Credit Expansion and Neglected Crash Risk

Online Appendix

Matthew Baron and Wei Xiong

A. Additional details on data construction

Here we present additional information related to data sources and variable construction beyond what is described in Section I. The sample length for each variable within each country is reported in Appendix Table 1.

All historical data was extensively examined country-by-country for each variable to ensure accuracy and was compared across multiple sources whenever possible. Only series that are highly correlated with series from alternative sources are retained. For example, for bank equity returns, Appendix Table 1 compares up to three alternative data series for each country from Global Financial Data (GFD1, GFD2, GFD3) with additional data sources including Compustat Global (generally with data from 1986 forward), Datastream (generally with data from 1973 forward), and Moody's Manuals (generally with data from 1925–1980). Panel A of Appendix Table 2 reports correlation coefficients between these various data sources, which generally range around 90%. Panel B lists the years covered by each data source to demonstrate when various data sources overlap.

We describe further elements of the data construction below:

Total excess returns of the bank index and non-financials index. The following links can be used to download spreadsheets detailing data sources used for each country in the construction of the various equity indices:

1. Bank price index construction: http://blogs.cornell.edu/baron/appendix-bank-index-construction/
2. Bank dividend yield construction: http://blogs.cornell.edu/baron/appendix-bank-dividend-construction/
3. Broad equity price index and dividend construction: http://blogs.cornell.edu/baron/appendix-equity-index-construction/
4. Non-financials index construction: http://blogs.cornell.edu/baron/appendix-non-financials-index-construction/

Total returns are constructed by adding bank dividend yield or market dividend yield to the bank or non-financials price returns index. (We do not have a non-financials-specific dividend yield, so we just use the market dividend yield.) The bank dividend yield index for each

country is taken from Compustat or Datastream for 1980 onwards) and is constructed by aggregating individual banks' dividend yields using hand-collected price and dividend data (1920–1980) of the largest publicly-listed banks in each country from Moody's Bank and Finance Manuals. Dividend yield of the market equity index is taken from GFD, occasionally supplemented by Compustat and Datastream (see spreadsheets above for details for each of the countries). Due to the difficulty in obtaining historical bank dividend yield data, the bank dividend yield index for each country does not necessarily contain exactly the same banks as the bank price index.

Control variables. The construction of *dividend yield* is described above. *Book-to-market* comes from Datastream. *Inflation* is calculated from CPI data from GFD. The *term spread* is the long-term interest rate minus the short-term interest rate, where *long-term interest rates* are the yields on 10-year government bonds taken mostly from GFD and OECD. *Short-term interest rates* are almost always the 3-month government t-bill rates taken from GFD, the IMF, OECD, Schularick-Taylor (2012), and other sources. Occasionally, for older data, the short-term interest rate was taken to be the yield on central bank notes, high-grade commercial paper, deposits, or overnight interbank lending; since some of these rates can rise in times of market distress and also historically have been regulated, care was taken to make sure these alternative rates, when used, were representative of the market short-term "risk-free" interest rate. *Investment to capital* is private non-residential fixed investment divided by the outstanding private non-residential fixed capital stock, which comes from the Kiel Institute's database on investment and capital stock.

Other measures of aggregate credit. The data on bank credit is compared with several other measures of credit in Table 2: (*total credit/GDP)* refers to credit extended from all sources (not just from banks) to domestic households and private non-financial corporations. The variables (*total credit to households/GDP)* and (*total credit to nonfinancial corporations/GDP)* are the same as (*total credit/GDP)* but decomposed into household and corporate components. Like *(bank credit/GDP)*, all these credit aggregates are taken from the BIS's "long series on credit to private non-financial sectors" and exclude sovereign lending and interbank lending.

Other indirect measures of credit used in Table 2 include: (*bank assets/GDP)*, which comes from Schularick and Taylor (2012); and *growth of household housing assets,* which is the year-over-year real growth rate in housing assets owned by the household sector, from Piketty and Zucman (2014). Lastly, we also examine international credit flows and aggregates using the change in (*gross external liabilities/GDP)*, which includes both public and private liabilities and comes from Lane and Milesi-Ferretti's (2007) database on countries' external assets and liabilities; and (*current account deficit/GDP)* from OECD and the IMF's external debt database.

Additional variables used in Appendix tables. *Real GDP growth* (year-over-year) is calculated from nominal GDP and the GDP deflator taken from GFD. *Daily stock volatility* is

computed for each country and quarter as the standard deviation of daily returns by using daily stock returns from GFD of the equity market index. The *corporate yield spread* is the yield spread between the AAA-rated 10-year-maturity corporate bond index from GFD and the 10-year government bond. The *sovereign default spread* is the yield on the 10-year government bond minus the yield on the U.S. 10-year Treasury. The U.S. *broker dealer leverage* factor comes from Adrian, Etula, and Muir (2013).

B. *Results for non-financials equity*

In the main paper, we focus on bank equity index returns. We repeat here our analyses using the non-financials equity index. We show that bank credit expansion has broad asset pricing implications beyond just for bank stocks.

A large asset pricing literature has identified a number of variables, such as dividend yield, term spread, and book to market, as having significant predictive power for market index returns. Unlike these commonly used return predictors, the variable we use in this paper, *Credit Expansion*, is a quantity variable, which does not contain any price component and instead gives a measure of the state of the banking sector. This attribute makes credit expansion an especially interesting variable to study how bank credit broadly affects equity prices.

The findings in this section add to a growing literature that analyzes asset pricing implications of balance sheet quantities of financial intermediaries. See, for example, the models developed by Shleifer and Vishny (1997), Xiong (2001), Kyle and Xiong (2001), Gromb and Vayanos (2002), Brunnermeier and Pedersen (2009), He and Krishnamurthy (2012, 2013), and Brunnermeier and Sannikov (2014). In particular, Adrian, Moench and Shin (2013) and Adrian, Etula and Muir (2013) provide empirical evidence for intermediary book leverage as a relevant pricing factor for both the time-series and cross-section of asset prices. A key implication of this literature is that asset market risk premia tend to increase substantially after financial intermediaries suffer large losses, which is confirmed by the evidence of Muir (2014).

Specifically, we re-estimate the panel regression models specified in equations (1), (2), and (3) of Section II – the probit model, OLS fixed effects model, and non-parametric model for predicting crash risk, mean returns, and negative returns conditional on large credit expansions, respectively – but this time with the non-financials equity index. We also interact credit expansion with dividend yield, as in Table 6, using the non-financials equity index. We choose to focus on the non-financials equity index rather than the broad market index, which contains both banks and non-financials, to ensure that the predictive power of credit expansion is not due to banks contained in broad market index (though, in practice, the results are nearly identical for the broad market index as for the non-financials index).

The results for the non-financial equity index are reported in Appendix Table 3. Panel A is analogous to Table 3, Panel B is analogous to Table 4, Panel C is analogous to Table 5, and Panel D is analogous to Table 6. We will focus on Panel B, which estimates mean returns, though the results of Panels A–D are all qualitatively similar the results in the main paper for the

bank equity index, though often somewhat less in magnitude. Panel B shows that credit expansion is a strong predictor of mean returns of the non-financials equity index over subsequent 1-, 2- and 3-year horizons, even after controlling for market dividend yield and other control variables known to predict the equity premium. For example, estimating credit expansion and dividend yield jointly in columns 3, 7, and 11, a one standard deviation increase in credit expansion predicts 1.9, 3.2, and 6.5 percentage point decreases in subsequent returns (all significant at the 5% level) over 1-, 2-, and 3-year-ahead horizons, respectively, while market dividend yield predicts 5.0, 6.2, and 6.6 percentage point increases, respectively.

These results suggest that credit expansion has broader asset pricing implications than simply for bank stocks. Credit expansion is a strong and robust predictor of non-financials equity returns and appears to be independent of other well-known predictors of the equity premium, such as dividend yield.

C. Bank equity prices and credit expansion before and after banking crises

In this section, we briefly examine the relationship between bank equity crashes and banking crises, given that the two are often linked. In Appendix Figure 1, the past three-year change in bank credit to GDP and the bank total excess log returns index are plotted before and after the start of banking crises, where the start of banking crises is based on data from Reinhart and Rogoff (2009). This figure is similar to Figure 2 but is constructed using banking crises rather than large credit booms.

As in Figure 2, *credit expansion* and bank total excess log returns are pooled averages across time and countries, conditional on the given number of years before or after the start of a banking crisis. The average bank log returns are then cumulated from t = -6 to t = +6, and the level is adjusted to be 0 at t = 0, so that the interpretation is that these are all cumulative returns relative to t = 0, the onset of the financial crisis.

Appendix Figure 1 looks similar to Figure 2 and shows that financial crises are accompanied by large declines in bank stocks. On average, the equity market decline starts two years before the start of the banking crisis and continues until the start of the crisis. On average, there is also a double-dip, as bank stocks continue to decline up until four years after the start of the crisis. From peak to trough, the average bank index in Figure 2 declines from around 0.54 to -0.32, a drop of 0.86 in log returns.

Appendix Figure 1 also highlights various other aspects of banking crises. For example, Appendix Figure 1 shows how bank equity prices tend to rise considerably leading up to the crisis (from year -6 to year -2), with log excess returns of the bank equity index of 9.7% per year, which is considerably above the historical average of 5.9%. In addition, Appendix Figure 1 shows the dynamics of *credit expansion* before and after the start of a financial crisis. Credit rises rapidly preceding the crisis and peaks at the start of the crisis, with credit gradually contracting after the onset of the crisis, only becoming negative after year 2. As in Figure 2, this gradual contraction process may be due to credit lines pre-committed by banks, which, as

documented by Ivashina and Scharfstein (2010), prevented banks from quickly reducing outstanding bank loans during the recent financial crisis.

D. Rolling regressions

This section of the Appendix presents evidence that the main results for the bank equity index have held since at least the 1980s and, more importantly, could have been forecastable at the time by investors during large historical credit expansions. To show this, Appendix Figure 2 presents rolling regressions for mean returns (corresponding to Table 4) in Panel A and predicted negative returns (corresponding to Table 5) in Panel B.

Specifically, Appendix Figure 2 plots the coefficient on *credit expansion* from the OLS regression for 3-year-ahead bank index returns (Panel A) and estimated future 3-year-ahead bank index returns conditional on *credit expansion* exceeding a 95th percentile threshold within a country (Panel B) estimated at each point in time t with past data from 1920 to time t (top plot) and over a rolling past-20-years window. As usual, *credit expansion* is standardized at each point in time using only past information to avoid any future-looking bias, and the 95th percentile thresholds are also computed this way. The estimates are plotted as solid lines, while 95% confidence intervals (dashed lines) are derived from standard errors that are dually-clustered on country and time.

As discussed in Section IV.B related to robustness in subsamples, the estimates of beta in Panel A are quite stable over the entire sample period, except for a period in the 1950s and early 1960s when the coefficient trended upwards but subsequently declined. Similarly, the estimate of future 3-year-ahead excess returns conditional on large credit expansion in Panel B is also robustly negative, except for a period in the 1950s and early 1960s when the 20-year-past rolling window saw positive returns. From these plots, we conclude that the main results have held since at least the 1980s and, more importantly, could have been forecastable at the time by investors during large historical credit expansions.

E. *Test for possible small-sample bias*

Tests of predictability in equity returns may produce biased estimates of coefficients and standard errors in small samples when a predictor variable is persistent and its innovations are highly correlated with returns, e.g., Stambaugh (1999). This small-sample bias could potentially pose a problem for estimating coefficients in our study, because the main predictor variable, three-year change in bank credit to GDP, is highly persistent on a quarterly level. In this section of the Appendix, we test for the possibility of small-sample bias using the methodology of Campbell and Yogo (2006) and find that small-sample bias is most likely not a concern for our estimates.

