Bulletin
de la Banque de France
229/1 - MAY-JUNE 2020

BANQUE DE FRANCE
EUROSYSTÈME

Economic research

Funding shock: how will the investment of large French firms be affected?

This article studies the impact of the negative funding shocks of 2008 and 2011 on the investment of large French groups. We compare companies rolling over their maturing debt in times of crisis with those which did not have to do so. After isolating the effects related to the business cycle and to firms' characteristics, it appears that the 2008 financial crisis reduced firms' investment rate by about four percentage points. The sovereign debt crisis of 2011, for its part, does not appear to have affected the average firm. This is partly because of the beneficial effect of the non-standard monetary policy measures of 2012 aimed at restoring the bank lending channel. In the context of the current crisis, which is of a different nature, the credit channel plays an important role in supporting economic activity: this is the purpose of the emergency measures recently taken by the ECB and, in France, by the government.

Anne Duquerroy, Clément Mazet-Sonilhac
Microeconomic and Structural Analysis Directorate
Microeconomic Analysis Division

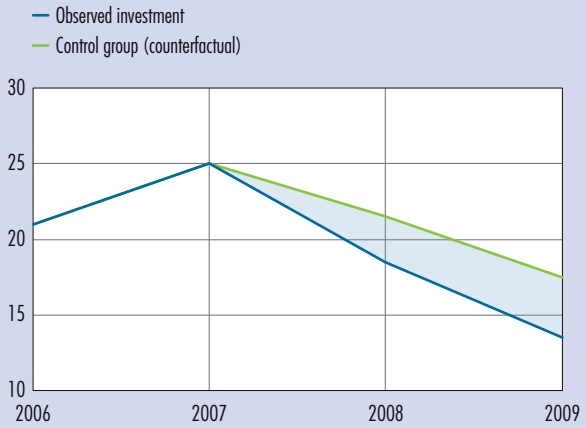
JEL codes
G01, G31

+200 basis points
the widening of corporate bond spreads in 2008

+92 basis points
the increase in the average interest rate on new loans to large companies in 2008

–4 percentage points
the contraction in the investment rate of major French groups solely attributable to difficulties in accessing external funding resulting from the 2008 crisis

2008 shock and investment rate of companies with high borrowing needs
(%)



Source: Banque de France, FIBEN Group database (individual group consolidated data – IFRS).
Notes: Total sample. Firms whose share of long-term debt to be rolled over in the year of the shock is greater than the median of the sample comprise the treatment group, while the others make up the control group. A firm with substantial borrowing needs is one with more than 20% of its long-term debt to be rolled over in a fiscal year.

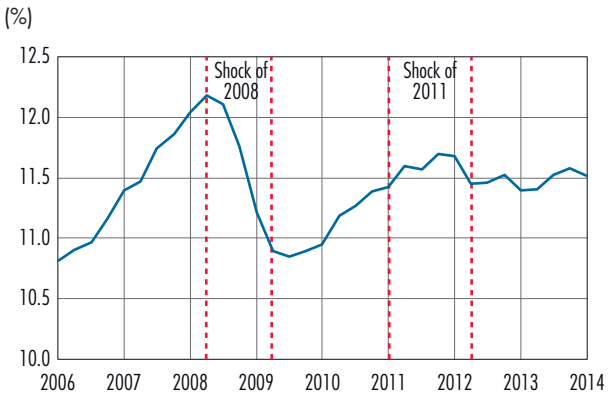
1 How can fluctuations in business investment in France be explained?

Insights and determinants

At the macroeconomic level, the gross investment rate of non-financial corporations (NFCs), measured as the ratio of their gross fixed capital formation (GFCF) to GDP, is subject to significant cyclical fluctuations. Over the past 15 years, two major shocks have affected this ratio: the financial crisis of 2008 and the sovereign debt crisis of 2011. The impact of the 2008 crisis is notable for its magnitude: the gross investment rate of NFCs fell by more than one percentage point between the beginning of 2008 and the end of 2009, from 12.1% to less than 11%. Admittedly, the pre-2007 investment rate was relatively high, i.e. slightly above its long-term average, but still below its 2000 or 1990 level. The 2011 crisis had a smaller impact on investment, with a decline of around 0.3 percentage point in the gross investment rate of NFCs between the last quarter of 2011 and the beginning of 2013, but this impact was particularly persistent (see Chart 1).

