Corporate Debt Structure and Economic Recoveries

Thomas Grjebine, Urszula Szczerbowicz, Fabien Tripier

PII: S0014-2921(17)30177-0
DOI: 10.1016/j.euroecorev.2017.09.013
Reference: EER 3057

To appear in: *European Economic Review*

Received date: 10 June 2016
Accepted date: 24 September 2017

Please cite this article as: Thomas Grjebine, Urszula Szczerbowicz, Fabien Tripier, Corporate Debt Structure and Economic Recoveries, *European Economic Review* (2017), doi: 10.1016/j.euroecorev.2017.09.013

Corporate Debt Structure and Economic Recoveries [1]

Thomas Grjebine,* Urszula Szczerbowicz† and Fabien Tripier‡

Abstract

This paper analyzes the business cycle behavior of the corporate debt structure and its interaction with economic recovery. The debt structure is measured as the share of bonds in the total credit to non-financial corporations for a quarterly panel of countries over the period 1989-2013. We first show that the substitution of loans for bonds in recoveries is a regular property of business cycles. Secondly, we provide evidence that economies with high bond share and important bond-loan substitution recover from the recessions faster. This identified link between corporate debt structure and business cycles is robust to the inclusion of traditional factors which shape recessions and recovery such as the size and the quality of financial markets, the occurrence of bank crisis, the dynamics of credit, and the distribution of firm size.

Keywords: Corporate Debt; Bonds Markets; Banking; Business Cycles; Recovery; Financial Frictions

JEL classification: E3; E4; G1; G2.

[1]We thank Gunther Capelle-Blancard, Stijn Claessens, Giancarlo Corsetti, Clemens Fuest, Adam Gulan, Jérôme Héricourt, Eleni Iliopulos, Marlène Isoré, Sébastien Jean, Ayhan Kose, Antti Ripatti, Moritz Schularick, Natacha Valla as well as numerous participants at the Banque de France, CEPII-OFCE-DIW-IFO, EconomiX, LUISS Guido Carli, OECD and the University of Helsinki HECER Macroeconomic seminars, 19th T2M conference, 2015 Royal Economic Society conference and 64th annual meeting of the French Economic Association.

*CEPII (thomas.grjebine@cepii.fr)

†Banque de France (urszula.szczerbowicz@banque-france.fr)

‡Paris–Saclay (Univ. Evry, EPEE) & CEPII (fabien.tripier@univ-evry.fr)

1. Introduction

During the Great Recession of 2008-2009, the total credit to the US non financial corporations declined and the structure of corporate debt shifted from bank debt to market debt. This time-varying composition of corporate debt has been stressed by Adrian et al. (2012) and Becker and Ivashina (2014) as essential to understand the transmission of the financial crisis to the non financial sector during the Great Recession in the US economy. Indeed, the issuance of market debt helps firms to mitigate the contraction in the supply of bank debt by troubled banks. These findings support policies designed to develop markets for corporate debt securities, capable of replacing impaired bank lending during recessions, to soften the recession costs.[2] However, beside the recent US experience, business cycle evidence that supports this view is relatively scarce.[3] This paper fills the gap by providing a cross-country study of the business cycle behavior of corporate debt structure. First, we analyze the variations of the corporate debt structure around recessions and find that the firms substitute bank debt by market debt in recoveries. Second, we investigate whether the access to corporate bond finance matters in the aftermath of recessions. We show that the economies with higher share of corporate debt and large substitution from loans to bonds experience shorter and more vigorous recoveries.

Our main measure of the corporate debt structure is the ratio of the amount of bonds issued by non-financial corporations to the total credit provided to them, referred to as "bond share" in the remainder. We use two BIS databases to construct this ratio: the total debt securities issued

[2]The European Commission (2014) claims that "Policy effort is needed in Europe to diversify financing channels. European capital markets are on average relatively underdeveloped and are currently insufficient to fill the funding gap created by bank deleveraging".

[3]Becker and Ivashina (2014) compare the growth rates of market and bank debts at the aggregate level since 1953 but only for the US economy. For the Euro area economy during the Great recession, see De Fiore and Uhlig (2015) and Rodriguez-Palenzuela et al. (2013). Allard and Blavy (2011) study the impact of financial structures on business cycles by comparing recoveries in market-based and bank-based economies. However, they do not take into account variations across time of the financial structures and include equity in the market sources of finance whereas we focus here on corporate debt. In a complementary work, Giesecke et al. (2014) compare the real and financial effects of banking and corporate default crises on GDP, industrial production, and inflation and find that corporate default crises have far fewer real effects than banking crises.

by non-financial corporations and the total credit provided to the non-financial corporations. We use the first series to measure the "bond" financing in the economy, also referred to as market debt in the remainder, and the second to measure the rest of credit which is called "loan", also referred as bank debt in the remainder. Our quarterly panel for corporate debt structure covers twenty three advanced and emerging economies since 1989 for most countries. The bond share ratio is reminiscent of the financing mix between bank loans and commercial papers proposed by Kashyap et al. (1993) to identify credit supply shocks in the bank lending literature.[4]

Business cycles are defined by using the methodology of cyclical turning points developed by Bry and Boschan (1971) and Harding and Pagan (2002). Traditionally, a business cycle is divided into two phases: the recession, between the peak and the subsequent trough, and the expansion, between the trough and the subsequent peak – see Burns and Mitchell (1946). However, there is a growing interest in the literature for another phase of the cycle: the recovery which is the period when the economy recovers the level of activity that occurred before the recession – see among others Bordo and Haubrich (2012) and Fatás and Mihov (2013).

We identify the peaks of real GDP for each country and study the behavior of corporate debt around these peaks. The substitution of bonds for loans, widely described after the Great Recession, is robustly observed in other recoveries of our panel. More precisely, the substitution starts one year after the peak when the economy exits from the recession and enters in the recovery phase. We then test whether important access to bond finance is associated with milder recessions and stronger recoveries. While we find no significant link for the recession phase, the recoveries are related to the country's access to bond financing. The high level of bond share before recession and the large bond share increase after the peak are associated with more vigorous and faster

[4]This work has initiated controversies on the relevance of the Kashyap et al. (1993)'s methodology to identify credit supply shocks. Oliner and Rudebusch (1996) claim that it is a difference between small and large firms that drives the Kashyap et al. (1993)'s evidence. However, the existence of the bank lending channel has been confirmed with detailed micro-data by Becker and Ivashina (2014). Moreover, during the Great Recession credit standards tightened in the Euro area and the US not only for small firms but also for large ones, see the ECB Bank Lending Survey and Senior Loan Officer Opinion Survey on bank lending practices.

recoveries.[5]

Our results complement the large empirical literature on the interactions between financial markets and business cycles – see the influential contributions of Bordo et al. (2001) and Schularick and Taylor (2012). In particular, Claessens et al. (2012) and Jordà et al. (2013) show how the costs of recessions are amplified by the development of financial markets before peaks. We reach a similar conclusion when we include the series of excess credit growth and housing prices as suggested by Claessens et al. (2012) and Jordà et al. (2013). The link identified between the corporate debt structure and recoveries may be a by-product of financial booms, which could modify the composition of corporate debt before recession. To show the existence of a specific effect of corporate debt structure, the occurrence of banking crisis and the series of financial market developments are introduced as controls in our benchmark regressions. We also control for the structural differences between economies using country fixed effects and measures of firm size distribution without altering the main results.

A natural explanation of the role of corporate debt in business cycles is that bond financing replaces impaired bank lending during recoveries and therefore stimulates total credit, investment, and output growth. The role of credit in recoveries is however controversial since Calvo et al. (2006) pointed out the existence of credit-less recoveries, or "phoenix miracles", that is recovery of output without recovery of credit. Actually, we show that the relationship between credit and output growth is affected by the structure of corporate debt. The correlation between total credit and output is stronger in economies where the share of bond in corporate debt is high. Consistently with this interpretation we show that the corporate debt structure is also a key driver of investment dynamics after peaks and that the role of the substitution between bonds and loans

[5]While the theoretical model presented in the Online Appendix proposes a causal explanation of this fact (based on the financial constraints on bank credit supply), it should be emphasized that our empirical result establishes correlation and not causation between corporate debt structure and economic recovery. This finding suggests a potential benefit of market-based finance when compared with bank-based finance in the aftermath of recessions. A full assessment of the relative merits and disadvantages of these two financial systems should naturally include other dimensions of welfare such as economic growth and stability.

is reinforced in the case of bank crisis.

These results are of interest for the theory of corporate finance. In the theoretical literature on the composition of corporate debt, banks are monitoring firms which can alleviate the problem of asymmetric information but at costs that make bank finance more expensive than bond finance. Firms with good characteristics have access to the cheaper market debt because the agency issue is less severe for firms with good reputation in Diamond (1991) or high level of publicly observable capital in Holmstrom and Tirole (1997).[6] Rodriguez-Palenzuela et al. (2013) emphasize the limits of the literature to explain the shift form bank debt to bond debt during the Great Recession. Because an economic crisis deteriorates the fundamentals of firms, for example their net worth, fewer firms should have access to the bond market leading to a shift from market debt to bank debt during bad times and not the opposite. Adrian et al. (2012) and De Fiore and Uhlig (2015) are two recent theoretical contributions that solve this puzzling behavior of corporate debt structure - see also Crouzet (2014) who develops a model where firms use multiple types of debt instruments simultaneously. De Fiore and Uhlig (2015) assume an increase in the information acquisition costs of banks that makes indirect finance more expensive and leads some firms to exit from the banking sector either to abandon production or to be directly financed. In Adrian et al. (2012), it is the leverage of banks that plays a key role in the time-varying composition of corporate debt. The credit supply by banks diminishes during a recession because they have to reduce their exposition to the rising risk of default given a Value-at-Risk constraint. We provide in the Online Appendix an extension of this model consistent with our empirical results. Numerical simulations of the model show that bond share increases not only in recessions, as in Adrian et al. (2012), but also in recoveries due to financial losses, which limit the bank credit supply during recovery. The recovery is slower in a bank-based economy than in a market-based economy.

The remainder is as follows. Section 2 presents the data, describes the business cycle behavior

[6]See Freixas and Rochet (2010) for a survey of the microeconomic literature, De Fiore and Uhlig (2011) for an extension of in general equilibrium.

of the corporate debt structure and shows the interaction between the corporate debt structure and the recovery. Section 3 studies how corporate debt structure interacts with other financial and economic factors which shape recessions and recoveries, such as the development of financial markets, the dynamics of credit and investment, the occurrence of bank crisis, and the distribution of firm size in the economy. Section 4 provides a set of robustness checks of our main results. We show that our results are robust to alternative business cycle dating and to alternative specifications of variables and data samples. Section 5 concludes. An Online Appendix is also available with supplementary empirical results and simulations of a theoretical model consistent with our main conclusions.

2. Corporate debt structure and business cycles

This section presents the data used to measure the corporate debt structure and shows the main cross-country differences in the level of bond financing. Then, we describe the substitution process between bonds and loans over business cycles and show how this process interacts with the GDP dynamics in the aftermath of recessions.

2.1. Data

Our objective is to construct a homogeneous variable that represents the corporate debt structure for several countries over long periods of time. We use two databases published by the BIS to decompose the total credit into loans and bonds. The first database entitled *Long series on credit to private non-financial sectors* provides a measure of the total credit distributed to the non-financial corporations in nominal terms at the quarterly frequency for a large set of countries over the last decades. The definition of total credit used by the BIS is large and encompasses the credit provided by domestic banks and all other sectors of the economy including the non-residents.[7] This series is referred to as "total credit" in the remainder of the paper. Unfortunately, this database

[7] In terms of financial instruments, the total credit covers debt securities and loans. It does not include other financing sources, such as trade credit or financial derivatives.

does not allow the breakdown between loans and debt securities of non financial corporations.[8] In order to isolate the share of debt securities in total credit we use a second BIS database entitled *Debt securities statistics*. The series *Total debt securities by residence of issuer* gives the amount of debt securities denominated in US dollars issued by non-financial corporations. We use the nominal exchange rate to convert this series in national currency. This series is referred to as "bond" (also called "market debt") and the "loan" (also called "bank debt") series is computed as the difference between "total credit" and "bond" when both series are available.[9] The series "bond share", defined as the ratio of bond to total credit, characterize the corporate debt structure.[10] Additional information about variables can be found in Table A.1 in Appendix A.

The final panel encompasses a set of 23 emerging and advanced countries.[11] The panel starts in 1951Q1 for the United-States, in 1989Q1 for ten countries and ends in 2013Q4 for all countries. As the sample starts much earlier for the Unites-States, we check that our results are robust to the exclusion of this country from the panel. Table A.2 reports descriptive statistics for bond share series. On average, debt securities amount to 17% of the total credit of non-financial corporations over the whole period covered. The bond share has been the highest in the United States: with a mean value of 51% and a well developed corporate bond market since the 1950s, the United States is clearly a special case. The second country to rely significantly on bond finance is Singapore, with a mean value of 40%, followed by the United Kingdom, with mean value of 22%. For the 20 other countries, the bond share is on average below 20% with the smallest values (below 5%) in Ireland, Hungary, Sweden, and Spain.

