# Banks' portfolio choices and interest rate premiums: some exploratory analyses

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**Résumé**

L'objectif du papier est de fournir une première analyse exploratoire des déterminants macroéconomiques des primes de taux. L'optique retenue est celle des choix de portefeuille opérés par les banques à leur actif. Dès lors, les primes de taux sont calculées en comparant un actif risqué (le crédit) à un actif sans risque (le taux des emprunts d'Etat) de maturité équivalente, ce qui revient à neutraliser la prime de terme. De façon générale, les résultats obtenus mettent en évidence des disparités parfois importantes entre les estimations au sein de la même catégorie d'emprunteurs, lesquels ne se distinguent que par la période de fixation initiale du contrat de crédit. Ces observations montrent que les banques, en plus de scinder leur marché entre ménages et entreprises, n'ont pas un comportement homogène au sein de chacune des catégories d'emprunteurs. Au total, les résultats obtenus indiquent l'existence d'un marché des crédits à l'habitat d'autant plus concurrentiel que la maturité des crédits est forte et d'un marché unifié des crédits à la consommation. S'agissant des crédits aux sociétés non financières, il s'agirait d'un marché segmenté, la période de fixation initiale du contrat de crédit fournissant une appréciation sur le degré de risque de l'emprunteur.

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## 1. Introduction

Two often convergent approaches are generally taken to analyse banks' behaviour in terms of loan pricing and, implicitly, in terms of their margins. One strand of the literature seeks to measure the size and speed of the pass-through from changes in monetary policy to bank lending rates. The other uses balance sheet and P&L data to examine the determinants of bank profitability, notably via net interest margins.

Making the assumption that bank balance sheets can be broken down, we conduct an exploratory analysis of the main macroeconomic indicators that could explain the dynamics of interest rate premiums, which we obtain by comparing lending rates and the yield on government bonds of similar maturity. Our aim is to neutralise the term premium, in line with the methodology used to model credit spreads. Implicitly, this specification amounts to modelling, *inter alia*, the determinants of bank costs, especially in terms of risk, which combine with the market rate to determine the bank lending rate[4]. Nevertheless, we opt not to introduce an explicit link to bank liabilities and funding costs.

We use 13 aggregated time series on consumer, housing, and business loans. The data are taken from the "Cost of Credit Survey" led by the Banque de France in line with the new items on new loan contracts defined by the ECB. The estimation period runs from the second quarter of 1993 to the fourth quarter of 2003.

The indicators that we use to model interest rate premiums seek to pick out common types of behaviour within the groups of series in use. The empirical findings, however, identify different behaviour types within each group, suggesting that series that are *a priori* identical except for the initial rate fixation period (IRFP) are actually distinct, even disconnected, market segments, even though they concern the same category of borrowers.

Our aim is to break up the bank premium into several components measuring:

1) the degree of competition on the market
2) the existence of insurance arrangements to shield against changes in interest rates
3) the cost of risk
4) risk aversion among credit institutions or the cost of maturity transformation
5) uncertainty over the cost of refinancing
6) shifts in the demand function.

Concretely, while most of our findings may be interpreted as indicating the possibility that banking business represents the sum of various markets, at least on the assets side of the balance sheet, the values of some of the parameters call for greater caution. Our results leave open the possibility that some activities may be interdependent, as if banks were cross-subsidising.

The paper is organised as follows. Section 2 reviews the literature, describing the different approaches taken to studying interest rate premiums. The aim is to tease out recent trends, to show how the paper is positioned, and to present the rationale underpinning our choice of methodology. In section 3 we show how the series are constructed, present a descriptive analysis of the series profiles, and seek to offer some initial elements of interpretation. Section 4 considers

[4] An interpretation in terms of profitability is also possible.

the possible theoretical determinants of interest rate spreads. In section 5, we present the models and explanatory variables used in the study, discuss the findings and put them in perspective. Section 6 contains the conclusions.

## 2. Key lessons drawn from the literature, and choice of methodology

The banking system is an important, if not essential, part of the financial system. A considerable body of literature has examined the behaviour of banks and their role in transmitting monetary policy impulses. We begin by revisiting the different approaches encountered in the literature, before analysing their implications for the study of interest rate premiums.

One important strand of the literature examines the direct influence of monetary policy on bank lending rates, i.e. a pass-through approach. Here, the focus is placed on the speed of adjustment and the degree of pass-through to short-, medium- and long-term lending rates following a change in the central bank's official rate, or, more correctly, in a short-term market rate that reflects monetary policy impulses. The relationship postulated between the different interest rates may be linear and symmetric (BIS, 1994; Cottarelli and Kourelis, 1994; Borio and Fritz, 1995; Donnay and Degryse, 2001; Toolsema, Sturm and de Haan 2002; Heinemann and Schüler, 2002) or non-linear and asymmetric (Kleimeier and Sander, 2002; Sander and Kleimeier, 2004; Hofmann and Mizen, 2004). The determinants of lags in the pass-through process and the reasons why the process is incomplete in the long term are not explained in the sense that, aside from the Hofman and Mizen (2004), and Sander and Kleimeier (2004) models, it is difficult to separate the causes of stickiness[5]. Thus, Mojon (2001), Angeloni and Ehrmann (2003) and Hofmann (2003) also identify stickiness in short-term lending to businesses, but they assume *a priori* that long-term elasticity is unitary. However, De Bondt (2002) and De Bondt, Mojon and Valla (2003) show that the highlighted stickiness is not automatic and depends heavily on which interest rate is selected as the benchmark. In addition, instances of overadjustment may arise if the maturity of the selected interest rate is close to that of the loan, or if a composite index is used that weights short-term and long-term interest rates differently. The selection of a suitable benchmark interest rate may have important ramifications for the analysis. Indeed, one issue much debated since the advent of the single currency concerns the role played by the convergence of financial systems and how a single monetary policy might affect the pass-through of shocks to lending rates via banks. Kleimeier and Sander (2004) detect no structural change if the short-term interest rate is replaced in the analysis by yield of comparable maturity. Meanwhile, Angeloni and Ehrmann (2003) posit the hypothesis of a behavioural break in January 1999.

Often, this kind of time series analysis does not explicitly factor in the special role played by banks. The analysis is concerned solely with the effect of monetary policy on bank lending rates. Yet there is a good chance that the speed of adjustment to a change in market rates will depend for example on the financial health of banks. This approach may therefore be supplemented with panel studies that seek to explain differences in the degree of pass-through by means of indicators of liquidity, capitalisation, stability of customer relations, degree of competition, risk and transformation (De Graeve, De Jonghe and Vennet, 2004; Gambacorta, 2004).

[5] Lowe and Rohling (1992) attribute sticky interest rates to menu costs, adverse selection and insurance arrangements, i.e. risk sharing.

In sum, applying this approach to an investigation of interest rate spreads poses the problem of the term premium in configurations where bank lending rates have a different maturity from the short-term interest rate that transmits monetary policy impulses.

A second avenue developed in the literature centres on the structure of bank balance sheets, considering the issue from the perspective of funding and operating costs, or from the perspective of asset/liabilities management. The approach is based on the specific nature of the intermediation process, i.e. on maturity transformation by credit institutions. The aim is to calculate banks' margins and to specify the determinants of these margins. The theoretical framework for such analyses is often derived from the dealership model proposed by Ho and Saunders (1981)[6]. Thus, variables like operating costs, financial taxation, the quality of the loan portfolio, market power, reserve requirements, the level of shareholders' equity, restrictions on interest paid on deposits, interest rate volatility, and high inflation may be important explanatory factors (Barajas, Steiner and Salazar, 1999; Saunders and Schumacher, 2000; Chirwa and Mlachila, 2004; Moore and Craigwell, 2002; Soledad, Peria and Mody, 2004).

From a theoretical standpoint, this approach implies numerous joint hypotheses. For instance, it is hard to assume that all banks behave in the same way whether in terms of the return on assets or the cost of liabilities. Panel techniques are needed to address this problem. These require disaggregated bank data, which may not be available. Furthermore, these joint hypotheses may be contrasted further out, because a bank's competitive stance may vary over time from, say, monopolistic in the short term to competitive in the long term. Analyses have to be conducted over long periods to capture this kind of structural shift, once again raising the question of data availability.

In this paper, we are proposing a third approach, in which we consider the banking environment, or market structure. We investigate spreads between bank lending rates and market rates, drawing on quarterly aggregate data for the period 1993Q3 - 2003Q4. Our aim is to model interest rate spreads calculated from the difference between the lending rate and the yield on public securities of comparable maturity[7]. When looking at rates of identical maturity, we follow Mojon (2001) in fixing the long-term elasticity of the bank lending rate to the market rate, forcing it to be unitary. This means that the premium is considered to be solely the residual of the long-term relationship, once elasticity is assumed to be one. There is a risk, however, that the premium might be "contaminated" if the wrong benchmark rate is selected. Thus, to eliminate any problems of transmission along the yield curve, we opt to neutralise the term premium and subtract a market rate of equivalent duration from the lending rates. In addition, this approach makes it easier to introduce macroeconomic and market-structure variables into the time series analysis, by reducing the risk of interaction between the explanatory variables. It also appears to lessen the risk of a break in the model.

From a theoretical perspective, then, we are placing the emphasis on the portfolio decisions made by banks, which are viewed as choosing between riskless assets (government bonds) and risky assets (loans). The interest rate spreads examined thus translate not just borrowers' risk of default, but also the administrative costs involved in granting loans. Loan

[6] In the dealership model, banks are seen as dealers that dynamically set interest rates for deposits and loans so as to balance inflows, i.e. supply of deposits, and outflows, i.e. demand for loans. Allen (1988) and Angbazo (1997) extend this model.

[7] Note that for variable or adjustable rate loans (IRFP<1 year), the term of the loan may differ from the IRFP. However, in the case of fixed rate loans (IRFP >1 year), the term of the loan will generally be between the upper and lower ranges of the IRFP.

pricing is assumed to reflect changes in financial-market returns for which banks are price takers. Furthermore, this approach has the effect of excluding the transformation risk to which banks are exposed. Indeed, as in Klein's (1971) model, bank assets and liabilities are dissociated. Note that at least in the case of Germany, Winker (1999) reveals, with the aid of causality tests, that the balance sheets of credit institutions may be separated.

