The evolution of lending standards is similarly based on HY shares of issuance only up until year t. It is not difficult to construct ways in which definitions that use future information could be biased.

[21] Results with the global HY share also help address potential concerns that differences in government debt management strategies during credit booms drive my baseline results.

My results are similar if I define credit booms in other ways, but use similar portions of the right tail of growth in credit/GDP. For example, I obtain very similar results if I use the 75th percentile of five year growth in credit/GDP over the full sample to define booms instead. Table 9 shows regressions that use this alternative definition of credit booms. Figure 10 shows the impulse response to a a one standard deviation increase in the HY share given a boom with this definition. The results are both qualitatively and quantitatively similar. This reflects in part that the threshold for what gets classified as a credit boom with my baseline rolling methodology does not drastically shift over time, and is similar to the full sample threshold (see Appendix Figure A.3). The full sample threshold for five year growth in credit/GDP is close to 22 percent.

This raises the question of whether I should define credit booms based on cutoffs further in the right tail of growth in credit/GDP. For example, Krishnamurthy & Muir (2016) present some results using the 92nd percentile of growth in credit/GDP as their definition (to match the number of putative credit booms with the number of financial crises in their sample). The 75th percentile is a much less stringent definition of what counts as a credit boom. Dell'Ariccia, Igan, Laeven & Tong (2012) present a methodology to define credit booms based on the previous ten years' history of credit/GDP for a given country as a reference. Their thresholds for defining credit booms are also more stringent. Panel A of Appendix Table A.3 shows that their methodology identifies only 39 country years in my sample as credit booms, as opposed to 173 in my baseline definition. Panel A of Appendix Table A.4 shows that results using the Dell'Ariccia, Igan, Laeven & Tong (2012) definition are much weaker. Panel B of Appendix Table A.3 and Appendix Table A.4 show that results are closer to the baseline using a looser version of the methodology of Dell'Ariccia, Igan, Laeven & Tong (2012) to define credit booms. All of this is consistent with Panel B of Table 5, which shows that conditional on a boom defined at the 75th percentile, booms followed by lower growth are not systematically bigger. Once a boom is large enough, it seems that characteristics other than size are more relevant.

As Table 1 shows, according to my baseline methodology, the US has no credit booms over the sample period. In the run up to the Great Recession in the US, five year growth in credit/GDP was high, but consistently below the 75th percentile of the previous international experience. Of course,

the approach I use is to apply a consistent, and in the baseline, backward-looking, methodology across countries, with no prior intent to label specific episodes as credit booms. As a sense check, the methodology of Dell'Ariccia, Igan, Laeven & Tong (2012) also does not flag any of my US sample as a credit boom. Neither does the looser version of this methodology described in Panel B of Appendix Table A.3. Two alternative definitions of booms in which some of the US history is flagged as a credit boom produce weaker results, concentrated in the short term. These alternatives use the 75th percentile within the country's history, and the median five year growth in credit/GDP over the previous ten years (see Appendix Tables A.5 and A.6).

An alternative approach is to look at whether credit is high relative to a recent trend, and avoid defining credit booms completely. My results are robust to using the credit/GDP gap from the BIS to proxy for whether credit growth is high. Table 10 shows that the HY share is also informative given a positive credit gap. These specifications are similar to my baseline methodology, but substitute the credit boom dummy with a dummy for whether the credit gap is positive. Episodes with a positive credit gap when the HY share has been rising over the previous five years are also followed by lower growth in subsequent years. Here the effects are only two to three years ahead, rather than three to four years ahead.

4.2.3 Advanced economies and emerging markets

My results are concentrated in advanced economies, and are weaker in emerging markets. My sample consists of 25 advanced economies and 13 emerging markets, typically with shorter coverage. Table 11 shows results for my baseline methodology separately for advanced and emerging markets. Panel A shows the advanced economies, and Panel B shows the emerging markets. The results are stronger than the baseline, both in terms of statistical significance and magnitude, for advanced economies.[22] While coefficients have the same signs for emerging markets, magnitudes are smaller, and coefficients are not statistically significantly different from zero. There are at least three ways in which to understand this split. First, as the sample is skewed towards advanced

[22] As I include government bond issuance in the HY share, one concern might be that increases in the HY share driven by sovereign downgrades drive the results. There are no episodes in my sample where advanced economy sovereign debt is downgraded from investment grade to high yield during a credit boom.

economies, the sample of emerging markets may simply be too small, and statistical power too low. Second, my measure of lending standards is based on market finance, and may be less relevant for emerging markets, which are more bank dependent. Third, market finance may be much more noisy in emerging markets, reflecting, for example, global cycles in capital flows, and therefore a less useful signal there. Section 4.2.1 attempts to test this last explanation, and finds consistent, but statistically insignificant, results.

4.2.4 Household credit and house prices

Consistent with recent work pointing to a special role for household credit (Mian et al. 2017, IMF 2017), I find that credit booms that are also household credit booms are worse. In addition to data on aggregate credit, the BIS also provides data on household credit. As time series coverage here is shorter, I define booms in household credit as country years where five year growth in household credit to GDP is above the 75th percentile of the full sample of this variable. Table 12 shows regressions with three dummies that partition the set of credit booms: booms that are both household credit booms and broad credit booms, and booms of one kind, but not the other. Episodes categorized as booms of both kinds are followed by substantially lower growth over the subsequent five years.[23] That simultaneous booms across different types of credit are worse also suggests a role for credit supply.

Lending standards measured in bond markets are also informative given household credit booms. Table 13 shows my baseline specification from Equation 1, repeated substituting household credit booms for broad credit booms. It is not obvious that lending standards measured with the HY share in bond markets should be informative conditional on household credit booms. Nevertheless, Table 13 shows that they are. The interaction coefficient is negative and statistically significant out to two years, with similar magnitudes as the baseline.[24] This could reflect that lending standards evolve in a consistent way across asset classes. Indeed, Section 3 shows that the HY share moves in line with survey measures of lending standards in bank lending. This also addresses the potential

[23] In regressions that do not include credit boom dummies, growth of household credit/GDP is statistically significantly related to subsequent growth, while growth of credit/GDP is not.

[24] The interaction of household credit growth and the change in HY share alone is also statistically significant.

concern that a rising HY share simply identifies which credit booms are household credit booms.[25]

My baseline results are also robust to controlling for the evolution of house prices. Asset price booms, particularly in housing markets, might be problematic for subsequent growth. For example, these might facilitate (while also being caused by) excessive credit, and require deleveraging if asset prices subsequently fall. My baseline results do not control for asset prices, only for the quantity of credit. However, Appendix Table A.7 shows that my results are robust to controlling for the evolution of house prices. Specifically, Appendix Table A.7 presents regressions including the five year growth in house price indices relative to GDP, as well as an interaction of this growth with the credit boom dummy, as controls.[26] The results are similar to my baseline results in Table 6.

4.2.5 Further robustness exercises

The baseline results are also robust to six further types of modifications to the methodology.

- First, the results are robust to adding additional controls based on credit quantities. Appendix Table A.8 shows these results. Panel A adds the level of credit/GDP and bond market proceeds/GDP as controls. Panel B adds the credit to GDP gap as a control.

- Second, the results are robust to using horizons of three or four years, instead of five years. Panels A and B of Appendix Table A.9 show versions of my baseline specification using these horizons instead. Both the credit boom dummy and the average changes in the HY share are defined over these shorter horizons.

- Third, the results are not driven by extreme booms or recessions. They are robust to winsorizing subsequent cumulative growth (the dependent variable). Panels A, B, and C of Appendix Table A.10 show that results are similar if growth is winsorized at the 5th and 95th percentile in the full sample, by country, or by year, respectively.

- Fourth, the results are qualitatively similar, although with weaker magnitudes, if I define the HY share in different ways. I consider scaling the HY share by its country mean before

[25] Two thirds of household credit booms are broad credit booms, and vice versa.
[26] I use data on house prices from the OECD and the Global Property Guide.

looking at five year changes, and defining the HY share by number of issues or excluding new issuers. Weaker results for the HY share defined based on the number of issues rather than the share of proceeds suggest that information about investors' asset allocations in my baseline definition of the HY share is important. They also suggest that increases in the HY share do not primarily reflect credit to substantial numbers of new borrowers. Appendix Tables A.11 and A.12 show these specifications.

- Fifth, the results are similar for the post-1995 sample (see Appendix Table A.13). Figure 4 shows that my construction of the US HY share, adjusted for coverage, is similar to the Greenwood & Hanson (2013) US HY share after 1995.

- Sixth, the results are similar if I look at subsequent growth in real GDP per capita rather than real GDP. This confirms that my results concern the economic, rather than the demographic, component of growth. Appendix Table A.14 shows these regressions.

4.3 Information in prices

My main results focus on whether lending standards in bond markets add to quantities in helping separate good credit booms from bad credit booms. Bond level data also provides information on credit spreads (Krishnamurthy & Muir 2016). Section 4.1 shows that spreads do compress less for credit booms with a rising HY share. Although credit spreads do not seem to rise enough for such booms, a comparison of the dynamics of credit spreads within credit booms may be indicative of risk, even if comparing spreads inside and outside episodes of credit booms may be misleading.

Consistent with this intuition, credit booms with rising spreads are followed by lower growth over subsequent years. I define credit spreads as the difference between the 90th and 10th percentile yields within a country year, divided by the country level mean of this difference. Paralleling regressions using the HY share, I use the change in this spread from year $t-5$ to t, including both the level and an interaction of this change with credit booms. Table 14 shows the regression results. Credit booms accompanied by rising spreads are followed by lower growth over subsequent years, with statistical signifiance out to three years. It is worth noting that these results are based on

spreads measured in primary markets.[27]

Results based on credit spreads are also stronger in advanced economies. Appendix Table A.15 presents results for advanced economies in Panel A, and for emerging markets in Panel B. For advanced economies, the results are larger in magnitude, and have stronger statistical significance at longer horizons. Interaction coefficients between credit booms and changes in spreads are not significant for emerging markets. Panel B does suggest that rising credit spreads are unconditionally followed by lower growth in emerging markets.

Lending standards and credit spreads are informative together: both are related to subsequent output growth in a horse race. Appendix Table A.16 shows regressions including the evolution of both the HY share and credit spreads. Coefficients are similar to regressions including only one of these variables of credit booms at a time, although the results are somewhat weaker for spreads. This suggests that both indicators might be useful in going beyond quantities in evaluating booms in a contemporaneous manner.

5 Conclusion

In this paper, I suggest that primary debt capital markets may be a useful source of information on lending standards. Using bond level data on issuance, I construct a measure of lending standards, the high-yield (HY) share of bond issuance, for a broad cross section of countries. Some time series coverage is available: for 16 out of the 38 countries covered, the sample begins in the early 1980s. Lending standards measured this way are procyclical, loosening during economic booms. Lending standards in bond markets move in line with survey measures of bank lending standards, but are available more broadly. Lending standards do help distinguish good credit booms from bad booms: credit booms with a rising HY share are followed by lower output growth over the subsequent three to four years. Outward shifts in credit supply are likely to play a role: even for credit booms with deteriorating lending standards, credit spreads do not seem to rise substantially. Policy makers should pay particular attention to such credit booms.