[8]The breakdown is only possible for the whole private non-financial sector and allows separating domestic bank lending from the total credit.

[9]For the US, we use the long series from the Financial accounts of the United States (see Table A.1 for details).

[10] We confront our measure with the Becker and Ivashina (2014)'s firm-level measure for the US. They study the recessions of 1990q4 and 2008q1 and represent the substitution process by a fraction of firms issuing bank loans compared to all firms issuing debt (Bank debt/Total debt). A fall in this share is interpreted as negative shock to the supply of credit by banks. We report their series in the Section III of the Online Appendix and compare it in Figure OA-II with our measure of corporate debt structure.

[11]Australia, Austria, Belgium, Canada, Czech-Republic, Denmark, Finland, France, Germany, Hong-Kong, Hungary, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Singapore, Spain, Sweden, Thailand, the United-Kingdom, and the United States. For our panel of 23 countries, the bond share series comprises 1,840 observations. When we restrict our sample to the two-years period following a peak (see Section 2.2), we get 581 observations.

The determinants of firms' choice between bank debt and bond debt in the long-run is an interesting question that has not been much investigated by the empirical literature when compared with the huge empirical literature on bank-based versus market-based (e.g. equity markets) financial system. To shed some light on this issue, we carry out a cross-country analysis of bond share drivers in Section II of the Online Appendix. Table OA-I in the Online Appendix shows that the size of the economy and financial markets, as reflected by the real GDP and the total market capitalization, is associated with higher bond share. As expected, the quality of enforcement has also a positive effect on the bond share. Indeed, better legal infrastructure helps enforce bondholders' rights in case of default and therefore increases the demand for debt securities. We find finally that bank competition plays a role in bond share determination as firms in countries with more competitive banking markets make less use of bond finance.

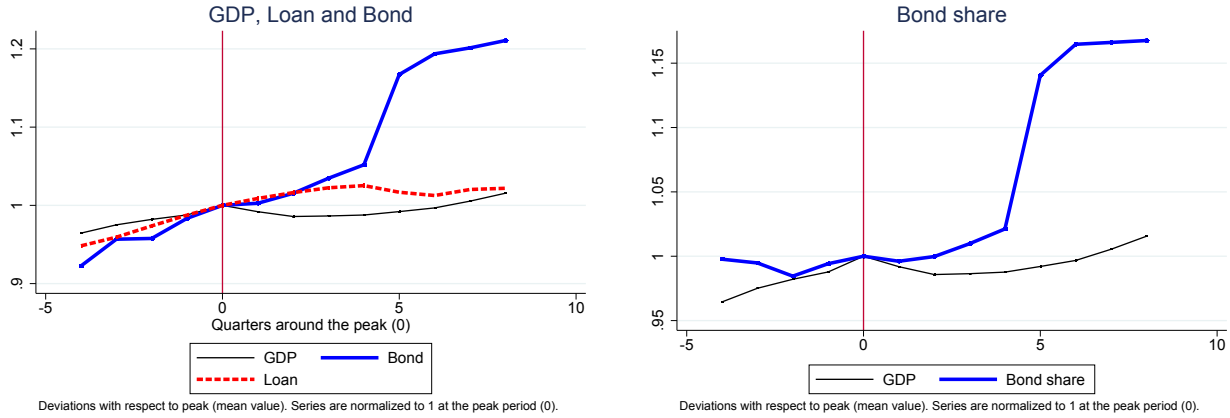
2.2. Substitution between loans and bonds over the business cycle

To show how the corporate debt structure varies over the business cycle, we first define the turning points of business cycles for each country in our panel and then characterize the behavior of corporate debts around these points.

The decisions of the NBER Business Cycle Dating Committee represent a reference for the business cycles chronology in the United States (the CEPR recently adopted a similar methodology for the Euro area as a whole). The Committee defines a recession as "a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales". As this definition cannot be used directly to establish business cycle turning points in a panel of countries, the Harding and Pagan (2002)[12] algorithm became very popular in the empirical literature to define peaks (local maxima) and troughs (minima). This procedure comes closest to translating the NBER's definition into practice - see Section 4.1 for a discussion.

[12]This algorithm constitutes a quarterly implementation of the original algorithm of Bry and Boschan (1971).

Figure 1 – GDP, bonds and loans over the cycle



Deviations with respect to peak (mean value). Series are normalized to 1 at the peak period (0).

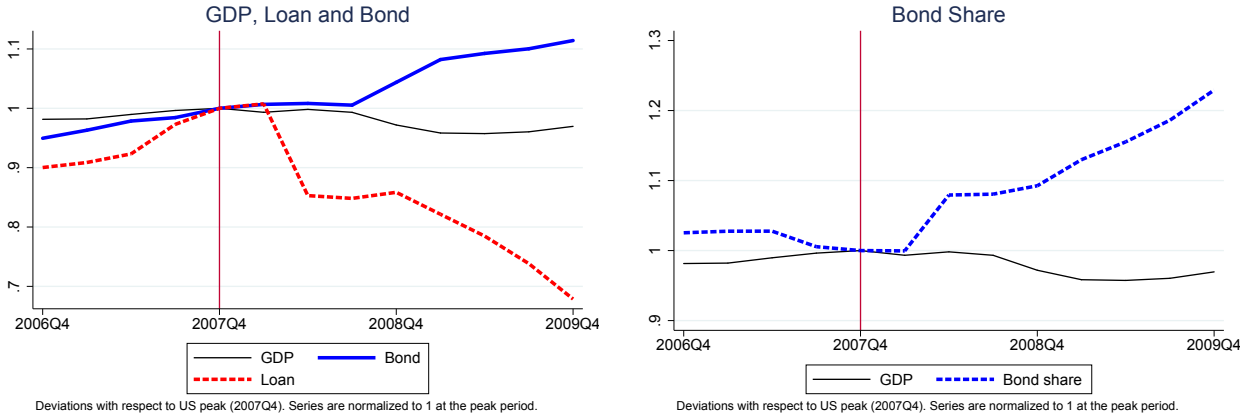
Deviations with respect to peak (mean value). Series are normalized to 1 at the peak period (0).

We apply the algorithm of Harding and Pagan (2002) to identify local maxima (peaks) and minima (troughs) in the log-levels of real GDP in each country of our panel. A cycle is composed of two phases: the recession (or contraction) phase starts after a peak and ends at the trough which initiates the expansion phase up to the next peak. The parameters of the algorithm are fixed such that a full cycle and each of its phase must last at least 5 quarters and 2 quarters, respectively. We adjust the algorithm for Germany imposing the minimum duration of a cycle equal to 6 quarters as we would otherwise observe too many recessions at the beginning of the 2000s.[13] Table A.3 reports the peaks for all countries of the panel. Table A.4 reports the basic features of the business cycles in our panel. We identify 75 recessions and 70 recoveries. A recession lasts on average 4.04 quarters and results in a median output decline of 2.84% (so-called amplitude of a recession). A typical recovery takes 3.92 quarters and is followed by a median output increase of 2.37%. Therefore, in the reminder of the paper, we focus on the years after peaks and interpret the first year as the recession phase and the second year as the recovery phase.

To characterize the business cycle behavior of corporate debts, we define $\hat{x}_{t,k,i} = x_{t,k,i}/x_{0,k,i}$ as the deviation of series x with respect to its value at the peak (the peak date is normalized

[13]We show in the Section V of the Online Appendix that the results are unchanged when the same parameters of the Bry and Boschan (1971) procedure (namely, 5 and 2 quarters) are applied for all countries, i.e. including Germany.

Figure 2 – GDP, bonds and loans in the US Great Recession



to 0) for $t \in [-4:8]$ quarters before or after the peak in country i ($k = 1, \ldots, K$ indexes recessions). To assess the robustness of our results, the growth rates of series are also considered $g_{x,t,k,i}(j) = \log\left(x_{t,k,i}/x_{t-j,k,i}\right)$ where $g_{x,t,k,i}(j)$ is the quarterly growth rate of x for $j = 1$ and its year-to-year growth rate for $j = 4$. We first comment graphically the evolution of series and then employ regression analysis to verify statistical significance of the exhibited patterns.

The left panel of Figure 1 depicts the average deviations of real GDP, bonds and loans for all the peaks of our sample. The growth of real GDP in the expansion phase stops at the peak and then becomes negative during four quarters. Eight quarters after the peak, the economy recovers: the level of real GDP reaches its value of the previous peak. The growth of real bonds and real loans are on average positive before and after the peaks. It is worth mentioning however that series are not detrended. Therefore the slow growth of loans after the peak could also be interpreted as a credit crunch: the cumulative growth of loans is close to 2.1% during the two years after the peak against an annual growth of 4.5% during the year before the peak. It is the opposite for the growth of bonds: the cumulative growth of bond reaches 19.6% during the two years after the peak against an annual growth of 6.6% during the year before the peak. The loan and bond deviations follow a similar pattern in the year before peaks but diverge strongly in the aftermath of recessions. The bond share depicted in the right panel of Figure 1 shows that

the shift in the corporate debt structure occurs during the second year after peaks with a final increase of about 15.8%. Figure 2 shows the same data for the Great Recession in the United States. This recession has been exceptionally severe. Two years after the peak the real GDP has still not recovered its value of 2007Q4, and the fall in loans was particularly drastic (above 30%). Despite these differences, the bond-loan substitution during this recession led to 20% increase in the bond share, close to the 15% increase observed on average in our panel.

To test the statistical significance of the bond-loan substitution after peaks, we regress the series $\hat{x}_{t,k,i}$ on dummy variables Year_j, which are equal to one when t belongs to the year j for the $j = [-1; +1; +2]$ years before or after the peak.[14] To measure to what extent the behavior of the corporate debt structure varies with business cycle phases, the following regression is estimated:

$$\hat{x}_{t,k,i} = \sum_{j=-1, j\neq 0}^{j=2} \delta_j \times \text{Year}_j + \bar{a} + a_i + \epsilon_{t,k,i} \tag{1}$$

where $i = 1, \ldots, N$ indexes countries, $k = 1, \ldots, K$ indexes recessions and j indexes years around peaks. $\bar{a}$ is the constant and a_i are time-invariant country fixed effects. We report two-way clustered standard errors by country and time (Cameron et al. (2008)).

The columns (1)-(3) of Table 1 report the regression coefficients δ_j for the series of bond share, loan, and bond. To check the robustness of our results, the columns (4)-(6) of Table 1 report the regression coefficients using the growth rate of series $g_{x,t,k,i}(4)$ instead of the deviation with respect to the peak value $\hat{x}_{t,k,i}$. During the second year after the peak (namely Year_{+2}), the bond share is significantly higher (at the 1% level of significance) either in deviation or in growth rate, while the dummies for the first year after the peak are not significant (columns (1) and (4)). The year before the peak the bond share increase is either insignificant in growth terms (column (4)) or significant at the 10% level in deviation with respect to the peak. These results indicate that

[14] For example, $\text{Year}_1 = 1$ when $t = [1, 2, 3, 4]$. We group quarterly observations within year variables. To ease the comparison between dummy coefficients, the deviation $\hat{x}_{t,k,i}$ is expressed as the cumulative growth factor between the peak and the date t, that is $\hat{x}_{t,k,i} = x_{t,k,i}/x_{0,k,i}$ for $t > 0$ and $\hat{x}_{t,k,i} = x_{0,k,i}/x_{t,k,i}$ for $t < 0$.

Table 1 – Bond, loan and bond share over business cycles

	(1) BS	(2) Loan	(3) Bond	(4) BS (gr.)	(5) Loan (gr.)	(6) Bond (gr.)	(7) BS (hp)
Year_{+2}	0.146***	0.195**	0.217***	0.077***	-0.045***	0.048***	22.853***
	(0.037)	(0.084)	(0.051)	(0.016)	(0.004)	(0.015)	(8.607)
Year_{+1}	-0.006	0.046	-0.005	0.002	-0.003	-0.004	0.561
	(0.021)	(0.053)	(0.040)	(0.012)	(0.005)	(0.012)	(3.659)
Year_{-1}	0.072*	0.049	0.105**	-0.008	0.010*	-0.001	0.456
	(0.037)	(0.048)	(0.053)	(0.015)	(0.006)	(0.014)	(2.946)
Observations	872	869	866	1,779	2,052	1,808	872
R^2	0.095	0.227	0.095	0.107	0.112	0.085	0.127

Note: Dependent variable: $\hat{x}_{t,k,i}$ = the cumulative growth factor of series x between the peak and the date t for bond share (BS), loan, and bond in Cols. (1)-(3); and $g_{t,k,i}(4)$ = the year-to-year growth rate of bond share (BS), loan, and bond in Cols. (4)-(6) ; the cumulative growth factor of bond share (BS) between the peak and the date t when the bond share series is detrended using a HP filter ($\delta = 400$) in Col. (7). Independent variable: dummy variables Year_j for the $j = [-1; +1; +2]$ years before or after the peak. OLS with robust standard errors clustered by country and time in parentheses. Country fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

the part of bond financing with respect to the bank financing is increasing in recoveries.[15]. Similar results are obtained for the bond series which also increases significantly in Year_{+2} (columns (3) and (6)). The loans on the other hand grow much more slowly after peaks. Their variation with respect to peak is still positive but smaller (column (2)) while the yearly growth rate becomes negative (in Year_{+2} at the 1% level of significance, column (5)).