The approach taken to modelling the spread between lending rates and the yield on Treasury securities of comparable maturity is similar to the method used by credit market analysts to model credit spreads, i.e. the differential between the rates paid on private securities, like commercial paper and corporate bonds, and public securities with the same maturity, like Treasury bills and Treasury bonds. In some cases, the literature is heavily directed by its use by market players (see for example Spreads and Credits Stratégie, 2004; Manzoni, 2002); in others it is more concerned with consistency and innovation (for example Gauthier and Lardic, 2003). Also, the literature often uses data from individual firms and especially from private-sector accounting.

Our approach is also akin to the cross-country comparative analysis of interest rate spreads recently proposed in the WGMBS report on MFI interest rate statistics[8]. The working group calculated interest rate spreads, looking notably at the differences between apparent interest rates deduced from IRFP / maturity bands and the corresponding market rates.

## 3. Presenting the series and descriptive analysis of interest rate spreads

We selected equivalent market interest rates on the basis of average loan maturities calculated from disaggregated data. Specifically, the selected market rates are fictitious rates that we constructed using a zero coupon curve for government bonds. We plot charts to verify that the rates at specific maturities do not differ greatly from the market rates identified for securities paying a coupon[9].

We calculate lending rates using an equivalent method, leading us to consider an "annual coupon payment date".

Table 1 presents market rates of comparable maturity to the average loan maturity. Note that the IRFP concept is helpful because it separates loans according to the frequency with which interest rates are revised. Table 1 highlights the possibility of a significant divergence between the IRFP and the term of the loan, especially in the case of variable rate loans (IRFP < 1 year) to non-financial corporations. Moreover, even if the average loan maturity falls within the interval of the IRFP, it may be closer to one end of the range than the other. It should be noted that neither the interest rate indicated by the IRFP nor the market rate with a maturity comparable to the lending rate necessarily corresponds to the loan's benchmark interest rate. Although the survey may reveal this information, the benchmark index is often a mixed rate or the bank base rate, whose calculation methodology may be difficult to trace back over time.

Finally, we broke out housing loans to eliminate the impact from home savings plans (Plan d'Epargne Logement – PEL). The share represented by PELs in the transaction numbers

[8] "MFI Interest Rate Statistics: study on cross-country differentials", Working Group on Money and Banking Statistics, September 2004.

[9] Recall that with a zero coupon yield, there is no uncertainty about the rate at which the coupon is reinvested because the rate is known in advance.

declined over the period, with a sharp drop in 1998. Meanwhile, interest rate premiums across all housing loans including PELs, trended upwards. We therefore sought to neutralise the component of lending rates that reflects regulated rates and over which banks have no influence. Accordingly, we stripped out the PEL effect from the housing loan rates used in the analysis.

**Table 1: Market rates of comparable maturity to bank lending rates**

| | | | Average loan maturity | Selected market rate |
|---|---|---|---|---|
| **Households** | Consumer | IRFP < 1 yr | 1 yr + 4 mths | 1 yr |
| | | 1 yr =< IRFP < 5 yrs | 3 yrs + 8 mths | 4 yrs |
| | | IRFP > 5 yrs | 6 yrs + 7 mths | 7 yrs |
| | Housing | IRFP < 1 yr | 10 yrs | 10 yrs |
| | | 1 yr =< IRFP < 5 yrs | 3 yrs + 11 mths | 4 yrs |
| | | 5 yrs =< IRFP < 10 yrs | 8 yrs + 10 mths | 10 yrs |
| | | IRFP > 10 yrs | 15 yrs + 6 mths | 15 yrs |
| **Non-financial corporations** | | | | |
| | Loan < €1 million | IRFP < 1 yr | 4 yrs + 4 mths | 5 yrs |
| | | 1 yr =< IRFP < 5 yrs | 4 yrs | 5 yrs |
| | | IRFP > 5 yrs | 8 yrs + 8 mths | 10 yrs |
| | €1 million < Loan < €4 million | IRFP < 1 yr | 5 yrs + 4 mths | 5 yrs |
| | | 1 yr =< IRFP < 5 yrs | 4 yrs + 4 mths | 5 yrs |
| | | IRFP > 5 yrs | 10 yrs + 2 mths | 10 yrs |

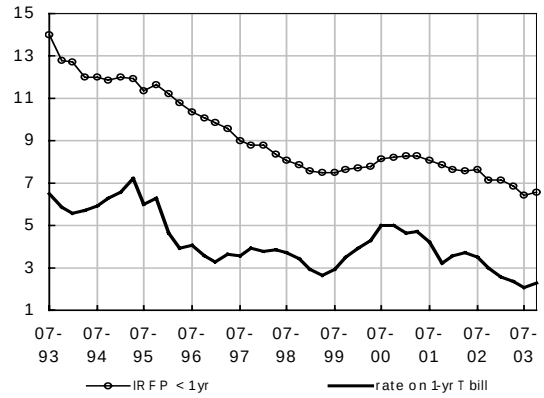
Source: Business Conditions Directorate (DCONJ)
Calculations: Monetary Research and Statistics Directorate (DESM) - Monetary Analyses and Statistics Division (SASM)

The period analysed runs from the second quarter of 1993 to the fourth quarter of 2003. The data are taken from the "Cost of Credit Survey" led by the Banque de France.

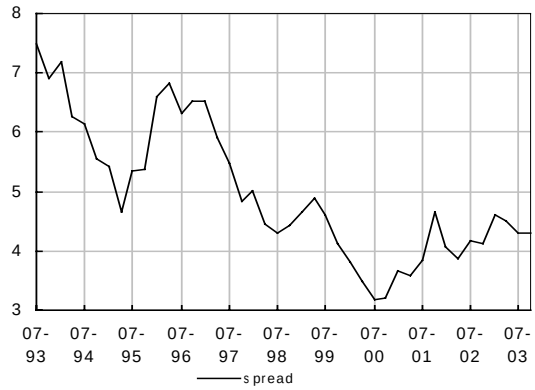
Figure 1 shows interest rates on consumer loans, market rates of equivalent maturity, and the corresponding interest rate spreads. We use the same type of presentation for housing loans minus PELs (Figure 2), and for loans of under €1 million (Figure 3) and over €1 million (Figure 4) to non-financial corporations.

**Figure 1: Interest rates on consumer loans, market rates of equivalent maturity, and corresponding interest rate spreads**
(monthly data, rate on new loans, %)

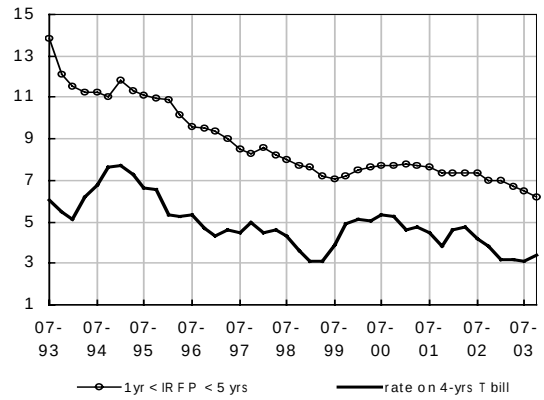
**Consumer loans (IRFP < 1 yr)**



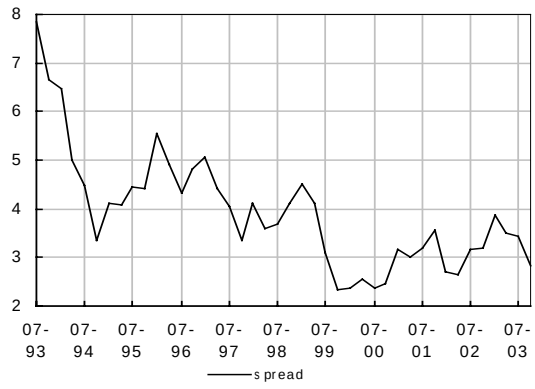

**Consumer loans (IRFP < 1 yr) – spread**



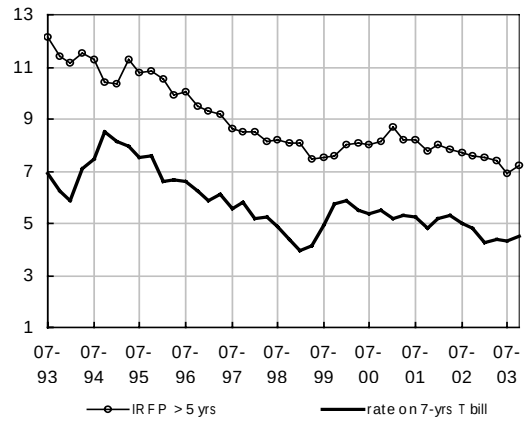

**Consumer loans (1 yr < IRFP < 5 yrs)**



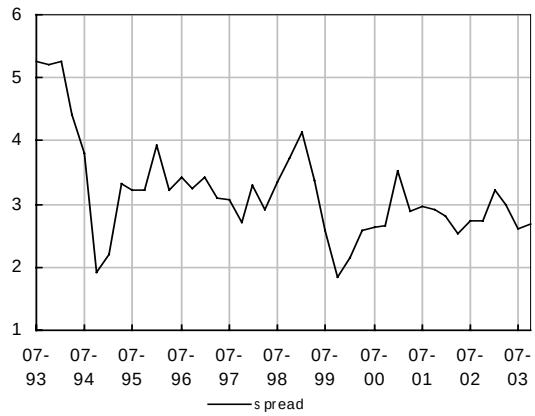

**Consumer loans (1 yr < IRFP < 5 yrs) – spread**




**Consumer loans (IRFP > 5 yrs)**



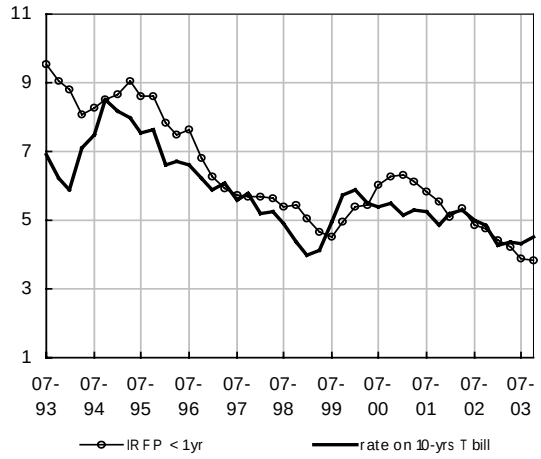

**Consumer loans (IRFP > 5 yrs) – spread**



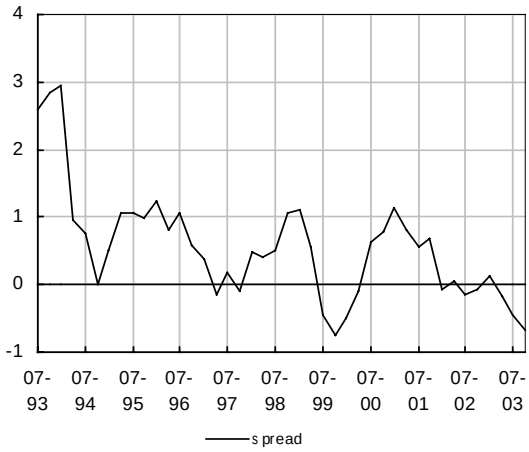

Source: DCONJ
Calculations: DESM-SASM

**Figure 2: Interest rates on housing loans, market rates of equivalent maturity, and corresponding interest rate spreads**
(monthly data, rate on new loans, %)

