

# Credit conditions do not seem to amplify the economic cycle in France

Vincent Alhenc-Gelas  
Aurélien Fortin

**Département de la  
conjoncture**

Jean-Baptiste Bernard  
Benoît Campagne

**Département des Études  
Économiques**

*Since the beginning of the Great Recession, corporate credit in Europe has seen a sharp contraction. This decline is certainly due in part to a fall in the demand for credit from companies. Faced with a collapse in demand and what was initially a pronounced increase in uncertainties as to future economic growth, companies have cut their investment spending sharply and scaled down their inventory, resulting in a fall in their demand for financing.*

*But the decline in credit may also be partly due to the credit supply behaviour of the banks. In addition to tighter prudential requirements, the deterioration in the creditworthiness of borrowers may have led banks to restrict their supply of credit. The latter phenomenon refers us to the concept of the financial accelerator in the economic literature: in phases when the short-term economic situation is poor, the value of the assets held by companies and the profitability of their use tend to fall, thereby increasing the risk for a bank of not getting its funds back when it grants a loan. For projects of identical quality, phases when the short-term economic outlook is poor and phases when prudential requirements are being tightened are therefore less conducive to the distribution of credit by banks. This theoretical prediction involves testing for the existence of two economic regimes, one «standard» and the other of a credit squeeze.*

*The nonlinear nature of the financial accelerator lends itself well, on the macroeconomic level, to the estimation of a threshold model. In the case of France, over the period 2003 to 2013, this model detects two major periods during which there was a credit squeeze. However, this squeeze had a very limited impact on economic activity and does not provide evidence of a significant financial accelerator effect, even during the 2008-2009 financial crisis and the sovereign debt crisis of 2011-2012. The main cause of the fall in credit therefore lies in the decline in demand from companies. ■*

Over the past six years, the weak credit environment must be linked with a difficult economic situation

**In the Eurozone, the fall in bank credit continues, despite the upturn in activity...**

*In the Eurozone, the contraction in the credit market continues...*

Despite the emergence of the Eurozone from recession in Q2 2013, the credit market continued to contract at the beginning of this year: outstanding credit to non-financial enterprises was down 3.0% year-on-year in April. This contraction, which has been almost uninterrupted for close to 5 years, is directly linked with the two spells of recession in the Eurozone in 2008-2009 and then 2011-2013. Among other things, the latter led to a fall in the investment spending of companies, and therefore in the drying up of demand for credit from the banks. However, this is not necessarily sufficient to explain the extent of the adjustment in credit volumes or, most importantly, the big contrasts between the countries of the monetary union. For example, in April, credit fell by 9.7% in Spain, while it grew very slightly in France, by 0.6%. The survey conducted by the European Central Bank (ECB) among small and medium-sized companies (SAFE) confirmed this heterogeneous access to bank financing. While 45%<sup>1</sup> of Spanish companies surveyed at the end of 2013 considered access to financing a major problem, 38% were in the same situation in France and only 28% in Germany.

*... as a counterpoint to the excesses of the pre-crisis period...*

This fall in credit contrasts with the pre-crisis period. During the first half of the 2000s and through to 2007, the credit market went through a phase of sometimes massive expansion in the major Eurozone countries. Beyond the relationship between credit and activity, this expansion phase was also driven by a poor perception of credit risk by European banks (see report in *Conjoncture in France*, March 2009, *The Subprime Crisis: from Financial Crisis to Economic Crisis*). The causes were many: the scarcity of violent crises in the course of the period of "the great moderation" from the mid-1980s through to 2007, the practice of securitisation in the United States and the perception - disproven by the crisis - that all the Eurozone countries offered investors the same level of risk exposure, created an illusion of the dilution of systemic risk. This resulted in risky behaviour on the part of the banks and investors, reinforced by deregulation of the banking system in certain States (in Germany, for example, but above all in Spain, see *Illueca et al. (2013)*). In the wake of the subprime crisis that started in 2007 in the United States, the risk carried by banks that had granted loans to insolvent borrowers began to materialise with the growing level of borrower defaults, causing a sudden turnaround in expectations. The European credit market then stalled suddenly, before contracting in a process that continues today (see *Graph 1*).

The growing awareness of the weaknesses of the banking systems in the wake of the *Lehman Brothers* bankruptcy in September 2008 led to a sharp rise in risk aversion among financial players. Consequently, the interbank financing that is necessary to provide banks with good liquidity conditions partly dried up, endangering the banks' ability to serve demand for credit from the private sector. Since then, the liquidity conditions of the European banks have remained a matter of concern and several unconventional monetary policy operations conducted by the ECB (for example the 3-year refinancing operations at the end of 2011 and beginning of 2012) have contributed to reducing the banks' liquidity risk. This risk is still there, however, notably on account of the still sub-normal working of the interbank market in the Eurozone. The introduction of the prudential ratios of Basel III decided on by the G20 in 2010 may also take its toll on the credit distribution behaviour of banks (see *Annexe*).

(1) This proportion corresponds to enterprises that gave a score of between 7 and 10 on a scale of 1 to 10 to describe their financing difficulties.

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## ...and the interventions of the Central Bank...

... despite the accommodative policy of the ECB...

The ECB reacted to the shock of the crisis by bringing down its main policy rate to a level which was soon close to zero. In the first half of 2009, it came down to 1% and stands at 0.15% today. This has led to a reduction of the room for manoeuvre of the central bank which then introduced a series of unconventional monetary policy measures.

... which has difficulty transmitting to the economic players of southern countries

But this accommodative monetary policy is passed on in different ways in the countries of the Eurozone. The very fragile state of the banking system of certain peripheral countries, such as Spain, where the banks were highly exposed to real-estate risk, prevented the transmission of the ECBs' low-rate policy: it was passed on more clearly to corporate lending rates in countries perceived as being sounder, such as France and Germany. Systemic risk was also reinforced by the correlation between sovereign risk and banking risk highlighted by the sovereign debt crisis from 2010 onwards. On the one hand, some States had been forced to recapitalise their banking system when it was insolvent, thereby increasing their debt and placing their own solvency in peril. Such was the case in Spain, for example, where about €60 billion in aid was ploughed into the partial recapitalisation of the banking system (of which €40 billion lent by Eurozone partners via the European Financial Stability Fund). On the other hand, like in Italy, the banks of the Eurozone held large amounts of Treasury bills of the countries in which they are based and were therefore exposed to the losses caused by the fall in value of sovereign securities.

The credit market situation in the Eurozone is therefore particularly heterogeneous

This situation whereby each nation carries a specific risk premium has led to the fragmentation of the credit market. For example, the borrowing costs faced by non-financial enterprises continue to be much higher in those countries perceived as being more fragile than in those seen as being sounder (see Graph 2).

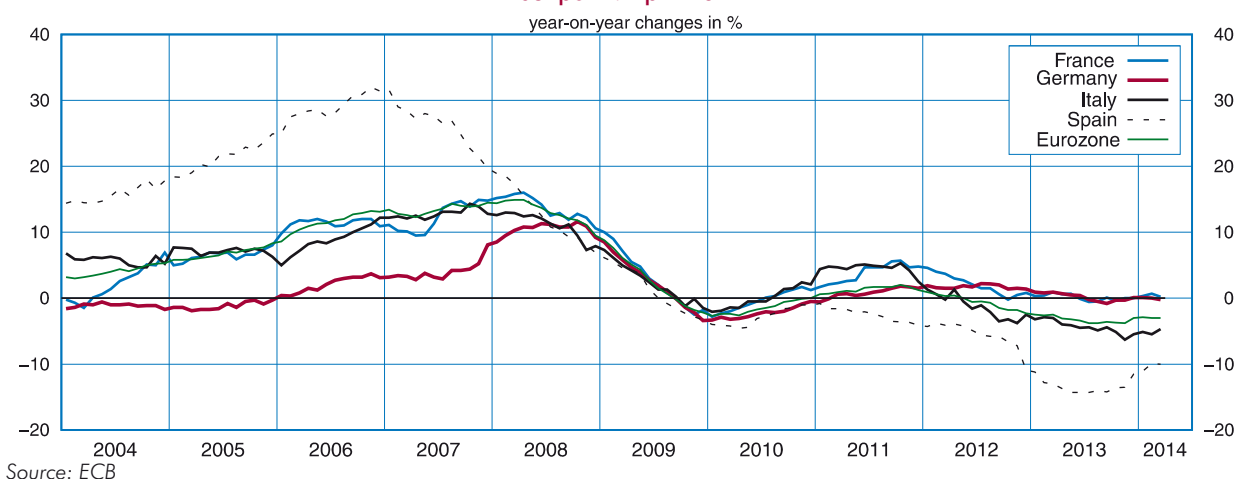
## ...due mainly to weak demand from companies

The weakness of credit is caused by the poor economic situation...