Understanding the drivers of investment, and thus of growth, is key to the economic debate. At the macroeconomic level, weak aggregate demand (Bussière, Ferrara and Milovitch, 2015) combined with increased uncertainty, particularly political uncertainty (Bloom, Bond and Van Reenen, 2007), explain the sluggishness of business investment after the 2008 crisis. Supply factors and, more specifically, external funding conditions are also an important determinant of business investment (Carluccio, Mazet-Sonilhac and Mésonnier, 2018). Indeed, when the supply of external funding is limited or becomes more expensive, firms are forced to forego profitable investment opportunities, thus constraining future economic growth (Campello, Graham and Harvey, 2010).

C1 Gross investment rate of non-financial corporations relative to GDP in France



Sources: Insee and Banque de France.
Note: Investment rate of NFCs = GFCF/GDP

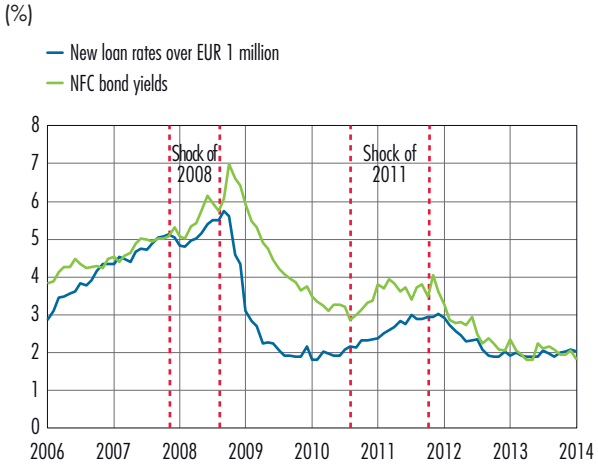
Using a microeconomic approach, this article seeks to quantify the causal impact of financing conditions on the investment of large French companies. To this end, we identify certain characteristics of companies – related to the management of their liabilities – that influence the sensitivity of the investment response to fluctuations in the supply of financing, in our case to a contraction in supply. To do so, we study the crisis episodes of autumn 2008 and winter 2011, which were shocks that were exogenous to the economic position of French companies. We draw on the methodology used by Almeida, Campello, Laranjeira, and Weisbenner (2009) and compare the investment behaviour of firms, before and after each shock, in terms of the share of long-term debt they had to roll over during these crisis episodes.

The 2008 and 2011 crises as natural experiments

We study the effects of two shocks, the financial shock of 2008 following the collapse of the US bank Lehman Brothers on the one hand, and the euro area sovereign debt crisis of 2011 on the other. These episodes can be regarded as independent of the position of French companies, since they are linked to the mortgage and housing market crisis in the United States and the exposure of euro area banks to the risk of default by Greece, respectively.

Both shocks, transmitted via banks and markets, are characterised by a very large increase in the cost of borrowing for firms (see Chart 2). They nevertheless differ in terms of their magnitude. The 2008 crisis was a global shock that had a strong impact on bank lending rates (+92 basis points [bp]) and corporate bond rates (+200bp) between January and September 2008. The 2011 episode was less pronounced, with an increase in bank lending rates of "only" 64bp between January and December 2011. At the same time, corporate bond rates rose by 50bp.

C2 Average rates on new loans to non-financial corporations (over EUR 1 million) and yields on bonds issued by NFCs in France



Sources: ECB and Banque de France (Gilchrist and Mojon, 2018).

2 How do we measure the response of firms to a credit shock?

Identifying a credit shock and its consequences

Isolating the impact of a contraction in the supply of credit on firms' borrowing conditions and subsequently on their investment behaviour is a tricky exercise. This empirical analysis encounters two main difficulties.

First, it is necessary to identify an "exogenous funding shock", i.e. an episode of contraction in the supply of credit that is not directly attributable to a change in the risk profile of the firms that borrow or to a decline in their loan demand. This shock must also be unanticipated so that firms have not had time to gradually adjust their balance sheet structure to the new financing conditions. Here we take the crises of 2008 and 2011.