Note that the substitution process between bank and market debts remains even when we specifically detrend our variables. In column (7) of Table 1, we detrend the bond share series using a HP filter ($\delta = 400$). During the second year after the peak (namely Year_{+2}), the bond share is significantly higher (at the 1% level of significance), while dummies for Year_{+1} and Year_{-1} are not significant. The Section IV in Online Appendix provides additional figures to illustrate this

[15]Given that Handbook on Securities Statistics (HSS) recommends that debt securities holdings should be recorded at market value, it could be that the increase in bond share in recoveries is due to the valuation changes of the debt securities. The BIS debt securities statistics that we use in this paper are in principle harmonised with the HSS recommendations. Nevertheless, in practice only five countries out of twenty three in our sample record the Total debt securities series of NFC at market value (Australia, Denmark, Hungary, Norway, UK, see Reporting practices for domestic and total debt securities). Remaining eighteen countries record them at nominal or face value which substantially reduces the possibility that our results are driven by the securities valuation changes during the recoveries.

business cycle behavior of bond share.

2.3. Substitution between loans and bonds and economic recovery

Having established differences in the business cycle behavior of loans and bonds, we are now interested in the existence of links between the corporate debt structure and the GDP growth after peaks. To test whether the corporate debt structure matters for the shape of business cycle, we estimate the following regression:

$$\log\left(\hat{y}_{t,k,i}\right) = \beta_j \times \log\left(s_{t,k,i}\right) + \Gamma_j \times X_{t,k,i} + \epsilon_{t,k,i} \tag{2}$$

where $i = 1, \ldots, N$ indexes countries, $k = 1, \ldots, K$ indexes recessions and $t = 1, \ldots, 8$ indexes quarters after peaks. $X_{t,k,i}$ includes the constant, time-invariant country fixed effects, time fixed effects and a set of controls introduced in section 3. For each recession k, $\hat{y}_{t,k,i}$ is the deviation of real GDP with respect to the peak value t quarters after the peak in country i and $s_{t,k,i}$ is the contemporary value of bond share. Estimated coefficients for β_j and Γ_j depend on the phase j of the business cycle. Equation (2) is estimated separately for two periods: $j = 1$ corresponds to the first year after the peak, namely Year$_+1$ for $t \in [1, 4]$ and $j = 2$ to the second year after the peak, namely Year$_+2$ for $t \in [5, 8]$. We report two-way clustered standard errors by country and time.

The columns (1) and (2) of Table 2 report the value of the coefficient of interest, β_j, for the first and the second year after the peak (respectively: Year$_{+1}$ for $t \in [1, 4]$ and Year$_{+2}$ for $t \in [5, 8]$). Given the duration of business cycle phases established in Section 2.2, Year$_{+1}$ corresponds to the recession phase and Year$_{+2}$ to the recovery phase. The results differ with the business cycle phase considered. The value of bond share is not significantly correlated with the GDP growth during the first year but the correlation becomes positive and significant (at the 1% level) during the second year. The elasticity of the real GDP deviation with respect to bond share is of about 2%.

We find that the real GDP deviation and bond share are positively correlated during recoveries. The contemporary value of the bond share can be further expressed as the outcome of two factors: the initial value of bond share at the date of the peak and its variation between the peak and the recovery phase. The role of the initial value of bond share is especially important because it characterizes the financial structure of the economy before the peak. The bond-loan substitution after the peak is also a relevant corporate debt structure characteristic. To identify the respective role of the initial bond share and the bond-loan substitution, the contemporary bond share series is decomposed as follows:

$$\log\left(s_{t,k,i}\right) = \log\left(s_{0,k,i}\right) + \log\left(\frac{s_{t,k,i}}{s_{0,k,i}}\right) = \log\left(s_{0,k,i}\right) + \sum_{\tau=0}^{t} g_{s,\tau,k,i}(1) \tag{3}$$

By construction, the value of bond share (taken in log) at time t is equal to its value at the peak $s_{0,k,i}$ plus the sum of its quarterly growth rates $g_{s,\tau,k,i}(1)$ between periods $\tau = 0$ and $\tau = t$. Therefore, the equation (2) is re-estimated using the decomposition of bond share series as suggested by the equation (3):

$$\log\left(\hat{y}_{t,k,i}\right) = \beta_j^1 \times \log\left(s_{0,k,i}\right) + \beta_j^2 \times \left(\sum_{\tau=0}^{t} g_{s,\tau,k,i}(1)\right) + \Gamma_j \times X_{t,k,i} + \epsilon_{t,k,i} \tag{4}$$

The column (3) of Table 2 reports the estimated values of β_j^1 and β_j^2. The two bond share variables are significant at 1% level of significance in the second year. The increase of real GDP with respect to its peak value during the recovery is stronger when both the value of bond share at the peak and its increase after the peak are the higher.

In columns (4) and (5) of Table 2, the equation (4) is re-estimated with initial bond share and bond share variation separately. Both coefficients are significant at 1% level. Finally, we decompose the bond share variation after the peak into bond and loan component to show which one of these two contributing factors is more important for the GDP growth in the second year after the peak. Column (6) shows that the higher bond growth after the peak is associated with stronger

Table 2 – Corporate debt structure and GDP

	(1) GDP *Year 1*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*	(6) GDP *Year 2*
BS	-0.0006	0.0198***				
	(0.0021)	(0.0058)				
BS[0]			0.0193***	0.0156***		0.0200***
			(0.0058)	(0.0060)		(0.0060)
BS[gr.wr.0]			0.0295***		0.0153***	
			(0.0069)		(0.0051)	
Bond/Bond[0] [gr.wr.0]						0.0341***
						(0.0067)
Loan/Loan[0] [gr.wr.0]						0.0276
						(0.0388)
Observations	297	251	251	259	251	238
R^2	0.2348	0.5062	0.5091	0.4683	0.4540	0.5062

Note: Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak for $t = \{1, 2, 3, 4\}$ in Year 1 (Col. (1)) and for $t = \{5, 6, 7, 8\}$ in Year 2 (Cols. (2)-(6)). Independent variables: "BS" means bond share level (in log). "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Bond/Bond[0] [gr.wr.0]" and "Loan/Loan[0] [gr.wr.0]" are the respective variations of bonds and loans compared to the peak period. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

recoveries while contribution of loan variation is not significant.

Figure 3 summarizes the links between the corporate debt structure and real GDP growth established by our regressions. Panel A depicts the deviation of real GDP with respect to the peak value three years after the peak for recessions where the initial value of bond share is high (that is above the mean, see the solid blue line) and for recessions where the initial value of bond share is low (that is below the mean, see the dotted red line) – Panel B describes the same pattern with the year-to-year growth rate of real GDP. Accordingly with our estimation results, Panel A shows that no differences are observed during the beginning of the recession: the two lines are very close during the three first quarters. These results reveal that in Year 1 there is no significant difference between the two recession paths. The blue and red lines diverge afterwards. The expansion phase starts on average three quarters after the peak in economies with high bond share against six quarters in economies with low bond share. The gap is even stronger for the recovery. The economies with low bond share recover eleven quarters after the peak while, at this date, the real GDP in economies with low bond share is about 5% above its peak value. Indeed, the recovery in economies with high bond share occurs earlier, i.e. five quarters after the peak. While the second year after the peak (namely Year 2) corresponds on average to the recovery phase it may still correspond to a recession phase in some economies with low values of bond share. Therefore, we replicate in Table 3 the results from Table 2 without the recession quarters observed in Year_{+2}. When we restrict our attention only to economies in expansion in Year_{+2}, we still find a positive relationship between output and bond share.

In the remainder we will consider separately two alternative timings. In the first, the peak date remains the reference date and we focus on the second year after this date – see Section 3. We do that to investigate differences in postpeak economic performances for a given period after this reference date – in line with Jordà et al. (2013).[16] We aim in particular to assess whether the link

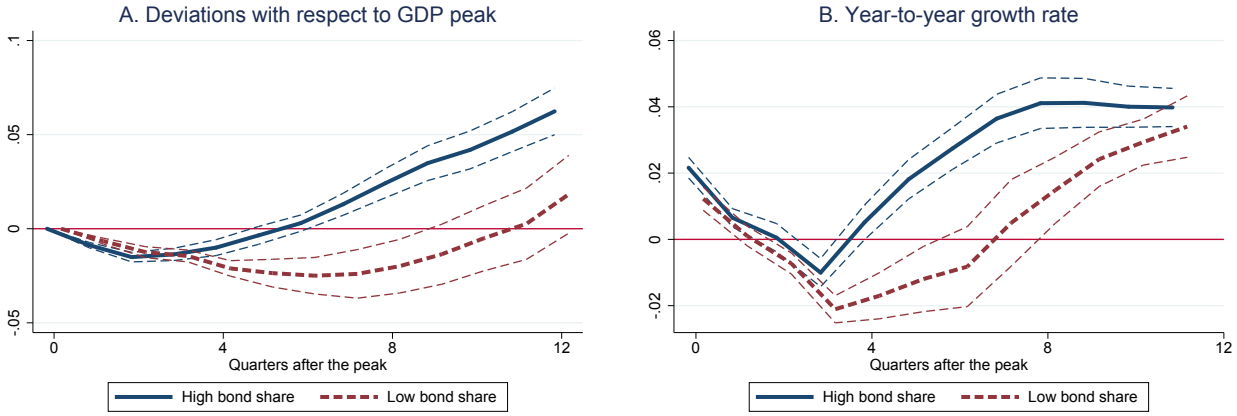
[16] Jordà et al. (2013) track the effects of excess credit on the path of output for several years after the beginning of the recession and study differences in GDP paths year by year.

Table 3 – Focusing on Year 2 for quarters after troughs

	(1) GDP *Year 2*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*
BS	0.0269***				
	(0.0061)				
BS[0]		0.0256***	0.0179**		0.0257***
		(0.0065)	(0.0086)		(0.0067)
BS[gr.wr.0]		0.0394***		0.0216***	
		(0.0085)		(0.0068)	
Bond/Bond[0] [gr.wr.0]					0.0412***
					(0.0090)
Loan/Loan[0] [gr.wr.0]					0.0149
					(0.0500)
Observations	213	213	221	213	203
R^2	0.4733	0.4790	0.4179	0.4174	0.4681

Note: Dependent variable: $\log(\hat{y}_{t,k,i}) =$ the log-deviation of GDP with respect to its level at the peak in Year 2 after the peak. Only economies in expansion in Year 2 are considered. Independent variables: "BS" means bond share level (in log). "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Bond/Bond[0] [gr.wr.0]" and "Loan/Loan[0] [gr.wr.0]" are the respective variations of bonds and loans compared to the peak period. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Figure 3 – Recoveries depending on financial structures



Note: Dependent variable: $\log(\hat{y}_{t,k,i}) =$ the log-deviation of real GDP with respect to its level at the peak (Panel A) and $g_{t,k,i}(4) =$ the year-to-year growth rate of real GDP (Panel B). Independent variable: dummy variables Quarter_j for the $j = [0 : +12]$ quarters after the peak. 90% confidence intervals for OLS with robust standard errors clustered by country and time in parentheses.

between economic growth and bond share identified in this section is robust to the inclusion of numerous factors that characterize the economy at the peak date, as the credit-to-output ratio or the occurrence of a banking crisis. Because these factors can impact both the duration of the recession phase and the dynamic of the economy in the recession and expansion phases, it is important to keep a fixed distance (two years) with respect to the reference period (the peak date). In the second timing, the trough date becomes the reference date and we focus on the years that follow immediately this date – see Section 4.2 in the robustness checks. In this case we can directly assess the link between corporate debt structure and growth when economies exit from recession. In our benchmark specification, we keep the peak as a reference date. Indeed, when we focus on the observations after troughs, we can only consider the growth dynamics among countries that already start to recover, and not the global differences in postpeak economic performances for all economies.