[27] Some specifications, but not others, suggest that spiking credit spreads after a credit boom might act as a trigger for worse growth in subsequent years.

My results also add to the discussion of why credit booms might lead to recessions or financial crises. The procyclicality of lending standards suggests that lenders, rather than anticipating poor subsequent growth, expect the economic booms they are in to continue, consistent with more behavioral narratives of credit build ups and crises (Minsky 1977, Minsky 1986, Kindleberger 1978). The dynamics of bad credit booms are difficult to explain in views of credit-driven crises based solely on financial frictions.

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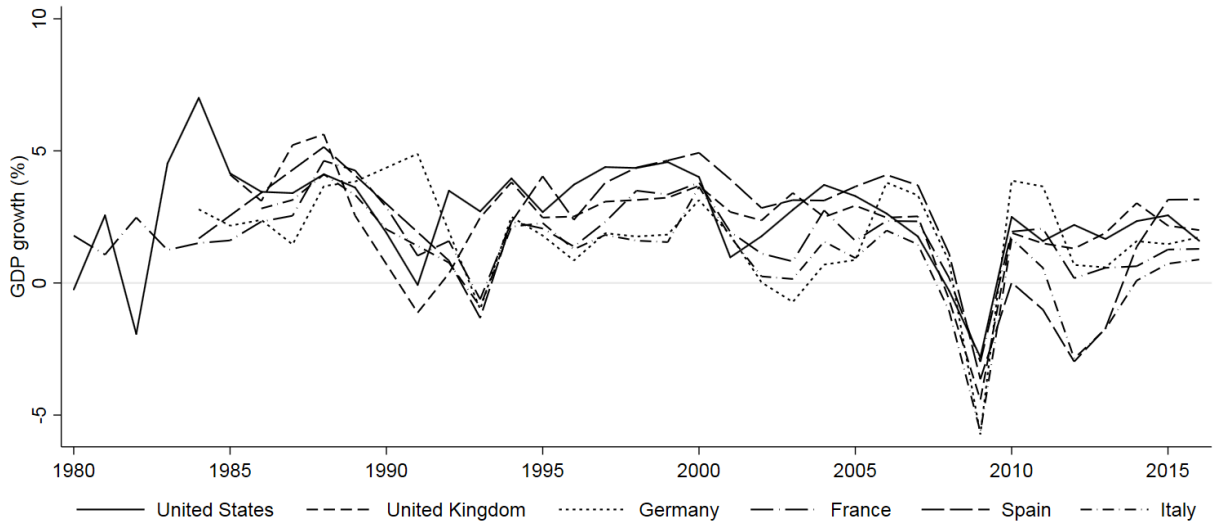
Figure 1: *Summary of sample coverage*

Notes: This figure summarizes sample coverage, showing the 38 countries covered by the decade in which coverage starts. Refer to Table 1 for details on coverage.

Figure 2: *Real GDP growth for selected countries*

Notes: This figure shows GDP growth, in percentage points, from 1980, or when the country enters the sample, to 2016. Panel A shows a selection of advanced economies, while Panel B shows a selection of emerging markets. Refer to Table 1 for details on coverage.

Panel A: Selected advanced economies



Panel B: Selected emerging markets

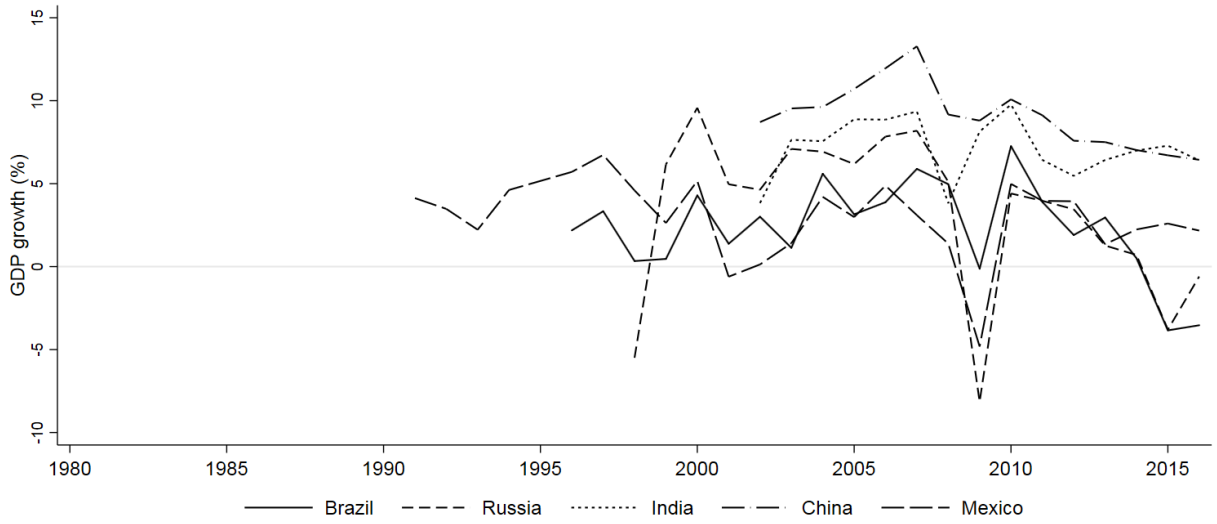
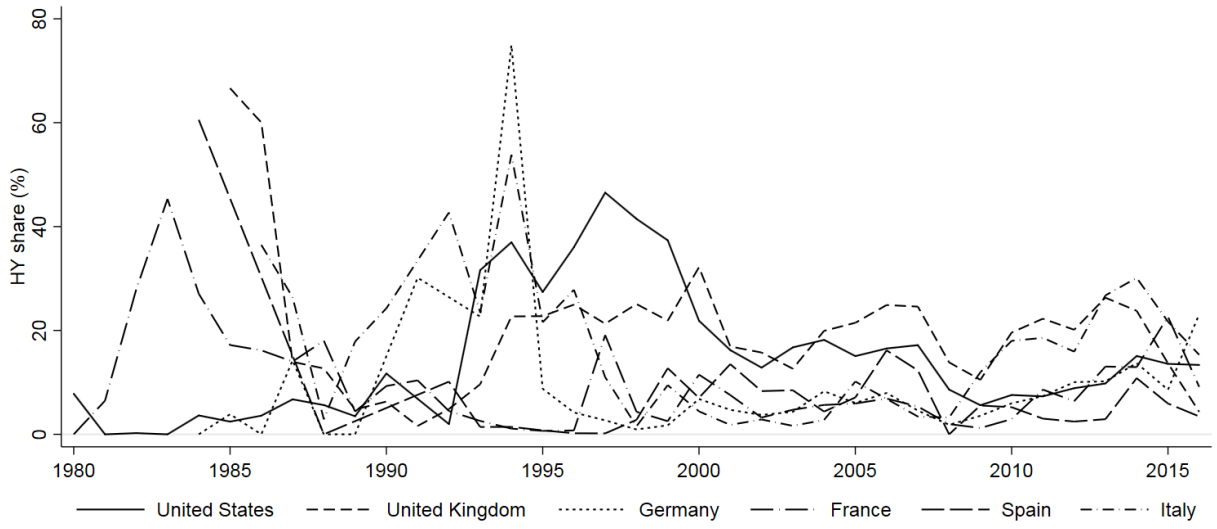


Figure 3: *High-yield (HY) share of bond issuance for selected countries*

Notes: This figure shows the HY share of bond issuance, in percentage points, from 1980, or when the country enters the sample, to 2016. Panel A shows a selection of advanced economies, while Panel B shows a selection of emerging markets. Refer to Table 1 for details on coverage.

Panel A: Selected advanced economies



Panel B: Selected emerging markets

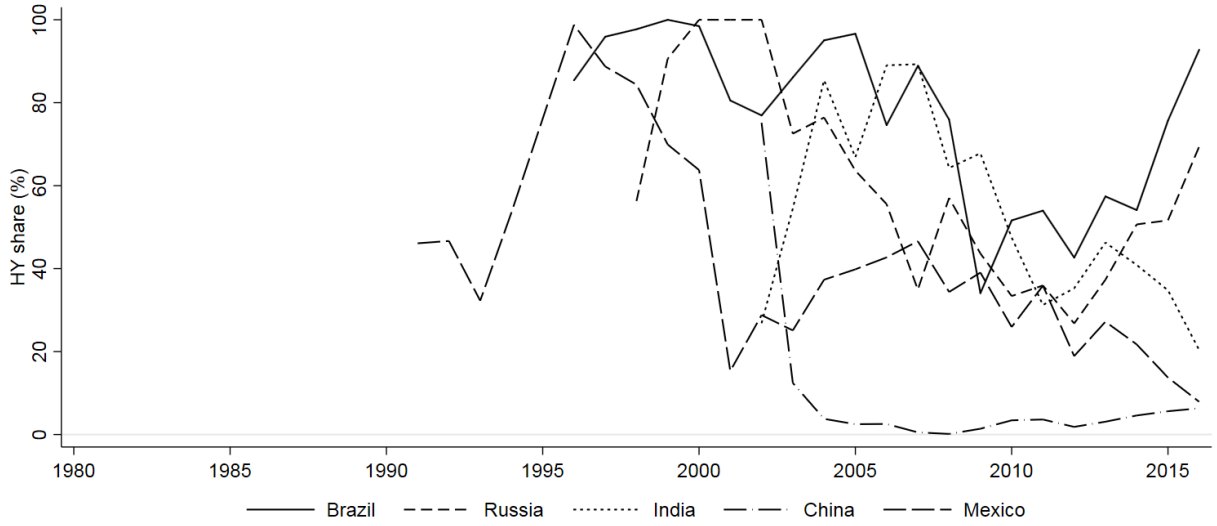


Figure 4: *Comparison of HY share with Greenwood and Hanson US series*

Notes: This figure shows three versions of the HY share: the corporate-only US HY share, the global HY share, and Greenwood and Hanson's US HY share (from the Behavioral Finance and Financial Stability Project website, exponentiated).