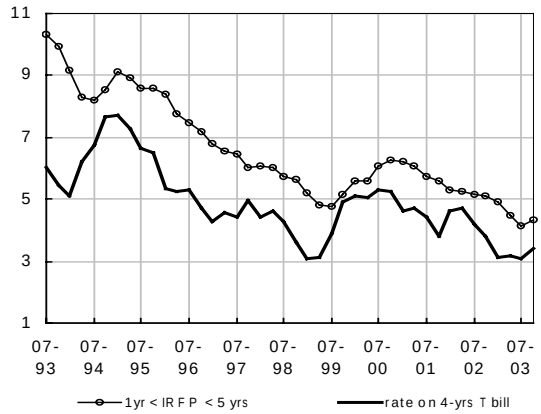
**Housing loans (IRFP < 1 yr)**



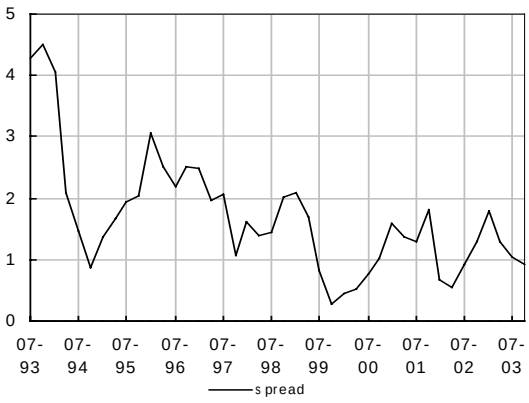

**Housing loans (IRFP < 1 yr) – spread**



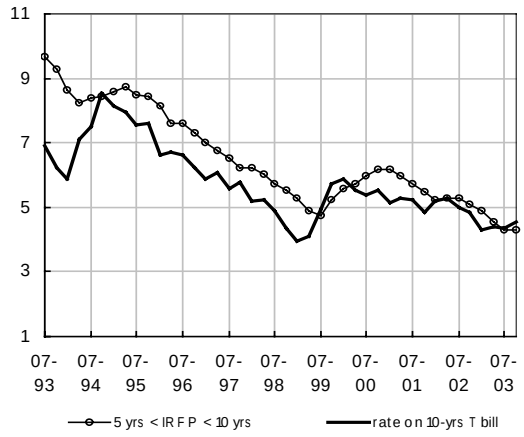

**Housing loans (1 yr < IRFP < 5 yrs)**



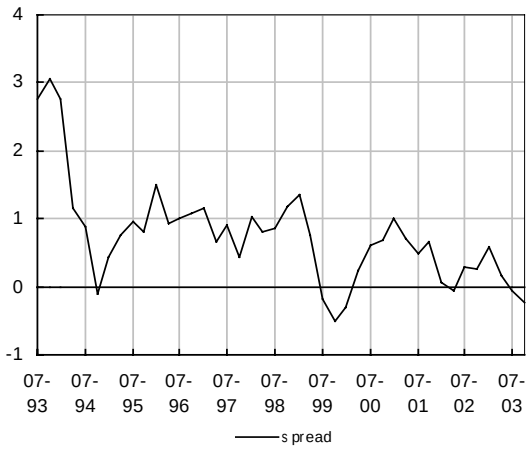

**Housing loans (1 yr < IRFP < 5 yrs) – spread**



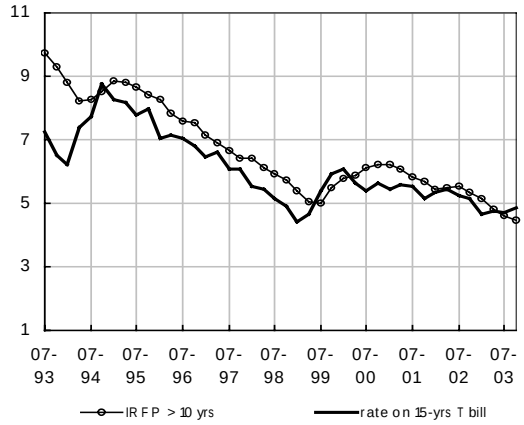

**Housing loans (5 yrs < IRFP < 10 yrs)**



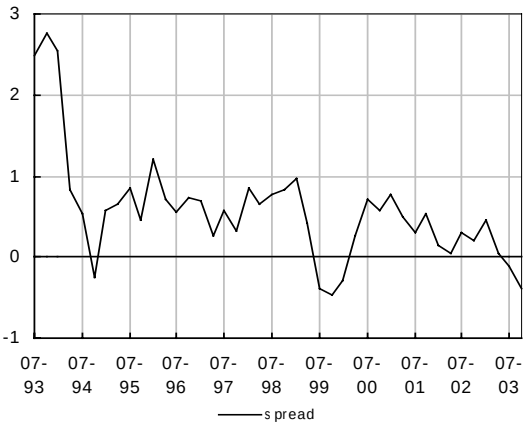

**Housing loans (5 yrs < IRFP < 10 yrs) – spread**



**Housing loans (IRFP > 10 yrs)**



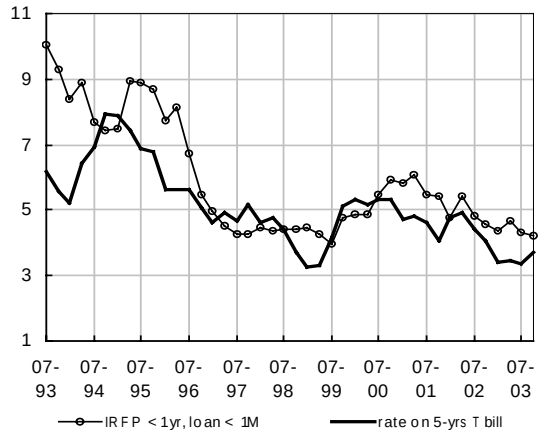

**Housing loans (IRFP > 10 yrs) - spread**



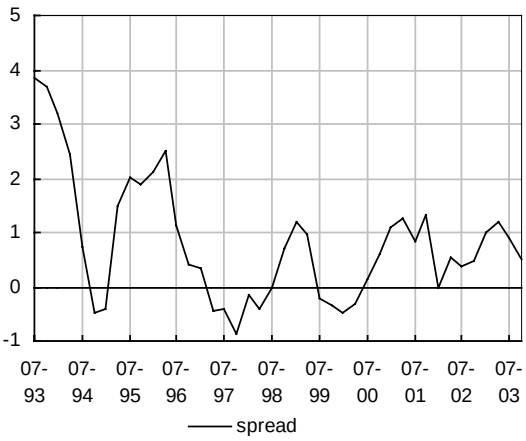

Source: DCONJ
Calculations: DESM-SASM

**Figure 3: Interest rates on loans under €1 million to non-financial corporations (NFCs), market rates of equivalent maturity, and corresponding interest rate spreads**
(monthly data, rate on new loans, %)

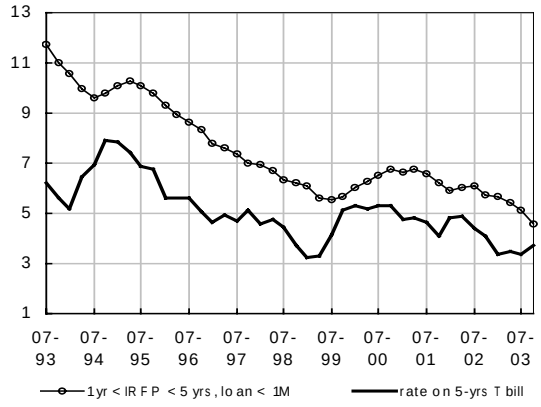
**Loans to NFCs (IRFP < 1 yr, loan < €1M)**