The intuition behind the methodology of Campbell and Yogo (2006) is that three conditions need to be jointly met for small-sample bias to be a concern: 1) the predictor variable needs to be

persistent; 2) its innovations need to be highly correlated with returns, and 3) the sample size needs to be small. Campbell and Yogo (2006) present Monte Carlo evidence to demonstrate when small-sample bias is or is not likely a concern, given parameter values for the sample size, persistence of the regressor, and the correlation of its innovations with returns.[1]

Following the Campbell and Yogo (2006) methodology, we estimate the following regressions:

$$r_{i,t+K} - r^{f}_{i,t+K} = \alpha_i + \beta \cdot credit\_expansion_{i,t} + u_{i,t} \quad \text{(A1)}$$

$$credit\_expansion_{i,t+K} = \gamma_i + \rho \cdot credit\_expansion_{i,t} + \epsilon_{i,t} \quad \text{(A2)}$$

Appendix Table 4 reports parameter values corresponding to the sample size (N), persistence of bank credit expansion (ρ and c = N*(ρ-1)), and the correlation of its innovations with returns (δ = corr($u_{i,t}$, $\epsilon_{i,t}$)). The table shows that our data correspond to parameter values well outside the region for which small-sample bias is likely to be a concern. The key reason is that δ (the correlation of innovations in *credit expansion* with returns) is small in our data. More specifically, we can see that all the values of δ are less than 0.125, the critical threshold reported in Campbell and Yogo (2006) for which small-sample bias is likely not a concern regardless of the value of c. In addition, because of the large sample size of our data, c = N*(δ-1) is universally larger than the threshold for which small-sample bias is likely not to be a problem regardless of the value of δ. Thus, our data correspond to parameter values well outside the region for which small-sample bias may be a concern.

To test for small-sample bias in multivariate regressions that use the five standard control variables, we estimate the following additional regression:

$$r_{i,t+K} - r^{f}_{i,t+K} = \alpha_i + k \cdot controls_{i,t} + z_{i,t} \quad \text{(A3)}$$

and replace the left-hand side variable in equation (A1) with the residual, $z_{i,t}$, taken from equation (A3). Parameters obtained in the presence of control variables are also reported in Appendix Table 4. In this new specification with controls, the parameter estimates again remain well outside the region for which small-sample bias may be a concern.

Because our data set is a panel and because fixed effects may also cause biased estimates in small samples, as an extra robustness check, we also obtain tables of parameter estimates for each of the 20 countries individually (results reported in Appendix Table 5) and find that individual countries' parameters, with only rare exceptions, also fall into the region for which small-sample bias is probably not a concern. Those exception are: Ireland (1- and 2- year ahead returns) and Italy (1-year ahead returns for bank index returns only), since these countries had unusually large and persistent credit expansions in the 2000s.

[1] Specifically, the Monte Carlo simulations report regions of the parameter space for which the actual size of the nominal 5% t-statistic (generated when testing the estimated β against the true β_0 with null hypothesis $\beta = \beta_0$ and alternative $\beta > \beta_0$) is greater than 7.5%.

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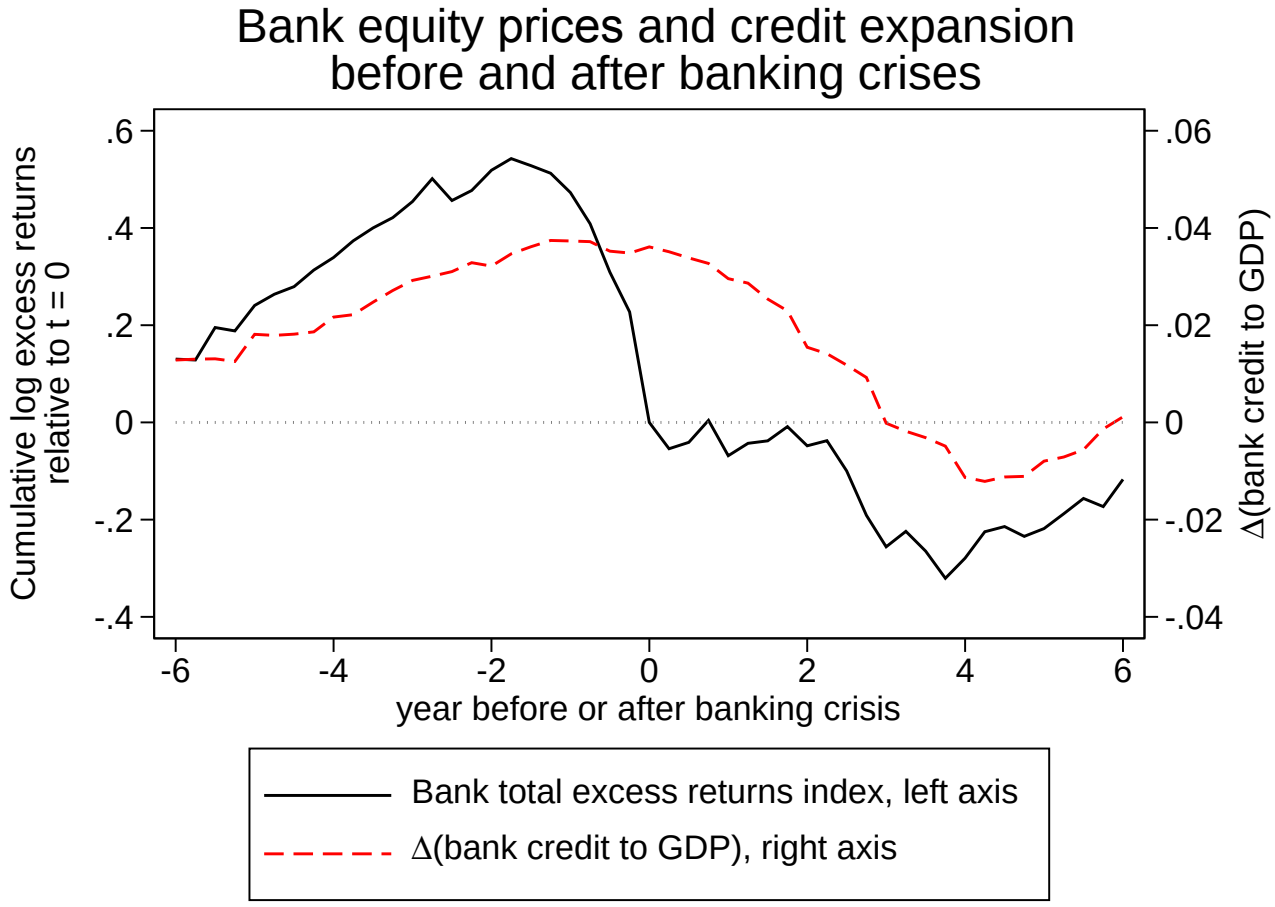
Xiong, Wei, "Convergence Trading with Wealth Effects: An Amplification Mechanism in Financial Markets," *Journal of Financial Economics*, 62 (2001), 247-292.

Appendix Figure 1: Bank equity prices and credit expansion before and after banking crises

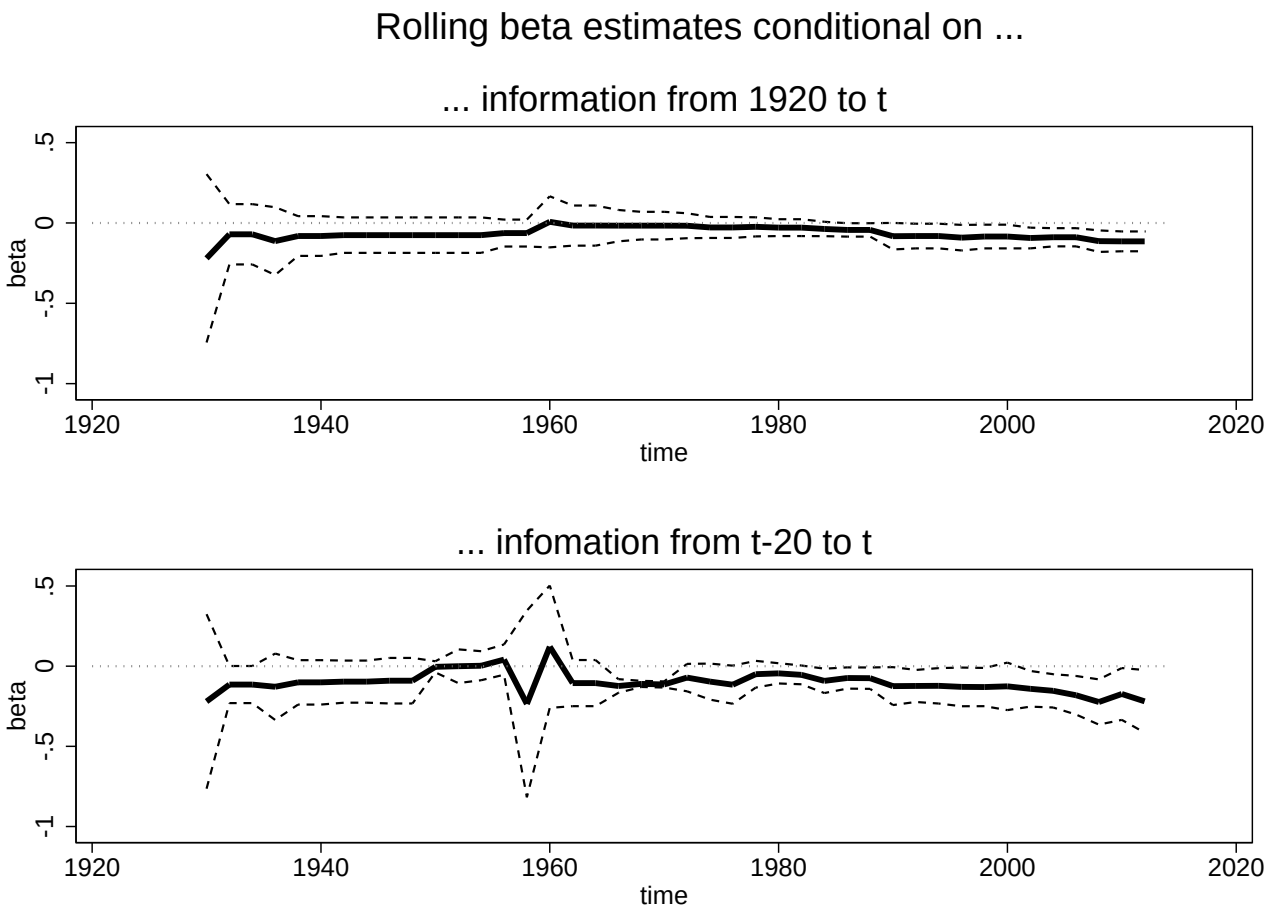
This figure is similar to Figure 2 but plots bank equity prices and credit expansion before and after banking crises rather than large credit booms. Specifically, the past three-year change in bank credit to GDP ($\Delta(bank\,credit/GDP)$) and the bank total excess log returns index are plotted before and after the start of banking crises. The starts of banking crises are based on data from Reinhart and Rogoff (2009). $\Delta(bank\,credit/GDP)$ and bank total excess log returns are pooled averages across time and countries, conditional on the given number of years before or after the start of a banking crisis. The average bank log returns are then cumulated from t = -6 to t = +6, and the level is adjusted to be 0 at t = 0. Observations are over the sample of 20 countries, 1920–2012.