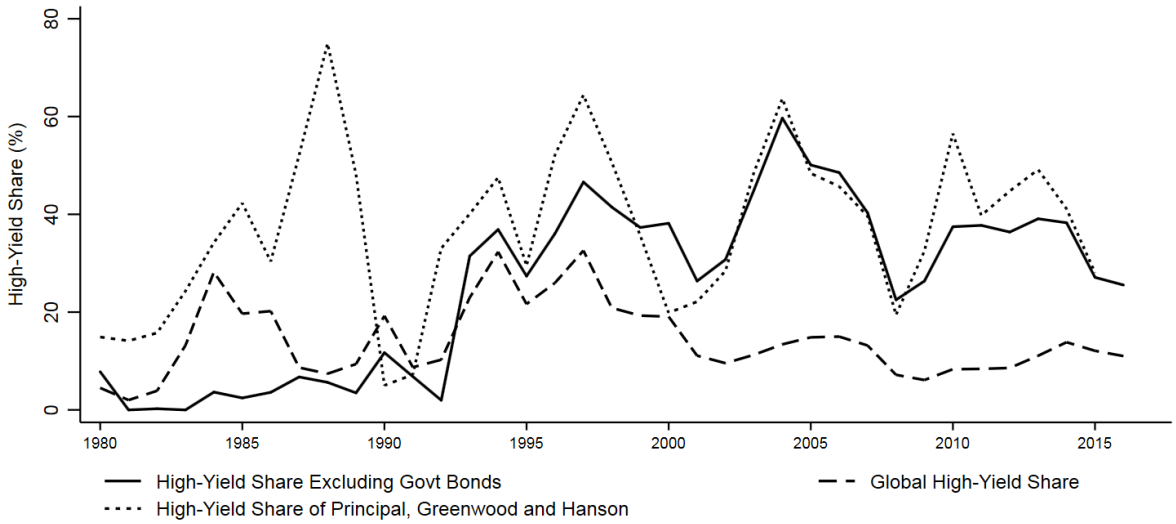


Figure 5: *US corporate investment-grade share and US SLOOS*

Notes: This figure shows the US corporate investment-grade share and lending standards for US banks. Lending standards are based on the Federal Reserve's Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS). The reported SLOOS index rises when lending standards tighten. I use responses related to credit to small firms. I plot the investment grade share so that both measures increase when lending standards tighten. Refer to Appendix Table A.1 for details on the SLOOS.

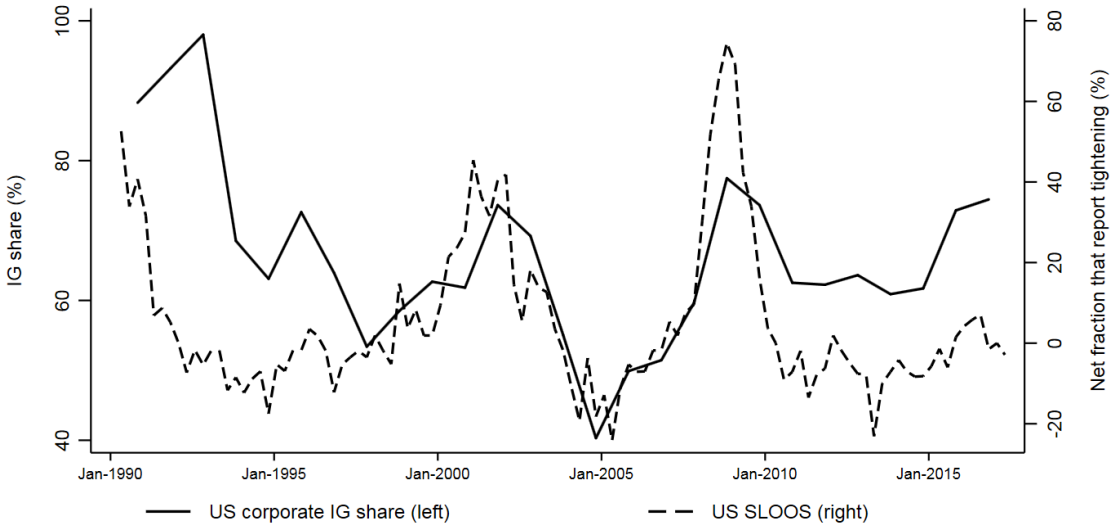


Figure 6: *Average change in HY share by whether growth is rising or falling*

Notes: This figure shows the average change in HY share, by whether growth is rising or falling, at different horizons. The sample is split using the average change in growth rate over $(t, t-k)$, where $k \in [1, 5]$. Growth is rising when the average change in growth rate over $(t, t-k)$ is positive, and falling when the average change in growth rate over $(t, t-k)$ is negative.

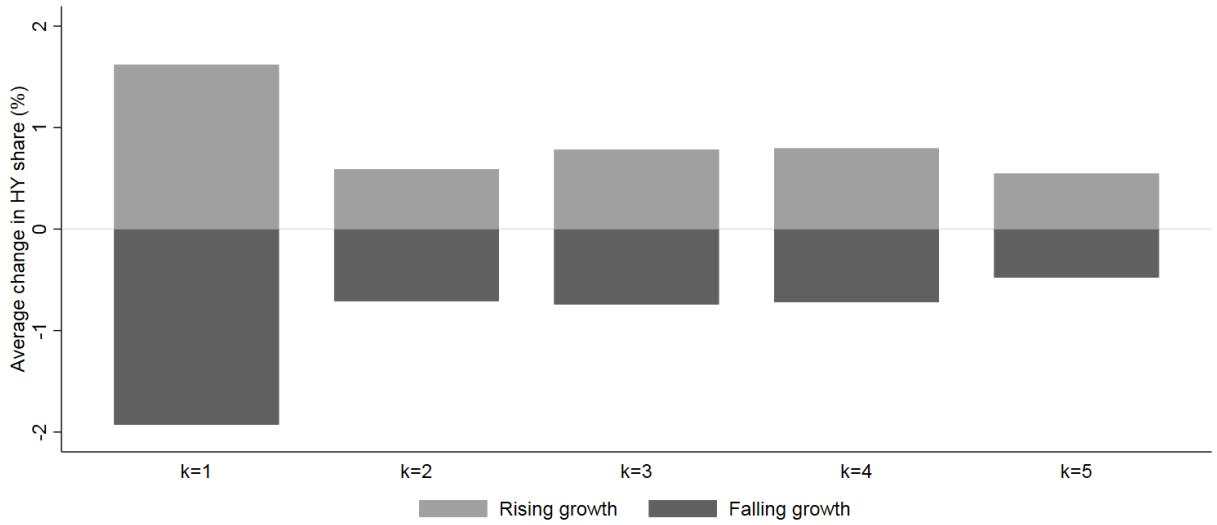


Figure 7: *Change in HY share and change in real GDP growth rate*

Notes: This figure shows the change in the HY share and the change in the real GDP growth rate. Observations are grouped into ten bins based on the change in growth rate.

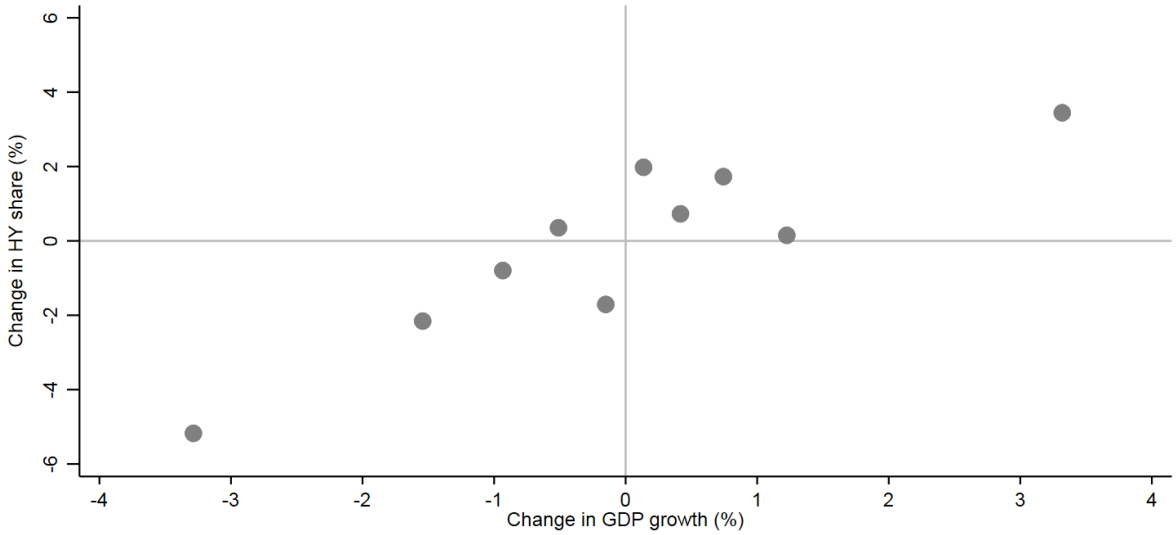


Figure 8: *Impulse response for subsequent cumulative real GDP growth*

Notes: This figure shows the path of subsequent cumulative real GDP growth in response to one standard deviation increase in the average change in HY share, given a credit boom, with 95 percent confidence intervals (interaction coefficient from Table 6).

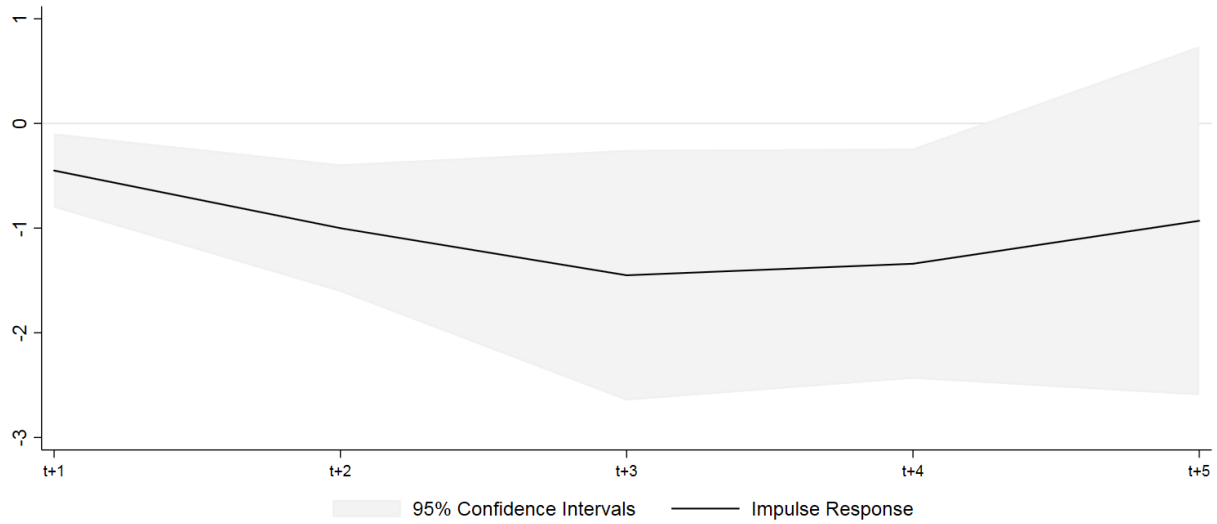


Figure 9: *Probability of bad boom by change in HY share during boom*

Notes: This figure shows the conditional probability of subsequent three year real GDP growth being in the lowest quintile, conditional on a credit boom at year t. The horizontal axis partitions the set of credit booms into quintiles based on the average change in the HY share over the previous five years. 'Good HY indicator' refers to the lowest quintile increase in HY share, 'Bad HY indicator' refers to the highest quintile increase in HY share, and 'Intermediate HY indicator' combines the remaining three quintiles.