The decline in credit is not necessarily the result of restrictions on supply, meaning a situation in which a loan is refused to a company despite the fact that the project for which it is applying for credit is considered profitable. The credit may be refused simply because the bank judges the project not profitable enough. It should be noted that restrictions can take two forms: either by volume, refusing all or part of the amount requested by companies, or by price, proposing higher or lower interest rates depending on the borrower.

### 1- Annual growth rate of outstanding credit to non-financial companies

Last point: April 2014



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... as empirical studies tend to show an absence of credit rationing in France through to 2010

Several studies have been conducted at microeconomic level in the Eurozone in recent times. They tend to conclude that there was no credit rationing through to 2010. In France, according to *Kremp and Sevestre (2013)*, there is no robust evidence of small companies having been the subject of rationing between 2008 and 2010: although the banks reduced their credit supply idiosyncratically, the decline in lending to small companies was mainly due to a fall in demand in the wake of the shock in activity. Likewise, *Cabannes et al. (2013)* conclude that limited markets predominated over any restrictions there might have been in credit for French companies. In the case of Italy, according to *Del Giovane, Eramo and Nobili (2011)*, based on the data of the Bank Lending Survey (BLS), while restrictions on supply did have a certain impact, pure supply effects (meaning those unrelated to the financial situation of the borrowers) were of minor importance over the period 2007-2009. In Germany, *Rottman and Wollmerhäuser (2012)* also conclude that there was no real credit rationing in 2008-2009.

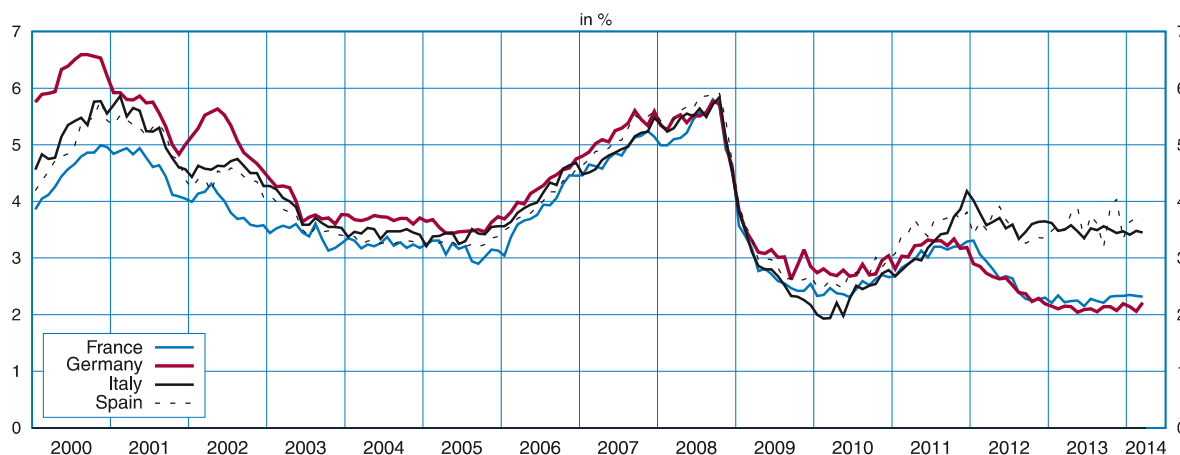
... although not in Spain in recent times...

*Bentolila et al. (2013)*, meanwhile, developed a different approach based notably on detailed data on relations between companies and their banks. According to them, there is credit rationing in Spain, and it is significantly more severe when the intermediated financing was taken out from a bank that was hit hard by the crisis.

... and the surveys do nevertheless show the existence of supply restrictions

The current difficulties of the financial system can therefore explain some of those encountered by the European economies over and above the level justified by the weakness of demand. In addition, the banks surveyed by the ECB for the BLS survey indicated that they had tightened their lending terms in 2008-2009, then again in 2011-2012, and had not eased them since. 14% of European SMEs, meanwhile, declared that they were having difficulties gaining access to external financing between October 2013 and March 2014 in the SAFE survey (see *Graphs 3 and 4*). These difficulties were even leading some of them to restrict themselves and not even apply for bank credit.

**2 - Average rate of bank loans to enterprises in the Eurozone**  
Last point: March 2014



Source: ECB

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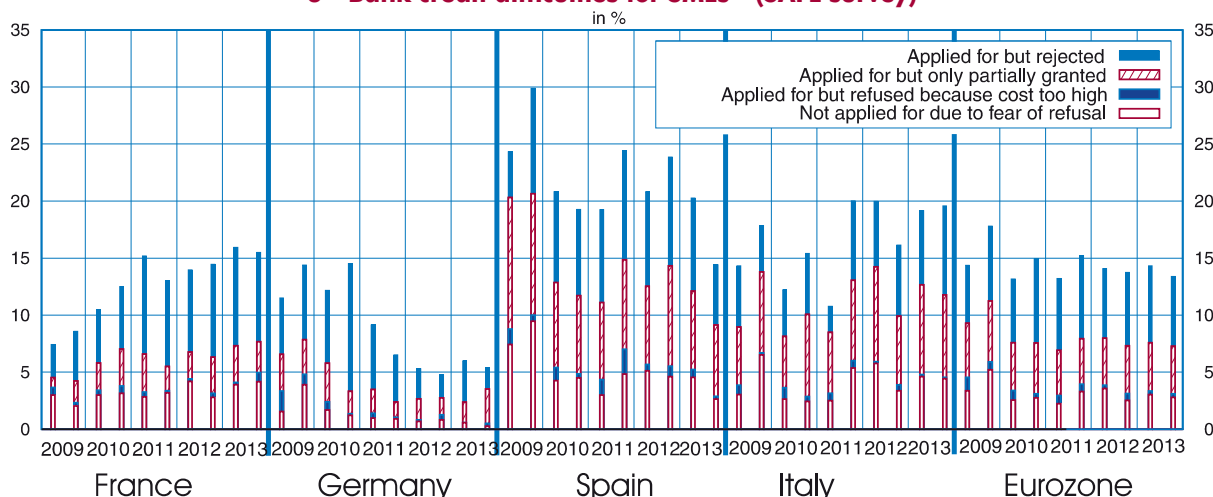
Consequently, the structure of corporate financing has been changed substantially

*This situation has generated a modification in the structure of corporate financing*

The difficulties of the banking systems of the different European countries have had an impact in return on the structure of corporate financing in the Eurozone, although to varying degrees.

The vast majority of European companies gain access to external financing through bank financing, unlike American companies, for example, whose financing is less intermediated and based more directly on financial markets, and in particular bond issues. In France, for example, bank lending is thought to have represented about 73% of the total debt of companies prior to the crisis. Since 2008, this share has fallen regularly and bank credit currently represents 63% of companies' external financing. This process shows a substitution in external financing sources between bank financing and market financing. The origin of this substitution lies in the financing difficulties of the banking system and the fall in the rates on bond issues, generating opportunistic behaviour. It is hitting companies in varying ways, however. For large companies that enjoy easier

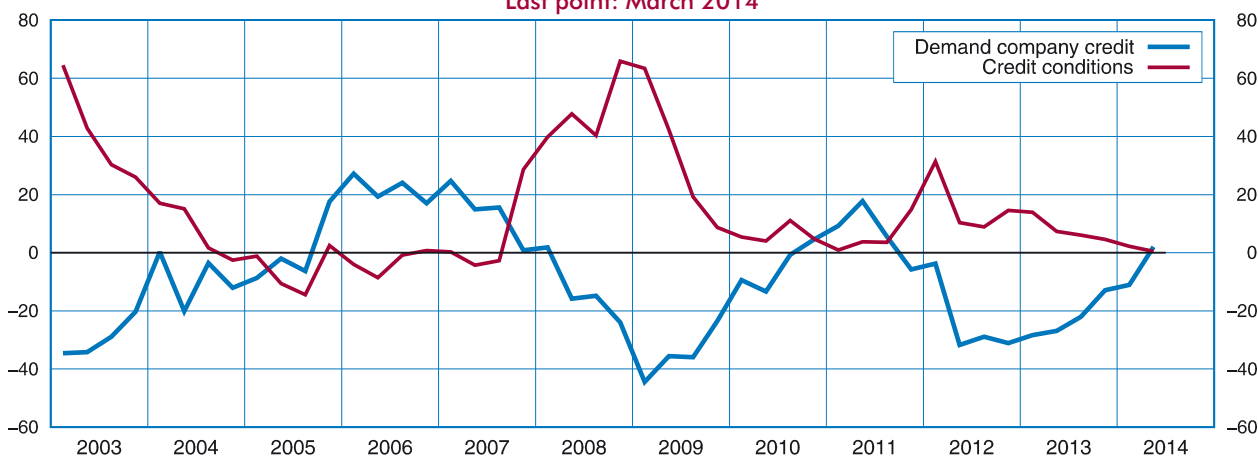
### 3 - Bank credit difficulties for SMEs - (SAFE survey)