Appendix Figure 2: Rolling regressions

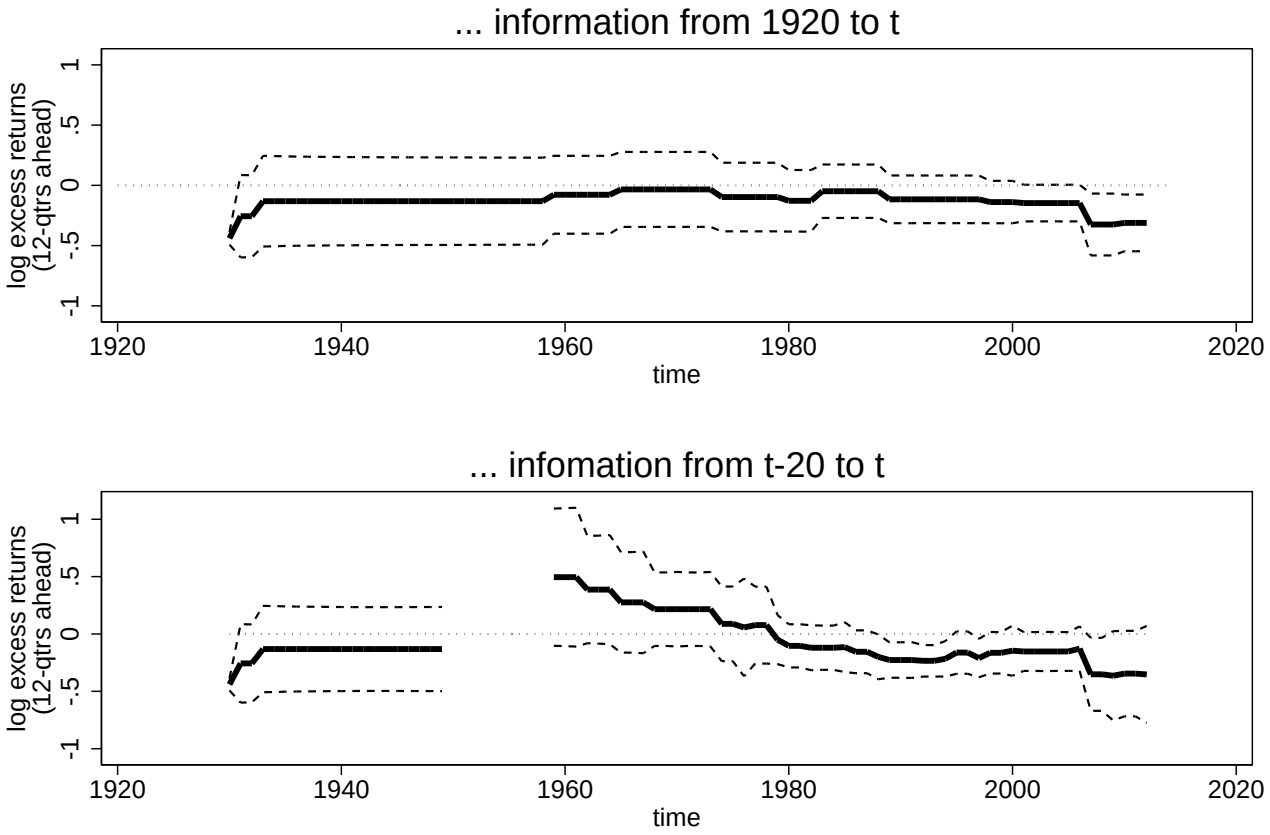
This figure plots rolling estimates (solid line) and 95% confidence intervals (dashed lines) corresponding to (Panel A) the OLS estimates in Table 4 and (Panel B) the non-parametric estimates in Table 5. Specifically, Panel A plots the coefficient on $\Delta(bank\,credit/GDP)$ from Table 4 estimated for 3-year-ahead returns of the bank equity index estimated at each point in time *t* using data from 1920 to *t* (top plot) and from *t-20* to *t* (bottom plot). Panel B plots the predicted 3-year-ahead returns of the bank equity index conditional on a large credit expansion (i.e. when $\Delta(bank\,credit/GDP)$ exceeds a 95th percentile threshold within a country) estimated at each point in time *t* using data from 1920 to *t* (top plot) and from *t-20* to *t* (bottom plot). In Panel A, $\Delta(bank\,credit/GDP)$ is in standard deviation units within each country but is standardized at each point in time using only past information to avoid any future-looking bias. The 95% confidence intervals are derived from standard errors that are dually clustered on country and time. Observations are over the sample of 20 countries, 1920–2012.

Panel A:



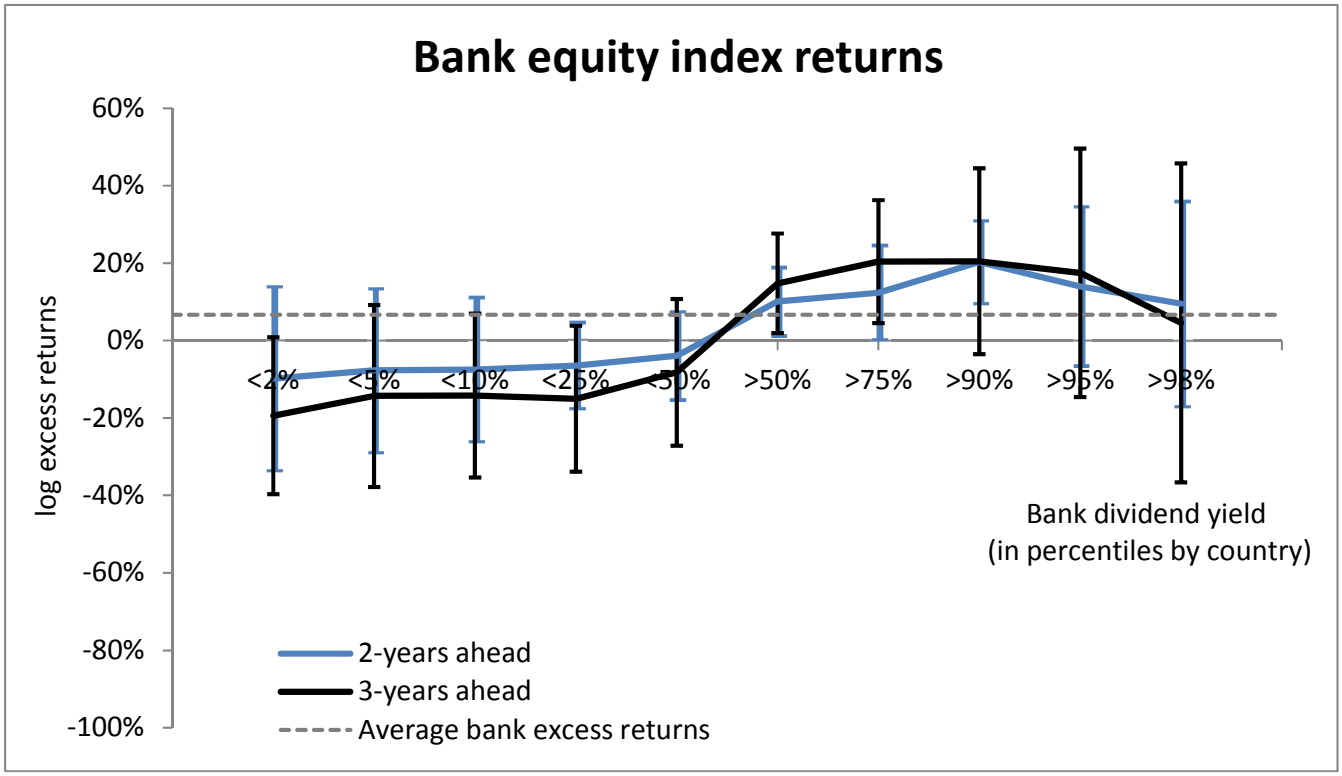
Panel B:

Predicted returns conditional on a large (95th percentile) credit expansion using...



Appendix Figure 3: Low bank dividend yield predicts negative returns of the bank equity index

This figure is similar to Figure 3 but conditions returns on various thresholds of bank dividend yield rather than credit expansion. Specifically, this figure plots average log excess returns of the bank equity index subsequent to high values of bank dividend yield (when it exceeds a given percentile threshold) and subsequent to low values of dividend yield (when it falls below a given percentile threshold). These results, in table form, are also reported in Appendix Table 12. To avoid any future-looking bias, percentile thresholds are calculated for each country and each point in time using only past information. Average returns conditional on the thresholds are computed using regression models (3) and (4) with non-overlapping returns. 95% confidence intervals are computed using dually-clustered standard errors. Observations are over the sample of 20 countries, 1920–2012.



Appendix Table 1: Data and sample length

This table shows the sample length for each variable by reporting the first year of data for each variable within each country.

Country	Δ (bank credit / gdp)	Non-financials equity return	Bank equity return	Market D / P	Bank index D / P	three mo tbill yield	book / market	term spread	inflation	i / k	(total credit / gdp)	(total credit HHs / gdp) Δ	Δ (total credit NFCs / gdp) Δ	Bank assets / gdp	growth in HH housing assets	gross external debt / gdp	current account / gdp	first year of banking crisis
Australia	1920	1920	1920	1920	1924	1928	1980	1928	1920	1960	1957	1980	1980	1920	1961	1970	1960	1920
Austria	1952	1921	1986	1925	1986	1960	1980	1960	1920	1960	1952	1998	1998	1987		1970	1960	1920
Belgium	1973	1955	1934	1927	1965	1948	1980	1948	1921	1960	1973	1983	1983	1981		1970	1960	1920
Canada	1920	1920	1920	1934	1923	1934	1980	1934	1920	1960	1957	1972	1972	1920	1971	1970	1961	1920
Denmark	1920	1921	1921	1969	1952	1921	1980	1921	1920	1960	1954	1997	1997	1920		1970	1960	1920
France	1923	1920	1920	1920	1924	1922	1980	1922	1920	1960	1972	1980	1980	1950	1971	1970	1960	1920
Germany	1928	1920	1928	1920	1928	1920	1980	1920	1920	1960	1953	1973	1973	1925	1951	1970	1960	1920
Ireland	1974	1973	1973	1973	1973	1960	1981	1960	1923	1960	1974	2005	2005	1995		1970	1960	1920
Italy	1920	1961	1973	1925	1973	1922	1981	1922	1920	1960	1953	1953	1953	1920	1967	1970	1960	1920
Japan	1920	1946	1946	1920	1958	1920	1980	1920	1920	1960	1967	1967	1967	1953	1971	1970	1960	1920
Korea	1963	1976	1975	1963	1987	1969	1986	1973	1949		1965	1965	1965			1971	1970	1920
Netherlands	1922	1931	1928	1969	1928	1920	1980	1920	1920	1960	1964	1993	1993	1920		1970	1960	1920
Norway	1920	1920	1988	1969	1986	1924	1984	1924	1920	1960	1956	1978	1978	1920		1970	1960	1920
Portugal	1950	1990	1938	1988	1989	1981	1986	1981	1931	1960	1950	1982	1982			1972	1960	1920
Singapore	1966	1970	1970	1972	1986	1972	1980	1998	1949		1994	1994	1994			1970		1920
Spain	1920	1940	1940	1920	1966	1924	1990	1924	1920	1960	1973	1983	1983	1920		1970	1960	1920
Sweden	1920	1920	1920	1920	1926	1920	1982	1920	1920	1960	1964	1984	1984	1920		1970	1960	1920
Switzerland	1920	1925	1930	1920	1930	1920	1980	1920	1920	1960	1978	2002	2002	1920		1970	1960	1920
UK	1920	1920	1920	1923	1923	1920	1980	1920	1920	1960	1965	1965	1979	1920	1972	1970	1960	1920
US	1920	1920	1920	1920	1929	1920	1980	1920	1920	1960	1955	1955	1955	1920	1947	1970	1960	1920

Appendix Table 2: comparisons of different data sources

To help validate the accuracy of the historical data, Panel A reports correlation coefficients between various data sources. Panel B lists the years covered by each data source to demonstrate when various data sources overlap. For both panels, the primary data source is from Global Financial Data (GFD), and various data series from GFD are compared (GFD1, GFD2, GFD3). Alternative data sources include Compustat Global (generally with data from 1986 forward), Datastream (generally with data from 1973 forward), and Moody's Manuals (generally with data from 1920–1970).