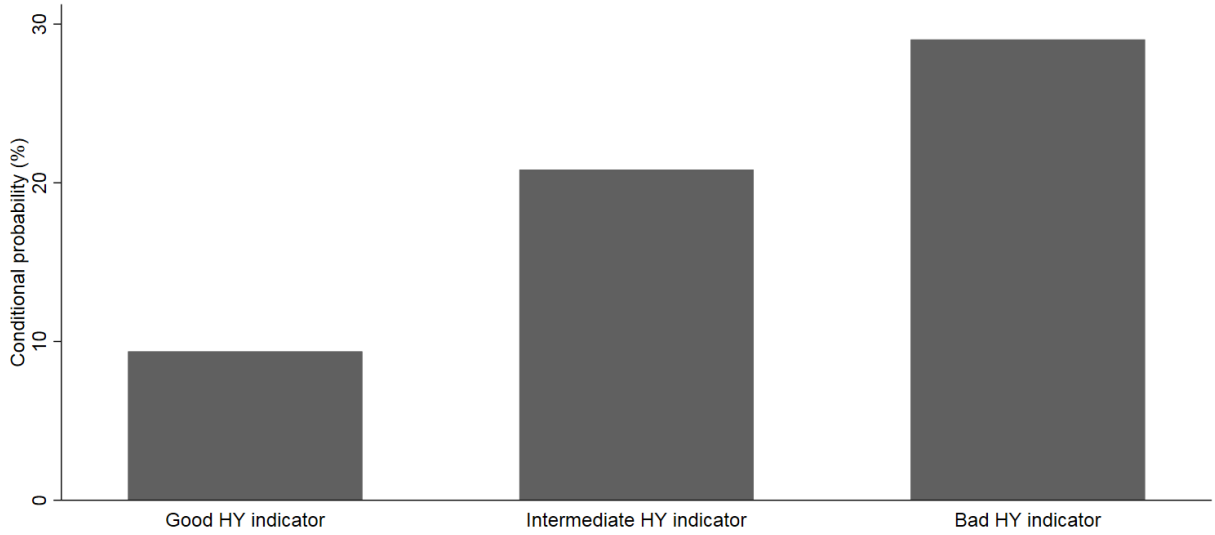


Figure 10: *Impulse response for subsequent cumulative real GDP growth (full sample credit boom)*

Notes: This figure shows the path of subsequent cumulative real GDP growth in response to one standard deviation increase in the average change in HY share, given a full sample boom, with 95 percent confidence intervals (interaction coefficient from Table 9).

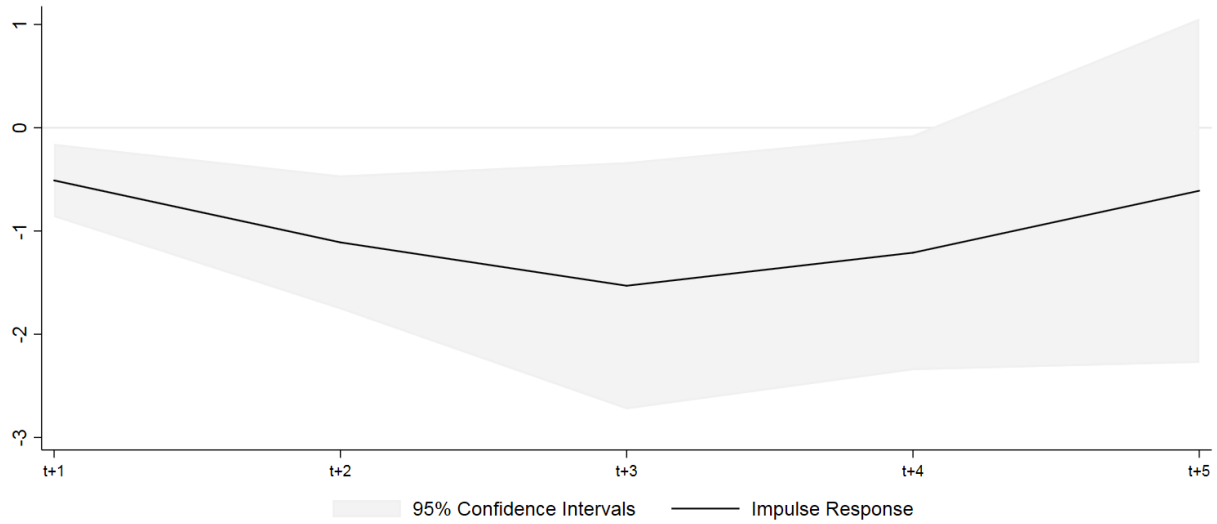


Table 1: *Sample coverage*

Notes: The sample consists of 110k bond issues, using data from Dealogic. Bond issues are associated with countries based on issuers' countries of operation. Sample coverage requires data on non-financial credit from the BIS. Bonds with maturity less than 1 year are excluded, as are financial issuers, and countries with no bond issuance for 5 years. For each country, the sample starts with the first year with at least 10 bonds and at least one non-financial corporate bond issued. The resulting sample is also restricted to countries that have at least 10 years with at least 10 bonds issued and at least one non-financial corporate bond issued. *First year* indicates the year in which coverage begins for a country. *N* counts the number of years a country is in the sample. *Missing* counts the number of years for which no issues are available. *Issuers* counts the total number of distinct issuers in each country, while *Bonds in sample* counts the total number of bonds in each country. *Mean Share/GDP* is the average share of bond proceeds as a fraction of GDP, over the sample period. *Boom years* counts the number of country-years that are credit booms for each country. *Advanced* is a dummy for advanced economies.

	First year	N	Missing	Issuers	Bonds in sample	Mean Share/GDP	Boom years	Advanced
Argentina	1993	23	1	198	413	2.4	5	0
Australia	1984	33	.	637	1,891	2.4	10	1
Austria	1986	31	.	223	892	6.1	0	1
Belgium	1985	32	.	204	1,034	7.7	5	1
Brazil	1996	21	.	937	554	1.5	3	0
Canada	1981	36	.	988	3,320	4.2	2	1
Chile	1996	21	.	155	423	2.8	9	0
China	2002	15	.	5,225	12,715	5.0	6	0
Czech Republic	1994	23	.	123	464	4.7	4	1
Denmark	1984	32	1	161	751	3.7	8	1
Finland	1985	32	.	163	631	6.2	6	1
France	1980	37	.	760	4,155	5.7	0	1
Germany	1984	33	.	780	2,508	3.8	0	1
Greece	1994	23	.	69	318	9.7	14	1
Hong Kong SAR	1993	24	.	414	1,001	4.1	5	1
Hungary	1997	20	.	30	1,038	8.0	12	0
India	2002	15	.	641	1,528	1.8	9	0
Indonesia	1996	19	2	342	693	1.1	7	0
Ireland	1991	26	.	164	302	5.2	14	1
Italy	1986	31	.	519	2,127	9.0	11	1
Japan	1984	33	.	1,734	10,596	10.5	1	1
Korea	1996	21	.	959	6,455	3.0	2	1
Malaysia	2000	17	.	538	2,829	6.9	0	0
Mexico	1991	26	.	356	793	2.2	6	0
Netherlands	1985	32	.	394	1,104	5.6	5	1
New Zealand	1984	33	.	148	391	2.7	13	1
Norway	1985	31	1	419	663	2.7	4	1
Poland	1997	20	.	53	663	5.9	11	0
Portugal	1994	23	.	318	416	8.3	10	1
Russia	1998	19	.	941	1,623	2.5	12	0
Singapore	2000	17	.	341	753	6.0	3	1
Spain	1984	32	1	378	1,472	5.9	11	1
Sweden	1984	33	.	317	1,949	5.2	9	1
Switzerland	1984	33	.	512	1,561	2.7	0	1
Thailand	2000	17	.	292	1,988	2.8	1	0
Turkey	1992	25	.	74	408	3.2	17	0
United Kingdom	1985	32	.	1,598	3,994	5.6	12	1
United States	1980	37	.	12,941	32,971	6.1	0	1
Observations	38							

Table 2: *Definitions of key variables*

Variable	Description
$\Delta Credit/GDP_{t,t-5}$	Growth in private non-financial credit/GDP over $(t, t-5)$: $log[\frac{credit/GDP_t}{credit/GDP_{t-5}}] \times 100$
Credit boom	$\Delta Credit/GDP_{t,t-5} > 75^{th}$ percentile of $\Delta Credit/GDP_{t,t-5}$ over $(t, t-10)$, for all countries with data on credit over $(t, t-10)$
Full-sample credit boom	$\Delta Credit/GDP_{t,t-5} > 75^{th}$ percentile of 5-year credit/GDP growth in the full sample
$HY_{i,t}$	Share of proceeds from high yield issues, for country i in year t, winsorized at the 5th and 95th percentile, and imputed with lags when missing
$\Delta\overline{HY}_{t,t-5}$	Average change in $HY_{i,t}$ over $(t, t-5)$, drop i in notation
$S_{i,t}$	Difference between the 90^{th} and 10^{th} percentile yield for country i in year t, winsorized at the 5th and 95th percentile, scaled by the country mean of the difference, and imputed with lags when missing
$S_t - S_{t-5}$	Change in $S_{i,t}$ over $(t, t-5)$, drop i in notation
$G_{t,t-k}$	Average change in real GDP growth over $(t, t-k)$

Table 3: *Correlation between bank loan officer surveys and HY share*

Notes: This table shows the correlation between bank loan officer surveys and HY share at the annual level. The US SLOOS is available from 1990, while surveys for other countries generally start in the early 2000s. Refer to Appendix Table A.1 for details on coverage. For the US, I use responses related to credit to small firms. For Poland, the loan officer survey refers to responses for long-term loans. Panel A shows correlations for countries that report measures that increase as standards tighten, while Panel B shows correlations for countries that report measures that increase as standards ease.

Panel A: Countries that report measures that increase when standards tighten

	Austria	Belgium	Canada	France	Germany	Greece	Italy	Netherlands	Portugal	Spain	United States
Survey: overall	-0.18	-0.045	-0.41	-0.34	-0.40	-0.20	-0.37	-0.35	-0.56	-0.28	-0.28

Panel B: Countries that report measures that increase when standards ease

	Japan	Poland	United Kingdom
Survey: small firms	0.83	0.63	0.25

Table 4: *Average change in high-yield share by whether growth is rising*

Notes: This table shows regressions where the dependent variable is the average change in high-yield (HY) share over different horizons in two panels. The independent variable is a dummy for whether growth is rising, $\mathbf{1}_{G_{t,t-k}>0}$, over $(t, t-k)$ where $k \in [1, 5]$. Panel A only includes country fixed effects, while Panel B includes country and year fixed effects. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

Panel A: Regressions with country fixed effects

	$\Delta\overline{HY}_{t,t-1}$	$\Delta\overline{HY}_{t,t-2}$	$\Delta\overline{HY}_{t,t-3}$	$\Delta\overline{HY}_{t,t-4}$	$\Delta\overline{HY}_{t,t-5}$
$\mathbf{1}_{G_{t,t-1}>0}$	3.50				
	(4.78)				
$\mathbf{1}_{G_{t,t-2}>0}$		1.37			
		(2.98)			
$\mathbf{1}_{G_{t,t-3}>0}$			1.60		
			(3.05)		
$\mathbf{1}_{G_{t,t-4}>0}$				1.60	
				(3.06)	
$\mathbf{1}_{G_{t,t-5}>0}$					1.22
					(2.84)
Mean of depvar	-0.15	-0.06	-0.01	-0.04	-0.06
Country FE	Y	Y	Y	Y	Y
Year FE	N	N	N	N	N
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.08	0.10	0.16	0.21	0.25
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Panel B: Regressions with country and year fixed effects

	$\Delta\overline{HY}_{t,t-1}$	$\Delta\overline{HY}_{t,t-2}$	$\Delta\overline{HY}_{t,t-3}$	$\Delta\overline{HY}_{t,t-4}$	$\Delta\overline{HY}_{t,t-5}$
$\mathbf{1}_{G_{t,t-1}>0}$	1.40				
	(1.76)				
$\mathbf{1}_{G_{t,t-2}>0}$		0.10			
		(0.13)			
$\mathbf{1}_{G_{t,t-3}>0}$			0.56		
			(0.80)		
$\mathbf{1}_{G_{t,t-4}>0}$				0.82	
				(1.25)	
$\mathbf{1}_{G_{t,t-5}>0}$					1.07
					(2.12)
Mean of depvar	-0.15	-0.06	-0.01	-0.04	-0.06
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.16	0.19	0.23	0.28	0.30
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table 5: *Summary statistics by quintiles of future cumulative real GDP growth*

Notes: This table shows average subsequent cumulative 3-year real GDP growth, five year growth in credit/GDP, and the average change in HY share by quintiles of subsequent cumulative real GDP growth. Panel A shows the full sample, while Panel B conditions on credit booms.