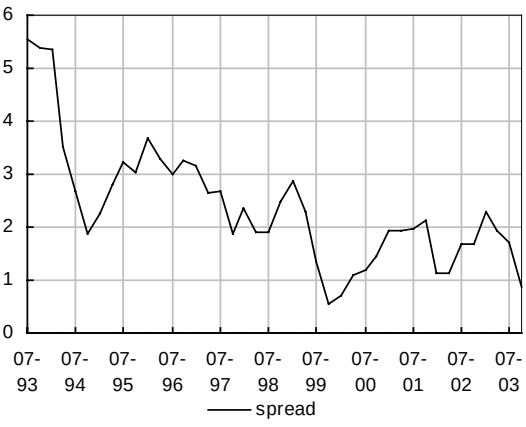

**Loans to NFCs (IRFP < 1 yr, loan < €1M) – spread**



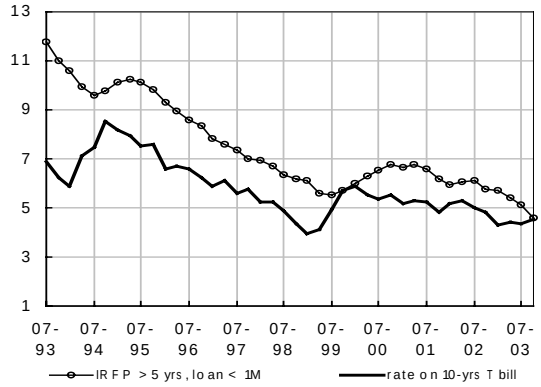

**Loans to NFCs (1 yr < IRFP < 5 yrs, loan < €1M)**



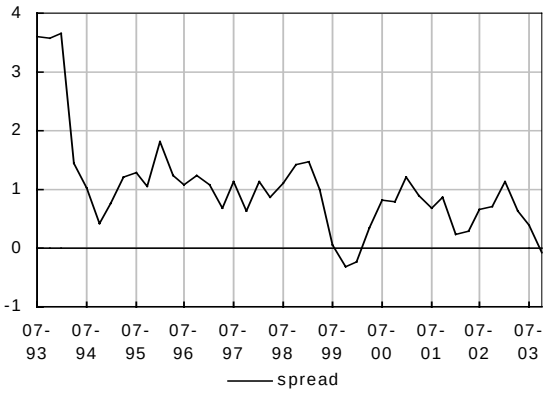

**Loans to NFCs (1 yr < IRFP < 5 yrs, loan < €1M) – spread**



**Loans to NFCs (IRFP > 5 yrs, loan < €1M)**



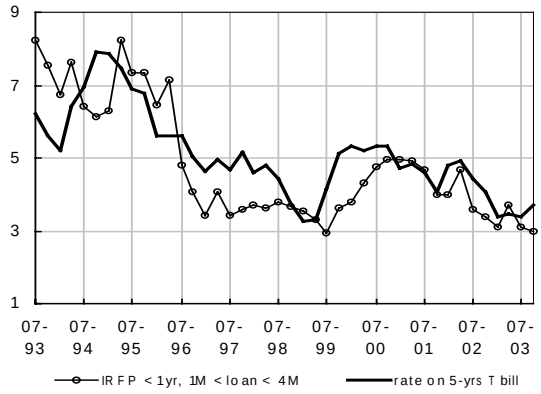

**Loans to NFCs (IRFP > 5 yrs, loan < €1M) – spread**



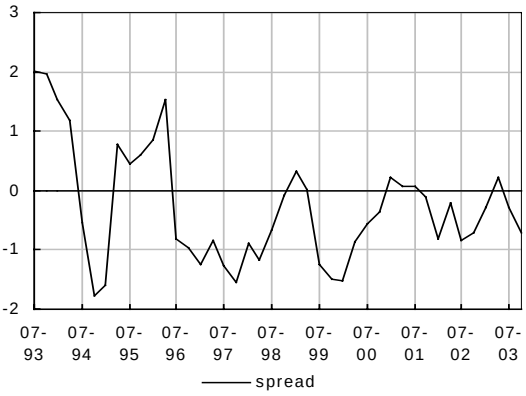

Source: DCONJ
Calculations: DESM-SASM

**Figure 4: Interest rates on loans to NFCs (€1 million < loan < €4 million), market rates of equivalent maturity, and corresponding interest rate spreads**
(monthly data, rate on new loans, %)

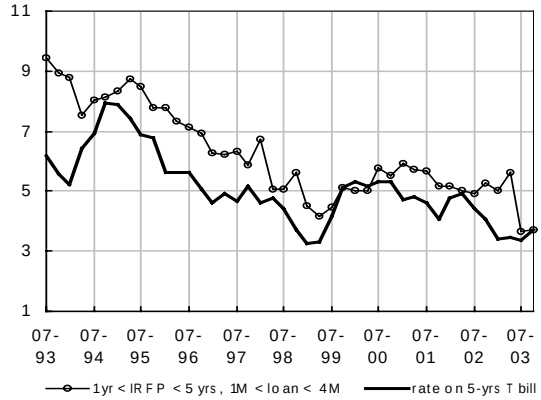
**Loans to NFCs (IRFP < 1 yr, €1M < loan < €4M**



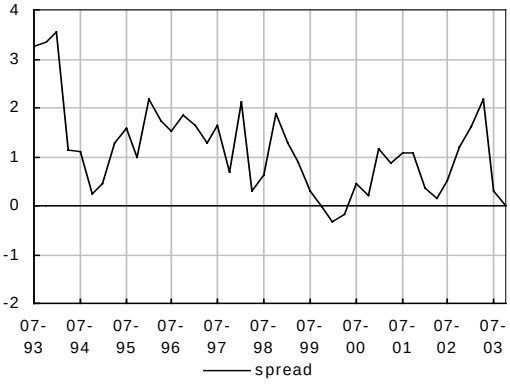

**Loans to NFCs (IRFP < 1 yr, €1M < loan < €4M - spread**



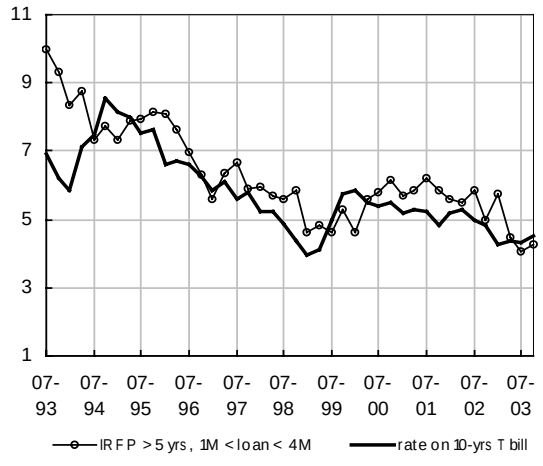

**Loans to NFCs (1 yr < IRFP < 5 yrs, €1M < loan < €4M)**



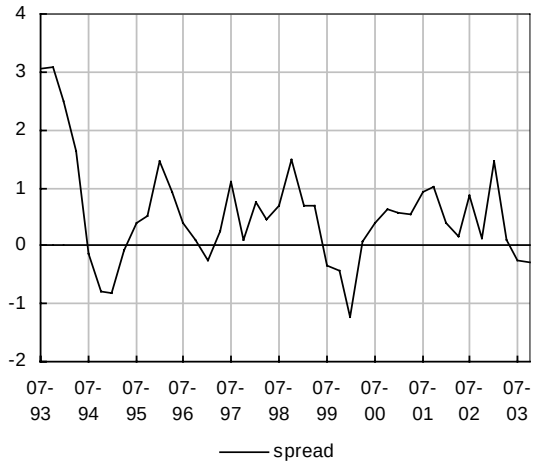

**Loans to NFCs (1 yr < IRFP < 5 yrs, €1M < loan < €4M) - spread**



**Loans to NFCs (IRFP > 5 yrs , €1M < loan < €4M**




**Loans to NFCs (IRFP > 5 yrs , €1M < loan < €4M - spread**




Source: DCONJ
Calculations: DESM-SASM

By analysing the mean and volatility of interest spreads over the entire period, we are led to several sets of observations.

First, in the case of households, spreads are higher for consumer loans than for housing loans (cf. Table 2). These differences may stem from the value of the collateral pledged when the loan is signed. The guarantee provided for a housing loan may well be larger, especially if the bank requires the borrower to put up their future property as collateral. Furthermore, the mean spread for housing loans decreases with the average maturity of the underlying loans, i.e. with the banks' investment horizon (cf. Table 1). Note also that the interest rate premium on housing loans is occasionally negative. This does not necessarily mean that credit institutions are making losses on this type of product, insofar as we are not allowing for the impact of fees. Another possible explanation for this situation lies with the banking practice of maturity transformation.

In addition, the volatility of the spreads on consumer loans is higher than for housing loans (cf. Table 3).

**Table 2: Mean interest rate spreads (1993Q3 - 2003Q4)**

| | IRFP < 1 yr | 1 yr =< IRFP < 5 yrs | 5 yrs =< IRFP < 10 yrs | IRFP > 10 yrs |
|---|---|---|---|---|
| **Households** | | | | |
| Consumer | 5.0 | 3.9 | 3.2 | 3.2 |
| Housing | 0.6 | 1.7 | 0.8 | 0.6 |
| **Non-financial corporations** | | | | |
| Loan < €1 million | 0.8 | 2.4 | 1.0 | 1.0 |
| €1 million < Loan < €4 million | -0.3 | 1.1 | 0.5 | 0.5 |

Source: DCONJ
Calculations: DESM-SASM

**Table 3: Volatility of interest rate spreads (1993Q3 - 2003Q4)**

| | IRFP < 1 yr | 1 yr =< IRFP < 5 yrs | 5 yrs =< IRFP < 10 yrs | IRFP > 10 yrs |
|---|---|---|---|---|
| **Households** | | | | |
| Consumer | 1.15 | 1.20 | 0.79 | 0.79 |
| Housing | 0.83 | 0.96 | 0.76 | 0.69 |
| **Non-financial corporations** | | | | |
| Loan < €1 million | 1.15 | 1.16 | 0.86 | 0.86 |
| €1 million < Loan < €4 million | 0.98 | 0.92 | 0.91 | 0.91 |

Source: DCONJ
Calculations: DESM-SASM

Second, interest rate spreads are smaller for non-financial corporations than for households across all initial rate fixation periods. This observation is consistent with the main features of the French financial system: households do not have access to alternative forms of financing, which gives banks greater market power on this segment. Another possible explanation would involve collusive behaviour by banks on the retail market. In any event, except for credits with an IRFP between 1 and 5 years, interest rate spreads are systematically less volatile for households than for non-financial corporations as Table 3 indicates.

Third, it appears that the size of bank loans to non-financial corporations is a determining factor in both the magnitude and volatility of interest rates spreads. As regards long-term credits, a high average premium goes hand in hand with a lower volatility. Thus, smaller companies have to contend with tougher financing conditions than large companies, being exposed to smaller interest rate risk. This phenomenon that we interpret here as the existence of a risk sharing contract, that is a protection offered by banks against erratic shifts in market interest rates, does not apply to weak maturity loans.

We extend our descriptive analysis of mean spreads in the empirical section of the paper, where we verify the validity of our proposed explanations.