3. On the role of corporate debt structure and other financial and economic variables

This section investigates how the corporate debt structure interacts with other economic and financial variables in shaping economic recoveries. We show that the existence of a link between the structure of corporate debt at the peak of the cycle and output dynamics after this peak is robust to the inclusion of other factors as: the size and quality of financial markets, the occurrence of bank crisis, the dynamic of total credit in the economy, and the distribution of the size of firms.

3.1. Controlling for financial markets developments

We are not the first to highlight the interactions between financial markets and the strength of the recovery. Claessens et al. (2012) and Jordà et al. (2013) are two recent influential contributions that put forward the association of financial markets developments with slower recoveries using different datasets - a long-run dataset for advanced countries in Jordà et al. (2013) and a postwar dataset for advanced and emerging countries in Claessens et al. (2012). Our results for the structure of corporate debt could be a by-product of financial market developments omitted in the previous analysis.

Therefore, we include financial market variables in the regressions to verify the existence of a specific relation between the structure of corporate debt and the GDP growth in recoveries. A first set of variables, in line with Jordà et al. (2013) and Claessens et al. (2012), controls for the development of total private credit of both households and non-financial corporations before and after the recession. More specifically, we consider the ratio of total private credit to GDP at the peak, the rate of change of this ratio, in deviation from its mean, one year before the peak as well as the growth of private credit after the peak. Furthermore, Claessens et al. (2012) show that equity and housing markets also interact with the business cycles. Accordingly, we include in our regression the stock market capitalization and house prices level at the peak as well as the year-to-year growth rate of house prices after the peak.

Table 4 – GDP, corporate debt structure and financial markets

	(1) GDP *Year 2*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*
BS[0]	0.0193***	0.0165***	0.0193***	0.0109*	0.0144*
	(0.0058)	(0.0059)	(0.0071)	(0.0064)	(0.0083)
BS[gr.wr.0]	0.0295***	0.0285***	0.0262***	0.0249***	0.0269***
	(0.0069)	(0.0067)	(0.0073)	(0.0073)	(0.0079)
Market cap.[0]		-0.0032	0.0046	0.0023	0.0060
		(0.0049)	(0.0034)	(0.0047)	(0.0040)
Total credit/GDP[0]		-0.0210*		-0.0287**	
		(0.0114)		(0.0121)	
Total credit/GDP[growth,0]				-0.2479***	-0.2468***
				(0.0539)	(0.0714)
Total credit(growth)				0.2068**	
				(0.0876)	
House prices[0]			-0.0299***		-0.0337***
			(0.0071)		(0.0075)
House Prices(growth)					0.0841
					(0.1000)
Observations	251	226	176	226	176
R^2	0.5091	0.5092	0.5446	0.5644	0.5829

Notes:
Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak in Year 2 after the peak. Independent variables: "BS[0]" is bond share level (in log) at the peak period. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Market cap.[0]" is market capitalization (in log) at the peak period. "Total credit/GDP[0]" is the credit-to-output ratio at the peak period, "Total credit/GDP[growth,0]" is the cumulative growth of this ratio one year before the peak period, and "Total credit (growth)" is the growth rate of credit in Year 2. "House prices[0]" is a price index for housing at the peak period and "House prices(growth)" the growth rate of this index in Year 2. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Table 4 reports the regression coefficients for bond share variables and financial markets development variables. Consistently with the literature, we find that high total credit to GDP ratio at the peak (columns (2) and (4)), high house prices at the peak (columns (3) and (5)) and the total credit growth one year before the peak (columns (4) and (5)) are associated with lower GDP growth in Year 2. However, stock market capitalization at the peak is not significantly correlated to output in our specifications, see columns (2)-(5). Finally, the growth rate of credit after the peak is positively correlated with output (column (4)), which is not the case for house price growth (column (5)). The corporate debt structure variables (initial value and growth rate of bond share) remain positively and significantly correlated with the GDP variation regardless of the regression specification, see columns (2)-(5). Hence, we conclude that there exists a specific interaction between the corporate debt structure and the GDP growth which is independent from the developments on other financial markets.

In Table 4, we included financial market variables in our regressions to control for the size and dynamics of financial markets. The quantitative measures of financial markets, such as the credit to output ratio, may poorly inform about the quality of the financial sector as argued by Beck et al. (2009) and Arellano et al. (2012). We thus introduce the coverage of credit bureau and the bank overhead costs to total assets as measure of the efficiency of the financial system. We also include measures of the quality of institutions in the economy such as the rule of law and the regulatory quality – a complete definition of these variables is given in Table A.1. Table 5 shows that, among these variables, the rule of law (columns (1) and (5)) and bank overhead costs (columns (4) and (5)) are significantly correlated with output growth without altering the significance of the coefficients estimated for the corporate debt structure.

3.2. Banking crisis

According to our results, the weaker recoveries are observed when the value of bond share before the recessions is low. However, it has also been demonstrated that the occurrence of a banking

Table 5 – GDP, corporate debt structure and institutions

	(1) GDP *Year 2*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*
BS[0]	0.0509***	0.0257***	0.0981***	0.0276*	0.1060***
	(0.0095)	(0.0078)	(0.0247)	(0.0142)	(0.0244)
BS[gr.wr.0]	0.0591***	0.0382***	0.1535***	0.0384***	0.1564***
	(0.0084)	(0.0071)	(0.0332)	(0.0113)	(0.0320)
Rule of Law	0.1585***				0.2579***
	(0.0351)				(0.0612)
Regulatory quality		0.0184			0.0819
		(0.0250)			(0.0518)
Private credit bureau coverage			-0.0009*		-0.0002
			(0.0005)		(0.0005)
Bank overhead costs to total assets[0]				-0.0130***	-0.0122**
				(0.0040)	(0.0051)
Observations	182	182	145	170	141
R^2	0.5636	0.5028	0.5729	0.5039	0.7304

Notes: Dependent variable: $\log(\hat{y}_{t,k,i}) =$ the log-deviation of GDP with respect to its level at the peak in Year 2 after the peak. Independent variables: "BS[0]" is bond share level (in log) at the peak period. "BS[gr.wr.0]" is bond share variation with respect to the peak period. The variables "Rule of Law", "Regulatory quality", "Private credit bureau coverage" and "Bank overhead costs to total assets[0]" (at the peak period) are defined in Table A.1. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

crisis during recessions amplifies their economic costs and that the following recoveries tend to be significantly weaker - e.g. Bordo et al. (2001), Dell'Ariccia et al. (2008), Claessens et al. (2012), and Jordà et al. (2011). Then, to assess the existence of specific effects of both factors, namely the structure of corporate debt and the occurrence of bank crisis, we include in our benchmark regression a dummy variable equal to one if a banking crisis occurs during the cycle, using the database of Laeven and Valencia (2013). The column (3) in Table 6 confirms that bank crisis episodes are associated with slower recoveries while our results on the interaction between output and the structure of corporate debt are maintained. Interestingly, when we split the sample according to the occurrence of banking crisis we find that the initial bond share level contributes positively to the strength of the recovery in the sample with bank crisis (column (4)) and without bank crisis (column (5)). However, bond share growth after the peak is only positive and significant in the sample with bank crisis. As we have showed previously, the increase in bond share after the peak is due to the stronger increase in non financial corporations' bond financing and reflects the substitution between bonds and bank lending during recoveries (see Table 2). This substitution is much stronger after recessions with bank crisis than without (see columns (1) and (2) in Table 6). Therefore, the bond share level before the recession is associated with higher GDP growth in recoveries independently on the bank crisis occurrence as opposed to the bond-loan substitution that correlates significantly with the GDP growth only during the recoveries that follow bank crisis. We consider the interaction variables for the two components of our debt structure variable, i.e. the initial bond share level and the bond share deviation with respect to peak. The column (6) in Table 6 shows that the interaction of initial bond share level with the crisis is not significant while the bond-loan substitution has a positive but poorly significant coefficient (17% level).

Table 6 – Bank crisis

	(1) BS	(2) BS	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*	(6) GDP *Year 2*
	with bank crisis	w/o bank crisis		with bank crisis	w/o bank crisis	
Year_{+2}	0.259***	0.054***				
	(0.067)	(0.017)				
Year_{+1}	-0.019	0.003				
	(0.039)	(0.014)				
Year_{-1}	0.014	0.021				
	(0.029)	(0.016)				
BS[0]			0.0153***	0.042**	0.078***	0.014**
			(0.00570)	(0.018)	(0.016)	(0.007)
BS[gr.wr.0]			0.0273***	0.054***	0.011	-0.001
			(0.00639)	(0.015)	(0.019)	(0.023)
Bank Crisis			-0.0242***			-0.020**
			(0.00502)			(0.009)
Bank crisis*BS[0]						0.002
						(0.005)
Bank crisis*BS[gr.wr.0]						0.033
						(0.024)
Observations	380	468	239	115	124	239
R^2	0.144	0.436	0.559	0.626	0.687	0.562

Notes: Cols (1)-(2). Dependent variable: $\hat{s}_{t,k,i}$ = the cumulative growth factor of bond share between the peak and the date t. Independent variable: dummy variables Year_j for the $j = [-1; +1; +2]$ years before or after the peak. Cols (3)-(6) Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak in Year 2 after the peak. Independent variables: "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. Bank crisis is a dummy variable which is equal to one if a bank crisis occurs during the cycle and zero otherwise. "with bank crisis" (Cols. (1) and (4)) and "w/o bank crisis" (Cols. (2) and (5)) restrict the sample to cycles that respectively coincide with and exclude the bank crisis. OLS with robust standard errors clustered by country and time in parentheses. Country fixed effects included in Cols. (1)-(2). Country and time fixed effects included in Cols. (3)-(6). *** p<0.01, ** p<0.05, * p<0.1.

3.3. On the role of credit and investment in economic recovery

The role of credit in economic recovery is controversial since Calvo et al. (2006) pointed out the existence of "phoenix miracles" or creditless recoveries – defined as the recovery of output accomplished without a recovery of credit. In this context, the economic recovery is not driven by the external financing of firms on financial markets but rather by the use of idle capacity of production or trade credit between firms. The identification of such miracles is however highly sensitive to the definition of credit as a stock variable, in deviation with respect to its value at the peak, or as a flow variable, in deviation with respect to its value at the previous period. Biggs et al. (2010) show that the creditless recoveries identified by Calvo et al. (2006) are no longer puzzling when the the flow of new credit is considered instead of the stock of credit as done by Calvo et al. (2006). Consistently with this literature, we investigate the role of credit in the economic recovery for our panel of recessions by considering both its deviation with respect to the peak value and its quarterly growth rate.

Results are reported in Table 7. Firstly, the interaction between GDP and corporate debt structure is robust to the inclusion of credit series both as stock (column (1)) and as a flow (column (5)). Secondly, columns (2) and (6) illustrate the importance of the specification of the credit series. When credit is considered as a stock as in Calvo et al. (2006), the absence of significant correlation between credit and real GDP deviation may support the creditless view of recovery developed by Calvo et al. (2006). But, when credit is considered as a flow, more credit is associated with a stronger recovery of real GDP as in Biggs et al. (2010) and Abiad et al. (2011). Finally, columns (3)-(4) and (7)-(8) suggest that the relationship between credit and output dynamics depends on the structure of corporate debt. If we consider the recoveries where the initial value of bond share is above its average value, the correlation between credit and real GDP becomes significant at the 1% level of significance for both measures of credit (as a stock or as a flow). For recoveries in low bond share economies, the correlation remains not significant for the credit as a stock – see

column (3) – and becomes less strong and less significant for the credit as a flow – see column (7). The link between credit and output is thus stronger in economies with a high bond share than in those with a low value of bond share.