Panel A:

Correlations between data sets of bank index returns

Country	Compustat - Datastream	GFD - Compustat	GFD - Datastream	GFD - Moody's	GFD1 - GFD2	GFD1 - GFD3	GFD2 - GFD3
Australia	0.989	0.999	0.979	0.840			
Austria	0.936						
Belgium	0.954	0.897	0.882	0.675		0.927	0.993
Canada	0.987	0.997	0.976	0.762			
Denmark	0.989	0.989	0.981	0.745			
France	0.949	0.946	0.912	0.657	0.842	0.913	0.861
Germany	0.980	0.979	0.985	0.746			
Ireland	0.966	0.974	0.984				
Italy	0.974	0.985	0.980				
Japan	0.982	0.999	0.959	0.742	0.930		
Korea	0.965	0.945	0.947				
Netherlands	0.611	0.988	0.787	0.795	0.692	0.919	
Norway	0.876	0.952	0.853		0.998		
Portugal	0.985	0.988	0.986		0.841		
Singapore		0.970					
Spain	0.986	0.996	0.988	0.892	1.000		
Sweden	0.959	0.955	0.972	0.627			
Switzerland	0.823	0.805	0.930	0.813	0.997		
UK	0.945	0.906	0.905	0.734			
US	0.973	0.955	0.934		0.884		
Average	**0.938**	**0.959**	**0.941**	**0.752**	**0.898**	**0.919**	**0.927**

Panel B:

Sample length of each data set

Country	GFD	Compustat	Datastream	Moody's Manuals	GFD1	GFD2	GFD3
Australia	1920 - 2012	1986 - 2012	1973 - 2012	1924-1972	1900 - 2013		
Austria	-	1986 - 2012	1986 - 2012				
Belgium	1934 - 2012	1986 - 2012	1973 - 2012	1966-1972	1934 - 1996	2000 - 2013	1983 - 2005
Canada	1920 - 2012	1982 - 2012	1973 - 2012	1923-1972	1919 - 2013		
Denmark	1921 - 2012	1986 - 2012	1973 - 2012	1952-1972	1921 - 2012		
France	1920 - 2012	1986 - 2012	1986 - 2012	1924-1985	1917 - 1993	1946 - 2002	1967 - 2013
Germany	1928 - 2012	1986 - 2012	1973 - 2012	1926-1972	1928 - 2013		
Ireland	1988 - 2012	1986 - 2012	1973 - 2012		1988 - 2013		
Italy	1985 - 2012	1986 - 2012	1973 - 2012		1985 - 2013		
Japan	1946 - 2012	1986 - 2012	1973 - 2012	1958-1972	1946 - 1992	1983 - 2013	
Korea	1975 - 2011	1986 - 2012	1987 - 2012		1975 - 2013		
Netherlands	1928 - 2003	1986 - 2012	1973 - 2012	1923-1972	1972 - 2003	1928 - 1974	1980 - 2013
Norway	1920 - 2012	1986 - 2012	1990 - 2012		1914 - 2001	1983 - 2013	
Portugal	1938 - 2012	1988 - 2012	1990 - 2012		1938 - 1959	1953 - 1974	1991 - 2013
Singapore	1970 - 2008	1986 - 2012	-		1970 - 2008		
Spain	1940 - 2011	1986 - 2012	1987 - 2012	1966-1985	1940 - 2001	2001 - 2013	
Sweden	1920 - 2012	1986 - 2012	1982 - 2012	1926-1981	1906 - 2012		
Switzerland	1930 - 2012	1986 - 2012	1973 - 2012	1923-1972	1930 - 2013	1930 - 2005	
UK	1920 - 2012	1986 - 2012	1965 - 2012	1923-1964	1900 - 2013		
US	1920 - 2012	1962 - 2012	1973 - 2012		1941 - 2013	1918 - 2001	

Appendix Table 3: Probit, OLS, and Negative returns for the Non-financials Index

This table replicates estimates of the Probit, OLS, and non-parametric regression models but for the non-financials equity index. Panel A is analogous to Table 3, Panel B is analogous to Table 4, Panel C is analogous to Table 5, and Panel D is analogous to Table 6. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Observations are over the sample of 20 countries, 1920–2012.

Panel A:

Probit estimates of increased crash likelihood of the non-financials equity index

		1 year ahead			2 years ahead			3 years ahead		
		Crash	Boom	Difference	Crash	Boom	Difference	Crash	Boom	Difference
No controls	Δ (bank credit / GDP)	0.019**	-0.002	0.020**	0.033***	-0.011*	0.044***	0.041**	-0.011	0.052***
	T-stat	[2.42]	[-1.15]	[2.18]	[3.17]	[-1.74]	[2.91]	[2.52]	[-1.12]	[2.72]
	N	867	867	867	440	440	440	282	282	282
No controls	log(market D/P)	-0.050***	0.008	-0.059**	-0.061**	0.006	-0.066**	-0.066**	0.018	-0.085*
	T-stat	[-2.74]	[0.58]	[-2.06]	[-1.97]	[0.17]	[-1.97]	[-2.02]	[0.79]	[-1.76]
	N	867	867	867	440	440	440	282	282	282
With D/P as control	Δ (bank credit / GDP)	0.017	-0.000	0.018	0.033	-0.007	0.040**	0.036**	-0.004	0.040**
	T-stat	[0.13]	[-0.01]	[0.26]	[1.35]	[-1.58]	[2.36]	[2.44]	[-0.52]	[2.07]
	log(market D/P)	-0.049	0.008	-0.057	-0.057	0.004	-0.062*	-0.063**	0.018	-0.080*
	T-stat	[-0.18]	[0.01]	[-0.12]	[-1.06]	[0.35]	[-1.95]	[-1.96]	[0.82]	[-1.68]
	N	867	867	867	440	440	440	282	282	282
With all 5 controls	Δ (bank credit / GDP)	0.012**	0.001	0.011	0.023	-0.003	0.026	0.026	0.003	0.023
(coeff on controls not reported)	T-stat	[2.09]	[0.07]	[0.33]	[0.27]	[-0.03]	[1.49]	[0.99]	[0.16]	[0.08]
	N	867	867	867	440	440	440	282	282	282

Panel B:

OLS estimation of the non-financials equity index

	1 year ahead				2 years ahead				3 years ahead			
Δ (bank credit / GDP)	-0.020**		-0.019**	-0.018**	-0.033**		-0.032**	-0.027**	-0.068***		-0.065***	-0.053**
	[-2.114]		[-1.989]	[-2.094]	[-2.564]		[-2.448]	[-2.282]	[-3.437]		[-3.366]	[-2.449]
log(market D/P)		0.051**	0.050**	0.053***		0.065*	0.062*	0.051		0.073	0.066	0.056
		[2.458]	[2.405]	[2.692]		[1.756]	[1.717]	[1.398]		[1.271]	[1.188]	[1.296]
inflation				-0.508**				-0.326				-0.201
				[-2.283]				[-1.142]				[-0.365]
term spread				0.015				0.028				0.104**
				[0.734]				[0.810]				[2.051]
log(book / market)				0.035*				0.062**				0.068*
				[1.860]				[2.055]				[1.953]
log(I/K)				0.002				-0.004				0.003
				[0.086]				[-0.178]				[0.084]
R^2	0.020	0.033	0.043	0.076	0.036	0.042	0.059	0.084	0.091	0.065	0.106	0.171
Adj. R^2	-0.003	0.01	0.019	0.048	-0.010	-0.004	0.012	0.029	0.021	-0.007	0.034	0.090
N	867	867	867	867	440	440	440	440	282	282	282	282

Panel C:

Non-financials equity index returns subsequent to large credit expansions and contractions

	Threshold in percentiles:	**<2%**	**<5%**	**<10%**	**<25%**	**<50%**	**>50%**	**>75%**	**>90%**	**>95%**	**>98%**
1 year ahead returns	$E[r - r_f]$	.123***	.13***	.073***	.042**	.05**	-.002	-.011	-.032	-.045	-.042
	[t-stat]	[3.408]	[4.742]	[3.071]	[2.063]	[2.377]	[-.049]	[-.267]	[-.523]	[-.665]	[-.724]
	Adj. R^2	.008	.012	.004	.002	.009	.009	.007	.007	.007	.003
	# obs. meeting threshold	44	58	94	210	395	472	273	124	84	48
2 year ahead returns	$E[r - r_f]$	.177*	.153**	.116***	.103***	.089***	.014	-.01	-.047	-.054	-.073
	[t-stat]	[1.823]	[2.211]	[2.67]	[3.105]	[2.814]	[.261]	[-.167]	[-.598]	[-.706]	[-1.041]
	Adj. R^2	.007	.006	.005	.009	.012	.012	.014	.013	.009	.008
	# obs. meeting threshold	20	27	45	107	195	245	141	63	42	25
3 year ahead returns	$E[r - r_f]$	.405***	.3***	.26***	.157***	.169***	-.006	.001	-.086	-.202***	-.232***
	[t-stat]	[3.964]	[3.881]	[3.685]	[3.092]	[3.264]	[-.1]	[.021]	[-1.301]	[-4]	[-36.587]
	Adj. R^2	.031	.02	.023	.012	.042	.042	.013	.021	.031	.02
	# obs. meeting threshold	13	18	29	61	119	163	99	39	20	11

Panel D:

OLS estimation of the non-financials equity index

	1 year ahead			2 years ahead			3 years ahead		
Δ(bank credit / GDP)	-0.019**	-0.019**	-0.001	-0.032**	-0.028**	0.015	-0.065***	-0.060***	-0.014
	[-1.989]	[-1.995]	[-0.049]	[-2.448]	[-2.412]	[0.547]	[-3.366]	[-4.234]	[-0.441]
log(market D/P)	0.050**	0.049**	0.050**	0.062*	0.062*	0.063*	0.066	0.064	0.067
	[2.405]	[2.405]	[2.505]	[1.717]	[1.715]	[1.754]	[1.188]	[1.179]	[1.204]
Δ(bank credit / GDP) x log(market D/P)		0.004			0.026**			0.043*	
		[0.603]			[2.470]			[1.845]	
Δ(bank credit / GDP) x …									
(market D/P 1st quintile dummy)			-0.024			-0.082**			-0.076
			[-1.150]			[-2.387]			[-1.266]
(market D/P 2nd quintile dummy)			-0.018			-0.046			-0.099
			[-0.731]			[-1.265]			[-1.541]
(market D/P 3rd quintile dummy)			-0.039**			-0.052			-0.051
			[-2.554]			[-1.642]			[-0.977]
(market D/P 4th quintile dummy)			-0.010			-0.023			-0.005
			[-0.468]			[-0.630]			[-0.129]
(market D/P 5th quintile dummy)									
R^2	0.043	0.043	0.047	0.059	0.068	0.071	0.106	0.120	0.122
Adj. R^2	0.019	0.018	0.018	0.012	0.018	0.015	0.034	0.046	0.036
N	867	867	867	440	440	440	282	282	282

Appendix Table 4: Test for possible small-sample bias

This table tests for the possibility of small-sample bias using the methodology of Campbell and Yogo (2006). Equations (A1) and (A2) are estimated, and parameter values corresponding to the sample size (N), persistence of bank credit expansion (ρ), and the correlation of its innovations with returns ($\delta = corr(u_{i,t}, \varepsilon_{i,t})$) are reported. Panel A corresponds to bank equity index returns, and Panel B corresponds to non-financials index returns. Observations are over the sample of 20 countries, 1920–2012.