## 4. Possible theoretical determinants of interest rate spreads

Drawing freely on Gauthier and Lardic (2003), we identify three sets of factors that could explain interest rate spreads, whose size varies according to the data type (e.g. firm-level or macroeconomic):

1. microeconomic factors or factors involving individual securities. Here, we employ accounting ratios for debt, profitability and liquidity (cf. Table 4) as they are usually used in SME failure forecasting models (like, for example, Banque de France scoring methods, cf. Bardos, 2001) or by credit analysts.
2. mesoeconomic factors or factors involving issuers of securities. Here, we consider variables relating to shares issued by companies, such as share price volatility or market capitalisation.
3. macroeconomic factors or factors involving all issuers. For this third group, we look at indicators on activity, the unemployment rate, prices, the level of short and long-term interest rates and monetary aggregates.

A list of this kind may be supplemented with more pragmatic research, such as, for instance, Spreads and Credits Stratégie (2004). There are grounds for including information

extracted from the markets, since these variables reflect market uncertainty or market expectations. Such market information might include the slope of the yield curve or interest rate or index volatility, which could be the volatility actually observed on the corresponding securities markets or the volatility implied in options on these products. However, by introducing macroeconomic variables, we can underscore the risks to which an economy is exposed as a result of the debt (in terms of stocks or flows) of the economic sectors. For example, a gearing variable illustrates the financial position of companies, while the public debt ratio or the public deficit to GDP ratio reflects the pressure that economic imbalances exert on financial stability or economic growth.

**Table 4: Financial ratios used for individual firms**

| | |
|---|---|
| **Debt ratios** | |
| Working Capital / Total Assets | - This ratio, which often appears in the literature, measures the relationship between the firm's net liquid assets and its total capitalisation. Working capital is defined as the difference between current assets and current liabilities. It reflects the firm's ability to generate money quickly enough to meet its short-term commitments. |
| Earnings Before Interest and Taxes (EBIT) / Total Assets | - This ratio is calculated by dividing the firm's earnings before interest and tax by its total assets. By excluding tax- and debt-related effects, the ratio measures the underlying productivity of the firm's assets. It reflects the ability of the firm's assets to generate profits. |
| Total Debt / Total Assets | - A standard debt ratio in default risk analyses. |
| **Profitability ratios** | |
| EBITDA / Interest<br>Cash / Fixed Charge<br>Fixed Charge Coverage ratio<br>Interest / Total Assets | Each of these ratios captures the firm's ability to cope with the interest generated by its debt structure. |
| **Liquidity ratios**<br>Quick ratio<br>Current ratio<br>Cash & Securities / Total Current Assets | These ratios measure the relationship between current assets and current liabilities. The Quick Ratio is calculated minus inventories. |

Source: Gauthier and Lardic (2003)

Some macroeconomic research has suggested microeconomic foundations, thereby justifying the careful introduction of explanatory variables for the risk premium on business lending, and, at an upstream stage, for the probability of company failure. This avenue was opened up by Wadhwani (1986), who examined the risk of failure among profit-maximising firms that were also price takers and experienced market constraints (imperfect competition). This led to the inclusion of the following variables: aggregate demand (which may be reformulated as the deviation from the trend), real wages, relative commodity prices, nominal or real interest rates and the ratio of debt to the market value of companies (EV enterprise value-debt + market capitalisation). In practice, econometric estimates for the USA, Canada, the UK and Germany (Davis, 1987, 1992), Ireland (Kearns, 2003) and France (Bordes and Mélitz, 1989, 1992, Boutillier and Derangère, 1992) have usually used a proxy for the last ratio, i.e. the debt-to-GDP ratio. As part of the Bank of England's financial stability research programme, Vlieghe (2001) revisits this approach, while Bunn and Redwood (2003) combine it with a method based on individual data close to the techniques mentioned above for credit spreads and scoring. This

kind of approach makes it possible to measure a company's debt against its total assets, which is generally tricky when using macroeconomic data.

At this point, we can usefully cite another Bank of England paper, by Leake (2003), in which the author concludes that the credit spread (on UK corporate bonds) is not a good leading indicator of the failure rate. This suggests that it would be dangerous to reduce the modelling of interest rate spreads to the modelling of failure rates, meaning that we have to examine another class of explanatory factors. This view is supported by the fact that the lending rate is not necessarily going to be unitary elastic with respect to the market rate. Thus, the financial system (banks especially) is not a passive observer of default risk, but actually helps to shape the credit spread, in particular via its own risk aversion. We therefore include determinants of financial-market liquidity and bank profitability. In other words, we have to establish whether the factors that determine bank margins should not be used in the analysis of credit spreads.

This led us to draw on a completely different branch of the literature, including for example the analyses summarised recently in Brock and Franken (2003), from which we extract Table 5. Setting aside the dummy variables specific to the paper, we find variables for aggregate risks and policy issues, which bring us back, with fresh justification, to the variables already proposed to explain the credit spread. Also present are new variables that focus explicitly on bank characteristics and industry structure. Brock and Franken look at individual data, but there is no reason why we should not take some of these variables and transpose them to the aggregate level or create appropriate proxies. In possible extensions of our research to involve comparisons across several European countries, we could expand this last category to include indicators reflecting the structural characteristics of, say, the Anglo-Saxon, Germanic or Latin financial systems.

**Table 5: Explanatory variables for bank margins**
(within an analysis based on individual data)

| Variable | Specific description | |
|---|---|---|
| *Implicit Payments* | Implicit Interest Payments | **BANK CHARACTERISTICS** |
| *Capital/Assets* | Capital Ratio (Adjusted Equity over Adjusted Assets) | |
| *Asset Quality* | Risk Index of the Loan's Portfolio | |
| *Loans/Employees* | Total Loans over Number of Employees | |
| *Interest Rate Volatility* | Interest Rate Risk | **AGGREGATE RISKS** |
| *Exchange Rate Volatility* | Nominal Exchange Rate Risk | |
| *Size* | Total Assets of the Bank over Total Assets of All Banks | **INDUSTRY STRUCTURE** |
| *Branches* | Number of Branches | |
| *Concentration* | Herfindahl Index in Terms of Total Loans | |
| *Slope of the Yield Curve* | Slope of the Yield Curve | **POLICY ISSUES** |
| *Output Gap* | Deviation of Log(GDP) from its Trend (HP filter) | |
| *Capital Controls* | Index of Capital Account Controls | |
| *Asian Crisis* | Dummy that Takes Value of 1 After the Asian Crisis | **DUMMY VARIABLES** |
| *Regulatory Change* | Dummy that Takes Value of 1 After a Regulatory Change Related to Loans Commissions | |

Source: Brock and Franken (2003)

We should conclude our review with a reminder of the explanatory variables that we referred to explicitly and similar indicators that deserve investigation in our work. Further, we must be mindful that we have several lending rates series and hence several interest rate spread series, which correspond to different objectives and to counterparties that include not just companies but also private individuals.

We can discern three main classes of explanatory variable, which we list in Table 6. Macroeconomic variables are presented alongside variables that capture the risk associated with borrowers, and other variables that reflect the attitude of lenders, i.e. markets or banks, to this risk. In practice, macroeconomic variables almost always influence both the supply of and demand for credit. For this reason we isolate rather than repeat them, because in this way we underline the ambiguity of the expected signs as well as the importance of the results obtained from the comparison with empirical data.

**Table 6: Variables that may be used to model interest rate spreads**

| | |
|---|---|
| **Macroeconomic situation** | **Activity, cyclical position:**<br>- GDP or output gap<br>- or its components (household consumption or housing-related investment by households)<br>**Pressures:**<br>- on the labour market (unemployment, corporate profit margin, division of value added, real wages)<br>- on the goods market (spare capacity or capacity utilisation, inflation, relative prices)<br>- on the property market (housing prices, turnover)<br>- on the money market (growth of narrow or broad aggregates, or liquidity ratios for these aggregates)<br>**Interest rates:**<br>- level of short-term interest rates (real or nominal)<br>- short-term rate volatility<br>- slope of the yield curve<br>- monetary policy stance (or rather changes in direction)<br>- general risks to the economy (public deficit, public debt) |
| **Situation of lenders** | **Bank structure:**<br>- Profitability indicators (ROA, ROE), constructed from net banking income but also from interest alone<br>- Soundness indicators (Cooke ratio)<br>**Financial structures:**<br>- Indicators of concentration (or competition)<br>- Number of branches or number of employees per capita |
| **Situation of borrowers** | **Uncertainty concerning businesses:**<br>- stock price volatility (for listed companies)<br>- failure rate<br>- provisioning ratio<br>- share of debt in liabilities (or ratio of debt to GDP or to assets) and debt servicing burden<br>- profitability, debt and liquidity variables (cf. Table 4)<br>**Uncertainty concerning households:**<br>- proportion of over-indebted households in the population<br>- provisioning ratio<br>- share of debt or interest relative to gross disposable income |

Given the possibility of ambiguity in terms of the expected signs and the number of degrees of freedom needed to preserve the quality of the statistical inference, we opt for a reduced model structure, which we describe in section 5.

## 5. Model specification and results of the estimates

### 5.1 Model specification

We chose to model interest rate premiums in terms of their level and not in first differences. We estimate models for the period 1993Q3 - 2003Q4 because some explanatory variables, including bank provisions for business and household loans, are not available before this time.

In addition to the explanatory variables deemed relevant, we also included a lag on the endogenous variable to capture any stickiness in the premium. If we detect serial correlation, we use a correction procedure to obtain more efficient estimators and to select pertinent explanatory variables, including the constant.

Since some models ultimately include a lagged endogenous variable while others do not, we make these estimates consistent by recalculating "long-term" elasticities.

Further, most of our variables are centred to avoid any problems of colinearity with the constant. We are seeking to estimate a "pure" constant, that is, not influenced by the other variables and called *marge_LT*. According to Ho and Saunders (1981), this premium measures banks' market power on the segment in question. It may also provide information on asymmetric information between lender and borrower that is not covered by guarantees: housing loans should therefore have lower pure premiums than consumer loans; long-term loans to businesses should have higher premiums than shorter-term credits. However, the explanatory factor should be shielded from cyclical variations, which is why differences in market power seem to be the most suitable way to describe this constant.

Insignificant variables, as pinpointed by the Student's t statistics, are progressively eliminated until obtaining the final model. After proposing the same set of explanatory variables (but distinguishing between variables affecting households and those affecting non financial corporations), we can propose a parsimonious model. As each series can reflect the behaviour of different types of borrowers, we do not expect premiums to react identically to shocks. The advantage of the analysis is to bring out a set of significant variables useful for the elaboration of a typology of borrowers operating within each segment of the market.