Second, the impact of the shock on investment due to financial conditions needs to be isolated from the impact of a deterioration in the growth prospects of firms in times of crisis and a decline in demand. To do this, we consider two types of firm: (i) those with a large share of long-term debt maturing just before the crisis and which will therefore be strongly affected by a credit supply shock; (ii) those with a small share of long-term debt maturing at the time of the crisis and which will therefore be less affected by the supply shock. Their observation makes it possible to estimate what would have happened to the firms strongly affected by the shock if it had not occurred (known as the counterfactual situation). By comparing the investment rate of these two groups of firms after the shock, we estimate the impact of the supply shock (see methodological box below).

BOX 1

Empirical measure of the impact of the negative financing supply shock

The empirical measurement of the impact of the deterioration in conditions of access to financing on investment dynamics during the two crisis episodes studied (2008 and 2011) is based on a method known as the "difference-in-differences" method.

This method consists of isolating two groups of firms: a "treatment" group, which undergoes the financial shock, and a "control" group, which is used as a counterfactual. The control group is used to assess the investment dynamics that would have prevailed in the absence of the shock. The validity of such a comparison rests on the fundamental assumption that, in the absence of the shock, the investment rates of the two groups would have followed a similar path. This assumption of a parallel trend is tested over the two fiscal years preceding the occurrence of the shock.

We use the differences in the maturity of long-term debt across firms to construct our treatment and control groups. Our empirical approach is based on the observation that there is no reason for the maturity of long-term debt to influence investment behaviour. That said, a shock to financing conditions on a given date will primarily affect companies that need to roll over maturing debt at the same time. Faced with a contraction in supply or an increase in the cost of borrowing, they will potentially be forced to reduce their investment.

The treatment group therefore comprises companies with significant borrowing requirements during the crisis (20%[1] or more of the long-term debt to be rolled over in the year preceding the crisis).

The control group consists of firms that do not need to borrow during this period:[2]

$$Inv\ Gap_{Treat} = Inv_{post} - Inv_{pre}$$

This difference makes it possible to measure, for the treated firms, the difference between the investment rate after and before each crisis. Each crisis resulted in a sharp decline in investment. However, this decline in investment may also be due – at least partly – to other concomitant economic factors (e.g. a contraction in demand linked to deteriorating growth outlook for firms) and not just to worsening financing conditions.

This is why we attempt to obtain a "counterfactual" investment rate that would be close to the investment rate of firms with high borrowing requirements in the absence of the funding shock. As above, we calculate the observed investment gap between the "post" and "pre" periods for the control group.

$$Inv\ Gap_{Treat} = Inv_{post} - Inv_{pre}$$

.../...

1 This figure corresponds to the median value of the share of long-term debt maturing within one year at the end of 2007 in our sample of large groups. We apply the same threshold in 2010 (the median is 18%).

2 In the case of the financial crisis, the "post" period corresponds to fiscal years 2008 and 2009, the "pre" period corresponds to fiscal years 2006 and 2007. In the case of the sovereign debt crisis, the "post" period corresponds to fiscal years 2012 and 2013, the "pre" period corresponds to fiscal years 2010 and 2011.

Companies that had to refinance themselves in the aftermath of the 2008 and 2011 crises suffered the full impact of the crisis-related financial shock. In contrast, companies that have not had to refinance themselves were of course affected by the crisis, but not through the financing channel. The difference between trends in these two groups, after and before the crisis, known as the "difference-in-differences", therefore makes it possible to isolate the change in investment attributable to financial conditions alone.

The "difference-in-differences" estimate of the impact of the funding shock on investment in France is thus expressed as follows: $DD\ Inv = Diff\ Inv_{Treat} - Diff\ Inv_{Control}$

In practice, we use a regression with dummy variables for the post-shock period and for the treatment group, augmented annual firm and industry sector fixed effects.

$$Investment_{it} = Firm_i + Sector_{jt} + \beta Post \times \mathbb{1}_{treatment} + Size_{it-1} + Leverage_{it-1} + \varepsilon_{it}$$

In this equation: the size of the firm is defined as the logarithm of its total assets; leverage is the ratio of long-term financial debt to the firm's total assets; the firm's sector of activity is defined on the basis of the section in INSEE's NAF nomenclature of French productive economic activities (excluding agriculture, finance, general government and education, with 14 sectors represented in the sample).