Table 7 – GDP, corporate debt structure and total credit

	(1) GDP *Year 2*	(2) GDP *Year 2*	(3) GDP *Year 2* BS[0] low	(4) GDP *Year 2* BS[0] high	(5) GDP *Year 2*	(6) GDP *Year 2*	(7) GDP *Year 2* BS[0] low	(8) GDP *Year 2* BS[0] high
BS[0]	0.0183***				0.0202***			
	(0.0064)				(0.0059)			
BS[gr.wr.0]	0.0297***				0.0311***			
	(0.0067)				(0.0064)			
Credit	0.1754**	0.0332	-0.0132	0.2807***				
	(0.0883)	(0.0504)	(0.0564)	(0.0367)				
Credit*BS[0]	0.0542*							
	(0.0279)							
Credit(growth)					0.3974*	0.3649***	0.1978**	0.5074***
					(0.2226)	(0.0836)	(0.0823)	(0.1186)
Credit(growth)*BS[0]					0.0571			
					(0.0630)			
Observations	247	363	185	178	248	378	185	193
R^2	0.5148	0.2899	0.5272	0.6277	0.5226	0.3248	0.5396	0.5354

Note: Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak in Year 2 after the peak. Independent variables: "BS[0]" is bond share level (in log) at the peak period. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Credit" is the log-deviation of total credit with respect to its level at the peak and "Credit (growth)" its growth rate in Year 2. "BS[0] low" (Cols. (3) and (7)) and "BS[0] high" (Cols. (4) and (8)) restrict the sample to economies respectively below and above the mean value of BS[0]. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

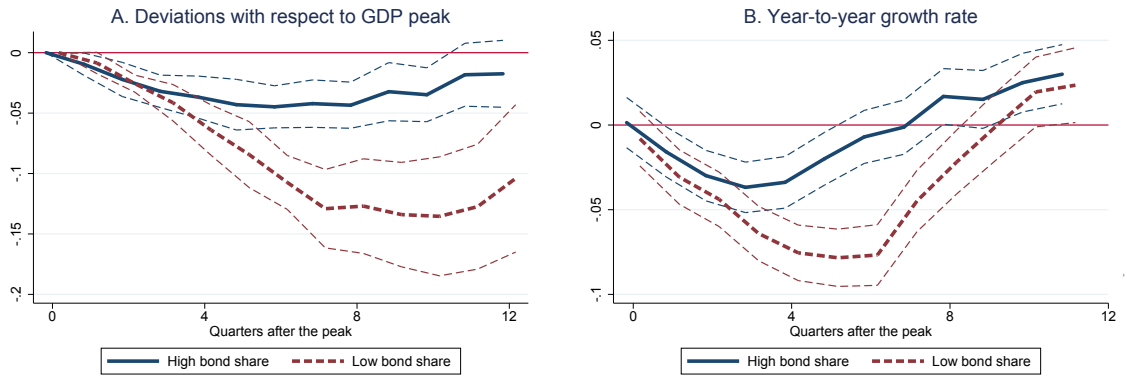
If bond share interacts with output trough the amount of credit in the economy, it is sensible to expect that bond share interacts equally with investment since new credit is used by non-financial corporations as an external source of investment financing. We reproduce our main regressions by considering the deviation of real investment instead of real GDP. Table 8 and Figure 4 exhibit strong positive correlation between the share of bonds in total credit and real investment during the second year after the peak – Panel A depicts the deviation of real investment with respect to the peak value and Panel B the year-to-year growth rate of real investment. The economies with higher initial bond share and higher bond share variation after the peak experience not only

Table 8 – Investment and corporate debt structure

	(1) Inv. *Year 1*	(2) Inv. *Year 2*	(3) Inv. *Year 2*	(4) Inv. *Year 2*	(5) Inv. *Year 2*	(6) Inv. *Year 2*
BS	-0.0074	0.0364***				
	(0.0055)	(0.0101)				
BS[0]			0.0283***	0.0013		0.0336***
			(0.0102)	(0.0127)		(0.0080)
BS[gr.wr.0]			0.1033***		0.0820***	
			(0.0138)		(0.0124)	
Bond/Bond[0] [gr.wr.0]						0.1172***
						(0.0137)
Loan/Loan[0] [gr.wr.0]						0.0851
						(0.1207)
Observations	259	219	219	227	219	210
R^2	0.4495	0.4635	0.4916	0.4215	0.4825	0.4916

Note: Dependent variable: $\log(\hat{y}_{t,k,i}) =$ the log-deviation of real investment ("Inv.") with respect to its level at the peak for $t = \{1, 2, 3, 4\}$ in Year 1 (Col. (1)) and for $t = \{5, 6, 7, 8\}$ in Year 2 (Cols. (2)-(6)). Independent variables: "BS" means bond share level (in log). "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Bond/Bond[0] [gr.wr.0]" and "Loan/Loan[0] [gr.wr.0]" are the respective variations of bonds and loans compared to the peak period. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Figure 4 – Investment recoveries depending on financial structures



Note: Dependent variable: $\log(\hat{x}_{t,k,i}) =$ the log-deviation of real Investment with respect to its level at the peak (Panel A) and $g_{t,k,i}(4) =$ the year-to-year growth rate of real Investment (Panel B). Independent variable: dummy variables Quarter_j for the $j = [0 : +12]$ quarters after the peak. 90% confidence intervals for OLS with robust standard errors clustered by country and time in parentheses.

higher GDP but also higher investment.

3.4. Firm size

It is a well-established fact in corporate finance that there exists a positive relation between the firm size and the access to debt markets. Indeed, small firms rely almost exclusively on bank finance while large firms finance themselves also by issuing debt securities. Therefore, the positive interaction between output dynamics and bond share that we found in previous sections may be the consequence of the firm size structure: in an economy with a large share of small firms, the bond share is low because these firms rely on banking finance and the recovery is weak because small firms are more fragile than large firms. Unfortunately, measures of the firm size are scarce and unavailable over a long period of time - see Poschke (2014) for a recent attempt to measure the firm size distribution across countries and Becker and Ivashina (2014) for a firm-level measure of substitution between bonds and loans.

In the absence of time varying measures of firm size distribution consistent with the period of our panel, we use time-invariant measures of firm size distribution and remove the country fixed effects from our benchmark regression to assess their specific impacts. The firm size distribution is

characterized by the share of large firms (with more than 250 employees) in the total value added of the economy. Three measures of this share are considered. The first two measures are taken from the same source, the OECD database, but for two different years 2007 and 2011 to make sure that our results are not dependent on the selected year of observation. The third measure uses another source, the Amadeus database, to check the robustness of our results to the choice of the database. Columns (8)-(9) in Table 9 confirm our intuition: economic growth is higher in economies where the share of value added realized by large firms is higher. Columns (1)-(3) show however that the correlation between growth and firm size distribution is weaker when the structure of the corporate debt is taken into account while the significance of the bond share is maintained. Interestingly, the correlation of corporate debt structure with growth is reinforced when an interaction term with firm size is introduced in columns (4)-(6). The interaction term suggests that the larger is the relative share of large firms, the higher is the positive correlation between output dynamics and the initial value of bond share.

Table 9 – GDP, corporate debt structure and firm size

	(1) GDP *Year 2*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*	(6) GDP *Year 2*	(7) GDP *Year 2*	(8) GDP *Year 2*	(9) GDP *Year 2*
BS[0]	0.0107***	0.0095***	0.0067**	0.0223***	0.0313***	0.0131***			
	(0.0024)	(0.0024)	(0.0027)	(0.0073)	(0.0111)	(0.0026)			
BS[gr.wr.0]	0.0180***	0.0182***	0.0202	0.0142***	0.0124***	0.0221			
	(0.0041)	(0.0044)	(0.0145)	(0.0044)	(0.0047)	(0.0149)			
Firms 250+(2007-OECD)	0.0000			0.0422*			-0.0037		
	(0.0090)			(0.0239)			(0.0144)		
Firms 250+(2011-OECD)		0.0106			0.0567**			0.0281***	
		(0.0100)			(0.0229)			(0.0083)	
Firms 250+(2014-Amadeus)			0.0026**			0.0115***			0.0048***
			(0.0013)			(0.0030)			(0.0012)
Firms 250+(2007-OECD)*BS[0]				0.0157**					
				(0.0078)					
Firms 250+(2011-OECD)*BS[0]					0.0239**				
					(0.0108)				
Firms 250+(2014-Amadeus)*BS[0]						0.0075***			
						(0.0019)			
Observations	223	223	189	223	223	189	232	232	194
R^2	0.1216	0.1264	0.1468	0.1340	0.1453	0.2080	0.0092	0.0752	0.1045

Note: Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak in Year 2 after the peak.
Independent variables: "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Firms 250+" is the share of large firms (250+ employees) in total value added measured in 2007, 2011 and 2014. Data for 2007 and 2011 are taken from OECD (Entrepreneurship at a Glance), data for 2014 from Amadeus. OLS with robust standard errors clustered by country and time in parentheses. Time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

ACCEPTED MANUSCRIPT

4. Robustness checks

This section summarizes a set of robustness checks of our main results. We first consider the robustness of the results to our dating methodology. To that end, the main regressions are replicated for alternative chronologies of business cycles. We also study the behavior of the economy in the quarters that follow the troughs of business cycles. We then implement heteroscedasticity-based estimations. Finally, alternative specifications are introduced for the key variables of our analysis (the dynamics of real GDP and the measure of bond share before peaks) and then alternative data samples are considered.

4.1. Alternative business cycle dating

Establishing a chronology for business cycles turning points is an essential element of our analysis. In this section, we discuss our business cycle dating methodology and compare the outcome (i.e. peak dates and estimation results) with other available sources and the existing literature. In Table OA-II of the Online Appendix we compare the peaks in our paper to those of NBER, Economic Cycle Research Institute (ECRI), and Datastream. For the United States, our peaks follow closely those of the NBER: we capture nine out of the ten US peaks with the exception of the 2001 recession. For other countries, our business cycle dating is close the dates provided by Datastream and ECRI.

We then consider alternative business cycle chronologies as robustness checks. Among external sources, ECRI is a natural candidate, frequently used in the literature[17] as it aims to reproduce the NBER procedure for other countries. The shortcoming of the ECRI database is that peaks are provided for a limited number of countries of our panel. Therefore, we also consider the business cycle dating proposed by Claessens et al. (2012)[18], which covers all the countries of our sample.

[17] See for instance Brinca et al. (2016), Ohanian and Raffo (2012), Canova et al. (2012), Carrillo-Tudela et al. (2016) to cite a few who use this database.
[18] We thank Stjin Claessens for sharing the updated database with us.

To assess the robustness of our results, we investigate two alternative chronologies. In the first, we use the ECRI database and complete the ECRI missing countries' peaks with Claessens et al. (2012)'s peaks, and in the second we consider Claessens et al. (2012)'s peaks for all countries. Our main results are maintained - see Tables A.5 and A.6. In both cases, columns (1) confirm the increase in bond share during the second year after the peak while columns (2)-(5) the link established in the previous sections between the corporate debt structure and GDP dynamics after a peak.

We report in the Section V of the Online Appendix two additional robustness checks. Firstly, we report the results when the same parameters of the Bry and Boschan (1971) procedure (namely, a full cycle and each phase must last at least 5 quarters and 2 quarters) are applied for all countries, i.e. including Germany. Secondly, we apply an additional condition to our benchmark business cycle dating to be sure that our results hold even if we exclude the very small recessions from the sample. More precisely, we drop the recessions when their amplitude is smaller than the smallest recession recorded by the NBER for the US economy – this removes eleven recessions from our database. Our main results are maintained in the two robustness checks – see Tables OA-III and OA-IV in the Online Appendix.

4.2. Recoveries after trough

In our main specification we investigate the differences in countries' postpeak economic performances during two years after a peak, and based on the business cycle statistics we interpret the second year as a recovery. Yet, the exact dates of the trough differ for each economy. Therefore, there may be cases where the economy is still in a recession phase in the second year after the peak. In section 2.3, we show that our main results are unchanged when we restrict our sample to the economies in recovery during the second year after peaks - see Table 3. In this section, we go further by considering explicitly the quarters that follow the troughs identified in Section 2. Firstly, we confirm the substitution between bonds and loans during the recovery. The Figure

OA-IV in the Online Appendix shows the dynamics of bond share following a trough. The annual growth rate of bond share is positive and significantly different from zero at the 10% level for the first six quarters. After two years, it becomes negative suggesting a return of bond share to its long-run level. Secondly, we confirm the interaction between the dynamics of real GDP and the initial value of bond share. Indeed, the Table A.7 reproduces the main results of Table 4 with the exact start of the recovery, i.e. after the trough. It confirms the positive association of the initial value of bond share and the real GDP growth during the economic recovery.

4.3. Heteroscedasticity-based identification

Regressions in Section 3 show significant correlation between corporate debt structure and economic recovery even if we control for country fixed-effects and for other financial market developments. Moreover, the use of bond share level at the peak and before the peak[19] limits the reverse causality problems. However, OLS estimators may not be consistent because of the remaining omitted variable bias, the reverse causation from growth to corporate debt structure, and measurement issues of variables. To correct for endogeneity, we follow the identification strategy based on the presence of heteroskedasticity in the regression's residuals recently proposed by Arcand et al. (2015). The interest of this methodology originally developed by Rigobon (2003) and Lewbel (2012) is to improve the identification of causal relationships even in the absence of external instruments - see Section VI of the Online Appendix for details on the identification strategy. Table A.8 reports the estimates of the model of Table 4 (column (4)) using identification through heteroskedasticity. We instrument the initial bond share in columns (1) and (2), and both the initial value of bond share and its cumulative growth in columns (3) and (4). As in the OLS estimations of Table 4, we find a positive and robust relationship between bond share variables and GDP during the recovery. The coefficients associated with bond share are precisely estimated for columns (1) to (4), suggesting that $\mathrm{cov}\,(X, \varepsilon_2^2)$ is not close to zero and the Hansen's J test

[19] See Table A.12 discussed in Subsection 4.4.

fails to reject the over-identifying restrictions at the 5% confidence level.