As part of the process of modelling interest rate premiums, we seek to capture different effects, reflecting:

- the prevailing competitive structure on the market (via the constant of the model)
- the cost of expected risk (hence the introduction of macroeconomic business cycle variables including the unemployment rate and the output gap) as well as *ex post* risk measured by provisioning variables
- bank's hedging costs (evidenced by the slope of the yield curve) and uncertainty on future refinancing costs (reflected in the volatility of 3-month interbank market rates)
- the effect of demand for loans, via the savings rate
- the type of loan, with the aid of an indicator variable intended to capture interest rate cycles.

The selected explanatory variables, together with their expected signs, are as follows.

*5.1.1) Slope of the yield curve (pente) : expectations of the future conduct of monetary policy, a leading indicator of economic activity and a determinant of bank profitability*

The slope of the yield curve is defined as the differential between the rate on 10-year benchmark bonds and the 3-month interbank market rate. It is regularly used to model bank margins, it may have several interpretations.

- The slope of the yield curve: a leading indicator of economic activity that reflects, among others, expectations about the future conduct of monetary policy.

A "normal" structure of interest rates has a positive slope: the long-term interest rate is higher than the short-term one in accordance with the liquidity preference theory or the market segmentation theory [10]. The preferred habitat theory implies that an investor having short resources will accept to invest in longer-term assets only if it receives higher returns.

Provided that there is a positive "equilibrium interest rate premium" in a normal configuration, the expectations theory – holding that the long-term interest rate is a weighted average of future short-term interest rates, apart from a constant risk premium – explains the existence of "unusual" configurations, i.e., of an inverted yield curve. This phenomenon indicates the expectation of an accommodating monetary policy, hence a decrease of the cost of banking resources. From this point of view, the correlation with the premium should be positive.

The slope of the yield curve is also used as a leading indicator of economic activity. Among the explanatory theories of this link, we find the credit channel theory: "*[…] Indeed, a rise in short-term interest rates leads to a smaller increase of long-term rates. The intermediation margin of banks diminishes. In order to maintain their profitability, banks cut off from their balance sheets the most risky borrowers, thus reducing investment and economic activity* (Sédillot, 2001, p. 143)". To put it differently, a moderation of the slope of the yield curve leads to a reduction of loan supply leading, for a given demand, to a rise in the loan interest rate and, as a consequence, to an increase in the interest rate premium.

- The slope of the yield curve: an indicator of bank profitability.

Because their balance sheet structures are distorted by their active role in maturity transformation, banks are exposed to interest rate risk, which increases when they hold long-term non-negotiable assets (in the sense that the loans are granted at a fixed rate) while their debt is indexed to short-term rates (cf. Baumel and Sevestre, 2000). Thus, the long-term interest rate would be representative of the return on loans and the short-term interest rate of the cost of funding. Measuring the impact of the slope of the yield curve amounts to assume the existence of an unchanged balance sheet structure of banks for the estimation period under consideration. Because of that, the coefficient of the slope is assumed to be fixed.

The interest rate margin of banks is the essential component of the net banking product[11]. This margin can be split into two different components, each generating banking income.

[10] Investors having short resources are more numerous than the suppliers of those assets: the excess demand in this market leads to a rise in prices and to a decrease in interest rates.

[11] It appears moreover that bank profits were affected by the period of negatively sloped yield curve observed until 1994.

The first one, allowing the "term neutralisation", is the modelled interest rate spread: it accounts for the risk priced by banks in their arbitraging process between a loan and a government bond of similar maturity.
The second one, i.e. the difference between the long-term market interest rate and the cost of resources, approximates the profit generated solely by the business of maturity transformation.[12]
Therefore, a rise in the slope reduces the relative cost of resources: the credit activity becomes more profitable, stimulating the bank to increase its supply of finance. All things being equal (risk and demand of loans unchanged), there is a downward pressure on the loan interest rate, leading to a reduction of the interest rate spread.

However, the impact of the slope variation on the interest rate spread depends also on the risk aversion of the bank. This risk would depend on the global position of the bank (or its balance sheet structure), which would determine its choice between holding a risky asset (loans) and a riskless asset (government bonds). For a given variation of the slope, the more this risk aversion is weak, the more the impact on the spread is high. Indeed, in the strand of money demand models, the macroeconomic impact of portfolio choices of households depends on the modifications of the risk aversion parameter, thus reflecting shocks on the liquidity preference. Here, we assume a risk aversion constant in time, but which might be different for each type of borrowers.

All in all, the sign of the coefficient of the slope of the yield curve is indeterminate. In this respect, Brock and Franken (2003) also finds contrasting results.

*5.1.2) Year-on-year change in the CAC40 (gan_CAC40): an indicator of the overall risk*

The evolution of the stockmarket index is likely to reflect expectations on future economic activity. As a result, a rise in the general level of stock exchange prices may indicate a greater interest for financial markets due to, for instance, a reduction of liquidity preference. The investors would abandon more easily liquid or less risky assets (government bonds) in favour of more risky assets. In our model, we assimilate loans to risky assets, thus including a risk premium. Following a decline of the general level of risk, banks would prefer to invest in less liquid assets and would increase their loan supply. As a consequence, there would be a shift in loan supply and a decline in the equilibrium interest rate. For a given level of return of the riskless asset, there would be a reduction of the interest rate premium.
A rise in the general level of stock exchange prices may also lead to a rise in the value of collateral, thus reducing the risk of granted loans and implying a reduction of the premium.

The previous analysis has some limitations in explaining different models of interest rate premiums:

- beyond a given horizon, the risk becomes uncertainty: the evolution of the stockmarket index should not be significant when explaining the premiums for distant maturities;
- as regards housing loans, the real estate can be used as a collateral so that the risk linked to this segment of the market is weak. Moreover, housing loans are granted for long maturities.

[12] Indeed, Oung (2004) finds in the French case that the maturity transformation operated by banks is an important determinant of banks' profitability affected by changes in the slope of the yield curve.

As a result, the sign for the parameter associated with this variable is expected to be negative.

*5.1.3) Bank provisions (provisions): an ex post or ex ante pricing of the risk specific to the banking activity*

When we model different premiums, we introduce the ratio of bank provisions for households and non financial corporations relative to corresponding loan outstandings, as an indicator of the cost of the risk borne by banks. The objective is to measure the cost in terms of risk for capital loss – both effective and expected – associated with holding a debt portfolio. This idiosyncratic risk is a typical banking risk in the sense that it takes into account two distinctive features:

- the lending risk linked to small borrowers' having no access to financial markets: the share of the premium attributable to this variable should not be contained in the spreads for private debt securities issued on the financial markets;
- moral hazard risk in the sense that it depends to a large extent on the bank's ability to provide good incentives to customers.

In accounting terms, we therefore draw a distinction between "specific" provisions, which are retrospective and hence countercyclical, and "general" provisions, which are prospective and hence procyclical. But the inclusion of this kind of variable raises additional questions. Do banks provision mainly before or after shocks? Do banks anticipate correctly cyclical evolutions and their consequences on the activity?

- provisions increase during the upswing: banks realize that the overall risk of the loan portfolio is growing, especially if they increase their loan outstandings to cope with a surge in demand. Their profitability (in the sense of their ability to make profits rather than profits actually recorded on the P&L account) should be positively correlated with the cycle, which might see them try to smooth their profits by over-provisioning.
- provisions increase during the downswing: confronted with an increase in debtor failures ratio, banks may be aware that they have not built up sufficient provisions in the past (with regard to *ex ante* risk indicators like activity and unemployment variables).

If provisions are of a prospective nature, they will contain redundant information as compared with the variables reflecting macroeconomic shocks. If they have a retrospective nature, we expect that they contain an additional information. Whatever the prevailing explanation, the *provisions* variable will have a positive coefficient if significant.

*5.1.4) Business cycle variables: the output gap (ec_pib) and the unemployment rate (txcho): the ability of resistance to macroeconomic shocks*

We seek to distinguish between the impact of business cycles, as measured by the output gap for companies and the unemployment rate for households. Rather than an explanation in terms of loan demand changes, we consider that these variables are likely to indicate the debtors' creditworthiness' sensitivity to macroeconomic shocks stemming from their financial position.

The output gap reflects the position in the business cycle in the sense that it summarizes the pressures on the factor markets arising from the relative strength of demand, notably in terms

of the impact on the division of value added. Moreover, the business cycle affects business cash flows. Changes in demand feed into profits as much as the firm is capital-intensive (effect of the operational lever) or/and has a fragile financial structure (gearing). Tu put it differently, a firm's financial soundness is conditioning upon the extent to which it can withstand a demand shock, with the result that all non financial corporations should not be affected identically.
In this spirit, Brock and Franken (2003) indicate that the output gap is positively correlated with the value of collateral.

Households, meanwhile, bear the full brunt of an increase in the unemployment rate and may offset the effect on their income only by drawing on their savings, by reducing consumption or by borrowing. The unemployment rate may then represent an indicator of demand for credit, provided banks do not ration credit. For this reason, we interpret it as a leading indicator of the risk of failure to repay.

Unlike companies, all households should be affected by a rise in joblessness, which does not signify a decline, but rather a break, in activity.

We expect the output gap to affect the interest rate premium negatively, while we assume that the unemployment rate will have a positive impact.

### *5.1.5) Interest rate cycle (pomo) : the stickiness of loan interest rates by the yardstick of the existence of an insurance contract*

To define interest rate cycles, i.e. phases in which interest rates rise and fall, we introduce an dummy variable that shows the direction of monetary policy, instead of using the 3-month money market rate directly. We have a particular reason for doing this: introducing an interest rate into the equation would amount implicitly to re-examining the concept of interest rate premiums and to measure the long-term elasticity of loans to market rates (a positive value for the coefficient would therefore reflect stickiness for long-term lending rates).

An upswing should be indicated by an increase in all market rates, driven by the short rate. We seek to strip out one-off rises, which have no effect on the overall structure of interest rates, even though some distortion may occur[13]. Banks are supposed to shield their customers from abrupt changes in interest rates, especially if the relationship is close (existence of a long term relationship), possibly at the price of a higher premium. Furthermore, the bank bears the risk of a change in interest rates when it grants a fixed rate loan: for this reason its margin is higher.