Source: ECB

### 4 - Net percentage of opinions of European banks on credit supply and demand

Last point: March 2014



Source: ECB

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access to financial markets, the fall in bank credit supply has been offset by a substantial rise in debt security issues (see *Graph 5*). In France, for example, market debt progressed by 15% in 2009, after a 1% fall in 2008. At the same time, bank financing fell from a growth rate of 13% in 2008 to 3% in 2009<sup>2</sup>. The same substitution phenomenon can be observed between the end of 2011 and 2012. The liquidity crunch which, in the wake of the sovereign debt crisis, was threatening at the time to hit the European banks, partly explains this.

This reallocation of external financing by companies weighed differently both between countries and according to the type of companies concerned. While the lowest-risk companies (generally large companies) achieved this substitution at low cost, the same does not apply to companies perceived by the markets as bearing higher risk (usually smaller companies), whose bond rates incorporated a high risk premium that still exists today<sup>3</sup>.

### The financial accelerator and flight to quality phenomena may have amplified the deterioration in activity

The weakened economic situation experienced by the Eurozone over the last six years may have amplified the difficulties encountered by the banks and, in return, hit activity harder. One part of economy theory addresses this question and can provide insights into the mechanisms involved. This is the financial accelerator theory and the phenomenon referred to as the "flight to quality". These mechanisms are based on microeconomic foundations and can result in the appearance of differentiated economic regimes from a macroeconomic point of view.

**The financial accelerator, a mechanism that amplifies the shock in the real economy, is the macroeconomic translation of market imperfections**

Bank financing involves lenders and borrowers in a principal-agent relation as described by contract theory: lenders and borrowers do not have the same information concerning the degree of risk attached to the investment projects, the behaviour of the borrower, or the final returns of the projects to be financed. This

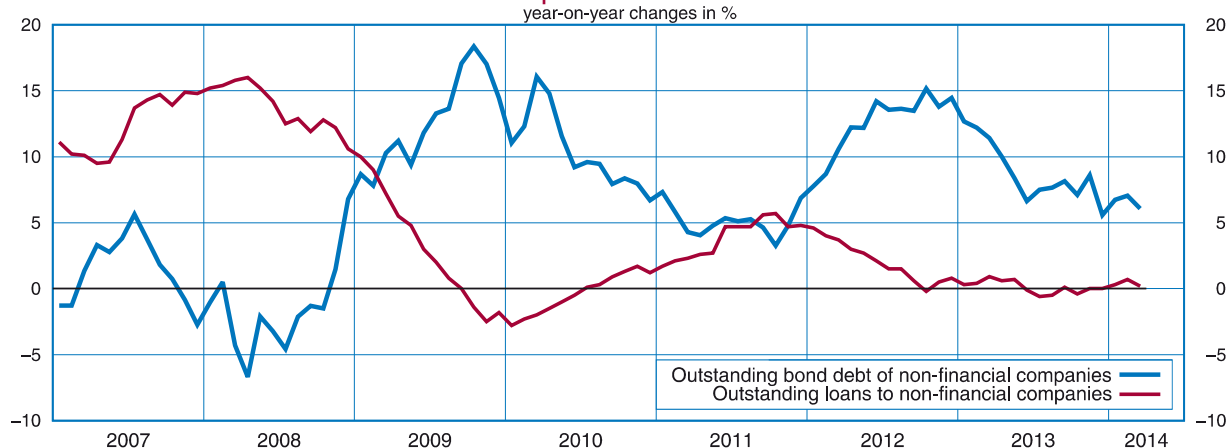
(2) These data are from the ECB. Market-based debt refers to total issues of bond debt of French non-financial companies, and bank debt refers to total outstanding debt granted by banks, also to non-financial companies.

(3) See the "stat info" publication "Financement des PME en France" by the *Banque de France* for a presentation of the structure of bond yields by risk class.

### 5 - Structure of the debt levels of large French enterprises

Last point: March 2014

year-on-year changes in %



Source: ECB

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asymmetry of information is an imperfection (within the meaning of the economic theory) of the bank credit market. The banks therefore implement an audit and information collection procedure that is costly and which cost is therefore passed on by the banks to their clients in their credit access terms. These costs resulting from asymmetry of information give rise to an external financing premium and to frictions on the credit market.

*Information asymmetries between lenders and borrowers give rise to a financial accelerator phenomenon...*

To reduce these information asymmetries to the minimum, along with the counterparty risk that goes with them, lenders can base their decisions on the value of the assets held by the borrowers, and accordingly apply an inversely-proportional external financing premium. These assets may be in the form of the financial balance sheet of the company or its collateral. However, as the value of such assets is generally correlated with economic activity, the banks introduce a *de facto* procyclical mechanism in their loan granting. *Bernanke and Gertler (1989)* described the role of the balance sheet position of agents in economic dynamics. This information provides an insight into the solvency of borrowers and can reduce agency costs for the banks.

*...based either on the company's balance-sheet position...*

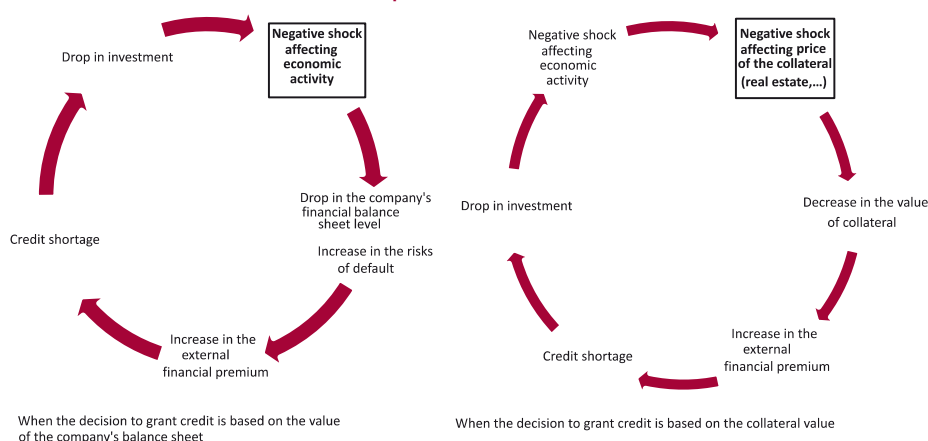
The external financing premium applied is inversely correlated with the financial situation of borrowers: companies with higher net wealth will be considered more solvent and will benefit from a lower financing premium. In economic slowdown periods, the deterioration of the balance-sheet position of agents results in a variation in this premium and, more generally, a deterioration of lending conditions. Given this increase in the cost of access to financial resources, companies are then forced to limit their inventory and their investment expenditure, and hence their level of production: the initial shock spreads and grows (see *Graph 6*).

*...or on the estimated value of collateral*

*Kiyotaki and Moore (1997)* perform a general equilibrium analysis of these microeconomic frictions and develop the idea that production factors (real-estate assets, plant, etc.) may also serve as collateral for loans. The potential amount of credit corresponds to an exogenous fraction of the value of collateral. When the price of assets falls, the increased difficulty in obtaining financing leads to a drop in investments. The initial shock is then amplified. In other words, an idiosyncratic shock on the price of assets may generate a variation in the value of the collateral and hence trigger the mechanism described above. In a loop system, this idiosyncratic shock may then be passed on to the economy as a whole (see *Graph 6*).

## 6 - Financial accelerator mechanism

Last point: March 2014



Source: ECB

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This mechanism is known as a financial accelerator, or "broad credit channel", and explains the interdependence between the real and financial sectors. It presents two types of asymmetries that may widen. On the one hand, banks adopt different behaviours according to the size of companies; the resulting phenomenon is known as the "flight to quality" (Bernanke 1993). On the other hand, the influence of the financial accelerator mechanism differs according to the phase in the economic cycle.