4.4. Alternative specifications of variables and data samples

Dynamic panel data estimations. Given the persistence of the principal dependent variable, the real GDP, we propose in Table A.9 to estimate a dynamic panel model with lagged dependent variable as a regressor following Blundell and Bond (1998).[20] We consider alternatively 4, 6 or 8 lags for the instruments in columns (1), (3) and (5) and add control variables as additional instruments in columns (2), (4) and (6). The Sargan test confirms the validity of the control variables as instruments independently on the number of lags. Overall, real GDP is indeed correlated with its past value, but the inclusion of this variable does not modify our main results.

Growth rate of real GDP. The dynamics of real GDP is measured by its log-deviation with respect to the peak value. To assess the robustness of the results, we replicate our main empirical analysis considering the growth rates of real GDP instead of the log-deviation which is actually the cumulative sum of the growth rates. Tables A.10 and A.11 replicate Tables 2 and 4, respectively, and confirm the patterns exhibited in Sections 2 and 3.

Bond share initial values. The initial value of bond share is robustly correlated with economic recovery in all our regressions. To check that this result is not specific to the selected date of the peak, we test alternative periods for the initial bond share value. Table A.12 of the Appendix presents the correlation of the GDP deviation after the peak (panel A) and the GDP growth (panel B) with alternative measures of bond share level: the average value of the bond share four quarters before and four quarters after the peak, as well as the average deviation of the bond share with respect to its mean value four quarters before and four quarters after the peak. The results show that the behavior of GDP is similar for all alternative periods of initial bond share value.

[20] As explained by Roodman (2009), Blundell and Bond (1998)'s estimator allows the parameters of time-invariant explanatory variables to be identified.

Excluding the United States. The United States is a special case in our panel because the series for this economy starts earlier (1951 against after 1989 for the other economies) and the share of bonds in its corporate debt structure is the highest. Table A.13 replicates the Table 4 while excluding the United States from the panel data. It shows that our results do not depend on the presence of this special economy in our panel.

Excluding the Great Recession. The Great Recession that started in the end of 2007 in the United States and then propagated to most countries of our panel can be considered as exceptional compared with other recessions. It is then important to assess whatever our results are entirely driven by this event. Table A.14 replicates the Table 4 while excluding the 2008 recession year from the panel data. It shows that our results do not depend on the presence of this special recession in our panel.

Balanced Panel. In addition to Tables A.13 and A.14 that exclude respectively the United States and the Great Recession, we replicate our main results for the balanced panel in Table A.15. Our results are maintained. In columns (1) and (2), we restrict the sample to all observations after the year 1989 as it is the starting date for ten countries in our sample. In columns (3) and (4), we propose a balanced panel for the years 1997-2013.

5. Conclusion

The recent crisis has renewed the need for understanding the links between financial markets and business cycles. In this paper, we contribute to this literature by showing the importance of the structure of corporate debt. We show that the substitution between bonds and bank loans is a regular feature of business cycles and this process is relevant for macroeconomic performance. The economies with higher share of bonds in corporate debt experience stronger recoveries.

We have investigated the potential links between the corporate debt structure and other characteristics of the economy and financial markets. Taking into account several measures of financial

markets development, we have highlighted a role of corporate debt structure which is independent from traditional indicators of financial markets development including the credit-to-output ratio, the market capitalization, housing prices, and institutional features of the financial system. We have also identified factors which reinforce the link between corporate debt structure and economic growth such as the occurrence of banking crisis, the growth of credit, and the distribution of firm size in the economy. In the Online Appendix, we propose a stylized model qualitatively consistent with our findings. Further research should be conducted to assess the relevance of quantitative business cycle models of corporate finance to account for empirical facts described in this paper.

Our findings seem also relevant for the economic policy design, especially in advanced economies such as the Euro area where the corporate debt markets are less developed. Indeed, the policies aimed at developing corporate debt markets could be a useful complement to bank recapitalization policies. However, developments of bond markets are not without risks. They can lead to market failures with deleterious consequences on the real economy, as described by Krishnamurthy (2010) for the Great Recession.

References

Abiad, A., Li, B. G., and Dell'Ariccia, G. (2011). Creditless recoveries. IMF Working Papers, pages 1–30.

Adrian, T., Colla, P., and Shin, H. S. (2012). Which financial frictions? parsing the evidence from the financial crisis of 2007 to 2009. In NBER Macroeconomics Annual 2012, Volume 27, pages 159–214. University of Chicago Press.

Allard, J. and Blavy, R. (2011). Market Phoenixes and Banking Ducks Are Recoveries Faster in Market Based Financial Systems? IMF Working Papers 11/213, International Monetary Fund.

Arcand, J.-L., Berkes, E., and Panizza, U. (2015). Too much finance? Journal of Economic Growth, Volume 20(Issue 2).

Arellano, C., Bai, Y., and Zhang, J. (2012). Firm dynamics and financial development. Journal of Monetary Economics, 59(6):533–549.

Beck, T., Demirguc-Kunt, A., and Levine, R. (2009). Financial institutions and markets across countries and over time - data and analysis. Policy Research Working Paper Series 4943, The World Bank.

Becker, B. and Ivashina, V. (2014). Cyclicality of credit supply: Firm level evidence. Journal of Monetary Economics, 62:76–93.

Biggs, M., Mayer, T., and Pick, A. (2010). Credit and Economic Recovery: Demystifying Phoenix Miracles. Available at SSRN 1595980.

Blundell, R. and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. Journal of econometrics, 87(1):115–143.

Bordo, M., Eichengreen, B., Klingebiel, D., and Martinez-Peria, M. S. (2001). Is the crisis problem growing more severe? Economic policy, 16(32):51–82.

Bordo, M. D. and Haubrich, J. G. (2012). Deep Recessions, Fast Recoveries, and Financial Crises:

Evidence from the American Record. Working Paper 18194, National Bureau of Economic Research.

Brinca, P., Chari, V., Kehoe, P., and McGrattan, E. (2016). Accounting for business cycles. Handbook of Macroeconomics by John B. Taylor and Harald Uhlig, 2:1013 – 1063.

Bry, G. and Boschan, C. (1971). Programmed selection of cyclical turning points. In Cyclical Analysis of Time Series: Selected Procedures and Computer Programs, pages 7–63. UMI.

Burns, A. F. and Mitchell, W. C. (1946). Measuring business cycles. NBER Books.

Calvo, G. A., Izquierdo, A., and Talvi, E. (2006). Sudden stops and phoenix miracles in emerging markets. The American economic review, 96(2):405–410.

Cameron, A. C., Gelbach, J. B., and Miller, D. L. (2008). Bootstrap-based improvements for inference with clustered errors. The Review of Economics and Statistics, 90(3):414–427.

Canova, F., Ciccarelli, M., and Ortega, E. (2012). Do institutional changes affect business cycles? evidence from europe. Journal of Economic Dynamics and Control, 36(10):1520 – 1533.

Carrillo-Tudela, C., Hobijn, B., She, P., and Visschers, L. (2016). The extent and cyclicality of career changes: Evidence for the u.k. European Economic Review, 84:18 – 41. European Labor Market Issues.

Claessens, S., Kose, M. A., and Terrones, M. E. (2012). How do business and financial cycles interact? Journal of International Economics, 87(1):178–190.

Crouzet, N. (2014). Corporate debt structure and the macroeconomy. In Annual Meeting of the American Economic Association, Philadelphia, pages 3–5.

De Fiore, F. and Uhlig, H. (2011). Bank Finance versus Bond Finance. Journal of Money, Credit and Banking, 43(7):1399–1421.

De Fiore, F. and Uhlig, H. (2015). Corporate debt structure and the financial crisis. Journal of Money, Credit and Banking, 47(8):1571–1598.

Dell'Ariccia, G., Detragiache, E., and Rajan, R. (2008). The real effect of banking crises. Journal

of Financial Intermediation, 17(1):89–112.

Diamond, D. (1991). Monitoring and reputation: The choice between bank loans and directly placed debt. Journal of political Economy, 99(4):689–721.

European Commission (2014). Communication from the Commission to the European Parliament and the Council on Long-Term Financing of the European Economy. COM(2014) 168 final.

Fatás, A. and Mihov, I. (2013). Recoveries. Technical report, CEPR Discussion Papers.

Freixas, X. and Rochet, J. C. (2010). Microeconomics of banking. The MIT Press, 2nd editio edition.

Giesecke, K., Longstaff, F. A., Schaefer, S., and Strebulaev, I. A. (2014). Macroeconomic effects of corporate default crisis: A long-term perspective. Journal of Financial Economics, 111(2):297–310.

Harding, D. and Pagan, A. (2002). Dissecting the cycle: a methodological investigation. Journal of monetary economics, 49(2):365–381.

Holmstrom, B. and Tirole, J. (1997). Financial intermediation, loanable funds, and the real sector. the Quarterly Journal of economics, 112(3):663–691.

Jordà, O., Schularick, M., and Taylor, A. M. (2011). Financial crises, credit booms, and external imbalances: 140 years of lessons. IMF Economic Review, 59(2):340–378.

Jordà, O., Schularick, M., and Taylor, A. M. (2013). When Credit Bites Back. Journal of Money, Credit and Banking, 45(s2):3–28.

Kashyap, A. K., Stein, J. C., and Wilcox, D. W. (1993). Monetary policy and credit conditions: Evidence from the composition of external finance. The American Economic Review, 83(1):78–98.

Krishnamurthy, A. (2010). How debt markets have malfunctioned in the crisis. Journal of Economic Perspectives, 24(1):3–28.

Laeven, L. and Valencia, F. (2013). Systemic banking crises database. IMF Economic Review,

61(2):225–270.

Lewbel, A. (2012). Using heteroscedasticity to identify and estimate mismeasured and endogenous regressor models. Journal of Business & Economic Statistics, 30(1):67–80.

Ohanian, L. E. and Raffo, A. (2012). Aggregate hours worked in OECD countries: New measurement and implications for business cycles. Journal of Monetary Economics, 59(1):40–56.

Oliner, S. D. and Rudebusch, G. D. (1996). Monetary policy and credit conditions: evidence from the composition of external finance: comment. The American Economic Review, pages 300–309.

Poschke, M. (2014). The Firm Size Distribution across Countries and Skill-Biased Change in Entrepreneurial Technology. IZA Discussion Papers 7991, Institute for the Study of Labor (IZA).

Rigobon, R. (2003). Identification through heteroskedasticity. Review of Economics and Statistics, 85(4):777–792.

Rodriguez-Palenzuela, D., Darracq Paries, M., Carboni, G., Ferrando, A., Köhler Ulbrich, P., Zachary, M.-D., Geiger, F., Rupprecht, M., Raudsaar, T., McCann, F., and Others (2013). Corporate Finance and Economic Activity in the Euro Area: Structural Issues Report 2013. ECB Occasional Paper, No. 151.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. Stata Journal, 9(1):86–136.

Schularick, M. and Taylor, A. M. (2012). Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008. The American Economic Review, 102(2):1029–1061.

Appendix

A. Data appendix

The Table A.1 provides a summary of the variables.

Note that in Table A.1 for "bond", "loan" and "total credit to corporations" variables, we take for the US, data from the Financial accounts of the United States. There are two reasons for this choice. Firstly, these series start in 1951 and not in 1989 as it is the case for "BIS Debt Securities Statistics". Secondly, "BIS total credit to non-financial corporations" includes in the US case both the total credit to non-financial corporations but also the credit to nonfinancial noncorporate businesses. This is not the case for European countries where BIS data includes only the credit to the corporate sector[21]. For comparability, we thus use US Flow of Funds data for "non-financial corporate business" (L103) in order not to include "Nonfinancial Noncorporate Business" (L.104 in US Flow of Funds).

In Section I of the Online Appendix, we compare our loan variable with Eurostat data.

[21] In contrast to the practice in the US, nonfinancial noncorporate businesses are included in many countries (in particular in Europe) in the household sector.