Maturity of corporate debt as a measure of their exposure to the credit shock

To isolate the impact of the credit shock, we compare the two groups of firms ("treatment" group and "control" group) whose exposure to shocks differs because of the maturity structure of their long-term debt. The underlying idea is that companies in the treatment group have ex ante more long-term debt to roll over at the end of 2007 (end-2010 respectively) and are thus relatively more exposed to a contraction in credit supply at the time of the crisis in 2008 (2011 respectively) than comparable companies in the control group whose debt has a longer maturity. The degree of exposure of firms to a contraction in credit supply therefore varies, depending on the structure of their balance sheets and, more specifically, on the maturity management of their bank and bond debt. Firms are classified into the control group and the treatment group according to the maturity of their debt observed before the crisis in order to prevent this characteristic from being influenced by the crisis itself.

We use annual consolidated balance sheet data for major French groups, for which we have detailed information on the term structure of debt over the 2008-2015 period for a sample of 300 groups (groups reporting under IFRS accounting standards). In practice, we compare changes, before and after the shock, in the investment of the two groups of firms: the treatment group with significant refinancing needs during the crisis (20% or more of long-term debt to roll over in the year preceding the shock), and the control group with small or no borrowing needs during this period. This control group is assumed to provide information on changes in investment in the absence of a shock.

BOX 2

Sample data

The sample studied is made up of 300 French non-financial companies. More specifically, we consider large groups established in France and consolidating their accounts under the international financial reporting standards (IFRS). These firms are included in the FIBEN Group database[1] during the 2008 and 2011 shocks and at least one year before and after the shocks.

The sample size is restricted due to the exclusion of groups that do not consolidate their accounts under IFRS. Indeed, only the IFRS groups provide information on their long-term debt broken down by maturity, which is necessary for our identification. Despite this, the large groups in our sample account for a significant share of aggregate investment by non-financial corporations in France (e.g. more than 25% in 2010).

The firms that were selected all have access to long-term financing: long-term debt accounts for at least 5% of their total assets. The average leverage, defined as the ratio of total debt to total assets, of the companies in our sample is 41%. Their apparent average cost of debt, defined as the interest payments on total financial debt, is 7%. Their investment rate is defined as the acquisition minus the disposal of fixed assets (tangible and intangible) as a share of total fixed assets: it averaged 15% over the period under review. This figure and the definition of the investment rate are consistent with national accounts estimates (gross fixed capital formation/net fixed capital), which averaged around 11.5% over the period.

1 FIBEN:Company database managed by the Banque de France, containing several million non-financial entities and managers.