*Bank behaviour towards large and small enterprises is asymmetric ...*

Banks usually reduce the proportion of funds allocated to uncertain projects requiring close monitoring and tend to prefer safer projects. The information asymmetry is potentially smaller for large enterprises, mainly due to the greater diversification of their risks. Next, they are also less sensitive to economic fluctuations than small enterprises as they have better control over their inventory. Last, they generally have officials (accountants, auditors) who afford banks easier access to information, leading to economies of scale in the information collection process and thus, by definition, a relatively lower agency cost borne by the bank.

*...especially when the economic outlook is poor*

The second asymmetry stems more broadly from the economic cycle. The financial accelerator has a stronger effect in the low phase of the cycle than in its high phase. During an expansionary phase the global net worth of borrowers, at aggregated level, is high and hence the agency costs are lower. Consequently, variations in the value of companies have little effect on the lending decision and the financial accelerator is weakened. In recessionary periods however, when global wealth is low, fluctuations in current profits have significant effects on investment and production. The amplifying effects are therefore stronger in unfavourable economic periods. This difference may foster and amplify the flight to quality, mainly because large enterprises have smoother activity. Gertler and Gilchrist (1994) develop the idea that small enterprises are more sensitive to credit rationing during adverse phases than in expansionary phases.

The financial accelerator is thus asymmetric in character and potentially displays nonlinearities in the response of real activity to economic and financial shocks. The methodology developed hereafter and the variables used attempt to identify these differentiated regimes.

### A real-financial spheres linkage model attempts to test for the existence of this accelerator effect, and to quantify it

*In order to find out whether the financial accelerator phenomenon exists in France...*

Is there a financial spheres accelerator mechanism in France? Can flights to quality be observed? What about in the current period? To answer these questions, a model inspired by Balke (2000) is adapted to France.

#### A representation of the French economy by a vector model allowing a change of regime and integrating a lending-conditions variable

*...a model is proposed, accounting for real-financial interactions...*

Real-financial spheres interactions are accounted for via a vector autoregression model, or VAR (see Box 1), which, with monthly data, takes into account the dependencies between economic activity, inflation, the interest rate and a credit market status indicator.

As in any VAR model, it is necessary to associate causality relations with the instantaneous correlation that exists between the variables, based on assumptions from economic theory. In the case at hand, from an economic viewpoint it seems reasonable to assume that the activity and inflation variables react with a time lag to the financial variables, while the two financial variables (interest rate and credit terms) depend contemporaneously on the macroeconomic environment. We also assume that activity does not react to a price shock within the same month, and that interest rates do not react to a lending-conditions shock within the same month (see Box 1).



## Box 1 - Modelling the nonlinear transmission of credit shocks

The modelling of the nonlinearities described by the economic theory and resulting from differentiated credit conditions is inspired by *Balke (2000)*, who uses a threshold vector autoregressive model (TVAR) to capture the differentiated responses from the economy. This multivariate model approximates the continuous phenomena of credit constraints into a binary phenomenon by introducing a threshold that distinguishes two separate regimes.

The monthly TVAR equation is written as follows:

$$Y_t = C_1 + A_1 Y_t + B_1(L)Y_{t+1} + (C_2 + A_2 Y_t + B_2(L)Y_{t+1}) I_{c_{t-d} \geq \gamma}$$

with:

$Y_t$  containing the following four variables: growth rate of the industrial production index (IPI), growth rate of the producer price index, 3-month Euribor rate, and a measure of the bank credit squeeze.

$B_1(L)$  and  $B_2(L)$  are matrix lag polynomials that represent the autoregressive structure of the model, i.e. its dependence on its past.

$I_{c_{t-d} \geq \gamma}$  corresponds to the regime indicator and is used to introduce the nonlinearity. This indicator is equal to 1 provided that  $c_{t-d}$ , which measures credit conditions, remains above the estimated threshold.

$d$  is introduced in order to take account of the transmission time, which is the time economic agents need to take account of the past conditions of the banking market.

Matrices  $A_1$ ,  $B_1$  and  $C_1$  are the coefficients of a linear VAR model estimated only on the part of the sample that corresponds to the standard regime (the indicator then has a value of 0). However, on the portion of the sample corresponding to the credit squeeze regime, the estimated matrices are  $C_1 + C_2$ ,  $A_1 + A_2$  and  $B_1 + B_2$ . The differentiated response from the variables in the different regimes (i.e. the accelerator effect) stems from this estimation strategy. Matrices  $A_1$  and  $A_2$  represent the contemporary relations between the different variables of  $Y_t$ . To estimate the model it is necessary to make a causal assumption in accordance with the following schema used in *Balke (2000)* and *Cecchetti (1995)*:

IPI → Producer price → Euribor → r → Bank credit squeeze

This causal relation means that here economic activity does not depend contemporaneously on any variable and hence only reacts with a time lag to the evolution of the other variables. Conversely, the measure of credit conditions reacts contemporaneously to the IPI, to inflation and to the interest rate (as well as to the past of all the variables). As a result, matrices  $A_1$  and  $A_2$  are lower triangular with zeroes along the diagonal. This assumption is equivalent to the particular choice of a *Cholesky* decomposition.

The particularity of this sort of model is the requirement to estimate  $\gamma$  and  $d$ . If these parameters were known, the model would be estimated directly by Ordinary Least Squares as in a classical VAR model. In the case at hand, a grid search method is used.

First, a set of acceptable values for unknown parameters  $\gamma$  and  $d$  is selected. A maximal  $d$  is chosen arbitrary and  $\gamma$  is chosen according to the empirical distribution of  $c_{t-d}$ . For each of these pairs of values, the model is estimated by ordinary least squares. Next, the so-called optimal pair ( $\gamma$ ,  $d$ ) is chosen to minimise the log-determinant of the variance-covariance matrix of the estimated residuals. On the assumption of Gaussian residuals, this methodology actually corresponds to a discrete evaluation of the estimator by maximum likelihood.

Prior to this estimation, it should be noted that the choice of the number of lags in the model is carried out separately by parsimony analysis on the *Schwartz and Akaike* information criterion.

Once the optimal model has been estimated, the presence of two regimes, i.e. nonlinearities, is tested in our model. The aim is to find out whether the threshold model provides more information than a linear model built on the same data. Formally, the assumption tested is:

$$C_2 = A_2 = B_2 = 0.$$

As previously, the threshold structure of our model does not allow direct recourse to the usual tests. In particular,  $\gamma$  is not estimated in a linear model, and this modifies the asymptotic behaviours of the test statistics. *Hansen (1996)* and *Andrews and Ploberger (1994)* derive analogous tests in the form of an average or a maximum of the likelihood ratio and Wald statistics on all the values of the search grid. These four tests are respectively denoted avg-LR, sup-LR, avg-Wald and sup-Wald. The critical values of the tests are calculated by bootstrapping to simulate the distributions.

Lastly, the refinement introduced by the threshold modelling also does not allow direct recourse to the classical definition of response functions. Indeed, due to the nonlinear structure of the model, the amplitude and the sign (positive or negative) of the shock under study, but also the initial conditions, are determining factors of the response from the model's four variables. *Koop, Pesaran and Potter (1996)* avoid this stumbling block by developing so-called generalised response functions taking these particularities into account. These response functions are calculated by bootstrapping and allow the switch between regimes in response to the simulated shocks. ■

## Credit conditions do not seem to amplify the economic cycle in France

*...and authorising nonlinearity*

The model also allows for a switch from a normal economic regime, when the credit squeeze indicator is below a given threshold, to an unfavourable regime when the indicator is above this threshold. However, the switch does not occur immediately after the threshold is crossed. This time lag corresponds to the speed of reaction of economic agents to the change in financial conditions, for example the time required to renegotiate loan contracts, or the time companies need to set up a market financing operation.

*The model variables are the IPI, the industrial producer price index, the 3-month Euribor rate, and a credit market indicator...*

Economic activity is measured here by the growth rate of the industrial production index. This monthly index gives the closest reflection of growth in the activity of French enterprises. While the scope of this index is restricted, the correlation with quarterly GDP<sup>4</sup> remains strong. Accordingly, inflation is measured by the growth rate of the French industrial producer price index for the French market. It both provides a measure of prices on a monthly basis and serves as a support for individual companies in their production decision-making processes. The interest rate corresponds to the refinancing cost of banks. It is measured by the Euribor 3-month rate, the average lending rate on the interbank market. Lastly, the model contains a variable intended to represent the credit market situation and more specifically the phenomena of flight to quality and the credit squeeze.