Panel A: Bank equity index returns

Years ahead	Controls?	ρ	δ	N	N * (ρ - 1)
1	N	0.778	0.047	957	-212.45
1	Y	0.778	0.051	957	-212.45
2	N	0.431	0.054	480	-273.12
2	Y	0.431	0.055	480	-273.12
3	N	0.144	-0.018	316	-270.50
3	Y	0.144	-0.002	316	-270.50

Panel B: Non-financials equity index returns

Years ahead	Controls?	ρ	δ	N	N * (ρ - 1)
1	N	0.769	0.016	867	-200.28
1	Y	0.769	0.023	867	-200.28
2	N	0.432	0.027	440	-249.92
2	Y	0.432	0.033	440	-249.92
3	N	0.136	-0.009	282	-243.65
3	Y	0.136	0.001	282	-243.65

Appendix Table 5: Test for possible small-sample bias, country-by-country

This table repeats the test for small sample bias (similar to Appendix Table 4) but on a country-by-country level. Since country fixed effects in panel settings may also cause biased estimates in small samples, we report parameter estimates for the small-sample bias test for each of the 20 countries individually. We find that individual countries' parameters, with only a handful of exceptions, also fall into the parameter region from Campbell and Yogo (2006) for which small-sample bias is not likely to be a concern. The exceptions are for some parameter calculations for Ireland (1- and 2- year ahead returns) and Italy (1-year ahead returns for bank index returns only), given that these countries had unusually large and persistent credit expansions in the 2000s. Observations are over the period 1920–2012.

Country	Type	Years ahead	Controls?	ρ	δ	N	N * (ρ - 1)
Australia	Bank equity returns	1	N	0.83	-0.033	60	-10.26
		1	Y	0.83	-0.035	60	-10.26
		2	N	0.51	0.056	29	-14.15
		2	Y	0.51	0.041	29	-14.15
		3	N	0.19	0.000	19	-15.37
		3	Y	0.19	0.018	19	-15.37
	Non-financial equity returns	1	N	0.85	-0.045	45	-6.62
		1	Y	0.85	0.083	45	-6.62
		2	N	0.55	0.071	24	-10.92
		2	Y	0.55	0.132	24	-10.92
		3	N	0.21	0.058	14	-11.13
		3	Y	0.21	0.084	14	-11.13
Austria	Bank equity returns	1	N	0.55	-0.006	25	-11.25
		1	Y	0.55	0.075	25	-11.25
		2	N	-0.02	-0.003	13	-13.21
		2	Y	-0.02	0.000	13	-13.21
		3	N	-0.44	0.277	8	-11.48
		3	Y	-0.44	-0.013	8	-11.48
	Non-financial equity returns	1	N	0.72	0.011	43	-11.87
		1	Y	0.72	-0.004	43	-11.87
		2	N	0.22	0.021	22	-17.18
		2	Y	0.22	0.017	22	-17.18
		3	N	0.07	-0.047	14	-12.99
		3	Y	0.07	-0.040	14	-12.99
Belgium	Bank equity returns	1	N	0.58	0.060	31	-12.93
		1	Y	0.58	0.119	31	-12.93
		2	N	0.06	0.030	16	-14.99
		2	Y	0.06	0.186	16	-14.99
		3	N	-0.27	0.091	10	-12.74
		3	Y	-0.27	0.177	10	-12.74
	Non-financial equity returns	1	N	0.75	0.054	28	-7.08
		1	Y	0.75	0.188	28	-7.08
		2	N	0.31	0.029	15	-10.31
		2	Y	0.31	0.081	15	-10.31

		3	N	0.07	-0.017	9	-8.40
		3	Y	0.07	0.011	9	-8.40
Canada	Bank equity returns	1	N	0.72	-0.054	59	-16.34
		1	Y	0.72	-0.038	59	-16.34
		2	N	0.42	0.065	29	-16.70
		2	Y	0.42	0.074	29	-16.70
		3	N	0.21	-0.007	19	-14.97
		3	Y	0.21	0.002	19	-14.97
	Non-financial equity returns	1	N	0.75	-0.117	59	-15.05
		1	Y	0.75	-0.115	59	-15.05
		2	N	0.46	0.048	29	-15.72
		2	Y	0.46	0.049	29	-15.72
		3	N	0.31	0.048	19	-13.05
		3	Y	0.31	0.041	19	-13.05
Denmark	Bank equity returns	1	N	0.80	-0.028	50	-9.80
		1	Y	0.80	-0.127	50	-9.80
		2	N	0.49	0.093	24	-12.17
		2	Y	0.49	0.052	24	-12.17
		3	N	0.52	0.106	16	-7.73
		3	Y	0.52	0.082	16	-7.73
	Non-financial equity returns	1	N	0.86	-0.096	38	-5.36
		1	Y	0.86	-0.144	38	-5.36
		2	N	0.47	0.034	18	-9.54
		2	Y	0.47	-0.011	18	-9.54
		3	N	0.24	0.022	12	-9.12
		3	Y	0.24	0.099	12	-9.12
France	Bank equity returns	1	N	0.79	0.079	61	-12.57
		1	Y	0.79	0.081	61	-12.57
		2	N	0.45	0.113	30	-16.56
		2	Y	0.45	0.139	30	-16.56
		3	N	0.18	-0.110	18	-14.85
		3	Y	0.18	-0.016	18	-14.85
	Non-financial equity returns	1	N	0.80	0.084	55	-10.78
		1	Y	0.80	0.150	55	-10.78
		2	N	0.43	0.102	28	-15.96
		2	Y	0.43	0.177	28	-15.96
		3	N	0.18	0.008	17	-13.89
		3	Y	0.18	0.036	17	-13.89
Germany	Bank equity returns	1	N	0.72	-0.011	56	-15.96
		1	Y	0.72	-0.031	56	-15.96
		2	N	0.40	-0.045	27	-16.17
		2	Y	0.40	-0.100	27	-16.17
		3	N	0.15	0.164	17	-14.48
		3	Y	0.15	0.150	17	-14.48
	Non-financial equity returns	1	N	0.72	0.221	56	-15.96
		1	Y	0.72	0.210	56	-15.96
		2	N	0.40	0.095	27	-16.17

		2	Y	0.40	0.053	27	-16.17
		3	N	0.15	0.189	17	-14.48
		3	Y	0.15	0.210	17	-14.48
Ireland	Bank equity returns	1	N	0.91	0.459	31	-2.67
		1	Y	0.91	0.137	31	-2.67
		2	N	0.61	0.305	15	-5.81
		2	Y	0.61	0.199	15	-5.81
		3	N	0.31	0.019	9	-6.19
		3	Y	0.31	-0.221	9	-6.19
	Non-financial equity returns	1	N	0.95	0.239	27	-1.35
		1	Y	0.95	0.076	27	-1.35
		2	N	0.61	0.228	15	-5.81
		2	Y	0.61	0.164	15	-5.81
		3	N	0.31	0.165	9	-6.21
		3	Y	0.31	0.070	9	-6.21
Italy	Bank equity returns	1	N	0.94	0.245	35	-2.21
		1	Y	0.94	0.156	35	-2.21
		2	N	0.72	-0.411	18	-5.06
		2	Y	0.72	-0.621	18	-5.06
		3	N	0.43	-0.108	10	-5.69
		3	Y	0.43	-0.384	10	-5.69
	Non-financial equity returns	1	N	0.80	0.103	46	-9.34
		1	Y	0.80	0.150	46	-9.34
		2	N	0.46	-0.239	24	-12.86
		2	Y	0.46	-0.176	24	-12.86
		3	N	0.14	0.054	13	-11.25
		3	Y	0.14	0.167	13	-11.25
Japan	Bank equity returns	1	N	0.69	0.131	50	-15.40
		1	Y	0.69	0.121	50	-15.40
		2	N	0.15	0.036	25	-21.20
		2	Y	0.15	0.030	25	-21.20
		3	N	-0.08	0.035	16	-17.22
		3	Y	-0.08	0.028	16	-17.22
	Non-financial equity returns	1	N	0.66	0.005	50	-17.00
		1	Y	0.66	0.007	50	-17.00
		2	N	0.13	-0.054	25	-21.75
		2	Y	0.13	-0.024	25	-21.75
		3	N	-0.22	-0.094	16	-19.58
		3	Y	-0.22	0.033	16	-19.58
Korea	Bank equity returns	1	N	0.69	-0.009	25	-7.70
		1	Y	0.69	0.043	25	-7.70
		2	N	0.20	0.096	12	-9.66
		2	Y	0.20	0.124	12	-9.66
		3	N	-0.27	-0.214	8	-10.18
		3	Y	-0.27	-0.142	8	-10.18
	Non-financial equity returns	1	N	0.69	0.138	29	-8.87
		1	Y	0.69	0.127	29	-8.87

		2	N	0.23	0.091	15	-11.63
		2	Y	0.23	0.116	15	-11.63
		3	N	-0.26	-0.109	9	-11.30
		3	Y	-0.26	-0.167	9	-11.30
Netherlands	Bank equity returns	1	N	0.72	0.008	49	-13.62
		1	Y	0.72	0.070	49	-13.62
		2	N	0.17	0.006	24	-19.92
		2	Y	0.17	0.064	24	-19.92
		3	N	0.01	0.009	16	-15.79
		3	Y	0.01	0.007	16	-15.79
	Non-financial equity returns	1	N	0.69	0.353	28	-8.62
		1	Y	0.69	0.329	28	-8.62
		2	N	0.25	-0.001	15	-11.25
		2	Y	0.25	-0.022	15	-11.25
		3	N	0.09	-0.031	9	-8.21
		3	Y	0.09	-0.006	9	-8.21
Norway	Bank equity returns	1	N	0.83	0.092	58	-10.03
		1	Y	0.83	0.139	58	-10.03
		2	N	0.46	0.217	29	-15.69
		2	Y	0.46	0.259	29	-15.69
		3	N	0.28	0.051	19	-13.64
		3	Y	0.28	0.044	19	-13.64
	Non-financial equity returns	1	N	0.85	-0.145	42	-6.43
		1	Y	0.85	-0.168	42	-6.43
		2	N	0.51	0.066	21	-10.21
		2	Y	0.51	0.010	21	-10.21
		3	N	0.28	0.070	14	-10.09
		3	Y	0.28	0.044	14	-10.09
Portugal	Bank equity returns	1	N	0.72	0.063	24	-6.67
		1	Y	0.72	0.067	24	-6.67
		2	N	0.40	-0.240	12	-7.20
		2	Y	0.40	-0.297	12	-7.20
		3	N	0.64	-0.271	8	-2.86
		3	Y	0.64	-0.294	8	-2.86
	Non-financial equity returns	1	N	0.75	-0.064	21	-5.33
		1	Y	0.75	-0.037	21	-5.33
		2	N	0.48	-0.458	10	-5.23
		2	Y	0.48	-0.433	10	-5.23
		3	N	0.45	-0.607	7	-3.87
		3	Y	0.45	-0.087	7	-3.87
Singapore	Bank equity returns	1	N	0.75	0.015	27	-6.78
		1	Y	0.75	-0.013	27	-6.78
		2	N	0.24	0.053	14	-10.67
		2	Y	0.24	0.093	14	-10.67
		3	N	-0.15	-0.062	9	-10.38
		3	Y	-0.15	0.002	9	-10.38
	Non-financial equity returns	1	N	0.62	-0.080	39	-15.02