3 Credit shock: what impact on the investment of large groups?

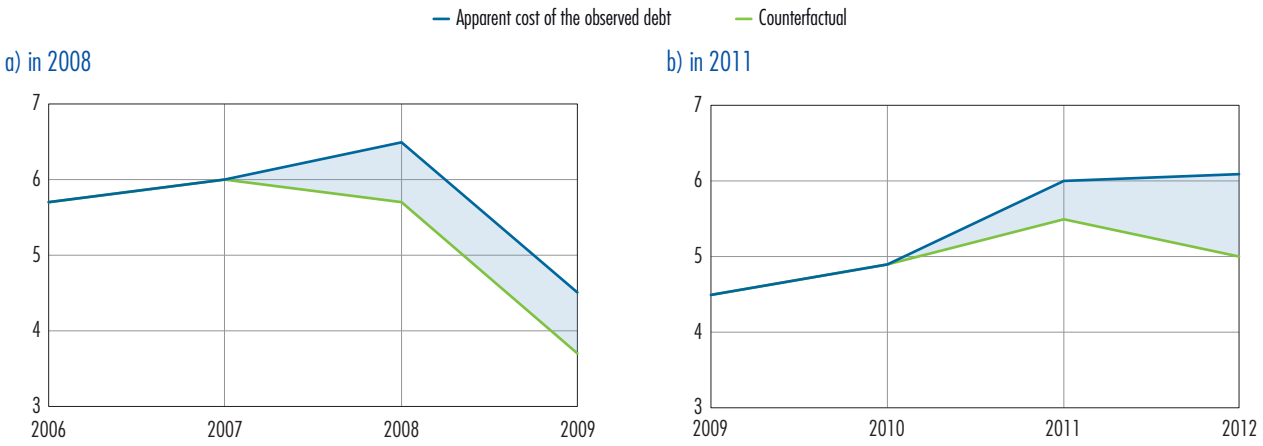
A rise in borrowing costs

First, we verify that firms exposed to the shock – i.e. those whose share of long-term debt to roll over in the year of the shock is above the median-have indeed experienced an increase in their borrowing costs. Charts 3a and 3b illustrate the average impact of the credit shock on the apparent cost of borrowing during the 2008 and 2011 episodes: the average cost of external funding for the treated firms (blue curve) was about 100bp higher than it would have been in the absence of the shock (green curve).

A detailed econometric analysis[1] taking into account other factors, such as cyclical effects as well as the impact of observable and unobservable firm characteristics, indicates that the impact of the shock on the apparent cost of borrowing remains close to 100bp and that this impact is statistically significant.

1 Significant impacts at the 5% threshold. The parameters are estimated by ordinary least squares within a firm for a given year after controlling for firm and industry fixed effects cross-referenced with the years. Standard deviations are robust and adjusted for firm cluster effects.

C3 Apparent cost of the debt of companies in the treatment group with significant borrowing requirements
(%)



Source: Banque de France, FIBEN Group database (individual data on the position of groups, data consolidated under IFRS).
Note: Firms whose share of long-term debt to be rolled over in the year of the shock is greater than the median of the sample comprise the treatment group, while the others make up the control group.

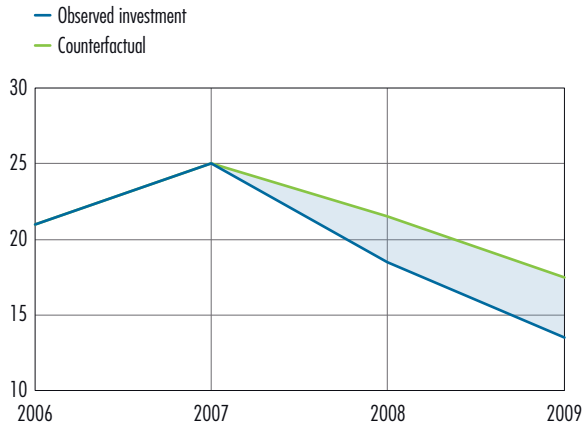
A heterogeneous impact on investment

While the average impact of the credit shock on the cost of borrowing appears to have been the same during the 2008 and 2011 crises, the response of investment by large French companies differed from one episode to the next.

Charts 4 and 5 show the investment rate observed for the treatment group and the investment rate that would have been observed in the absence of the shock (counterfactual investment rate). As Chart 4 shows, investment by treated firms would have fallen less sharply in the absence of the funding shock in 2008. That said, both groups had a similar average investment rate in 2011 (see Chart 5).

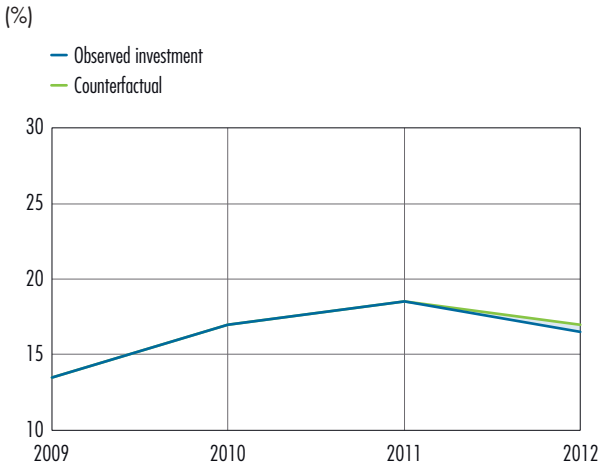
According to our estimate results, in 2009, the average investment rate of firms exposed to the refinancing shock would have been four percentage points higher in the absence of the shock, representing almost one-fifth of the pre-crisis level of investment (17% of the 2006-2007 average investment rate). These results are consistent – albeit to a lesser extent – with the effects observed in the United States. Indeed, Almeida et al. (2009) estimate that investment by US firms with higher long-term borrowing requirements fell by almost 30% from its previous level following the 2007 crisis.