### Flight to quality and credit squeeze are unobservable values which several indicators attempt to approximate

In this framework, a constrained economic regime may be linked either to a flight-to-quality effect or to a bank credit squeeze phase, and to different lending behaviours depending on the case. These two phenomena are identified by measurements of bank behaviour that differs either according to company size or to a deteriorating financial environment. The responses to the BLS survey have not been used as indicators since they come from banks and differ from the responses by companies to the SAFE survey. The analysis that follows uses four variables, presented below (see *Graphs 7*).

*The flight-to-quality phenomenon is measured via differences, either in lending rate...*

Two variables serve to record the flight-to-quality phenomenon. A first variable uses the difference between the loan interest rate billed to small enterprises and that billed to large enterprises (Indicator 1). The theory, based on differences in agency costs and on the uncertainties surrounding the projects of large and small enterprises, does indeed suggest that banks apply an external financing premium that differs according to company size. As the refinancing rate of the bank is the same whether it lends to a small or a large enterprise, this difference in premium captures the difference in bank behaviour faced with the risks of the project. In a general climate of uncertainty, banks are likely to increase the lending cost to small enterprises in order to guard against the risk of default and attempt to capture the investment demand of large enterprises, which are considered more reliable. The rate spread therefore tends to widen during periods where bank credit is tightening<sup>5</sup>

(4) An alternative would be to retain a monthly GDP by means of the IPI, using the Chow-Lin method for example. As the estimate results (available on request) are very similar, this approach is not presented here.

(5) A structure effect could however reduce this difference if a proportion of small companies did not take out these loans which have become more costly. The riskiest loans would be granted relatively less often, bringing down the average rate overall and probably more for small enterprises.

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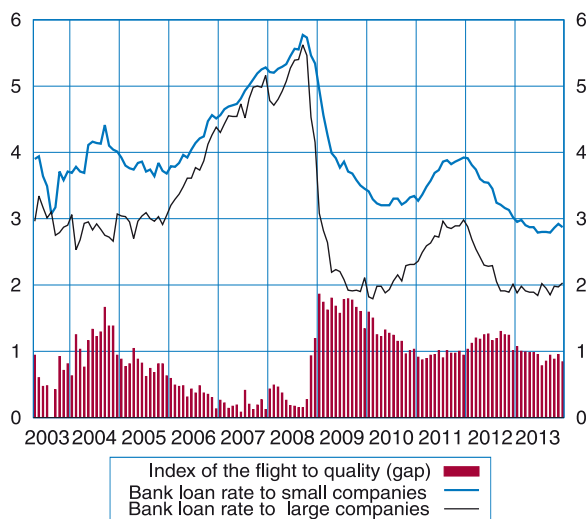
...or in quantity of credit granted to small and large enterprises

As banks can also modulate the quantities of loans granted according to company size, the flight to quality may also lead to an increase in the flows of new loans granted to large companies (whose projects are deemed safer) and a decrease in the flows granted to small companies. Hence the growth differential between new bank debt contracted by large companies and that contracted by small companies is an identifier of changes in economic regime (Indicator 2).

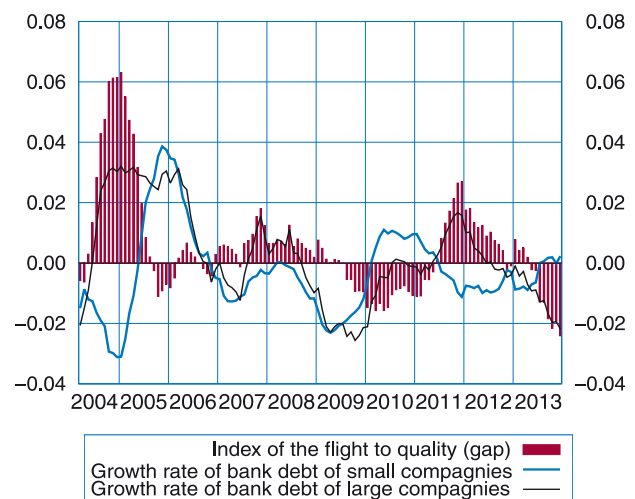
However, due to a lack of monthly data filtered by company size, it is necessary to use an approximation in order to build the indicators. Therefore, the loan amount is used as a proxy for size. The rates and flows of new loans agreements for less than €1 million are considered as being granted mainly to small enterprises, while the rates and flows of new agreements for loans of more than €1 million are considered as being granted mainly to large enterprises. This breakdown by company size, which is regularly used in the empirical literature, is an approximation of the partition between "more secure borrowers", i.e. large companies, and "riskier borrowers", i.e. small companies.

## 7 - The four credit market status variables used

**Indicator 1: Bank rate spread**

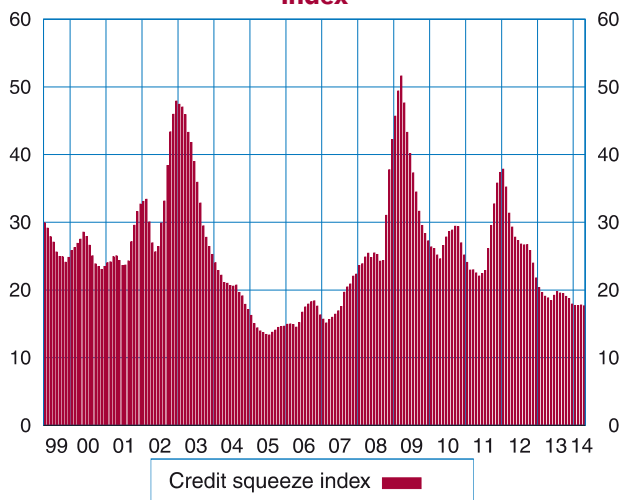


**Indicator 2: Bank debt volume spread**



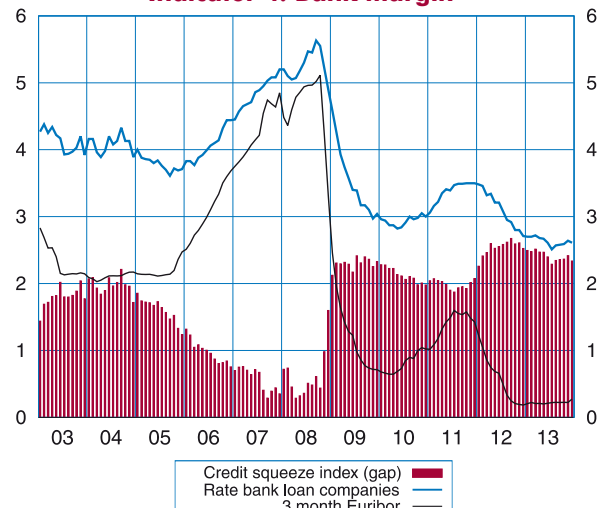
Source: ECB

**Indicator 3: European stock market volatility index**



Source: Data Insight

**Indicator 4: Bank margin**



Source: ECB

## Credit conditions do not seem to amplify the economic cycle in France

As well as their *a priori* ability to capture flight-to-quality periods, these two measurements present the advantage of being relatively independent of the economic cycle and of monetary policy decisions. Indeed, in a "standard" economic regime the behaviour of banks towards borrowers should evolve in an undifferentiated way between the various types of company. For example, in an economic recovery period, banks will increase their flows of new loan agreements at the same speed across all companies. Similarly, when the ECB's base interest rates are cut, banks will pass this reduction on identically to small and large enterprises. According to *Lown and Morgan (2002)*, the lending conditions of American banks do not depend on monetary policy. On the contrary, by capturing the differentiated ex-post behaviour of banks towards different company sizes, these indicators mainly identify the credit supply side of credit squeezes. However, like any indicator, they can also take account of a differentiated behaviour by the companies themselves, and, in this particular case, a differentiated behaviour among large companies, who would attempt to replace bank financing by market financing.

*The credit squeeze situation*

*is captured via a stock market index...*

*...or a bank margin indicator*

Two other variables complete this identification of flight-to-quality phenomena by identifying bank credit squeeze phases, that is, a deterioration of the financial environment which may have an impact on the credit behaviour of banks.