		1	Y	0.62	0.035	39	-15.02
		2	N	0.32	0.126	19	-12.86
		2	Y	0.32	0.179	19	-12.86
		3	N	-0.10	0.088	12	-13.15
		3	Y	-0.10	0.006	12	-13.15
Spain	Bank equity returns	1	N	0.89	0.135	39	-4.29
		1	Y	0.89	0.156	39	-4.29
		2	N	0.59	0.053	19	-7.83
		2	Y	0.59	-0.060	19	-7.83
		3	N	0.29	0.047	13	-9.26
		3	Y	0.29	0.060	13	-9.26
	Non-financial equity returns	1	N	0.80	0.104	29	-5.77
		1	Y	0.80	0.135	29	-5.77
		2	N	0.53	0.005	13	-6.10
		2	Y	0.53	0.202	13	-6.10
		3	N	0.22	-0.043	10	-7.85
		3	Y	0.22	-0.074	10	-7.85
Sweden	Bank equity returns	1	N	0.79	0.003	54	-11.39
		1	Y	0.79	-0.042	54	-11.39
		2	N	0.45	-0.127	26	-14.38
		2	Y	0.45	-0.118	26	-14.38
		3	N	0.15	-0.104	17	-14.40
		3	Y	0.15	-0.073	17	-14.40
	Non-financial equity returns	1	N	0.79	-0.093	40	-8.52
		1	Y	0.79	-0.053	40	-8.52
		2	N	0.45	-0.084	19	-10.51
		2	Y	0.45	-0.049	19	-10.51
		3	N	0.13	-0.047	13	-11.35
		3	Y	0.13	0.012	13	-11.35
Switzerland	Bank equity returns	1	N	0.70	-0.008	63	-18.71
		1	Y	0.70	-0.014	63	-18.71
		2	N	0.37	0.009	31	-19.41
		2	Y	0.37	-0.009	31	-19.41
		3	N	-0.11	-0.247	19	-21.09
		3	Y	-0.11	-0.188	19	-21.09
	Non-financial equity returns	1	N	0.68	0.046	44	-13.95
		1	Y	0.68	0.014	44	-13.95
		2	N	0.36	0.089	22	-14.04
		2	Y	0.36	0.044	22	-14.04
		3	N	-0.19	0.004	14	-16.60
		3	Y	-0.19	0.025	14	-16.60
U.K.	Bank equity returns	1	N	0.82	-0.029	67	-11.99
		1	Y	0.82	-0.013	67	-11.99
		2	N	0.56	0.028	33	-14.42
		2	Y	0.56	-0.019	33	-14.42
		3	N	0.27	-0.143	21	-15.27
		3	Y	0.27	-0.138	21	-15.27

	Non-financial equity returns	1	N	0.80	-0.084	64	-12.74
		1	Y	0.80	-0.073	64	-12.74
		2	N	0.61	-0.121	32	-12.45
		2	Y	0.61	-0.071	32	-12.45
		3	N	0.52	-0.148	19	-9.22
		3	Y	0.52	-0.024	19	-9.22
U.S.	Bank equity returns	1	N	0.79	-0.106	71	-14.98
		1	Y	0.79	-0.114	71	-14.98
		2	N	0.47	-0.002	35	-18.45
		2	Y	0.47	-0.022	35	-18.45
		3	N	0.01	-0.044	23	-22.89
		3	Y	0.01	-0.015	23	-22.89
	Non-financial equity returns	1	N	0.80	-0.059	70	-14.00
		1	Y	0.80	-0.114	70	-14.00
		2	N	0.55	-0.041	34	-15.44
		2	Y	0.55	-0.049	34	-15.44
		3	N	-0.06	-0.064	20	-21.10
		3	Y	-0.06	-0.042	20	-21.10

Appendix Table 6: "Optimizing" dividend yield as a control variable

This table considers variations of market dividend yield and bank dividend yield as alternative control variables and demonstrates even "optimizing" dividend yield does not meaningfully diminish the magnitude and statistical significance of the coefficient on $\Delta(bank\,credit/GDP)$. This table is similar to Table 4 and estimates in an OLS framework subsequent returns of the bank equity index (top panel) or the non-financials equity index (bottom panel) conditional on $\Delta(bank\,credit/GDP)$ and log dividend yield. The first four columns use market dividend yield; the second four columns use bank dividend yield. Within each set of four columns, the dividend yield measure is the same as in Tables 4 and 6 ("1-qtr") or smoothed over the past 2-, 4-, or 8-quarters. Explanatory variables are in standard deviation units within each country but are standardized at each point in time using only past information to avoid any future-looking bias. *T*-statistics in brackets are computed from standard errors dually clustered on country and time. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Observations are over the sample of 20 countries, 1920–2012.

OLS estimation of the bank equity index (3 yr ahead returns)

	Market D/P				Bank D/P			
	1-qtr	2-qtr smoothed	4-qtr smoothed	8-qtr smoothed	1-qtr	2-qtr smoothed	4-qtr smoothed	8-qtr smoothed
Δ (bank credit / GDP)	-0.110***	-0.111***	-0.112***	-0.112***	-0.119***	-0.116***	-0.115***	-0.115***
	[-3.189]	[-3.642]	[-3.627]	[-3.610]	[-3.609]	[-3.491]	[-3.524]	[-3.561]
log(D/P)	0.048	0.047	0.035	0.032	0.117***	0.136***	0.118***	0.132***
	[0.670]	[1.167]	[0.794]	[0.726]	[4.682]	[5.935]	[5.357]	[6.726]
R^2	0.138	0.139	0.135	0.135	0.194	0.214	0.194	0.195
Adj. R^2	0.067	0.077	0.074	0.073	0.137	0.158	0.137	0.138
N	316	316	316	316	316	316	316	316

OLS estimation of the non-financials equity index (3 yr ahead returns)

	Market D/P				Bank D/P			
	1-qtr	2-qtr smoothed	4-qtr smoothed	8-qtr smoothed	1-qtr	2-qtr smoothed	4-qtr smoothed	8-qtr smoothed
Δ (bank credit / GDP)	-0.065***	-0.066***	-0.067***	-0.067***	-0.075***	-0.072***	-0.071***	-0.071***
	[-3.366]	[-4.050]	[-3.955]	[-3.856]	[-3.772]	[-4.186]	[-4.103]	[-3.934]
log(D/P)	0.066	0.109**	0.113***	0.106***	0.045*	0.041	0.040	0.048
	[1.188]	[2.485]	[2.871]	[2.839]	[1.874]	[1.503]	[1.532]	[1.531]
R^2	0.106	0.126	0.128	0.121	0.105	0.097	0.096	0.098
Adj. R^2	0.034	0.061	0.063	0.056	0.034	0.030	0.029	0.031
N	282	282	282	282	282	282	282	282

Appendix Table 7: Change in credit versus change in GDP

This table decomposes $\Delta(bank\,credit/GDP)$ into $\Delta\log(bank\,credit)$ and $\Delta\log(GDP)$ in Panel A and into $\Delta\log(real\,bank\,credit)$ and $\Delta\log(real\,GDP)$ in Panel B and demonstrates that the main results of the paper are robust to various measures of credit expansion. In addition, this table demonstrates that the negative predictability in returns is not driven by changes in the denominator (GDP) but by changes in the numerator (bank credit). All estimates are from OLS regressions (similar to Table 4), and estimates of coefficients on controls (bank dividend yield, book to market, inflation, term spread, investment to capital) are omitted to save space. Explanatory variables are in standard deviation units within each country but are standardized at each point in time using only past information to avoid any future-looking bias. *T*-statistics in brackets are computed from standard errors dually clustered on country and time. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Observations are over the sample of 20 countries, 1920–2012.

Panel A: OLS estimation of the bank equity index with *nominal* quantities

	1 year ahead				2 years ahead				3 years ahead			
Δ (bank credit / GDP)	-0.032**				-0.060***				-0.114***			
	[-2.146]				[-3.455]				[-3.655]			
Δ log(bank credit)		-0.024	-0.060**	-0.062***		-0.046	-0.124***	-0.119***		-0.106*	-0.234***	-0.219***
		[-1.012]	[-2.011]	[-2.849]		[-1.355]	[-2.993]	[-2.962]		[-1.780]	[-3.329]	[-3.619]
Δ log (GDP)			0.060*	0.079**			0.131**	0.128**			0.204**	0.195**
			[1.878]	[2.488]			[2.074]	[2.269]			[2.341]	[2.497]
Controls	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
R^2	0.028	0.014	0.023	0.053	0.064	0.037	0.063	0.104	0.131	0.073	0.121	0.227
Adj. R^2	0.007	-0.007	0.001	0.026	0.023	-0.005	0.020	0.052	0.072	0.010	0.058	0.158
N	957	957	957	957	480	480	480	480	316	316	316	316

Panel B: OLS estimation of the bank equity index with *real* quantities

	1 year ahead				2 years ahead				3 years ahead			
Δ (bank credit / GDP)	-0.032**				-0.060***				-0.114***			
	[-2.146]				[-3.455]				[-3.655]			
Δ log(bank credit / cpi)		-0.033	-0.058**	-0.059***		-0.068**	-0.116***	-0.111***		-0.145***	-0.208***	-0.198***
		[-1.378]	[-2.335]	[-3.230]		[-2.233]	[-3.268]	[-3.541]		[-2.774]	[-3.468]	[-3.769]
Δ log (GDP / cpi)			0.054	0.063**			0.104	0.111*			0.136	0.158**
			[1.621]	[2.206]			[1.401]	[1.913]			[1.381]	[2.056]
Controls	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
R^2	0.028	0.018	0.028	0.059	0.064	0.049	0.071	0.114	0.131	0.102	0.128	0.237
Adj. R^2	0.007	-0.004	0.006	0.032	0.023	0.008	0.029	0.063	0.072	0.040	0.066	0.168
N	957	953	953	953	480	479	479	479	316	315	315	315

Appendix Table 8: Additional lags of credit expansion in predicting subsequent returns

This table justifies the use of the past *three-year* change in $(bank\,credit/GDP)$ by showing that the strongest predictive power for subsequent returns occurs at the past 1 to 3 year horizons. Specifically, the OLS regressions from Table 4 are re-estimated but now decomposing the three-year change into various lags of one-year changes in bank credit to GDP. The greatest predictive power comes from the 2 and 3 year lags, with the magnitude of the coefficients strongly dropping off at longer lags. This result suggests that three-year horizons are roughly consistent with the frequency of credit cycles. Explanatory variables are in standard deviation units within each country but are standardized at each point in time using only past information to avoid any future-looking bias. *T*-statistics in brackets are computed from standard errors dually clustered on country and time. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Observations are over the sample of 20 countries, 1920–2012.