Table A.1 – Variables definitions

Variables (Abbreviation)	Sources	Variable description
Market debt (Bond)	BIS Debt Securities Statistics, Federal Reserve	Total debt securities by residence of issuer (Issuers: Non financial corporations, in billions of US dollars, converted in national currency with nominal exchange rate), Quarterly. For the US, data are taken from the Financial accounts of the United States, Federal Reserve, "Total Debt Securities" (Corporate bonds+Commercial paper), Non financial corporate business, amounts outstanding end of period, L102.
Total credit to non-financial corporations (Total credit to corporations)	BIS Long series on credit to the private non-financial sector	Credit to non-financial private sector (Borrowing sector: Non-financial corporations that are resident in the economy, Lending sector: All sectors), National currency , Quarterly. For the US, data are taken from the Financial accounts of the United States, Federal Reserve, "Total credit" (Corporate bonds+Commercial paper+Bank loans+Other loans and advances+Total mortgages), Non financial corporate business, amounts outstanding end of period, L102.
Bank debt (Loan)	BIS, Federal Reserve, authors' calculations	"Total credit to corporations" −"Bond", National currency, Quarterly. For the US, data are taken from the Financial accounts of the United States, Federal Reserve, "Loans" (Bank loans+Other loans and advances+Total mortgages), Non financial corporate business, amounts outstanding end of period, L102.
Bond share over total credit (Bond share)	BIS, authors' calculations	"Bond"/"Total credit to corporations", Quarterly.
Total credit (Total credit)	BIS Long series on credit to the private non-financial sector	Credit to non-financial private sector (Borrowing sector: Private non-financial sector that is resident in the economy, Lending sector: All sectors), National currency , Quarterly.
Nominal exchange rate (Nominal exchange rate)	IMF IFS, OECD Main Economic Indicators	Nominal exchange rates, National currency per USD, Current prices, End of period, Quarterly
Real GDP (GDP)	OECD, Oxford Economics	Gross domestic product, Millions of national currency, constant prices, seasonally adjusted, Quarterly.
House Prices (House)	BIS Residential property price statistics	Residential property prices, Quarterly
CPI (CPI)	IMF, OECD, Oxford Economics	Consumer prix index, NSA, quarterly
Gross fixed capital formation (Investment)	OECD	Gross fixed capital Formation, Millions of national currency, seasonally adjusted, deflated by CPI, Quarterly.
Market capitalization (Market cap.)	WDI (World Bank)	Market capitalization of listed companies (ratio of GDP), Annual
Bank crisis (Bank crisis)	GFDD (Laeven and Valencia, 2013)	Dummy variable for the presence of banking crisis (1=banking crisis, 0=none).
Regulatory quality (Regulatory quality)	Worldwide Governance Indicators (WGI)	Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
Rule of Law (Rule of Law)	Worldwide Governance Indicators (WGI)	Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Private credit bureau coverage	World Bank, Doing Business project	Private credit bureau coverage reports the number of individuals or firms listed by a private credit bureau with current information on repayment history, unpaid debts, or credit outstanding. The number is expressed as a percentage of the adult population.

Variables (Abbreviation)	**Sources**	**Variable description**
Bank overhead costs to total assets	GFDD (World Bank)	Operating expenses of a bank as a share of the value of all held assets. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax, discontinued operations and other assets.

Table A.2 – Descriptive statistics for bond share

Country	Year(min)	Year(max)	Mean	Min	Max
Australia	1989	2013	0.17	0.13	0.20
Austria	1995	2013	0.10	0.02	0.18
Belgium	1989	2013	0.06	0.03	0.12
Canada	1989	2013	0.20	0.15	0.26
Czech Republic	2006	2013	0.08	0.05	0.15
Denmark	1999	2013	0.06	0.01	0.11
Finland	1989	2013	0.12	0.08	0.15
France	1989	2013	0.18	0.14	0.22
Germany	1989	2013	0.06	0.03	0.09
Hong Kong	1998	2013	0.08	0.04	0.12
Hungary	1997	2013	0.02	0.00	0.03
Ireland	2009	2013	0.01	0.01	0.01
Italy	1989	2013	0.05	0.03	0.09
Japan	1997	2013	0.18	0.15	0.21
Netherlands	1990	2013	0.10	0.04	0.19
Norway	1995	2013	0.12	0.08	0.16
Portugal	1989	2013	0.10	0.04	0.16
Singapore	2000	2013	0.40	0.27	0.50
Spain	1989	2013	0.04	0.01	0.10
Sweden	2001	2012	0.02	0.01	0.04
Thailand	1994	2013	0.14	0.00	0.31
United Kingdom	1989	2013	0.22	0.02	0.29
United States	1951	2013	0.51	0.38	0.74
Total	1951	2013	0.17	0.00	0.74

Note: This table presents bond share statistics for all countries in our sample. "Year(min)" and "Year(max)" stand for respectively the earliest and the latest available observation for each country. "Min" is the smallest, "Max" the highest and "Mean" the average bond share value over the sample for a given country.

Table A.3 – Countries and peaks - baseline

Country	Peaks				
Australia	1990q4				
Austria	2000q4	2008q1	2011q2		
Belgium	1992q1	2000q4	2008q2	2012q1	
Canada	1990q1	2008q3			
Czech Republic	2008q3	2011q3			
Denmark	2001q3	2008q2	2011q2		
Finland	1990q1	2007q4	2012q1		
France	1992q1	2008q1	2012q1		
Germany	1992q1	1995q3	2002q3	2004q2	
	2008q1	2012q3			
Hongkong	2000q4	2002q4	2008q1		
Hungary	2006q4	2008q1	2011q4		
Ireland	2011q4				
Italy	1992q1	2001q1	2002q3	2007q3	2011q2
Japan	2001q1	2008q1	2010q3	2012q1	
Netherlands	2008q1	2011q1			
Norway	2002q2	2007q4	2010q1	2012q2	
Portugal	1992q1	2002q2	2007q4	2010q3	
Singapore	2000q4	2002q2	2008q1		
Spain	1992q1	2008q1	2011q1		
Sweden	2007q4				
Thailand	1996q3	2008q1	2012q4		
United Kingdom	1990q2	2008q1	2011q3		
United States	1953q2	1957q3	1960q1	1969q3	1973q4
	1980q1	1981q3	1990q3	2007q4	

Note: We apply the algorithm of Harding and Pagan (2002) such that a full cycle and each of its phases must last at least 5 quarters and 2 quarters except for Germany where we apply respectively 6 and 2 quarters for a cycle and a phase. We identify 75 peaks.

Table A.4 – Business cycles: basic features

	Nr Events	Duration	Amplitude	Slope
Recession	Peaks: 75	4.04 [4.00]	-3.67% [-2.84%]	-0.88% [-0.70%]
Std. dev.		1.94	3.33%	0.63%
Recovery	Troughs: 70	3.92 [3.00]	3.44% [2.37%]	1.04% [0.73%]
Std. dev.		3.07	2.88%	0.99%

Note: mean, [median]. The amplitude of recovery and recession is not equal as the amplitude of the recovery is calculated based on the one year change in GDP after the trough.

Table A.5 – Business cycle dating: using external business cycle dating (I)

	(1) Bond share	(2) GDP *Year 1*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*
Year_{+2}	0.167***				
	(0.038)				
Year_{+1}	0.012				
	(0.013)				
Year_{-1}	0.009				
	(0.028)				
BS		-0.002	0.025***		
		(0.003)	(0.006)		
BS[0]				0.026***	0.021***
				(0.005)	(0.005)
BS[gr.wr.0]				0.036***	0.034***
				(0.007)	(0.007)
Total credit/GDP[0]					-0.028***
					(0.011)
Market cap.[0]					-0.000
					(0.005)
Total credit/GDP[growth,0]					-0.174***
					(0.062)
Total credit(growth)					0.283**
					(0.136)
Observations	944	279	259	242	217
R^2	0.094	0.252	0.466	0.531	0.561

Notes: Business cycle dating using the datation of peaks provided by ECRI and completed for missing countries with Claessens et al. (2012) (see Section 4.1 for details). Col. (1). Dependent variable: $\hat{s}_{t,k,i}$ = the cumulative growth factor of bond share between the peak and the date t. Independent variable: dummy variables Year_j for the $j = [-1; +1; +2]$ years before or after the peak. Cols. (2)-(5) Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak in Year 1 (Col. (2)) or Year 2 (Cols. (3)-(5)) after the peak. Independent variables: "BS" means bond share level (in log). "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Total credit/GDP[0]" is the credit-to-output ratio at the peak period, "Market cap.[0]" is market capitalization (in log) at the peak period , "Total credit/GDP[growth,0]" the cumulated growth of this ratio one year before the peak period, and "Total credit(growth)" the growth rate of credit after the peak. OLS with robust standard errors clustered by country and time in parentheses. Country fixed effects included in Col. (1). Country and time fixed effects included in Cols. (2)-(5). *** p<0.01, ** p<0.05, * p<0.1.

Table A.6 – Business cycle dating: using external business cycle dating (II)

	(1) Bond share	(2) GDP *Year 1*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*
Year_{+2}	0.158***				
	(0.038)				
Year_{+1}	0.013				
	(0.012)				
Year_{-1}	0.021				
	(0.027)				
BS		-0.001	0.028***		
		(0.002)	(0.005)		
BS[0]				0.024***	0.018***
				(0.005)	(0.006)
BS[gr.wr.0]				0.033***	0.030***
				(0.007)	(0.007)
Total credit/GDP[0]					-0.032**
					(0.012)
Market cap.[0]					0.005
					(0.005)
Total credit/GDP[growth,0]					-0.195***
					(0.052)
Total credit(growth)					0.262**
					(0.120)
Observations	971	292	258	245	228
R^2	0.084	0.256	0.450	0.488	0.536

Notes: Business cycle dating using the datation of peaks provided by Claessens et al. (2012) (see Section 4.1 for details). Col. (1). Dependent variable: $\hat{s}_{t,k,i}$ = the cumulative growth factor of bond share between the peak and the date t. Independent variable: dummy variables Year_j for the $j = [-1; +1; +2]$ years before or after the peak. Cols. (2)-(5) Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak in Year 1 (Col. (2)) or Year 2 (Cols. (3)-(5)) after the peak. Independent variables: "BS" means bond share level (in log). "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Total credit/GDP[0]" is the credit-to-output ratio at the peak period, "Market cap.[0]" is market capitalization (in log) at the peak period , "Total credit/GDP[growth,0]" the cumulated growth of this ratio one year before the peak period, and "Total credit(growth)" the growth rate of credit after the peak. OLS with robust standard errors clustered by country and time in parentheses. Country fixed effects included in Col. (1). Country and time fixed effects included in Cols. (2)-(5). *** p<0.01, ** p<0.05, * p<0.1.

Table A.7 – GDP, corporate debt structure and financial markets after troughs

	(1) GDP *Trough+4*	(2) GDP *Trough+8*	(3) GDP *Trough+4*	(4) GDP *Trough+8*
BS[0]	0.0133***	0.0194***	0.0093**	0.0133***
	(0.0040)	(0.0046)	(0.0039)	(0.0044)
BS[gr.wr.0]	0.0112	0.0189***	0.0028	0.0168***
	(0.0129)	(0.0060)	(0.0169)	(0.0051)
Total credit/GDP[0]			-0.0400***	-0.0413***
			(0.0133)	(0.0095)
Market cap.[0]			0.0091*	0.0038
			(0.0051)	(0.0044)
Total credit/GDP[growth,0]			-0.1207**	-0.0561
			(0.0521)	(0.0514)
Total credit(growth)			0.2564*	0.3527***
			(0.1380)	(0.0974)
Observations	259	454	168	402
R^2	0.4164	0.3901	0.5231	0.4459

Notes: Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak in the first 4 quarters (Cols. (1) and (3)) and 8 quarters (Cols. (2) and (4)) after the trough. Independent variables: "BS[0]" is bond share level (in log) at the peak period. "BS[gr.wr.0]" is bond share variation with respect to the trough period. "Market cap.[0]" is market capitalization (in log) at the peak period. "Total credit/GDP[0]" is the credit-to-output ratio at the peak period, "Total credit/GDP[growth,0]" the cumulative growth of this ratio one year before the peak period, and "Total credit (growth)" the growth rate of credit. OLS with robust standard errors clustered by country and time in parentheses. Country fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Table A.8 – Identification through heteroskedasticity

	(1) GDP (IV1) *Year 2*	(2) GDP (IV1) *Year 2*	(3) GDP (IV2) *Year 2*	(4) GDP (IV2) *Year 2*
BS[0]	0.0153*	0.0160**	0.0246**	0.0258**
	(0.0085)	(0.0080)	(0.0102)	(0.0103)
BS[gr.wr.0]	0.0283***	0.0290***	0.0691***	0.0763***
	(0.0091)	(0.0087)	(0.0234)	(0.0247)
Market cap.[0]	-0.0014	-0.0014	-0.0086	-0.0095
	(0.0056)	(0.0056)	(0.0084)	(0.0085)
Total credit/GDP[growth,0]	-0.2242***	-0.2251***	-0.1879***	-0.1879***
	(0.0617)	(0.0609)	(0.0594)	(0.0584)
Total credit/GDP[0]	-0.0134	-0.0108	0.0008	0.0049
	(0.0095)	(0.0096)	(0.0131)	(0.0135)
Total credit(growth)		0.1949*		0.2038*
		(0.1007)		(0.1086)
Observations	226	226	226	226
R^2	0.2346	0.2436	0.1362	0.1192
Hansen J stat.	2.036	2.215	5.038	9.045
p-value	0.916	0.947	0.889	0.699