First of all, the Vstox 50 index (Indicator 3) of stock-market volatility in the options market on the Euro Stoxx 50, which more generally measures conditions on the financial markets and is tied to the uncertainty surrounding the balance-sheet valuation of companies. Although it measures the stock-market volatility of the European market, the strong integration of financial markets in the Eurozone allows an approximation of a similar behaviour in national markets, and here the French market.

Next, bank margins on loans (Indicator 4), measured by the spread between the average yield on loans to non-financial enterprises and the 3-month Euribor rate. This latter rate measures the short-term refinancing cost on the interbank market. In bank credit squeeze periods, at a constant interbank refinancing cost, a rise in the financing premium for companies translates a risk-averse behaviour among banks and a price constraint on lending. As previously, this indicator has the particularity of being independent of the monetary cycle, and probably represents the banks' own margin decisions. It is also an element in the trade-off by companies, and more specifically large companies, between bank and market financing, and may also capture the more structural effects of financial liberalisation. In particular, the stronger competition between banks, or their ability to diversify risk, may structurally lead to a drop in the bank margin. Lastly, this indicator may also be sensitive to changes in banking regulations, which can alter the way the risk linked to corporate credit is weighted.

### In France the credit market accelerator effect has not been in evidence over the last fifteen years

*In France, three of the indicators presented point to the presence of two regimes...*

The four indicators presented were used to estimate four models encompassing two credit regimes depending on whether the indicator was higher or lower than a threshold, which itself was determined endogenously during the estimation (see *Box 2* for the details of the results of the estimates).

Three of the four models<sup>6</sup> identify two different regimes depending on the value taken by the credit indicator included in the model. In other words, the introduction of a change of regime according to lending conditions generally provides significant information about the behaviour of the French economy, but the changes in behaviour do not indicate a financial accelerator phenomenon.

(6) Only the second one, which uses the growth differential in bank debt contracted by large enterprises and small enterprises, rejects the existence of this effect.

## Box 2 - Main findings

Due to the short time horizon, the VAR models are built with only one lag and with transmission times ranging from  $d = 1$  to 3 months, suggesting that the economy takes the credit environment into account relatively quickly.

### Three of the four models indicate the presence of a financial accelerator effect in France

For the four models estimated, the existence of an accelerator effect is given by the test statistic and its associated p-value (see *data in parentheses in the Table*). Statistics 1 and 2 (resp. 3 and 4) correspond to the average and the maximum of the likelihood ratio (resp. Wald) statistics on the search grid. Models 1, 3 and 4 reject the null hypothesis of the absence of financial accelerator, while model 2 accepts it: this finding actually shows that the indicator used is not discriminating enough. For each model the moving average of the credit squeeze variable and, when it is significant, the threshold used to determine the values of the credit regime indicator, are represented (see *Graph*).

### A negative shock in the bank credit squeeze indicator implies a 10% to 30% rise in the likelihood of an unfavourable regime for two quarters

The temporal evolution of the likelihood of being in the "credit squeeze" regime following a shock (on condition that the starting point is in the "standard" regime) depends on the model and is a function of the nature of the shock. For example, for Model 1 we observe 55% more likelihood in  $t=2$  of being in a credit squeeze

regime than in the absence of a shock and the natural evolution of the model.

A positive shock of two standard deviations of the credit squeeze indicator, that is, a deterioration in the credit environment, leads to increases of 35% to 55% in the likelihood of being in an unfavourable regime. This greater likelihood of being in an unfavourable regime persists for 6 to 8 months in models 1 and 4, while it lasts longer in model 3 with a likelihood that is still 10% after two years. This similarity between model 1, with a credit spread between small and large enterprises, and model 4, with bank margin on credits, may come from the fact that these indicators are directly linked to the credit decision of banks, while model 3, based on Vstox, is a more "diffuse" indicator of constraints relating to the financial sector.

Additionally, it emerges that all shocks, in particular those concerning the Euribor and credit squeeze indicators, have a retroactive effect on lending conditions and thus play an important role in the switch between regimes. In the financial accelerator theory all shocks are important, not only "credit" shocks. These findings are in line with those of Balke (2000) on American data.

In theory, the switch between the two regimes brings with it an asymmetry - if it exists - in the response from the economy to a shock. For example, an adverse shock on credit conditions is likely to have a stronger impact if it occurs in the credit squeeze regime than if it takes place in the standard regime. However, the empirical estimates only show very little asymmetry in the responses from the variables to the shocks. ■

### Results and models estimated for each indicator

| Model | Bank credit squeeze indicator   | Model specification              | Estimated threshold | Stat 1 avg-LR                     | Stat 2 sup-LR      | Stat 3 avg-Wald    | Stat 4 sup-Wald     | % of observations in the standard regime between 2004 and 2013 |
|-------|---|----------------------------------|---------------------|-----------------------------------|--------------------|--------------------|---------------------|--|
| 1     | Borrowing spread between SMEs and large enterprises                     | 2003M2-2013M12<br>d=1, P=1, m=4  | 0.015               | 45.10<br>(0.05)**                 | 71.57<br>(0.05)**  | 42.97<br>(0.00)*** | 71.11<br>(0.02)**   | 67.5 %   |
|       |   |                                  |                     | Existence of a critical threshold |                    |                    |                     |  |
| 2     | Difference in growth in credit flows between SMEs and large enterprises | 2004M1-2013M12<br>d=2, P=1, m=6  | 0.0075              | 29.72<br>(0.36)                   | 65.08<br>(0.07)*   | 27.68<br>(0.35)    | 63.24<br>(0.09)*    | A single regime  |
|       |   |                                  |                     | Linear model                      |                    |                    |                     |  |
| 3     | Stock market volatility   | 1999M2 - 2014M1<br>d=3, P=1, m=6 | 24.0792             | 44.65<br>(0.03)**                 | 87.75<br>(0.00)*** | 43.20<br>(0.00)*** | 88.46<br>(0.00)***  | 56.7 %   |
|       |   |                                  |                     | Existence of a critical threshold |                    |                    |                     |  |
| 4     | Bank margins on loans   | 2003M2-2013M12<br>d=1, P=1, m=6  | -0.0035             | 48.16<br>(0.02)**                 | 101.4<br>(0.00)*** | 45.98<br>(0.00)*** | 102.19<br>(0.00)*** | 65 %   |
|       |   |                                  |                     | Existence of a critical threshold |                    |                    |                     |  |

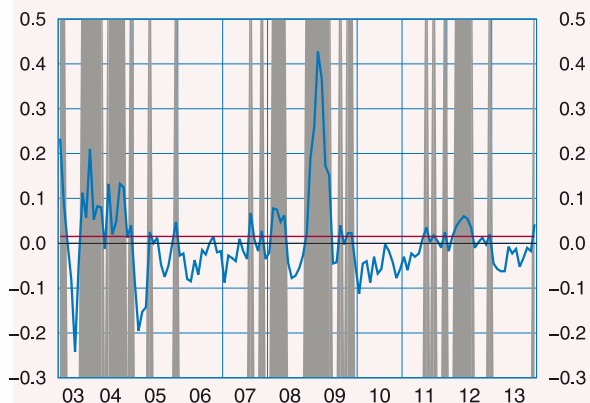
#### How to read it:

- \*, \*\*, and \*\*\* - correspond to a significance at the threshold of 10%, 5% and 1% respectively
- d indicates the time for transmission of changes in condition to the banking market
- P indicates the number of lags used in the model
- m indicates the order of the moving average applied to the credit squeeze indicators in the regime-change indicator

# Credit conditions do not seem to amplify the economic cycle in France

Over the last ten years, between three and four years are qualified as credit squeeze periods

**Model 1**

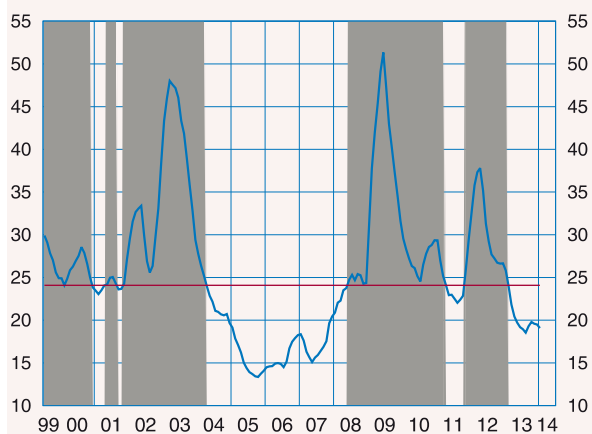


**Model 2**

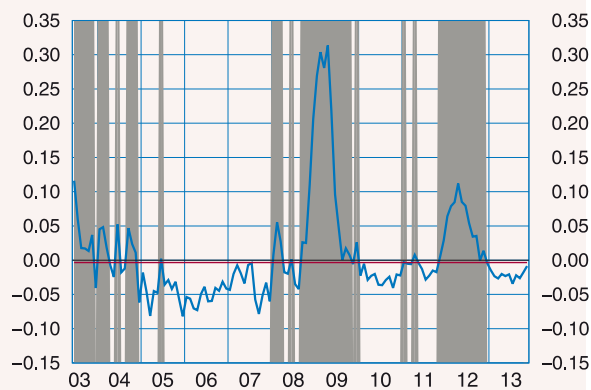


Periods of flight to quality identified  
Indicator of the flight to quality  
Gamma