Panel A: Unconditional

	$Q1$	$Q2$	$Q3$	$Q4$	$Q5$
Real GDP growth$_{t,t+3}$	-1.0	4.8	7.8	10.5	17.4
$\Delta Credit/GDP_{t,t-5}$	17.6	12.4	9.7	9.3	5.6
$\Delta\overline{HY}_{t,t-5}$	-0.2	-0.6	-0.7	-0.0	-1.1

Panel B: Conditional on credit boom

	$Q1$	$Q2$	$Q3$	$Q4$	$Q5$
Real GDP growth$_{t,t+3}$	-6.1	2.5	6.2	9.5	17.3
$\Delta Credit/GDP_{t,t-5}$	38.2	33.2	31.4	33.3	39.5
$\Delta\overline{HY}_{t,t-5}$	1.4	-0.8	-0.9	-1.2	-2.4

Table 6: *Subsequent cumulative real GDP growth and average change in the HY share during credit boom*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change in HY share over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the HY share. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.14	0.33	0.37	0.21	0.25
	(1.32)	(1.48)	(1.42)	(0.89)	(0.90)
$\mathbf{1}_{Credit\ boom}$	-0.35	-1.00	-1.47	-1.54	-1.67
	(-0.95)	(-1.35)	(-1.55)	(-1.66)	(-1.60)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.45	-1.00	-1.45	-1.34	-0.93
	(-2.56)	(-3.21)	(-2.36)	(-2.39)	(-1.09)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.56	0.60	0.64	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table 7: *Five year change in spreads*

Notes: This table shows regressions where the dependent variable is the change in credit spreads from year $t-5$ to t. The independent variables for the first specification are a credit boom dummy and the average change in HY share over the previous 5 years. The second specification splits out the coefficient on the average change in the HY share into two interactions: conditional on a boom and unconditional. Both the five year change in spread and the average change in the HY share are scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	$S_t - S_{t-5}$	$S_t - S_{t-5}$
$\mathbf{1}_{Credit\ boom}$	-0.25	-0.24
	(-2.34)	(-2.28)
$\Delta\overline{HY}_{t,t-5}$	0.14	
	(2.91)	
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$		0.26
		(2.78)
$\mathbf{1}_{No\ Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$		0.09
		(1.65)
Mean of depvar	-0.06	-0.06
Country FE	Y	Y
Year FE	Y	Y
Controls	Y	Y
Clustered by	Ctry	Ctry
R^2	0.17	0.17
Country years	785	785
Countries	38	38

Table 8: *Subsequent cumulative real GDP growth and average change in the global HY share*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over over horizons from one year to five years. The independent variables are a credit boom dummy, and an interaction between the credit boom dummy and the average five year change in the global HY share, an interaction between an emerging markets dummy and the change in the global HY share, and a triple interaction. The average change in the global HY share is scaled to have unit variance. Year fixed effects absorb the level of this variable, and country fixed effects absorb the emerging markets dummy. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\mathbf{1}_{Credit\ boom}$	-0.69	-1.78	-3.09	-3.43	-3.56
	(-1.59)	(-1.94)	(-2.23)	(-2.15)	(-1.82)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}^{G}_{t,t-5}$	-0.61	-1.15	-2.27	-2.65	-2.63
	(-2.32)	(-2.04)	(-2.21)	(-1.89)	(-1.54)
$\mathbf{1}_{EM} \times \Delta\overline{HY}^{G}_{t,t-5}$	-0.51	-0.78	-0.15	0.24	0.40
	(-1.34)	(-1.39)	(-0.17)	(0.21)	(0.30)
$\mathbf{1}_{EM} \times \mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}^{G}_{t,t-5}$	-0.53	-1.38	-2.66	-1.90	-2.41
	(-0.73)	(-1.01)	(-1.68)	(-1.11)	(-1.17)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.57	0.61	0.64	0.70	0.75
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table 9: *Subsequent cumulative real GDP growth: full sample definition of credit boom*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change in HY share over the previous 5 years, a credit boom dummy based on the full-sample definition, and an interaction between the credit boom dummy and the HY share. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. *t*-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.16	0.39	0.43	0.18	0.17
	(1.61)	(1.70)	(1.64)	(0.72)	(0.59)
$\mathbf{1}_{Credit\ boom}$	-0.32	-0.90	-1.36	-1.29	-1.56
	(-0.90)	(-1.26)	(-1.46)	(-1.29)	(-1.50)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.51	-1.11	-1.53	-1.21	-0.61
	(-2.86)	(-3.41)	(-2.51)	(-2.10)	(-0.72)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.56	0.60	0.64	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table 10: *Subsequent cumulative real GDP growth: credit/GDP gap and HY share*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change in HY share over the previous 5 years, a dummy for whether the credit/GDP gap is positive, and an interaction between the credit gap dummy and the HY share. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth, the level of the credit/GDP gap, and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.27	0.56	0.62	0.16	0.13
	(2.50)	(1.78)	(1.65)	(0.46)	(0.33)
$\mathbf{1}_{Credit/GDP\ gap>0}$	-0.66	-1.13	-1.09	-0.82	-1.15
	(-2.28)	(-2.27)	(-1.53)	(-0.87)	(-1.18)
$\mathbf{1}_{Credit/GDP\ gap>0} \times \Delta\overline{HY}_{t,t-5}$	-0.54	-1.01	-1.28	-0.78	-0.38
	(-3.74)	(-2.59)	(-2.06)	(-1.43)	(-0.60)
Mean of depvar	2.39	4.77	7.09	9.40	11.64
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.57	0.60	0.63	0.69	0.73
Country years	740	702	664	626	588
Countries	38	38	38	38	38

Table 11: *Subsequent cumulative real GDP growth: advanced economies and emerging markets*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change in HY share over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the HY share. Panel A shows those results for advanced economies, while Panel B shows those results for emerging economies. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

Panel A: Advanced economies

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.23	0.48	0.52	0.31	0.37
	(2.32)	(1.71)	(1.72)	(1.50)	(1.49)
$\mathbf{1}_{Credit\ boom}$	0.08	0.25	0.68	0.99	0.87
	(0.29)	(0.55)	(1.38)	(1.80)	(0.94)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.49	-1.16	-1.92	-1.87	-1.44
	(-2.80)	(-3.93)	(-2.77)	(-3.32)	(-1.44)
Mean of depvar	2.06	4.13	6.16	8.18	10.18
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.61	0.63	0.67	0.70	0.72
Country years	577	552	527	502	477
Countries	25	25	25	25	25

Panel B: Emerging markets

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.19	0.56	0.96	0.87	1.09
	(0.52)	(1.05)	(1.36)	(1.11)	(1.16)
$\mathbf{1}_{Credit\ boom}$	-0.18	-1.37	-2.09	-1.99	-1.13
	(-0.20)	(-0.69)	(-0.80)	(-0.71)	(-0.38)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.41	-0.98	-0.77	0.27	1.44
	(-0.77)	(-1.23)	(-0.77)	(0.25)	(1.20)
Mean of depvar	3.57	7.21	10.80	14.56	18.17
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.62	0.70	0.73	0.78	0.84
Country years	170	157	144	131	118
Countries	13	13	13	13	13

Table 12: *Subsequent cumulative real GDP growth by type of credit boom*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are based on dummies for baseline and household credit booms. The household credit boom is based on 75^{th} percentile of 5-year household credit/GDP growth in the full sample because of constraints on data availability. Controls include 5-year household credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\mathbf{1}_{Credit\ boom} \times \mathbf{1}_{HH\ Credit\ boom}$	-0.89	-2.26	-3.33	-3.72	-3.68
	(-1.91)	(-2.44)	(-2.65)	(-2.65)	(-2.30)
$\mathbf{1}_{Credit\ boom} \times (1 - \mathbf{1}_{HH\ Credit\ boom})$	-0.28	-0.43	-0.04	1.04	0.79
	(-0.89)	(-0.83)	(-0.05)	(0.76)	(0.76)
$(1 - \mathbf{1}_{Credit\ boom}) \times \mathbf{1}_{HH\ Credit\ boom}$	-0.66	-1.50	-1.44	-1.48	-1.71
	(-1.26)	(-1.60)	(-1.28)	(-1.25)	(-1.21)
Mean of depvar	2.25	4.48	6.66	8.83	10.89
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Year	Year	Year	Year	Year
R^2	0.54	0.58	0.61	0.68	0.74
Country years	674	636	598	560	522
Countries	38	38	38	38	38

Table 13: *Subsequent cumulative real GDP growth and average change in HY share during household credit boom*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change in HY share over the previous 5 years, a household credit boom dummy and an interaction term between the household credit boom dummy and the HY share. The average change in HY share is scaled to have unit variance. Controls include 5-year household credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.15	0.38	0.21	0.06	0.42
	(1.53)	(1.65)	(0.93)	(0.19)	(1.34)
$\mathbf{1}_{HH\ Credit\ boom}$	-0.81	-1.96	-2.51	-2.90	-2.92
	(-2.09)	(-2.69)	(-2.56)	(-2.52)	(-2.18)
$\mathbf{1}_{HH\ Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.82	-1.38	-1.19	-1.10	-1.38
	(-2.52)	(-2.13)	(-1.62)	(-1.15)	(-1.08)
Mean of depvar	2.25	4.48	6.66	8.83	10.89
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.55	0.59	0.61	0.68	0.74
Country years	674	636	598	560	522
Countries	38	38	38	38	38

Table 14: *Subsequent cumulative real GDP growth and 5-year change in spread during credit boom*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the 5-year change in spread over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the 5-year change in spread. The 5-year change in spread is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