Notes: Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak in Year 2 after the peak. Independent variables: "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Market cap.[0]" is market capitalization (in log) at the peak period. "Total credit/GDP[0]" is the credit-to-output ratio at the peak period, "Total credit/GDP[growth,0]" the cumulative growth of this ratio one year before the peak period, and "Total credit(growth)" the growth rate of credit in Year 2. The causal effect of Bond Share[0] is identified through heteroskedasticity (Lewbel (2012)). We instrument Bond Share[0] in Cols. (1)-(2), and both Bond Share[0] and "BS[gr.wr.0]" in Cols. (3) -(4). Estimators with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Table A.9 – Dynamic panel estimations

	(1) GDP *Year 2*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*	(6) GDP *Year 2*
	4 Lags	4 Lags	6 Lags	6 Lags	8 Lags	8 Lags
BS[0]	0.0087***	0.0067***	0.0087***	0.0066***	0.0087***	0.0067***
	(0.0028)	(0.0025)	(0.0028)	(0.0025)	(0.0028)	(0.0025)
BS[gr.wr.0]	0.0064	0.0084**	0.0066	0.0084**	0.0068	0.0084**
	(0.0044)	(0.0043)	(0.0044)	(0.0043)	(0.0044)	(0.0043)
L.GDP	0.8751***	0.8421***	0.8724***	0.8406***	0.8701***	0.8410***
	(0.0284)	(0.0296)	(0.0278)	(0.0290)	(0.0274)	(0.0290)
Market cap.[0]		-0.0075***		-0.0075***		-0.0075***
		(0.0024)		(0.0024)		(0.0024)
Total credit/GDP[growth,0]		-0.0121		-0.0124		-0.0123
		(0.0317)		(0.0316)		(0.0317)
Total credit(growth)		0.0189		0.0198		0.0197
		(0.0332)		(0.0330)		(0.0330)
Observations	251	226	251	226	251	226
Sargan Test - Prob > chi2	0.0268	0.150	0.0941	0.304	0.158	0.330

Note: Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak for $t = \{5, 6, 7, 8\}$ in Year 2. Independent variables: "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. L.GDP is the lagged value of the dependent variable. "Market cap.[0]" is market capitalization (in log) at the peak period. "Total credit/GDP[growth,0]" is the cumulative growth of the credit-to-output ratio one year before the peak period, and "Total credit(growth)" the growth rate of credit in Year 2. System GMM with GMM standard errors in parentheses with 4, 6, or 8 lags as instruments. The instruments refer to the lagged levels and lagged differences of variables in the respective difference and levels equations of the dynamic panel GMM system of equations. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Table A.10 – GDP growth and corporate debt structure

	(1) GDP *Year 1*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*	(6) GDP *Year 2*
BS	-0.0009	0.0090***				
	(0.0021)	(0.0024)				
BS[0]			0.0092***	0.0084***		0.0096***
			(0.0024)	(0.0023)		(0.0024)
BS[gr.wr.0]			0.0055*		-0.0013	
			(0.0032)		(0.0026)	
Bond/Bond[0] [gr.wr.0]						0.0060*
						(0.0033)
Loan/Loan[0] [gr.wr.0]						0.0030
						(0.0089)
Observations	297	251	251	259	251	238
R^2	0.0801	0.4821	0.4855	0.4736	0.3761	0.4920

Note: Dependent variable: $g_{t,k,i}(4)$ = the year-to-year growth rate of GDP for $t = \{1, 2, 3, 4\}$ in Year 1 (Col. (1)) and for $t = \{5, 6, 7, 8\}$ in Year 2 (Cols. (2)-(6)). Independent variables: "BS" means bond share level (in log). "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Bond/Bond[0] [gr.wr.0]" and "Loan/Loan[0] [gr.wr.0]" are the respective variations of bonds and loans compared to the peak period. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Table A.11 – GDP growth, corporate debt structure and financial markets

	(1) GDP *Year 2*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*
BS[0]	0.0092***	0.0084***	0.0107***	0.0088***	0.0103***
	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)
BS[gr.wr.0]	0.0055*	0.0049	0.0076**	0.0051	0.0086**
	(0.0032)	(0.0035)	(0.0034)	(0.0034)	(0.0034)
Market cap.[0]		-0.0005	-0.0017	-0.0010	-0.0032
		(0.0028)	(0.0026)	(0.0030)	(0.0025)
Total credit/GDP[0]		-0.0079		-0.0063	
		(0.0052)		(0.0053)	
Total credit/GDP[growth,0]				0.0233	0.0140
				(0.0253)	(0.0245)
Total credit(growth)				0.0482	
				(0.0470)	
House prices[0]			0.0017		0.0031
			(0.0027)		(0.0027)
House Prices(growth)					0.1205***
					(0.0363)
Observations	251	226	176	226	176
R^2	0.4855	0.5153	0.4928	0.5230	0.5379

Note: Dependent variable: $g_{t,k,i}(4) =$ the year-to-year growth rate of GDP in Year 2 after the peak. Independent variables: "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Market cap.[0]" is market capitalization (in log) at the peak period. "Total credit/GDP[0]" is the credit-to-output ratio at the peak period, "Total credit/GDP[growth,0]" the cumulative growth of this ratio one year before the peak period, "Total credit(growth)" the growth rate of credit in Year 2. "House prices[0]" is a price index for housing at the peak period and "House prices(growth)" the growth rate of this index in Year 2. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Table A.12 – GDP deviation w.r.t. peak (A) and GDP growth (B): different bond share levels

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GDP	GDP	GDP	GDP	GDP	GDP	GDP	GDP
A: deviation w.r.t peak	*Year 1*	*Year 1*	*Year 1*	*Year 1*	*Year 2*	*Year 2*	*Year 2*	*Year 2*
BS(mean:-4:0)	-0.0019				0.0138**			
	(0.0018)				(0.0060)			
BS(mean:-4:0 -dm)		-0.0021				0.0132**		
		(0.0019)				(0.0064)		
BS(mean:0:4)			-0.0011				0.0167***	
			(0.0025)				(0.0057)	
BS(mean:0:4-dm)				-0.0024				0.0127**
				(0.0024)				(0.0063)
Observations	284	256	296	268	243	218	259	234
R^2	0.2254	0.2496	0.2340	0.2594	0.4303	0.4187	0.4765	0.4342

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GDP	GDP	GDP	GDP	GDP	GDP	GDP	GDP
B: GDP growth	*Year 1*	*Year 1*	*Year 1*	*Year 1*	*Year 2*	*Year 2*	*Year 2*	*Year 2*
BS(mean:-4:0)	-0.0014				0.0085***			
	(0.0016)				(0.0022)			
BS(mean:-4:0 -dm)		-0.0015				0.0086***		
		(0.0017)				(0.0023)		
BS(mean:0:4)			-0.0015				0.0084***	
			(0.0023)				(0.0023)	
BS(mean:0:4-dm)				-0.0022				0.0082***
				(0.0022)				(0.0024)
Observations	284	256	296	268	243	218	259	234
R^2	0.0738	0.0679	0.0838	0.0863	0.4731	0.4897	0.4782	0.4821

Note: Dependent variable: Panel A: $\log(\hat{y}_{t,k,i}) =$ the log-deviation of GDP with respect to its level at the peak for $t = \{1, 2, 3, 4\}$ in Year 1 (Cols. (1)-(4)) and for $t = \{5, 6, 7, 8\}$ in Year 2 (Cols. (5)-(8)) ; Panel B: $g_{t,k,i}(4) =$ the year-to-year growth rate of GDP in Year 1 (Cols. (1)-(4)) and in Year 2 (Cols. (5)-(8)). Independent variables: "BS" means bond share level (in log), "(-4:0)" the mean value for the four quarters before the peak and (0:4) the mean value for the four quarters after the peak . "dm" means demeaned using the mean for the full panel. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Table A.13 – GDP, corporate debt structure and financial markets: excluding the US

	(1) GDP *Year 2*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*
BS[0]	0.0193***	0.0174***	0.0204***	0.0118*	0.0156*
	(0.0059)	(0.0059)	(0.0070)	(0.0063)	(0.0083)
BS[gr.wr.0]	0.0319***	0.0292***	0.0277***	0.0257***	0.0279***
	(0.0066)	(0.0067)	(0.0073)	(0.0072)	(0.0079)
Market cap.[0]		-0.0008	0.0062*	0.0041	0.0071*
		(0.0048)	(0.0037)	(0.0048)	(0.0043)
Total credit/GDP[0]		-0.0200*		-0.0273**	
		(0.0114)		(0.0120)	
Total credit/GDP[growth,0]				-0.2361***	-0.2262***
				(0.0531)	(0.0747)
Total credit(growth)				0.2023**	
				(0.0889)	
House prices[0]			-0.0260***		-0.0305***
			(0.0073)		(0.0081)
House Prices(growth)					0.0718
					(0.1028)
Observations	218	218	168	218	168
R^2	0.5042	0.5152	0.5465	0.5663	0.5784

Note: Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak in Year 2 after the peak. The observations for the US are excluded from the sample. Independent variables: "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Market cap.[0]" is market capitalization (in log) at the peak period. "Total credit/GDP[0]" is the credit-to-output ratio at the peak period, "Total credit/GDP[growth,0]" the cumulative growth of this ratio one year before the peak period, "Total credit(growth)" the growth rate of credit in Year 2. "House prices[0]" is a price index for housing at the peak period and "House prices(growth)" the growth rate of this index in Year 2. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Table A.14 – GDP and corporate debt structure: excluding 2008 crisis

	(1) GDP *Year 2*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*	(5) GDP *Year 2*
BS[0]	0.0193**	0.0186***	0.0275***	0.0184**	0.0259***
	(0.0076)	(0.0072)	(0.0078)	(0.0077)	(0.0099)
BS[gr.wr.0]	0.0209**	0.0102	0.0182*	0.0104	0.0200**
	(0.0095)	(0.0084)	(0.0096)	(0.0082)	(0.0089)
Market cap.[0]		0.0271***	0.0321***	0.0262***	0.0306***
		(0.0061)	(0.0045)	(0.0063)	(0.0049)
Total credit/GDP[0]		-0.0442***		-0.0396***	
		(0.0122)		(0.0140)	
Total credit/GDP[growth,0]				-0.0132	-0.0175
				(0.0638)	(0.0859)
Total credit(growth)				0.2141	
				(0.1394)	
House prices[0]			-0.0245***		-0.0225**
			(0.0080)		(0.0094)
House Prices(growth)					0.2005**
					(0.0960)
Observations	188	163	127	163	127
R^2	0.6115	0.6553	0.6783	0.6613	0.6924

Note: Dependent variable: $\log(\hat{y}_{t,k,i}) =$ the log-deviation of GDP with respect to its level at the peak in Year 2 after the peak. 2008 crisis excluded from the sample. Independent variables: "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Market cap.[0]" is market capitalization (in log) at the peak period. "Total credit/GDP[0]" is the credit-to-output ratio at the peak period, "Total credit/GDP[growth,0]" the cumulative growth of this ratio one year before the peak period. "House prices[0]" is a price index for housing at the peak period and "House prices(growth)" the growth rate of this index in Year 2. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.

Table A.15 – Balanced panel

	(1) GDP *Year 2*	(2) GDP *Year 2*	(3) GDP *Year 2*	(4) GDP *Year 2*
	After 1989	After 1989	1997-2013 balanced	1997-2013 balanced
BS[0]	0.0188***	0.0109**	0.0217***	0.0091
	(0.0059)	(0.0053)	(0.0082)	(0.0057)
BS[gr.wr.0]	0.0308***	0.0249***	0.0530***	0.0685***
	(0.0067)	(0.0086)	(0.0180)	(0.0217)
Total credit/GDP[0]		-0.0287**		-0.1147***
		(0.0128)		(0.0213)
Market cap.[0]		0.0023		0.0037
		(0.0060)		(0.0092)
Total credit/GDP[growth,0]		-0.2479***		-0.3550***
		(0.0684)		(0.0722)
Total credit(growth)		0.2068**		0.2676***
		(0.0906)		(0.0945)
Observations	226	226	136	136
R^2	0.4923	0.5644	0.4597	0.5912

Note: Dependent variable: $\log(\hat{y}_{t,k,i})$ = the log-deviation of GDP with respect to its level at the peak in Year 2. Independent variables: "BS[0]" is bond share level (in log) at the peak. "BS[gr.wr.0]" is bond share variation with respect to the peak period. "Market cap.[0]" is market capitalization (in log) at the peak period. "Total credit/GDP[0]" is the credit-to-output ratio at the peak period, "Total credit/GDP[growth,0]" the cumulative growth of this ratio one year before the peak period, "Total credit(growth)" the growth rate of credit in Year 2. In Cols. (1) and (2), we restrict the sample to all observations after the year 1989. In Cols. (3) and (4), we propose a balanced panel for the years 1997-2013. OLS with robust standard errors clustered by country and time in parentheses. Country and time fixed effects included. *** p<0.01, ** p<0.05, * p<0.1.