**Model 3**



**Model 4**



Credit squeeze identified periods  
Credit squeeze Index  
Gamma

Source: INSEE

### In France, two major credit tightening periods are pinpointed in the last ten years...

*...with two or three credit squeeze periods over the last ten years...*

The behaviour of the different indicators towards their critical estimated thresholds highlights two bank credit squeeze periods in the course of the last ten years: from mid-2008 to early 2011 and from end 2011 to early 2013. These two episodes correspond respectively to the financial crisis and the sovereign debt crisis in the Eurozone. One other episode identified in the model using the Vstox 50 stock-market volatility index as an indicator of the triggering of a credit regime, in early 2004, is more difficult to interpret.

*...globally concomitant with the business cycle*

It is also worth comparing these credit-squeeze periods with spells of recession in the French economy. The conventional definition of recession as a period of at least two successive quarters of zero or negative growth allows the identification of two episodes since 2003: 2008Q2-2009Q2 in the recession, and 2012Q4-2013Q1 further to the sovereign debt crisis. These two periods do indeed correspond to credit-squeeze periods as identified by all the indicators: this result is reassuring as to the relevance of the indicators used, although strictly speaking it does not provide conclusive evidence of a causal relation between credit squeeze and recession.

In all, the French economy has experienced between 39 and 52 months of tighter lending conditions over the last ten years. The actual length depends as much on the choice of indicator as on the choice of binary modelling of the switch between the two regimes, which qualifies as a "credit squeeze" values which can be both slightly higher than the threshold and much higher, like those observed at the end of 2008. The period is similar to the time in recession, which is 48 months according to the CEPR<sup>7</sup> European cycle dating, a period that is nonetheless longer than the 21 months of recession in France with the criterion used previously.

### ...but the credit squeeze periods do not seem to aggravate the reaction of activity to lending conditions

*But ultimately the impact of the credit market environment on activity is not discernable*

Irrespective of regime, an adverse credit-market shock results in a drop in the industrial production index. For the most empirically satisfactory model, which uses stock-market volatility, the growth rate of the IPI falls by 0.1 to 0.2 percentage points for an adverse lending-conditions shock of one standard deviation (see *Graph 8*).

But this reaction is not amplified in the credit squeeze regime compared with the other regime. It seems difficult to reconcile this observation with the theory of the financial accelerator. However, the difference is much greater as regards both the reaction of prices and that of rates. The existence of the two regimes as detected by the estimate could thus indicate the presence of common shocks bringing about changes in both the dynamic of prices and in the behaviour of the financial sector.

(7) The CEPR dating committee draws up an official list of recession periods in the Eurozone. For further information: <http://www.cepr.org/content/euro-area-business-cycle-dating-committee>

# Credit conditions do not seem to amplify the economic cycle in France

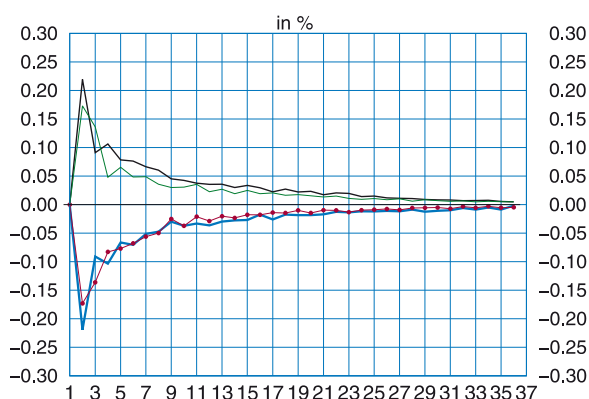
## Conclusion: the credit market does not appear to constitute an obstacle to growth in the French economy

With the ongoing recovery, the credit market should brighten. The beginnings of this brighter picture are already visible: in France, outstanding credit in the private sector is showing a slight upward trend (+0.6% year-on-year in April). Furthermore, according to the latest BLS survey in April 2014, lending conditions for companies stabilised in Q1 2014 and, for the first time since mid-2007, banks are indicating that their perception of the macroeconomic environment and corporate perspectives has had a positive impact on lending. This survey also signals a sharp improvement in corporate demand for credit, which is on the rise for the first time since mid-2011.

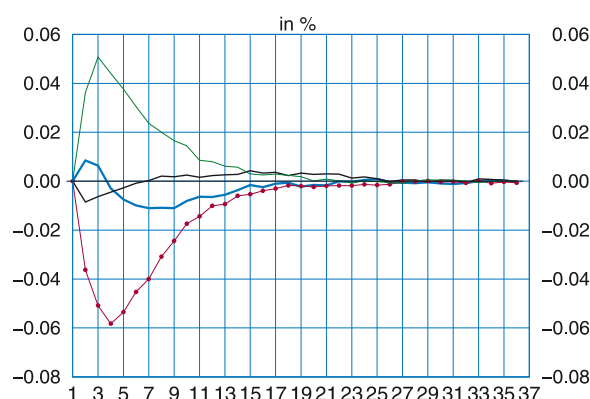
The switch in early 2013 to a non-constrained credit regime seems to have been confirmed and the credit market should therefore not constitute an obstacle to the recovery of the French economy if the behaviours observed between 2003 and 2013 are an indication of future behaviours. ■

### 8 - Response to a unit shock in the credit indicator (model 3)...

#### ... of the growth rate of the industrial production index

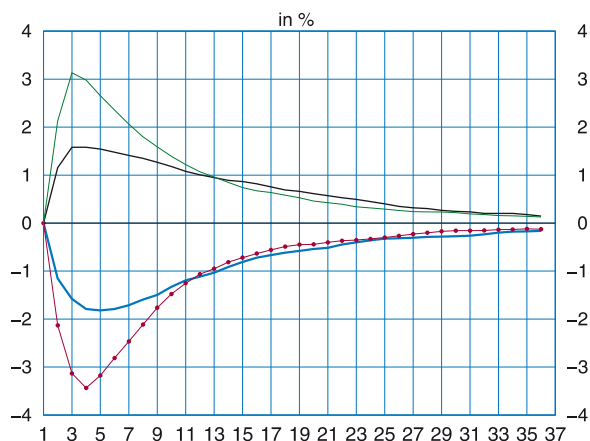


#### ... of growth of output prices

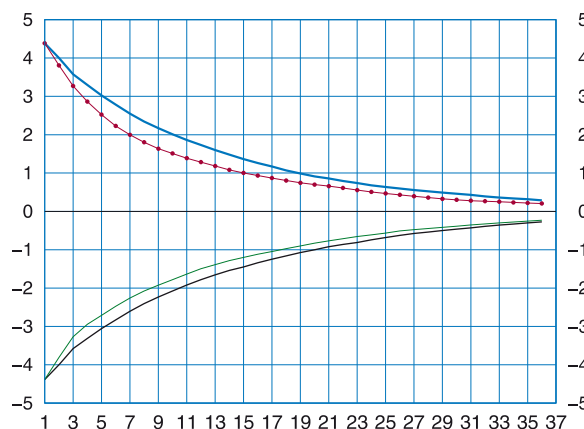


"Standard" initial regime – unfavorable unit shock — blue line  
 "Standard" initial regime – favorable unit shock — black line  
 "Credit squeeze" initial regime – unfavorable unit shock — red line  
 "Credit squeeze" initial regime – favorable unit shock — green line

#### ... of Euribor



#### ... of bank credit squeeze indicator



Source: INSEE



## Appendix - Difficult measurement of the impact of tighter banking regulations on credit supply in the Eurozone

The scale of the financial crisis and the public funds used to stabilise the situation highlighted the existence of failings in the banking regulation. The G20 rapidly tasked the Basel Committee (a committee of the main central bankers) with proposing a change to the "Basel II" Accords in force at the time; the amendment was voted in 2010 and given the name "Basel III" Accords.