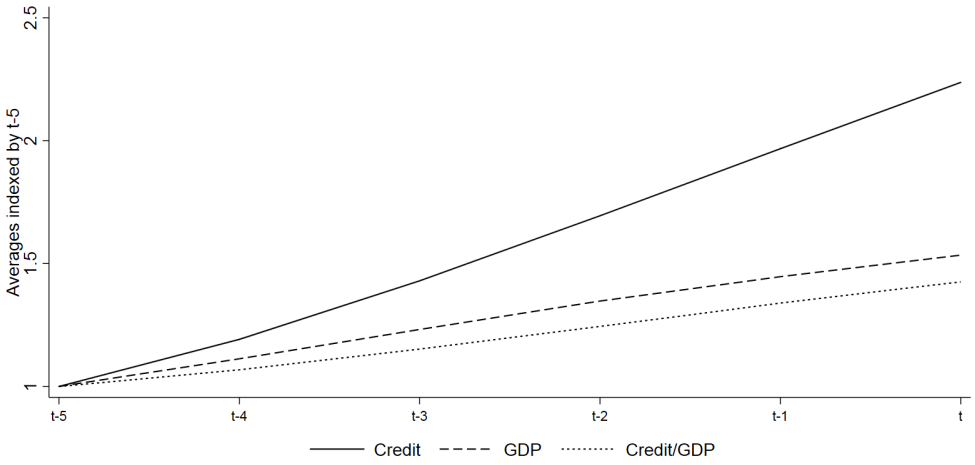
	1yr	2yr	3yr	4yr	5yr
$S_t - S_{t-5}$	0.13	0.19	0.09	0.03	0.15
	(1.62)	(1.46)	(0.50)	(0.12)	(0.58)
$\mathbf{1}_{Credit\ boom}$	-0.39	-1.07	-1.51	-1.61	-1.79
	(-1.03)	(-1.45)	(-1.69)	(-1.79)	(-1.70)
$\mathbf{1}_{Credit\ boom} \times S_t - S_{t-5}$	-0.51	-0.78	-0.80	-0.59	-0.67
	(-2.27)	(-2.46)	(-2.11)	(-1.46)	(-1.21)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.56	0.60	0.63	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

A Additional figures and tables

Figure A.1: *Averages of Credit, GDP, and Bond Market Proceeds during credit boom*

Notes: This figure shows the averages of credit, credit/GDP and GDP, all indexed to 1 at $t-5$, conditional on a credit boom at t in Panel A. Panel B shows the averages of proceeds, proceeds/GDP and GDP, all scaled by 5-year lags, conditional on credit boom at t. Credit booms are country-years where 5-year credit/GDP growth is above the 75^{th} percentile for the previous 10 years (backward looking definition).

Panel A: Credit/GDP, conditional on credit boom at t



Panel B: Proceeds/GDP, conditional on credit boom at t

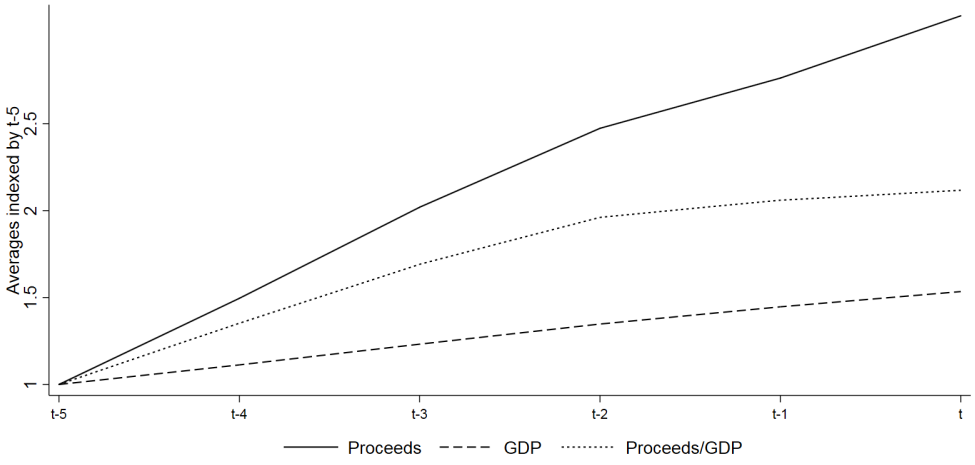
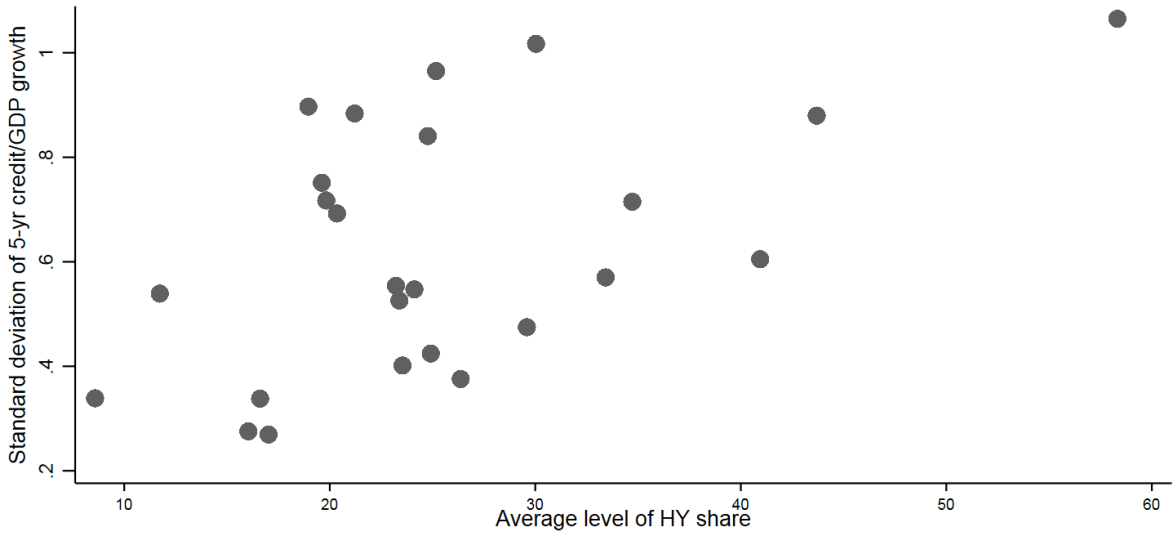


Figure A.2: *Average HY share and volatility of credit growth*

Notes: This figure shows the average HY share (based on non-financial corporate issuance only) over the sample period for each country, and the standard deviation of five year growth in credit/GDP. Panel A shows advanced economies, while Panel B shows emerging markets.

Panel A: Advanced economies



Panel B: Emerging markets

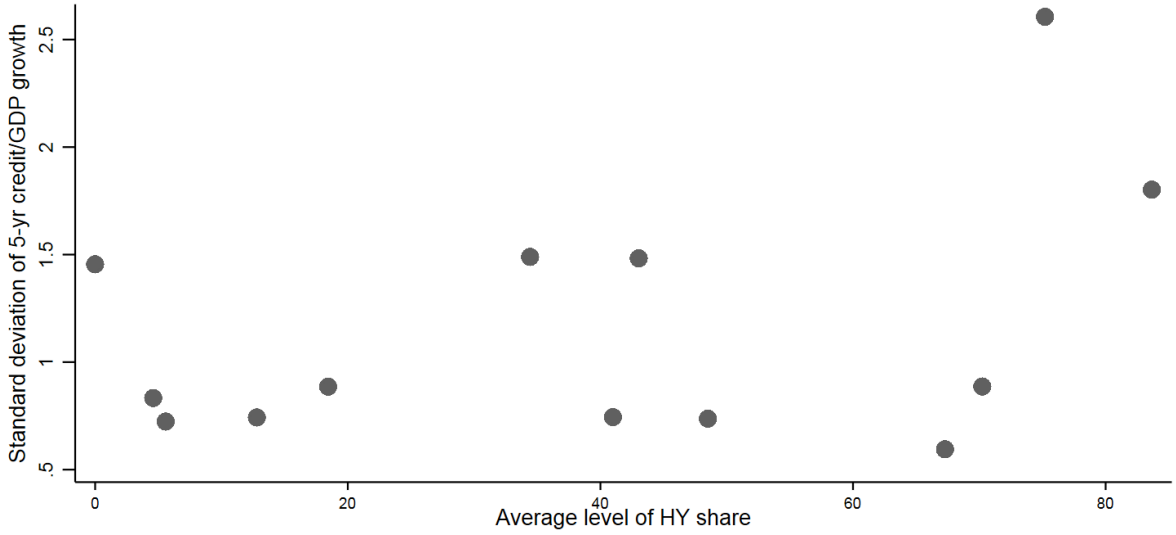


Figure A.3: 75^{th} *percentile of credit/GDP growth*

Notes: This figure shows thresholds for five year credit/GDP growth for credit booms. My baseline backward-looking definition has a varying threshold over time. This threshold is the 75th percentile of five year credit/GDP growth for all countries with data on credit growth over the previous ten years. The full sample threshold is based on the 75th percentile for the full sample.

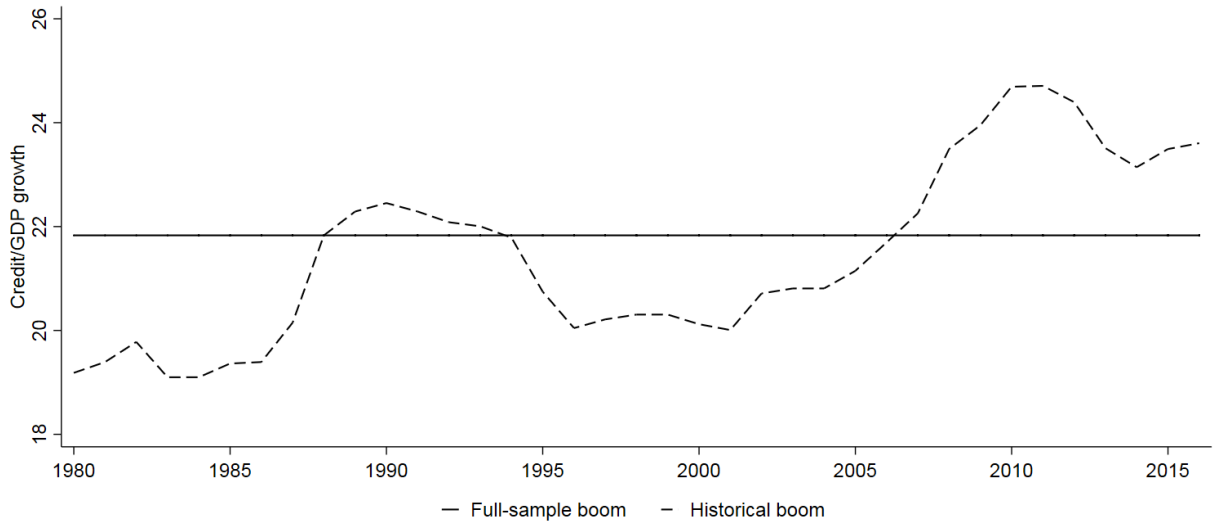


Table A.1: *Availability and sources of bank loan officer surveys*

Notes: This table provides details on the availability and sources of bank loan officer surveys. These surveys are available from the central banks of 14 countries in the sample. The table lists the sources, availability, names, weighting and questions asked in the surveys. Panel A shows the 11 countries that report measures that increase as standards tighten. Net tightening is the fraction of banks that report tightening minus the fraction of banks that report easing. Canada, France and the Netherlands report measures weighted by banks' market shares. Panel B shows the 3 countries that report measures that increase as standards ease. Net easing is the fraction of banks that report easing minus the fraction of banks that report tightening. The UK reports measures weighted by banks' market shares, while Japan uses a pre-determined weighting scheme. While surveys are also available for Russia and Thailand, I do not include these: the Russian survey does not distinguish credit supply from credit demand, and the Thai survey only began in 2013. Surveys are also available for 5 countries not in my sample: Cyprus, Lithuania, Luxembourg, Latvia and Slovenia.