C4 2008 shock and investment rate of companies with high borrowing needs
(%)



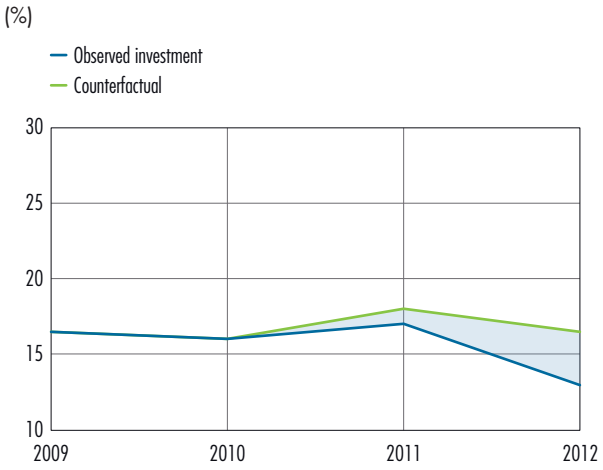
Source: Banque de France, FIBEN Group database (individual group consolidated data – IFRS).
Notes: Total sample. Firms whose share of long-term debt to be rolled over in the year of the shock is greater than the median of the sample comprise the treatment group, while the others make up the control group. A firm with substantial borrowing needs is one with more than 20% of its long-term debt to be rolled over in a fiscal year.

C5 2011 shock and investment rate of companies with high borrowing needs



Source: Banque de France, FIBEN Group database (individual group consolidated data – IFRS).
Notes: Total sample. Firms whose share of long-term debt to be rolled over in the year of the shock is greater than the median of the sample comprise the treatment group, while the others make up the control group. A firm with substantial borrowing needs is one with more than 20% of its long-term debt to be rolled over in a fiscal year.

C6 2011 shock and investment rate of companies with high borrowing needs and financially constrained



Source: Banque de France, FIBEN Group database (individual group consolidated data – IFRS).
Notes: Sub-sample of companies not distributing dividends in 2009. Firms whose share of long-term debt to be rolled over in the year of the shock is greater than the median of the sample comprise the treatment group, while the others make up the control group. A firm with substantial borrowing needs is one with more than 20% of its long-term debt to be rolled over in a fiscal year.

In contrast, in 2011, the average shock seems to be "absorbed" with no impact on investment dynamics, as shown in Chart 5. Additional analyses of companies' use of their cash reserves and their dividend distribution policy do not suggest that these variables had a dampening effect. The mitigated impact of the 2011 shock could thus mainly reflect the impact of the non-standard monetary policy measures of 2012 (OMTs, 3-year LTROs, ACC, etc.)[2] aimed at restoring the bank lending channel of monetary policy transmission (see Andrade et al., 2017, Cahn et al., 2017, and Mésonnier et al., 2017). In particular, these measures benefited large listed companies with strong fundamentals. Moreover, Andrade et al. find that the additional supply of bank credit generated by LTROs mainly benefited the largest firms (intermediate and large size firms) .

We then study how the sensitivity of the investment rate to the crisis varies according to companies' balance sheet characteristics and show that in 2011 the negative impact on investment is limited to companies that were already financially constrained. These firms are defined as those which distribute few dividends (dividend payout ratio below the median of the sample in the year preceding the shock). The use of a low dividend ratio as a measure of financial constraints for large firms is common in the literature (Fazzari et al., 1988; Almeida et al., 2009) and yields good results. Nevertheless, the payment of dividends is a decision endogenous to the firm and may therefore also reflect life-cycle effects.

Our results show that the 2011 shock does not affect all the firms identified as vulnerable in the same way: the most financially constrained firms experienced a 3.5 percentage point decline in their investment rate compared with non-constrained firms in the treatment group (see Chart 6).