Aiming for greater financial stability in order to support medium-term growth, these accords implement more stringent rules on bank financing and activities. They may therefore potentially have a negative short-term effect on activity by limiting the financing capacity of the real economy by banks.

### A bank's balance sheet (and off-balance sheet)

A bank is first and foremost a financial intermediary: it is the contact point between savings (households and businesses) and cash requirements (borrowers). This is a far from simple operation, because:

- (i) the demand for loans may differ from the amount of deposits;
- (ii) households may withdraw their deposits more quickly than the bank can retrieve the sums loaned;
- (iii) borrowers may default, while the bank has to guarantee all depositors the ability to retrieve their deposits if needs be.

Two other elements therefore complete banks' balance sheets (on top of deposits and loans):

- capital exchanged on the financial markets in order to finance the bank or invest surplus cash (short term, with day-to-day financing for example, or medium-term with bond issues, for example),
- the bank's own capital, held in reserve to guard against unexpected losses.

A bank's balance sheet<sup>1</sup> can thus be represented as follows:

### "Basel III" Accord

Bearing in mind the lessons learned from the crisis, the Basel Committee made three key decisions in the Basel III Accords (see *Basel Committee on Banking Supervision 2010*):

- (i) an increase in capital requirements,

(ii) the creation of two liquidity ratios: the Liquidity Coverage Ratio (LCR) to ensure that banks have the necessary assets to ride out a "severe but not extreme" liquidity crisis for a period of one month, and the Net Stable Funding Ratio (NSFR) for the medium-term (1 year) financing capacity of banks, forcing greater harmonisation between the maturities of liabilities and assets,

(iii) the introduction of a 3% limit on authorised leverage.

### These decisions are likely to have an impact on the credit market:

In theory, the "Basel III" Accords could impact the credit market:

- the rise in capital requirements could increase the cost of credit, all the more so for risky loans, by increasing the cost of holding assets proportionally to the degree of risk of the asset. Several microeconomic studies seem to indicate an adverse effect of capital requirements (identified either by financial crises causing capital shocks or by various regulatory modifications) on the bank credit supply. For example, the financial crisis in Japan in the late 1980s led to a constraint on Japanese banks to meet regulatory capital requirements and resulted in fewer loans on the American market (*Peek Rosengren 1997*). Similarly, certain German banks were exposed to the American subprime market and had to cope with liquidity constraints; a comparison of their credit supply with other banks indicates an adverse effect (*Puri, Rocholl, Steffen 2011*). Various assessments of changes to macroprudential policies also show a negative short-term effect on credit supply (*Jiménez et al. 2013 on Spain, Aiyar et al. 2014 on the United Kingdom, Brun, Fraise, Thesmar, 2013*). Conversely, certain studies find no impact of the increase in capital requirements on lending activity (*Buch and Prieto 2012 in Germany*) or on rates (*Martín-Oliver et al. 2012 in Spain*);
- the introduction of liquidity requirements could work slightly in favour of households and small enterprises, as banks are

(1) However, this balance sheet does not present all the financial commitments of a bank. Part of the bank's activities is recorded as "off-balance sheet": these are operations that may become, but are not yet, financial transactions (purchase or sale commitments, guarantees, commitments linked to term funding instruments, etc.).

### Simplified balance sheet of French banks at end 2012

| Tab Category                           | Assets<br>(what the bank owns = investment of its resources) | Liabilities<br>(what the bank owes = origin of its resources) |
|--|--|---|
| Financial intermediary role            | Loans to companies and households (2 409 Mds €)              | Customer deposits (2 263 Mds €)                               |
| Short-term financing/Investments       | Interbank loans (1 995 Mds €)                                | Interbank loans (1 679 Mds €)                                 |
| Medium/long-term financing/Investments | Securities portfolio (2 177 Mds €)                           | Transactions in securities (2 599 Mds €)                      |
| Equity Own funds                       |  | Common equity (600 Mds €)                                     |
| Other                                  | Miscellaneous (1 324 Mds €)                                  | Miscellaneous (1 249 Mds €)                                   |

Source: ACPR

## Credit conditions do not seem to amplify the economic cycle in France

encouraged to lend them money in order to secure their deposits (considered as a "safe" financing source). However, if the banks do not manage to attract sufficient deposits, these requirements could

i. increase the cost of credit by increasing the cost of resources for banks (which are obliged to finance themselves longer term, on average, than previously);

ii. reduce the volume distributed, in particular property loans with long maturities (forcing the banks to increase the average maturity). However, this risk appears to have been reduced by the inclusion in January 2013 of property asset-backed securities in the category of assets deemed highly liquid;

- the introduction of a leverage ratio leads banks to reduce the size of their financial commitments and thus to rationalise their investments by offloading low-margin assets.

### So far, few real effects have been observed, while virtually all banks have been brought in line with the future requirements

Adopted by the G20 on 11 and 12 November 2010, the "Basel III" Accords should apply in all signatory countries (with a gradual implementation over 5 years). The first provisions came into force on 1<sup>st</sup> January 2014 in the Eurozone (under the "CRD IV" directive) and will do so on 1<sup>st</sup> January 2015 in the United States.

Although implementation was partially postponed, the banks, under implicit pressure from the market, rapidly came into line with the requirements. According to an impact study carried out by the European Banking Authority on the accounts of banks at end 2012 (see *EBA 2013*),

(i) the most restrictive capital ratios were already respected by 72% of large banks and 84% of small banks;

(ii) the LCR was 109% on average for large banks and 128% for small ones, against 100% required;

(iii) the leverage ratio was 2.9% on average for large banks and 3.4% for the smaller ones, against the ultimate objective of 3%.

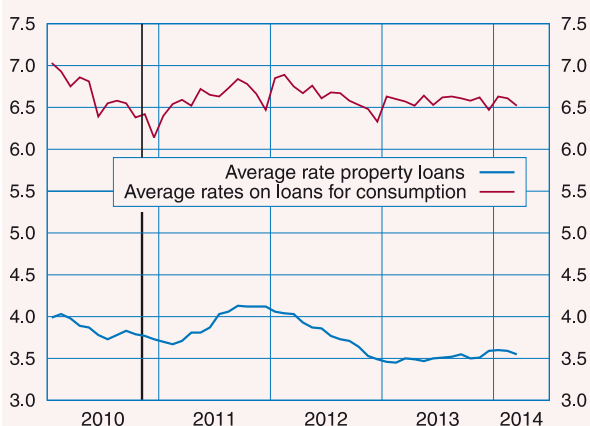
From end 2010 to end 2012, observation of the evolution of lending conditions gives a few initial indications of the expected effects of the implementation of "Basel III". As the context was very particular (debt crisis in Europe, interventionism by the central banks...), these observations should be viewed with the greatest caution.

In concrete terms, few marked changes have been observed on the credit market:

- no strong upward trend in interest rates on loans, whether risky or otherwise. Only the cost of consumer loans has risen, by 30 to 50 bp on average since the announcement of the Basel Accords, an estimate that is consistent with the expected effect (see *Graph 1*).

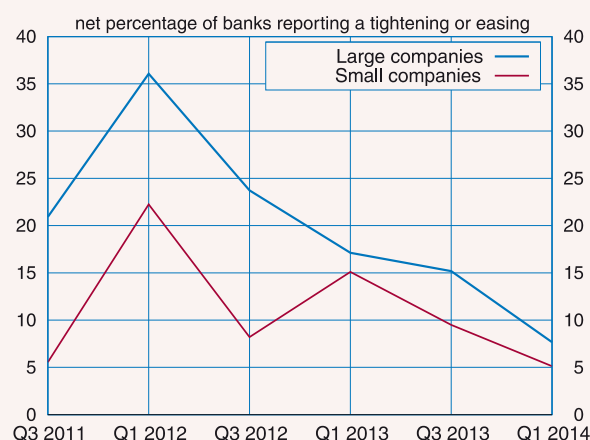
- according to a specific study carried out by the ECB, the accords led to a tightening of lending conditions for businesses, particularly large companies (see *Graph 2*). There is no comparable study for households, but as their credit conditions have followed the same trend as enterprises, a regulation effect may have occurred. In both cases, this effect is however likely to have been secondary to the economic context. ■

**1 - Households: rise in the cost of credit**  
Last point: March 2014



Source: ECB

**2 - Impact of regulatory changes on credit conditions for enterprises over the last six months**



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