This variable, which is illustrative of a behaviour that is typical to the banking industry, thus isolates one of the factors that explains the relative stickiness of lending rates (to market rates). It should exert a negative influence on interest rate premiums.

### *5.1.6) Volatility of the 3-month interbank market rate (volCT)*

The volatility of the 3-month interbank market rate is an indicator that is frequently used to measure uncertainty about the value of the refinancing rate. Yet, a higher uncertainty should lead to higher interest rate premiums. Accordingly, the corresponding coefficient for this variable is assumed to be positive.

[13] Distortions in the interest rate structure are already taken into account via the variable for the yield curve slope.

*5.1.7) The saving rate among companies (txS) and households (txS_fi)*

The saving rate can be seen in two different ways.

In Keynesian sense, it is a residual. An increase in this rate induces a greater financial independence, implying a weaker incentive to use external financing. Hence, a less demand for credit implies a downward pressure on the interest rate premium.

In the sense of the concept of forced saving, economic agents aims at maintaining a given level of wealth. Hence, an increase in the saving rate may be the consequence of past decisions in terms of debt, feeding into heavy repayment charges that reduce borrower solvency. It may also be the consequence of high (or rising) risk aversion. Finally, it can result from an increase in precautionary savings. As a consequence, the saving rate would be countercyclical. In accordance with these explanatory factors, a positive relationship is expected between the saving ratio and the interest rate premium.

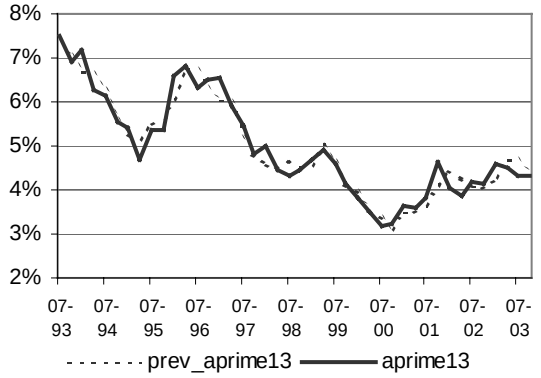
We use the overall saving rate for businesses and only the financial component in the case of households. The sign of the saving rate coefficient is indeterminate.

5.2 Results of the estimates

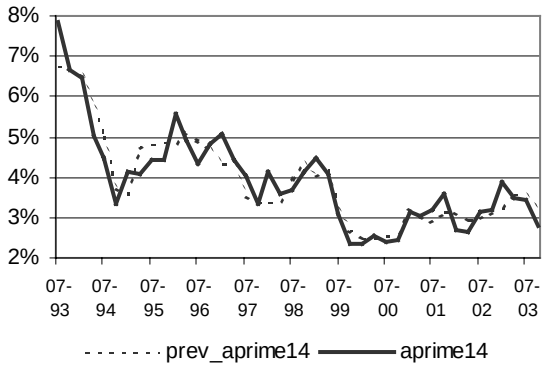
Figure 5 presents estimated and actual interest rate premiums. We see a good match between the two, which is a first indication of the robustness of the findings. Table 7 gives the values for the coefficients of the models estimated for households, while Table 8 provides the same information for businesses.

**Figure 5: Interest rate premiums: estimated (dotted line) and actual (unbroken line)**
(monthly data, %)

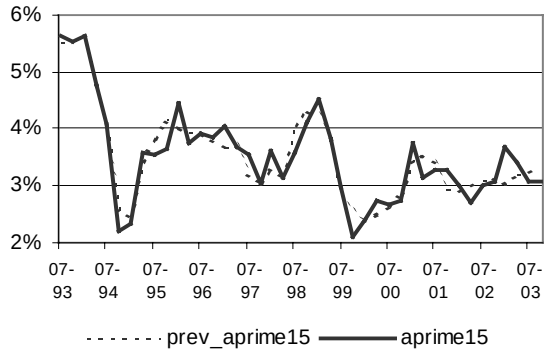
**Consumer loans, IRFP < 1 yr**



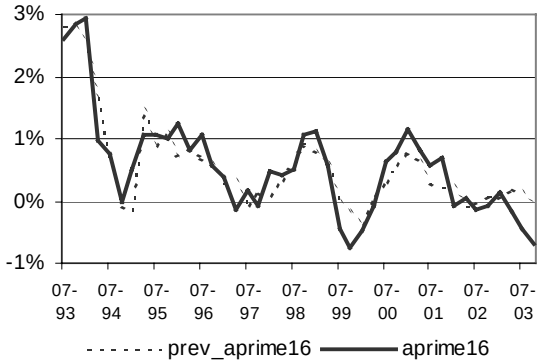

**Consumer loans, 1 yr < IRFP < 5 yrs**



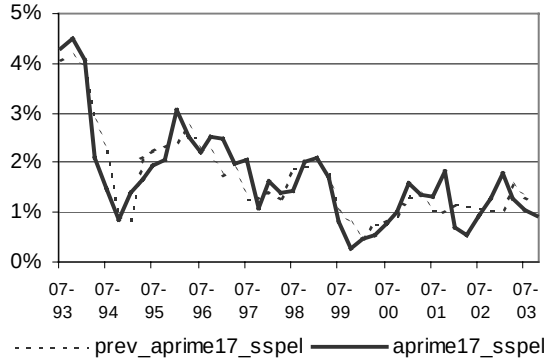
**Consumer loans, IRFP > 5 yrs**



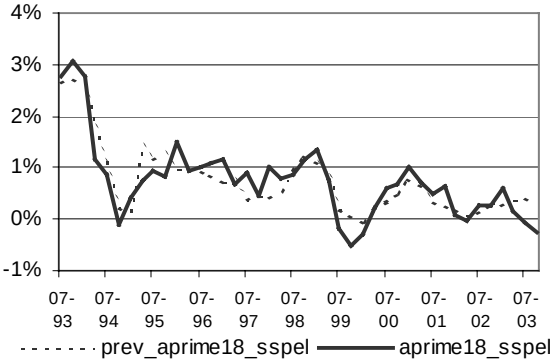

**Housing loans, IRFP < 1 yr**



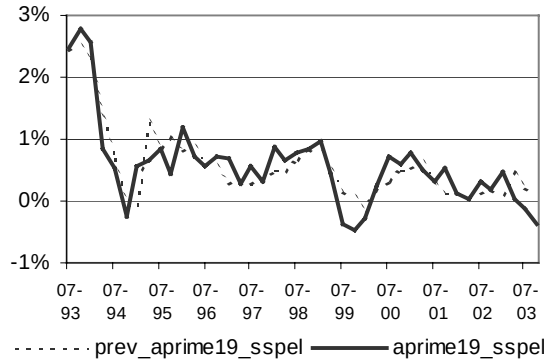

**Housing loans, 1 yr < IRFP < 5 yrs**



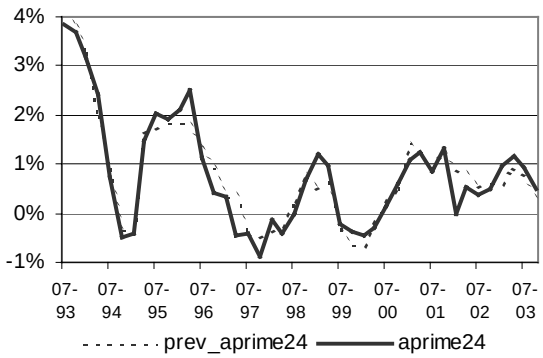

**Housing loans, 5 yrs < IRFP < 10 yrs**



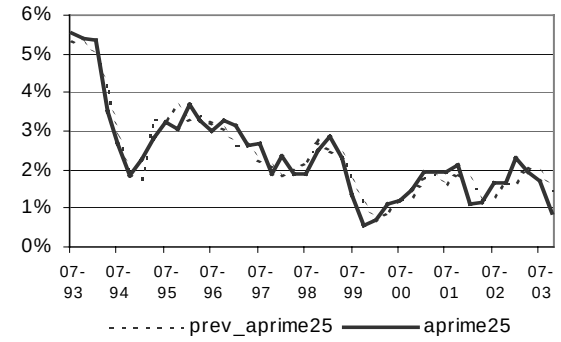

**Housing loans, IRFP > 10 yrs**



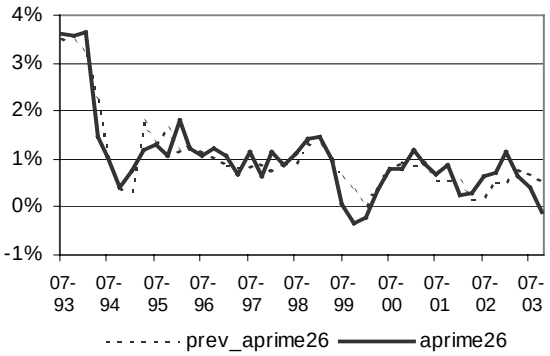

**Business loans, IRFP< 1 yr, loan < €1 million**



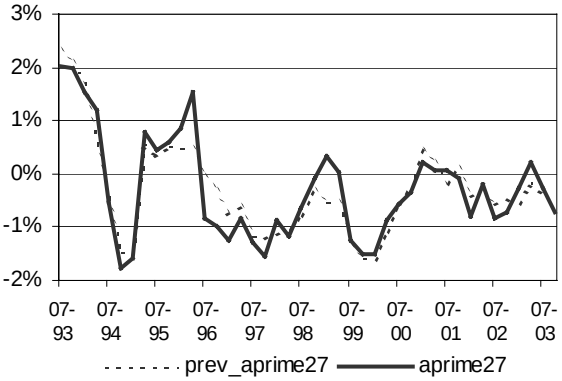
**Business loans, 1 yr < IRFP < 5 yrs, loan < €1 million**



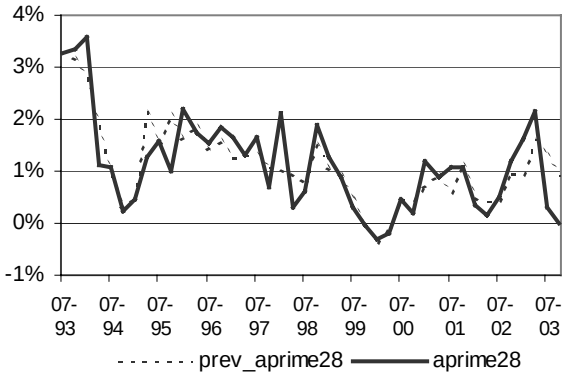

**Business loans, IRFP > 5 yrs, loan < €1 million**



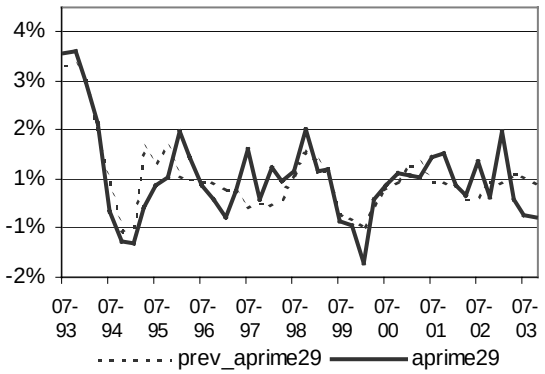

**Business loans, IRFP < 1 yr, loan > €1 million**




**Business loans, 1 yr < IRFP < 5 yrs, loan > €1 million**




**Business loans, IRFP > 5 yrs, loan > €1 million**



The analysis of Table 7, which contains the results of the estimates for households, yields the following findings.