2 OMT: outright monetary transactions; LTRO: longer-term refinancing operations; ACC: additional credit claims.

What are the implications for the present

Our analysis shows that firms that need to roll over a large share of their long-term debt at the time of a credit shock (here, "treated" firms) experience a greater increase in their apparent cost of borrowing and a more pronounced decline in their investment than do comparable but less exposed firms. The impact is further amplified if these companies are financially constrained. These results show that the financial shocks of 2008 and 2011 have had a real impact, affecting the investment behaviour of large firms. They suggest that the maturity of long-term debt is a useful variable for understanding the transmission of credit shocks to the non-financial sector.

Today, while the Covid-19 pandemic has a substantial impact on the activity of the different players in the economy and affects in particular the cash flow of companies, the structure of the debt and the concentration of maturities are important factors to be monitored in order to preserve firms' access to external funding and their ability to invest in the future. This partly explains the emergency measures taken by the French government (state-guaranteed loans) and by the ECB (Pandemic Emergency Purchase Programme [PEPP], rate cuts, etc.). In this respect, the position of major French groups (300 groups in our sample publishing consolidated financial statements under IFRS) appears to be more favourable today than in 2011, as suggested by the most recent data for 2017. Indeed, for the most financially constrained companies, the share of long-term financial debt to be rolled over within one year was 14.4%, or a decrease of 2.5 percentage points compared to 2011. The share of short-term debt, for its part, remained stable. These developments suggest that these firms have changed the structure of their long-term debt since the 2011 crisis, taking advantage of low interest rates to extend the maturity of their debt.

References

Almeida (H.), Campello (M.), Laranjeira (B.) and Weisbenner (S.) (2009)
"Corporate debt maturity and the real effects of the 2007 credit crisis", *Working Paper*, National Bureau of Economic Research, No. 14990, May.

Andrade (P.), Cahn (C.), Fraisse (H.) and Mésonnier (J.-S.) (2019)
"Can the provision of long-term liquidity help to avoid a credit crunch? Evidence from the Eurosystem's LTRO", *Journal of the European Economic Association*, Vol. 17, No. 4, August, pp. 1070-1106.

Bloom (N.), Bond (S.) and Van Reenen (J.) (2007)
"Uncertainty and investment dynamics", *Review of Economic Studies*, Vol. 74, No. 2, April, pp. 391-415.

Bussière (M.), Ferrara (L.) and Milovich (J.) (2015)
"Explaining the recent slump in investment: the role of expected demand and uncertainty", *Working Paper*, Banque de France, No. 571, September.
Download the document

Cahn (C.), Duquerroy (A.) and Mullins (W.) (2017)
"Unconventional monetary policy and bank lending relationship", *Working Paper*, Banque de France, No. 659, December (revised in May 2019).
Download the document

Campello (M.), Graham (J. R.) and Harvey (C.) (2010)
"The real effects of financial constraints: evidence from a financial crisis", *Journal of Financial Economics*, Vol. 97, No. 3, September, pp. 470-487.

Carluccio (J.), Mazet-Sonilhac (C.) and Mésonnier (J.-S.) (2018)
"Investment and the weighted average cost of capital: new micro evidence for France", *Working Paper*, Banque de France, No. 710, February.
Download the document

Gilchrist (S.) and Mojon (B.) (2018)
"Credit risk in the euro area", *The Economic Journal*, Vol. 128, No. 608, February, pp. 118-158.

Fazzari (S.), Hubbard (R. G.) and Petersen (B.) (1988)
"Financing constraints and corporate investment", *Brookings Papers on Economic Activity*, Vol. 19, No. 1, pp. 141-206.

Insee (2017)
"Faut-il s'inquiéter de la hausse de l'endettement des entreprises en France ?", *Note de conjoncture*, December.

Mésonnier (J.-S.), O'Donnell (C.) and Toutain (O.) (2017)
"The interest of being eligible", *Working Paper*, Banque de France, No. 636, August (revised in October 2017).
Download the document

Published by
Banque de France

Managing Editor
Gilles Vaysset

Editor-in-Chief
Françoise Drumetz

Editor
Didier Névonnic

Translator/English Editor
Anthony Dare

Technical production
Studio Creation
Press and Communication

ISSN 1952-4382

To subscribe to the Banque de France's publications
https://publications.banque-france.fr/en
"Subscription"