OLS estimation of the bank equity index

	1 year ahead			2 year ahead			3 year ahead		
Δ (bank credit / GDP) [t,t-3]	-0.032**			-0.060***			-0.114***		
	[-2.146]			[-3.455]			[-3.655]		
Δ (bank credit / GDP) [t,t-1]		0.012	0.01		-0.022	-0.018		-0.055*	-0.037
		[0.620]	[0.665]		[-1.573]	[-0.968]		[-1.844]	[-1.452]
Δ (bank credit / GDP) [t-1,t-2]		-0.036**	-0.039***		-0.036***	-0.042**		-0.096**	-0.100***
		[-2.426]	[-2.814]		[-2.950]	[-2.403]		[-2.210]	[-3.044]
Δ (bank credit / GDP) [t-2,t-3]		-0.037	-0.038*		-0.046*	-0.042*		-0.033	-0.032*
		[-1.535]	[-1.742]		[-1.805]	[-1.864]		[-1.282]	[-1.691]
Δ (bank credit / GDP) [t-3,t-4]		0.007	0.004		-0.019	-0.022		-0.076	-0.079
		[0.501]	[0.290]		[-0.968]	[-1.267]		[-1.463]	[-1.584]
Δ (bank credit / GDP) [t-4,t-5]		-0.01	-0.013		-0.026	-0.025		0.015	0.012
		[-0.852]	[-1.144]		[-0.957]	[-1.036]		[0.404]	[0.327]
Controls	No	No	Yes	No	No	Yes	No	No	Yes
R^2	0.028	0.043	0.076	0.064	0.085	0.13	0.131	0.166	0.271
Adj. R^2	0.007	0.018	0.047	0.023	0.036	0.075	0.072	0.095	0.197
N	957	957	957	480	480	480	316	316	316

Appendix Table 9: Robustness in arithmetic returns

The main analyses of the paper (Tables 3, 4, 5 and 6) are shown to be robust to using arithmetic returns rather than log returns as the dependent variables. Panel A is analogous to Table 3, Panel B is analogous to Table 4, Panel C is analogous to Table 5, and Panel D is analogous to Table 6. *T*-statistics in brackets are computed from standard errors dually clustered on country and time. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Observations are over the sample of 20 countries, 1920–2012.

Panel A: probit estimates of increased crash likelihood of the bank equity index

		1 year ahead			2 years ahead			3 years ahead		
		Crash	Boom	Difference	Crash	Boom	Difference	Crash	Boom	Difference
No controls	Δ (bank credit / GDP)	0.015**	-0.004	0.018	0.015***	0.004	0.011	0.023***	-0.010	0.033***
	T-stat	[2.07]	[-0.44]	[1.58]	[3.21]	[0.40]	[1.16]	[3.29]	[-1.39]	[2.83]
	N	957	957	957	480	480	480	316	316	316
With D/P as control	Δ (bank credit / GDP)	0.015**	-0.005	0.020*	0.015***	0.004	0.012	0.023***	-0.010	0.033***
	T-stat	[2.20]	[-0.58]	[1.78]	[2.97]	[0.38]	[1.13]	[3.17]	[-1.40]	[2.81]
	log(bank D/P)	-0.012	0.015	-0.026*	-0.014	0.017*	-0.030*	-0.011	0.008	-0.019
	T-stat	[-1.15]	[1.48]	[-1.68]	[-1.37]	[1.88]	[-1.86]	[-1.30]	[0.78]	[-1.24]
	N	957	957	957	480	480	480	316	316	316
With all 5 controls	Δ (bank credit / GDP)	0.013***	-0.005	0.018**	0.009	0.006	0.003	0.020**	-0.015***	0.034***
(coeff on controls not reported)	T-stat	[3.00]	[-0.77]	[2.57]	[1.62]	[0.93]	[0.28]	[2.22]	[-2.72]	[2.65]
	N	957	957	957	480	480	480	316	316	316

Panel B: OLS estimation of the bank equity index

	1 year ahead			2 years ahead			3 years ahead		
Δ (bank credit / GDP)	-0.034**	-0.035***	-0.037***	-0.068***	-0.069***	-0.063***	-0.111***	-0.115***	-0.097***
	[-2.566]	[-2.764]	[-3.148]	[-3.760]	[-3.701]	[-3.056]	[-3.785]	[-3.810]	[-3.009]
log(bank D/P)		0.047***	0.045***		0.076***	0.071***		0.099***	0.093***
		[3.212]	[2.645]		[3.504]	[3.119]		[3.325]	[2.632]
inflation			-0.18			0.031			0.084
			[-0.834]			[0.100]			[0.194]
term spread			0.019			0.02			0.127*
			[0.705]			[0.658]			[1.905]
log(book / market)			0.043			0.057			0.116
			[1.216]			[1.272]			[1.378]
log(I/K)			0.02			-0.005			0.018
			[0.986]			[-0.153]			[0.304]
R^2	0.022	0.041	0.052	0.058	0.093	0.103	0.095	0.134	0.193
Adj. R^2	0.001	0.02	0.027	0.017	0.051	0.054	0.033	0.072	0.123
N	957	957	957	480	480	480	316	316	316

Panel C: bank equity index returns subsequent to large credit expansions and contractions

	Threshold in percentiles:	**<2%**	**<5%**	**<10%**	**<25%**	**<50%**	**>50%**	**>75%**	**>90%**	**>95%**	**>98%**
1 year ahead returns	$E[r - r_f]$	.126**	.230***	.160***	.118***	.101***	0.037	0.014	-0.004	-0.012	-0.02
	[t-stat]	[2.544]	[3.811]	[4.284]	[4.372]	[4.093]	[1.001]	[.314]	[-.063]	[-.15]	[-.387]
	Adj. R^2	0.001	0.016	0.009	0.006	0.008	0.008	0.009	0.006	0.004	0.003
	# obs. meeting threshold	51	72	110	235	464	493	271	121	80	44
2 year ahead returns	$E[r - r_f]$	.218**	.380***	.326***	.243***	.179***	0.063	0.023	-0.074	-0.100	-0.083
	[t-stat]	[2.046]	[3.566]	[6.448]	[4.079]	[4.09]	[1.141]	[.34]	[-1.023]	[-1.455]	[-1.418]
	Adj. R^2	0.003	0.027	0.028	0.026	0.017	0.017	0.019	0.027	0.022	0.01
	# obs. meeting threshold	24	35	54	118	227	253	139	60	40	23
3 year ahead returns	$E[r - r_f]$	.357**	.482***	.460***	.362***	.311***	0.056	0.019	-0.094	-.189**	-.323***
	[t-stat]	[2.365]	[4.043]	[3.62]	[5.114]	[3.845]	[.655]	[.204]	[-1.091]	[-2.142]	[-4.925]
	Adj. R^2	0.007	0.026	0.034	0.034	0.052	0.052	0.036	0.032	0.027	0.029
	# obs. meeting threshold	18	25	36	73	147	169	99	38	19	11

Panel D: OLS estimation of the bank equity index

	1 year ahead			2 years ahead			3 years ahead		
Δ(bank credit / GDP)	-0.035***	-0.033**	-0.010	-0.069***	-0.066***	-0.054	-0.115***	-0.105***	-0.087*
	[-2.764]	[-2.561]	[-0.469]	[-3.701]	[-3.542]	[-1.270]	[-3.810]	[-3.238]	[-1.738]
log(bank D/P)	0.047***	0.048***	0.048***	0.076***	0.077***	0.076***	0.099***	0.104***	0.104***
	[3.212]	[3.101]	[3.082]	[3.504]	[3.570]	[3.431]	[3.325]	[3.543]	[3.623]
Δ(bank credit / GDP) x log(bank D/P)		0.010			0.012			0.030*	
		[1.619]			[1.034]			[1.736]	
Δ(bank credit / GDP) x …									
(bank D/P 1st quintile dummy)			-0.050*			-0.056			-0.104
			[-1.864]			[-1.045]			[-1.407]
(bank D/P 2nd quintile dummy)			-0.023			-0.032			-0.013
			[-0.915]			[-0.711]			[-0.139]
(bank D/P 3rd quintile dummy)			-0.024			0.025			-0.029
			[-0.787]			[0.437]			[-0.441]
(bank D/P 4th quintile dummy)			-0.031			-0.010			0.038
			[-1.305]			[-0.251]			[1.151]
(bank D/P 5th quintile dummy)			-			-			-
			-			-			-
R^2	0.041	0.044	0.045	0.093	0.095	0.100	0.134	0.144	0.148
Adj. R^2	0.020	0.021	0.020	0.051	0.052	0.051	0.072	0.080	0.075
N	957	957	957	480	480	480	316	316	316

Appendix Table 10: Disentangling country-specific versus global credit expansion

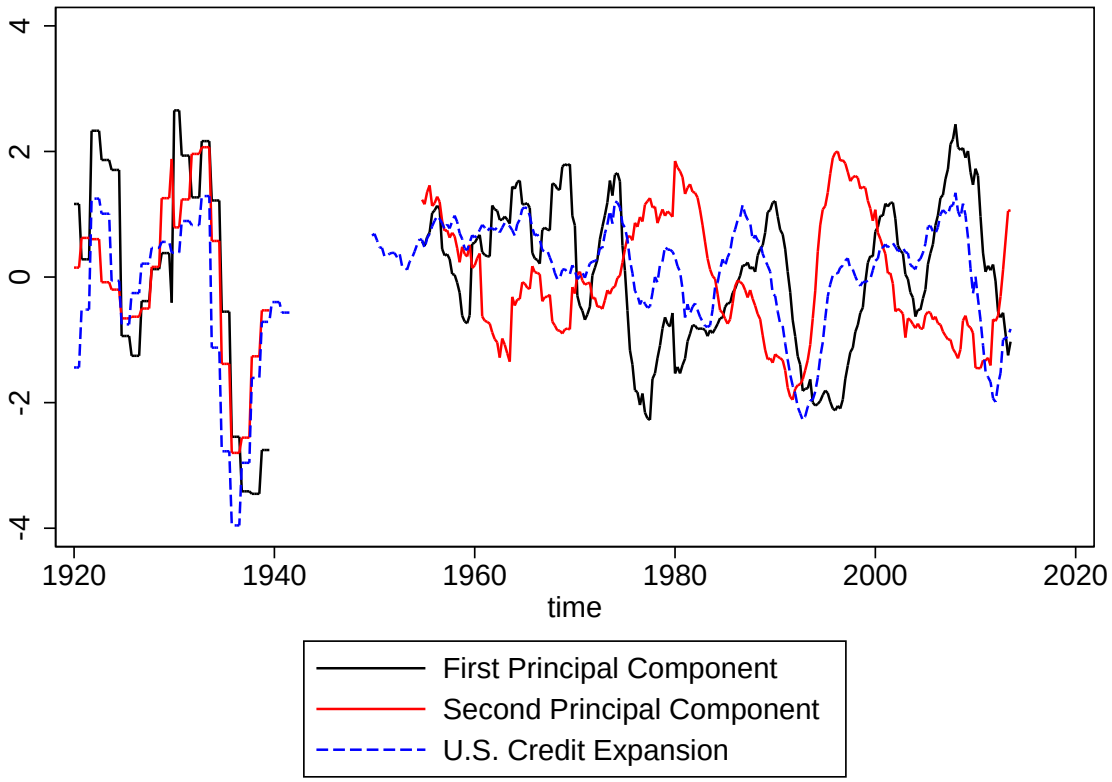
This table shows that the predictive power of credit expansion (i.e. $\Delta(bank\,credit/GDP)$) on subsequent returns is mainly due to country-specific credit expansion and not spillover effects from other countries. To disentangle the effects of local versus global credit expansions, we re-estimate the OLS regressions (similar to Table 4) in Panel A, controlling for U.S. credit expansion, U.S. broker-dealer leverage, and the first principal component of credit expansion across countries. U.S. credit expansion has no predictive power for equity returns in other countries. While U.S. broker-dealer leverage is a significant pricing factor, it does not meaningfully reduce the predictive power of local credit expansion. The first principal component, however, partially reduces the predictive power of local credit expansion, indicating that global spillover may also be important, in addition to domestic credit expansion. The first and second principal components of credit expansion across countries, along with U.S. credit expansion, are plotted in Panel B. Panels C and D replicate Tables 4 and 5 but remove the global component of returns, by adding in time fixed-effects in Table 4 and by first subtracting out global average returns in each quarter in Table 5. This analysis in Panels C and D is arguably too stringent, since it effectively removes global events like the 2007–8 Financial Crisis. In all the tables, explanatory variables are in standard deviation units within each country but are standardized at each point in time using only past information to avoid any future-looking bias. *T*-statistics in brackets are computed from standard errors dually clustered on country and time. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Observations are over the sample of 20 countries, 1920–2012.