Panel A: Countries that report measures that increase when standards tighten

Country	Source	Availability	Survey Name	Weighted	Survey Question
Austria	ECB	1/2003 - 7/2017	Bank Lending Survey	No	Credit standards for approving new loans
Belgium	ECB	1/2003 - 7/2017	Bank Lending Survey	No	Credit standards for approving new loans
France	ECB	1/2003 - 7/2017	Bank Lending Survey	Yes	Credit standards for approving new loans
Germany	ECB	1/2003 - 7/2017	Bank Lending Survey	No	Credit standards for approving new loans
Greece	ECB	1/2003 - 7/2017	Bank Lending Survey	No	Credit standards for approving new loans
Italy	ECB	1/2003 - 7/2017	Bank Lending Survey	No	Credit standards for approving new loans
Netherlands	ECB	1/2003 - 7/2017	Bank Lending Survey	Yes	Credit standards for approving new loans
Portugal	ECB	1/2003 - 7/2017	Bank Lending Survey	No	Credit standards for approving new loans
Spain	ECB	1/2003 - 7/2017	Bank Lending Survey	No	Credit standards for approving new loans
Canada	Bank of Canada	4/1999 - 4/2017	Senior Loan Officer Survey	Yes	General standards (appetite for risk) and terms for approving credit
US	Federal Reserve	4/1990 - 4/2017	Senior Loan Officer Opinion Survey on Bank Lending Practices	No	Credit standards for approving C&I loans or credit lines

Panel B: Countries that report measures that increase when standards ease

Country	Source	Availability	Survey Name	Weighted	Survey Question
Japan	Bank of Japan	4/2000 - 7/2017	Senior Loan Officer Opinion Survey on Bank Lending Practices at Large Japanese Banks	Yes	Credit standards for applications from firms
Poland	National Bank of Poland	10/2003 - 1/2017	Senior Loan Officer Opinion Survey	No	Credit standards on corporate loans
UK	Bank of England	7/2009 - 4/2017	Credit Conditions Survey	Yes	Willingness and ability to supply credit keeping demand constant

Table A.2: *Reversal of high-yield (HY) share*

Notes: This table shows regressions where the dependent variable is the subsequent average change in the HY share over horizons from one year to five years. The independent variables are the average change of HY share over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the HY share. The average change in HY share is scaled to have unit variance (on both sides of the regression). Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	-0.30	-0.33	-0.35	-0.30	-0.37
	(-6.09)	(-4.25)	(-3.99)	(-3.52)	(-3.74)
$\mathbf{1}_{Credit\ boom}$	-0.07	-0.06	0.08	0.08	0.03
	(-0.69)	(-0.42)	(0.38)	(0.40)	(0.16)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.18	-0.08	-0.05	-0.15	0.09
	(-1.23)	(-0.63)	(-0.29)	(-0.75)	(0.49)
Mean of depvar	-0.01	-0.01	0.00	0.00	-0.00
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.23	0.28	0.31	0.35	0.41
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table A.3: *Comparison of credit boom definition with Dell'Ariccia, Igan, Laeven & Tong (2012)*

Notes: This table compares my definition of credit booms to the one used by Dell'Ariccia, Igan, Laeven & Tong (2012) in an IMF Staff Discussion Note (SDN). Panel A uses the definition proposed by the SDN, in which an episode constitutes a boom if "either of the following two conditions is satisfied: (i) the deviation from trend is greater than 1.5 times its standard deviation and the annual growth rate of the credit-to-GDP ratio exceeds 10 percent; or (ii) the annual growth rate of the credit-to-GDP ratio exceeds 20 percent." The trend is estimated using a cubic regression over the past 10 years. Panel B considers a less stringent version of the SDN definition: either the deviation from trend is greater than 1.5 times its standard deviation and the annual growth rate of the credit-to-GDP ratio exceeds 5 percent; or the annual growth rate of the credit-to-GDP ratio exceeds 10 percent. The panels show how these definitions overlap with my baseline definition.

Panel A: SDN definition of credit boom

Credit Boom	**SDN Boom**		
	0	1	**Total**
0	566	8	574
1	142	31	173
Total	708	39	747

Panel B: Less stringent version of SDN definition

Credit Boom	**SDN Boom**		
	0	1	**Total**
0	524	50	574
1	83	90	173
Total	607	140	747

Table A.4: *Regression results for credit boom as defined by Dell'Ariccia, Igan, Laeven & Tong (2012)*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variable is the average change in HY share over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the HY share. Panel A shows results when the boom is defined as in the SDN, while Panel B shows results using a less stringent definition. The average change in the HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. *t*-statistics are displayed in parentheses. Refer to the Appendix Table A.3 for details on how the boom is defined.

Panel A: Credit boom defined as in SDN

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.02	0.08	-0.02	-0.18	0.09
	(0.16)	(0.44)	(-0.11)	(-0.70)	(0.30)
$\mathbf{1}_{Credit\ boom}$	0.27	-0.20	-0.66	-1.37	-1.60
	(0.43)	(-0.17)	(-0.39)	(-0.78)	(-0.89)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.37	-0.82	-0.63	-0.85	-1.88
	(-1.05)	(-1.58)	(-1.24)	(-0.91)	(-1.38)
Mean of y	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	C	C	C	C	C
R2	0.56	0.59	0.63	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Panel B: Credit boom defined by less stringent version of SDN methodology

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.07	0.20	0.09	-0.08	0.25
	(0.69)	(1.16)	(0.57)	(-0.28)	(0.95)
$\mathbf{1}_{Credit\ boom}$	-0.05	0.08	0.16	0.20	0.24
	(-0.12)	(0.12)	(0.16)	(0.18)	(0.26)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.40	-0.93	-0.82	-0.91	-1.77
	(-1.92)	(-2.14)	(-1.25)	(-0.91)	(-1.49)
Mean of y	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	C	C	C	C	C
R2	0.56	0.60	0.63	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table A.5: *Subsequent cumulative real GDP growth: boom defined at country level*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change in HY share over the previous 5 years, a credit boom dummy defined at the country level, and an interaction between the credit boom dummy and the HY share. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.13	0.29	0.11	-0.23	0.01
	(1.07)	(1.20)	(0.58)	(-0.79)	(0.04)
$\mathbf{1}_{Credit\ boom}$	-0.14	-0.99	-1.51	-1.52	-1.45
	(-0.51)	(-1.73)	(-1.88)	(-1.89)	(-1.81)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.53	-1.01	-0.70	-0.00	-0.23
	(-2.27)	(-1.88)	(-1.33)	(-0.01)	(-0.29)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.56	0.60	0.63	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table A.6: *Subsequent cumulative real GDP growth: boom defined at median*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change of HY share over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the HY share. The boom is defined based on median 5-year credit/GDP growth in the full sample. This definition covers 14 years for the United States (1986-1990, 2000-2008). The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.18	0.26	0.23	0.03	0.02
	(1.78)	(1.82)	(1.11)	(0.10)	(0.06)
$\mathbf{1}_{Credit\ boom}$	-0.64	-1.11	-1.33	-1.85	-2.36
	(-2.11)	(-1.66)	(-1.44)	(-2.03)	(-2.65)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.35	-0.40	-0.49	-0.40	-0.00
	(-2.24)	(-1.48)	(-1.37)	(-0.77)	(-0.00)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.56	0.60	0.63	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table A.7: *Controlling for house prices*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change of HY share over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the HY share. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. Controls also include the 5-year HPI/GDP growth (defined similarly to credit/GDP growth), and an interaction of this variable with the credit boom dummy. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.16	0.35	0.40	0.14	0.08
	(2.08)	(1.74)	(1.56)	(0.67)	(0.32)
$\mathbf{1}_{Credit\ boom}$	-0.35	-0.60	-0.59	-0.56	-0.70
	(-0.91)	(-0.83)	(-0.64)	(-0.57)	(-0.62)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.53	-1.11	-1.63	-1.47	-0.77
	(-3.06)	(-3.38)	(-2.41)	(-3.28)	(-1.33)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
HPI Controls	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.64	0.68	0.71	0.74	0.78
Country years	647	611	575	539	504
Countries	38	38	38	38	38

Table A.8: *Additional credit quantity controls*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change of HY share over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the HY share. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. Specifications in Panel A also include the level of the credit/GDP ratio, and the ratio of bond proceeds to GDP as controls. Specifications in Panel B include the credit/GDP gap as a control. t-statistics are displayed in parentheses. Standard errors are clustered by country.

Panel A: Controlling for credit/GDP and bond proceeds/GDP

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.17	0.40	0.47	0.31	0.38
	(1.56)	(1.79)	(1.76)	(1.24)	(1.24)
$\mathbf{1}_{Credit\ boom}$	-0.26	-0.78	-1.13	-1.11	-1.08
	(-0.74)	(-1.11)	(-1.29)	(-1.38)	(-1.14)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.41	-0.92	-1.40	-1.35	-0.74
	(-2.36)	(-2.93)	(-2.15)	(-2.09)	(-0.91)
Credit/GDP	-0.68	-1.47	-2.28	-2.75	-3.11
	(-2.14)	(-2.09)	(-2.25)	(-2.12)	(-1.90)
Bond Proceeds/GDP	0.26	0.49	0.40	0.04	0.52
	(1.76)	(1.52)	(1.17)	(0.10)	(1.09)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.57	0.62	0.65	0.70	0.75
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Panel B: Controlling for credit gap

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.11	0.29	0.37	0.23	0.29
	(1.11)	(1.49)	(1.57)	(1.07)	(1.14)
$\mathbf{1}_{Credit\ boom}$	-0.09	-0.50	-0.93	-1.02	-1.09
	(-0.31)	(-0.86)	(-1.18)	(-1.29)	(-1.11)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.34	-0.83	-1.41	-1.41	-1.03
	(-1.58)	(-2.74)	(-2.59)	(-2.60)	(-1.19)
Credit/GDP gap	-0.65	-1.35	-1.62	-1.60	-1.48
	(-1.68)	(-1.69)	(-1.68)	(-1.84)	(-2.15)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.57	0.62	0.65	0.70	0.74
Country years	740	702	664	626	588
Countries	38	38	38	38	38

Table A.9: *Shorter horizons than five years*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variable is the average change in HY share over the previous four (Panel A) or three (Panel B) years, a credit boom dummy (also defined over three or four years), and an interaction between the credit boom dummy and the HY share. The change in HY share is scaled to have unit variance. Controls include 3- or 4-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses.