**Table 7: Results of estimates for explanatory models of household interest rate premiums**

| | marge_LT | gan_CAC40 | pomo | volCT | pente | Txcho | provisions | txS_fi |
|---|---|---|---|---|---|---|---|---|
| Consumer IRFP < 1 yr (cat. 13) | 0.0410 | -0.0086 | -0.0074 | 1.03 | 0.25 | 0.0058 | N.S. | N.S. |
| Consumer 1 yr < IRFP < 5 yrs (cat. 14) | 0.0382 | -0.0077 | -0.0069 | 0.88 | -0.27 | 0.0063 | N.S. | 0.142 |
| Consumer IRFP > 5 yrs (cat. 15) | 0.0403 | N.S. | -0.0086 | 0.32 | -0.39 | 0.0036 | N.S. | 0.115 |
| Housing IRFP < 1 yr (cat. 16) | 0.0087 | N.S. | -0.0036 | 0.69 | -0.44 | 0.0021 | N.S. | N.S. |
| Housing 1 yr < IRFP < 5 yrs (cat. 17) | 0.0169 | N.S. | -0.0067 | 0.77 | -0.26 | 0.0037 | N.S. | 0.150 |
| Housing 5 yrs < IRFP < 10 yrs (cat. 18) | 0.0107 | N.S. | -0.0039 | 0.44 | -0.39 | 0.0030 | N.S. | 0.104 |
| Housing IRFP > 10 yrs (cat. 19) | 0.0078 | N.S. | -0.0020 | 0.50 | -0.37 | 0.0021 | N.S. | 0.116 |

*Note:* N.S. indicates insignificant variables

- "Pure" interest rate margins (*marge_LT*) on consumer loans are considerably higher than those for housing loans. The sizeable disparity between interest rate premiums on consumer and housing loans likely stems from differences in guarantees. Market structure also offers a plausible explanation for this: housing loans are more competitive than consumer loans, and the competition becomes stiffer when households take on long-term debt (they look for the most competitive bank).
Within consumer loans, premiums are broadly similar, while among housing loans they decline with the maturity. This comparison of "pure" margins for consumer and housing loans leads us to conclude that a single market exists for consumer loans, while there is an heterogeneous market for housing loans.

- The unemployment rate (*txcho*) has a small impact on consumer loans with an IRFP > 5 yrs, while protection against erratic changes in interest rates (*pomo*) appears to be stronger. This suggests that the segment of long-term consumer loans might be reserved for the best customers.

- The slope of the yield curve (*pente*) always has a negative sign, except in the case of short-term consumer loans (IRFP < 1 yr).

- The volatility of short-term interest rates (*volCT*) has a bigger effect on short-term or variable-rate loans. The variable has a fairly powerful influence on long-term and fixed-rate housing loans, similar to the yield curve slope. The interdependence between the two variables suggests

large-scale transformation in housing loans. This interdependence would explain the periods of negative premiums.

- The unemployment rate's (*txcho*) impact on housing loans eases as the term of the investment raises.

- The provisions are not significant in the presence of the unemployment rate. As a result, both variables should contain similar information.

- The year-on-year growth rate of CAC 40 appears with the expected sign for consumer loans with an IRFP < 5 yrs. On the other hand, this predictive variable of future activity do not affect consumer loans with an IRFP > 5 yrs, as well as housing loans.

- The coefficient of the savings ratio (*txS_fi*), if significant, is positively signed for all premiums. An increase in the savings effort would then be correlated with a higher premium, reflecting the existence of a possible precautionary motive and / or the effect of a higher debt burden.

The analysis of Table 8, which contains the results of the estimates for businesses, yields the following findings:

**Table 8: Results of estimates for explanatory models of business interest rate premiums**

| | **marge_LT** | **gan_CAC40** | **pomo** | **volCT** | **pente** | **ec_pib** | **provisions** | **txS** |
|---|---|---|---|---|---|---|---|---|
| **Loan < €1 million** | | | | | | | | |
| IRFP < 1 yr (cat. 24) | 0.0091 | -0.0099 | -0.0076 | 1.33 | -0.49 | N.S. | 0.184 | -0.327 |
| 1 yr < IRFP < 5 yrs (cat. 25) | 0.0253 | -0.0080 | -0.0040 | 1.02 | -0.50 | -0.30 | 0.329 | N.S. |
| IRFP > 5 yrs (cat. 26) | 0.0139 | N.S. | -0.0028 | 0.68 | -0.51 | -0.19 | 0.144 | N.S. |
| **€1 million < Loan < €4 million** | | | | | | | | |
| IRFP < 1 yr (cat. 27) | N.S. | -0.0076 | -0.0056 | 1.01 | -0.56 | N.S. | 0.215 | -0.551 |
| 1 yr < IRFP < 5 yrs (cat. 28) | 0.0146 | -0.0106 | N.S. | 0.59 | -0.58 | -0.43 | 0.282 | -0.446 |
| IRFP > 5 yrs (cat. 29) | 0.0087 | N.S. | -0.0035 | 0.63 | -0.44 | -0.19 | N.S. | N.S. |

*Note:* N.S. indicates insignificant variables

1. The main difference: fixed rate vs variable rate

Given that the average loan maturity is identical for loans with an IRFP lower than 1 year and between 1 and 5 years (cf. Table 1), some borrowers turn towards fixed rate financing, whereas the other ones ask for variable rate financing.

Jimenez and Saurina (2002) indicate that low-risk borrowers and borrowers with a sound financial structure make less effort to shield themselves from interest rate variations. They appear to seek either to borrow at a lower rate, i.e. a short-term rate – safe in the knowledge that their loan will be renewed – or to borrow at a variable rate.

According to our results, borrowers calling for loans with an IRFP lower than 1 year should represent the riskless category: they should be shielded from demand chocks, attesting of their stronger financial position. Meanwhile, they seem to belong to the most competitive part of the market. Indeed, the "pure" or long term margin of the banks would be the lowest one (or even insignificant for high loan amounts) and the availability of substitutes to bank credit would be the most developed. Last but not least, they would benefit from the best long term customer relationships with the bank, their financing conditions being the best immunised against cyclical changes in market interest rates. Yet, the volatility of the short term interest rate would be more strongly transmitted, confirming that these loans are granted at a variable rate and not at a fixed one.

However, the borrowers resorting to loans with an IRFP higher than 1 year would engender a higher degree of risk (their financing conditions would be significantly affected by demand shocks), would be more strongly bank-dependent (the *txS* variable do not playing a very significant role), giving the banks a stronger monopoly power in terms of the interest rate margin. Finally, they would be less protected against cyclical interest rate changes at medium and long term.

2. Within the borrowers contracting financing at fixed interest rates, the best clients would go at the longest maturities.

The impact of demand shocks is stronger for firms contracting medium term loans (with an IRFP between 1 and 5 years) rather than long term loans. Similarly, given the value of the coefficient for the *provisions* variable, the default risk seems lower.

3. A stronger market power for firms borrowing high loan amounts.

The "pure" margin is generally weaker, which seems to indicate the possibility for borrowers to benefit from alternative financing, internal or external. Indeed, we notice that the saving ratio is significant, except for high loan amounts with an IRFP higher than 5 years. This last observation could indicate a willingness of this category of borrowers to maintain a constant structure on the liability side of their balance sheets. Indeed, the default risk for this type of borrowers seems to be lower since the coefficient of the *provisions* variable is not significant.

**Conclusion**

We have sought to provide an initial exploratory analysis of the macroeconomic determinants of interest rate premiums. The prevailing approach in the literature consists in analysing either the direct effect of monetary policy on bank lending rates, or in examining the determinants of bank margins. We have taken a complementary approach by comparing a risky asset (a loan) against a non-risky asset (the yield on government bonds) of similar maturity. Our aim was to model the determinants of banks' portfolio choices. Of the various possible explanatory factors, we focussed on a set of macroeconomic variables, which were intended to reflect the competitive structure of the market, the cost of risk for banks, hedging costs, uncertainty about the future cost of refinancing, the effects of demand for credit and the nature of loan agreements.

The findings reveal a good match between estimated and actual interest rate premiums, demonstrating the suitability of the selected variables. Some sizeable disparities were found between estimates in the same category of borrowers, when the only separating factor was the initial rate fixation period. First, some variables are significant and others not. Second, even among significant variables, the values of certain coefficients exhibit large differentials.

In addition to the traditional households/non-financial corporations distinction, these observations indicate that there are further splits in markets as banks do not behave uniformly within each borrower category.

As far as households are concerned, the housing market seems all the more competitive as the average length of a loan is high. The competition between banks would be all the more stronger as the market is *a priori* captive. This could constitute an important explaining element of the negative premiums in the housing market observed in 2003.

Regarding firms, it appears that both the fix or variable nature of the interest rate of financing and the average term of loans are taken into account by banks when establishing the loan contract. Therefore, the interest rates should not be viewed as the unique adjustment variable in the loan market. The underlying idea is that for a fixed interest rate, a shorter average length implies a better control of the borrower by the bank via the renewal or not of the credit line.

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