Panel A:

OLS estimation of the bank equity index

	1 year ahead					2 years ahead					3 years ahead				
Δ (bank credit / GDP)	-0.032**	-0.031***	-0.046***	-0.015**	-0.029***	-0.060***	-0.055***	-0.081***	-0.029***	-0.039***	-0.114***	-0.090***	-0.142***	-0.076***	-0.099***
	[-2.146]	[-2.765]	[-2.606]	[-2.127]	[-4.944]	[-3.455]	[-3.205]	[-4.337]	[-3.833]	[-3.061]	[-3.655]	[-3.365]	[-5.579]	[-3.381]	[-3.379]
Δ (U.S. bank credit / U.S. GDP)		-0.364			3.236		-1.020			2.532		-5.265			0.127
		[-0.203]			[1.336]		[-0.477]			[0.798]		[-1.504]			[0.037]
Δ (U.S. broker dealer leverage)			-0.004***		-0.003**			-0.008***		-0.009***			-0.005*		-0.000
			[-2.743]		[-2.031]			[-2.621]		[-3.463]			[-1.758]		[-0.098]
First Principal Component				-0.053*	-0.104***				-0.087**	-0.181***				-0.119**	-0.195***
of Δ (bank credit / GDP)				[-1.873]	[-3.490]				[-2.044]	[-4.756]				[-2.102]	[-3.364]
Controls	No	No	No	No	Yes	No	No	No	No	Yes	No	No	No	No	Yes
R^2	0.028	0.028	0.088	0.067	0.189	0.064	0.066	0.131	0.122	0.313	0.131	0.154	0.213	0.201	0.392
Adj. R^2	0.007	0.006	0.061	0.046	0.156	0.023	0.023	0.078	0.082	0.256	0.072	0.094	0.139	0.144	0.314
N	957	957	721	957	721	480	480	363	480	363	316	316	245	316	245

Panel B:


4
2
0
-2
-4
1920
1940
1960
1980
2000
2020
time
First Principal Component
Second Principal Component
U.S. Credit Expansion

Panel C:

OLS estimation of the bank equity index

	1 year ahead				2 years ahead				3 years ahead			
Δ (bank credit / GDP)	-0.032**	-0.018***	-0.020***	-0.022***	-0.060***	-0.031***	-0.033***	-0.032**	-0.114***	-0.072***	-0.078***	-0.074**
	[-2.146]	[-2.626]	[-3.128]	[-2.977]	[-3.455]	[-2.808]	[-3.181]	[-2.439]	[-3.655]	[-2.631]	[-2.700]	[-2.328]
log(bank D/P)			0.028*	0.029*			0.044*	0.042			0.089***	0.087***
			[1.866]	[1.727]			[1.814]	[1.633]			[3.181]	[2.958]
inflation				-0.223				0.264				-0.008
				[-1.441]				[0.780]				[-0.015]
term spread				0.015				0.016				0.059
				[0.903]				[1.116]				[1.369]
log(book / market)				-0.014				-0.002				0.019
				[-0.413]				[-0.041]				[0.281]
log(I/K)				0.028				0.013				0.030
				[1.043]				[0.327]				[0.647]
Time fixed effects?		✓	✓	✓		✓	✓	✓		✓	✓	✓
R^2	0.028	0.485	0.493	0.497	0.064	0.423	0.434	0.436	0.131	0.473	0.504	0.510
Adj. R^2	0.007	0.429	0.437	0.439	0.023	0.345	0.356	0.352	0.072	0.387	0.421	0.419
N	957	957	957	957	480	480	480	480	316	316	316	316

Panel D:

Bank equity index returns subsequent to large credit expansions -- ***after removing global bank equity returns***

	Threshold in percentiles:	**<2%**	**<5%**	**<10%**	**<25%**	**<50%**	**>50%**	**>75%**	**>90%**	**>95%**	**>98%**
1 year ahead returns	E[r - r_f]	.044	.077**	.04*	.019***	.009***	-.008	-.017	-.023	-.017*	-.017
	[t-stat]	[1.077]	[2.228]	[1.919]	[.]	[.]	[-.734]	[-1.481]	[-1.585]	[-1.674]	[-.671]
	Adj. R^2	.002	.008	.004	.002	.001	.001	.002	.001	0	0
	# obs. meeting threshold	51	72	110	235	464	493	271	121	80	44
2 year ahead returns	E[r - r_f]	.016	.095*	.083***	.037***	.015***	-.011	-.024	-.025	-.03	-.009
	[t-stat]	[.267]	[1.719]	[6.68]	[13.543]	[.]	[-.45]	[-.756]	[-.848]	[-1.41]	[-.212]
	Adj. R^2	0	.006	.008	.004	.001	.001	.002	.001	.001	0
	# obs. meeting threshold	24	35	54	118	227	253	139	60	40	23
3 year ahead returns	E[r - r_f]	.095	.15**	.155***	.068***	.053***	-.038	-.044	-.118***	-.166***	-.273***
	[t-stat]	[1.135]	[2.126]	[3.975]	[6.032]	[.]	[-1.081]	[-1.276]	[-2.74]	[-2.669]	[-7.152]
	Adj. R^2	.003	.011	.018	.007	.013	.013	.007	.013	.011	.017
	# obs. meeting threshold	18	25	36	73	147	169	99	38	19	11

Appendix Table 11: Robustness of imputing missing control variables; additional control variables

In the main analyses, missing control variables (dividend yield, book to market, inflation, term spread, investment to capital) are imputed using the mean of the variable for each country. This table compares OLS regressions (similar to Table 4) with and without imputed missing values for control variables and finds that imputing means does not meaningfully change the magnitude or statistical significance of the coefficients on $\Delta(bank\,credit/GDP)$. This table also adds a host of additional control variables (which were excluded from the main analysis due to limit data or minimal predictive power) and shows that adding these variables to the regression does not meaningfully change the magnitude or statistical significance of the coefficients on $\Delta(bank\,credit/GDP)$ or on any of the control variables. *T*-statistics in brackets are computed from standard errors dually clustered on country and time. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Observations are over the sample of 20 countries, 1920–2012.

OLS estimation of the bank equity index

	1 year ahead			2 years ahead			3 years ahead		
	imputed controls		not imputed	imputed controls		not imputed	imputed controls		not imputed
Δ (bank credit / GDP)	-0.035***	-0.037***	-0.048***	-0.057***	-0.056***	-0.082**	-0.106***	-0.099***	-0.122**
	(-2.985)	(-3.241)	(-2.793)	(-3.150)	(-3.688)	(-2.239)	(-3.226)	(-3.377)	(-2.388)
log(bank D/P)	0.042*	0.044*	0.058**	0.067**	0.055***	0.086**	0.115***	0.109***	0.097
	(1.840)	(1.901)	(2.406)	(2.236)	(2.758)	(2.299)	(3.842)	(3.499)	(1.633)
inflation	-0.184	-0.211	-1.044**	-0.011	-0.200	-0.271	0.015	-0.329	0.439
	(-0.970)	(-0.877)	(-2.278)	(-0.040)	(-0.638)	(-0.404)	(0.042)	(-0.991)	(0.366)
term spread	0.019	0.039	0.048	0.024	0.068	0.083	0.099*	0.162**	0.124
	(0.718)	(1.402)	(1.274)	(0.742)	(1.543)	(1.184)	(1.783)	(1.976)	(1.551)
log(book / market)	0.030	0.015	0.056	0.046	0.066	0.051	0.083	0.086	0.042
	(0.792)	(0.395)	(1.546)	(0.782)	(1.397)	(0.986)	(1.037)	(1.368)	(0.530)
log(I/K)	0.015	0.006	0.012	0.002	-0.001	0.007	0.016	0.015	-0.058
	(0.641)	(0.298)	(0.186)	(0.075)	(-0.030)	(0.085)	(0.307)	(0.338)	(-0.633)
3-mo tbill rate		0.043			0.060			0.125	
		(0.820)			(0.823)			(1.004)	
daily volatility		0.033			-0.032			0.052	
		(1.434)			(-0.619)			(0.686)	
real GDP growth		0.005			0.105*			0.064	
		(0.227)			(1.702)			(0.881)	
corporate yield spread		0.004			-0.005			0.051**	
		(0.315)			(-0.285)			(2.094)	
sovereign default spread		0.043			0.050			0.070	
		(1.483)			(1.027)			(1.020)	
R^2	0.057	0.069	0.109	0.104	0.145	0.146	0.233	0.262	0.281
Adj. R^2	0.031	0.039	0.068	0.055	0.088	0.063	0.167	0.184	0.163
N	957	957	516	480	480	261	316	316	164

Appendix Table 12: Bank dividend yield predicts negative returns of the bank equity index

This table is similar to Table 5 but conditions returns on various thresholds of bank dividend yield rather than credit expansion. Specifically, this table reports average log excess returns of the bank equity index subsequent to high values of bank dividend yield (when it exceeds a given percentile threshold) and subsequent to low values of dividend yield (when it falls below a given percentile threshold). These results are also plotted in Appendix Figure 3. Estimates, along with corresponding *t*-statistics and adjusted R^2 values, are computed using regression models (3) and (4) with non-overlapping 1, 2, and 3 years ahead returns. To avoid any future-looking bias, percentile thresholds are calculated for each country and each point in time using only past information. *T*-statistics in brackets are computed from standard errors dually clustered on country and time. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Observations are over the sample of 20 countries, 1920–2012.

Bank equity index returns subsequent to dividend yield exceeding various thresholds

	Threshold in percentiles:	<2%	<5%	<10%	<25%	<50%	>50%	>75%	>90%	>95%	>98%
1 year ahead returns	E[r - r_f]	-.047	-.038	-.056	-.052*	-.029	.059**	.097***	.141***	.152**	.072
	[t-stat]	[-.865]	[-.87]	[-1.512]	[-1.768]	[-.845]	[2.129]	[2.923]	[3.494]	[2.5]	[.815]
	Adj. R^2	.003	.003	.009	.019	.022	.019	.02	.018	.012	.001
	# obs. meeting threshold	79	101	147	296	514	489	232	102	59	32
2 year ahead returns	E[r - r_f]	-.098	-.077	-.075	-.065	-.039	.101**	.124**	.203***	.14	.095
	[t-stat]	[-.815]	[-.721]	[-.799]	[-1.167]	[-.683]	[2.323]	[2.015]	[3.804]	[1.349]	[.711]
	Adj. R^2	.008	.007	.012	.023	.032	.027	.015	.018	.004	.001
	# obs. meeting threshold	38	48	77	147	257	244	119	49	28	17
3 year ahead returns	E[r - r_f]	-.194*	-.143	-.142	-.15	-.082	.148**	.204**	.205*	.175	.046
	[t-stat]	[-1.885]	[-1.199]	[-1.321]	[-1.569]	[-.853]	[2.266]	[2.53]	[1.683]	[1.074]	[.22]
	Adj. R^2	.022	.017	.026	.069	.066	.044	.027	.012	.005	0
	# obs. meeting threshold	31	37	54	106	169	165	70	35	25	14