Panel A: Four year horizon

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-4}$	0.06	0.25	0.38	0.15	0.22
	(0.71)	(1.12)	(1.33)	(0.70)	(0.81)
$\mathbf{1}_{Credit\ boom}$	-0.32	-0.52	-0.56	-0.56	-0.79
	(-0.90)	(-0.73)	(-0.65)	(-0.55)	(-0.74)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-4}$	-0.45	-0.96	-1.45	-1.78	-2.07
	(-2.09)	(-2.84)	(-3.14)	(-2.88)	(-2.64)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.56	0.60	0.63	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Panel B: Three year horizon

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-3}$	0.06	0.23	0.36	0.25	0.23
	(0.47)	(1.02)	(1.19)	(0.99)	(0.82)
$\mathbf{1}_{Credit\ boom}$	-0.12	0.02	0.01	0.22	0.57
	(-0.33)	(0.02)	(0.01)	(0.30)	(0.62)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-3}$	-0.45	-0.93	-1.19	-1.13	-1.92
	(-1.99)	(-2.63)	(-2.87)	(-2.09)	(-2.88)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.56	0.60	0.63	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table A.10: *Winsorized subsequent cumulative real GDP growth*

Notes: This table shows regressions where the dependent variable, subsequent cumulative real GDP growth, is winsorized at the 5th and 95th percentiles. I winsorize growth over the full sample in Panel A, by country in Panel B, and by year in Panel C. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country. The results are similar if growth is winsorized at the 10th and 90th percentiles instead.

Panel A: Growth winsorized over full sample

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.12	0.19	0.25	0.20	0.28
	(1.65)	(1.40)	(1.32)	(0.89)	(1.04)
$\mathbf{1}_{Credit\ boom}$	-0.26	-0.71	-0.89	-1.14	-1.35
	(-0.92)	(-1.27)	(-1.13)	(-1.40)	(-1.53)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.41	-0.81	-1.05	-1.13	-0.67
	(-2.72)	(-3.47)	(-2.93)	(-2.81)	(-1.39)
Mean of depvar	2.42	4.79	7.12	9.48	11.81
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.62	0.66	0.69	0.73	0.76
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Panel B: Growth winsorized by country

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.13	0.32	0.36	0.20	0.26
	(1.31)	(1.42)	(1.39)	(0.85)	(0.91)
$\mathbf{1}_{Credit\ boom}$	-0.30	-1.01	-1.44	-1.52	-1.66
	(-0.85)	(-1.37)	(-1.51)	(-1.65)	(-1.60)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.46	-0.97	-1.43	-1.32	-0.92
	(-2.64)	(-3.02)	(-2.31)	(-2.35)	(-1.08)
Mean of depvar	2.46	4.83	7.17	9.50	11.77
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.52	0.59	0.63	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Panel C: Growth winsorized by year

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.11	0.23	0.25	0.18	0.22
	(1.37)	(1.57)	(1.25)	(0.82)	(0.86)
$\mathbf{1}_{Credit\ boom}$	-0.23	-0.72	-0.96	-1.13	-1.26
	(-0.80)	(-1.23)	(-1.20)	(-1.32)	(-1.37)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.40	-0.94	-1.10	-1.25	-0.78
	(-2.77)	(-3.59)	(-2.56)	(-2.57)	(-1.43)
Mean of depvar	2.41	4.80	7.17	9.51	11.79
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.65	0.67	0.70	0.73	0.76
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table A.11: *Subsequent cumulative real GDP growth: HY share scaled by country mean*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change in HY share (first scaled by its country mean) over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the HY share. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. *t*-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.12	0.25	0.26	0.14	0.19
	(1.56)	(1.67)	(1.35)	(0.73)	(0.86)
$\mathbf{1}_{Credit\ boom}$	-0.33	-0.95	-1.37	-1.47	-1.67
	(-0.91)	(-1.31)	(-1.53)	(-1.64)	(-1.59)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.29	-0.73	-1.16	-1.15	-0.67
	(-1.37)	(-2.12)	(-1.71)	(-1.86)	(-0.98)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.56	0.60	0.63	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table A.12: *Subsequent cumulative real GDP growth: alternative definitions of HY share*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are alternative definitions of the average change in HY share over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the HY share. Panel A defines the HY share based on the number of issuers, while Panel B defines the HY share excluding new issuers in the first year of issuance. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

Panel A: HY share defined based on the number of issuers

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.15	0.19	0.26	0.25	0.14
	(1.30)	(1.08)	(1.18)	(0.70)	(0.31)
$\mathbf{1}_{Credit\ boom}$	-0.34	-0.97	-1.41	-1.43	-1.43
	(-0.90)	(-1.28)	(-1.44)	(-1.48)	(-1.41)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.16	-0.29	-0.42	-0.49	-0.52
	(-3.40)	(-4.06)	(-2.35)	(-2.14)	(-2.22)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.57	0.60	0.64	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Panel B: HY share excluding new issuers

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.20	0.49	0.51	0.31	0.29
	(2.28)	(2.38)	(2.12)	(1.14)	(0.83)
$\mathbf{1}_{Credit\ boom}$	-0.38	-1.09	-1.60	-1.66	-1.76
	(-1.06)	(-1.53)	(-1.74)	(-1.82)	(-1.72)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.11	-0.26	-0.34	-0.23	-0.12
	(-2.16)	(-4.07)	(-3.33)	(-1.25)	(-0.39)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.56	0.61	0.64	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table A.13: *Subsequent cumulative real GDP growth: post-1995 sample*

Notes: This table shows regressions for the post-1995 sample, where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change in HY share over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the HY share. The average change in high-yield share is scaled to have unit variance. Controls include 5-year credit/GDP growth, and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.12	0.33	0.34	0.15	0.20
	(1.00)	(1.30)	(1.14)	(0.55)	(0.60)
$\mathbf{1}_{Credit\ boom}$	-0.43	-1.24	-1.80	-1.91	-2.12
	(-0.99)	(-1.42)	(-1.62)	(-1.76)	(-1.65)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.48	-1.06	-1.52	-1.38	-0.99
	(-2.52)	(-3.30)	(-2.37)	(-2.29)	(-1.00)
Mean of depvar	2.46	4.89	7.21	9.48	11.62
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.57	0.61	0.64	0.70	0.75
Country years	655	617	579	541	503
Countries	38	38	38	38	38

Table A.14: *Subsequent cumulative real GDP growth per capita*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth per capita over horizons from one year to five years. The independent variables are the average change in HY share over the previous 5 years, a credit boom dummy and an interaction between the credit boom dummy and the HY share. The average change in HY share is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.12	0.31	0.32	0.04	-0.01
	(1.17)	(1.38)	(1.27)	(0.20)	(-0.03)
$\mathbf{1}_{Credit\ boom}$	-0.40	-1.15	-1.76	-1.86	-2.11
	(-1.04)	(-1.50)	(-1.80)	(-1.98)	(-1.98)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.43	-0.96	-1.37	-1.14	-0.54
	(-2.49)	(-2.83)	(-2.19)	(-2.16)	(-0.60)
Mean of depvar	1.74	3.49	5.18	6.87	8.47
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.53	0.56	0.59	0.64	0.69
Country years	747	709	671	633	595
Countries	38	38	38	38	38

Table A.15: *Subsequent cumulative real GDP growth and spreads: advanced economies and emerging markets*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the 5-year change in spread over the previous 5 years, a credit boom dummy, and an interaction between the credit boom dummy and the 5-year change in spread. Panel A shows regression results for advanced economies, while Panel B shows regression results for emerging economies. The 5-year change in spread is scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

Panel A: Advanced economies

	1yr	2yr	3yr	4yr	5yr
$S_t - S_{t-5}$	0.21	0.29	0.19	0.16	0.23
	(2.22)	(1.90)	(1.04)	(0.68)	(0.86)
$\mathbf{1}_{Credit\ boom}$	-0.01	0.04	0.42	0.72	0.54
	(-0.03)	(0.09)	(0.78)	(1.19)	(0.57)
$\mathbf{1}_{Credit\ boom} \times S_t - S_{t-5}$	-0.55	-0.98	-1.15	-1.01	-1.36
	(-2.30)	(-2.42)	(-2.66)	(-2.26)	(-2.35)
Mean of depvar	2.06	4.13	6.16	8.18	10.18
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.61	0.63	0.66	0.69	0.72
Country years	577	552	527	502	477
Countries	25	25	25	25	25

Panel B: Emerging markets

	1yr	2yr	3yr	4yr	5yr
$S_t - S_{t-5}$	-0.38	-0.65	-0.96	-0.96	-0.53
	(-1.03)	(-1.33)	(-2.00)	(-1.74)	(-0.81)
$\mathbf{1}_{Credit\ boom}$	-0.18	-1.25	-2.63	-2.99	-2.03
	(-0.22)	(-0.70)	(-1.21)	(-1.37)	(-0.80)
$\mathbf{1}_{Credit\ boom} \times S_t - S_{t-5}$	0.52	1.00	1.32	1.46	1.50
	(0.85)	(1.26)	(1.51)	(1.48)	(1.56)
Mean of depvar	3.57	7.21	10.80	14.56	18.17
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.63	0.69	0.73	0.78	0.83
Country years	170	157	144	131	118
Countries	13	13	13	13	13

Table A.16: *Subsequent cumulative real GDP growth: HY share and spreads together*

Notes: This table shows regressions where the dependent variable is subsequent cumulative real GDP growth over horizons from one year to five years. The independent variables are the average change in HY share and 5-year change in spread over the previous 5 years, a credit boom dummy, and interaction terms of the credit boom dummy and the HY share, and of the credit boom dummy and the 5-year change in spread. Both the average change in HY spread and the 5-year change in spread are scaled to have unit variance. Controls include 5-year credit/GDP growth and two lags of real GDP growth. t-statistics are displayed in parentheses. Standard errors are clustered by country.

	1yr	2yr	3yr	4yr	5yr
$\Delta\overline{HY}_{t,t-5}$	0.13	0.33	0.38	0.22	0.25
	(1.27)	(1.45)	(1.43)	(0.91)	(0.86)
$S_t - S_{t-5}$	0.13	0.19	0.09	0.03	0.14
	(1.65)	(1.45)	(0.53)	(0.13)	(0.53)
$\mathbf{1}_{Credit\ boom}$	-0.40	-1.10	-1.59	-1.63	-1.79
	(-1.06)	(-1.47)	(-1.69)	(-1.78)	(-1.69)
$\mathbf{1}_{Credit\ boom} \times \Delta\overline{HY}_{t,t-5}$	-0.40	-0.91	-1.36	-1.29	-0.88
	(-2.29)	(-3.15)	(-2.27)	(-2.33)	(-1.07)
$\mathbf{1}_{Credit\ boom} \times S_t - S_{t-5}$	-0.46	-0.68	-0.67	-0.48	-0.62
	(-1.99)	(-2.11)	(-1.70)	(-1.09)	(-1.13)
Mean of depvar	2.40	4.81	7.16	9.50	11.76
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Clustered by	Ctry	Ctry	Ctry	Ctry	Ctry
R^2	0.57	0.61	0.64	0.69	0.74
Country years	747	709	671	633	595
Countries	38	38	38	38	38