

Some implications of bank restructuring for French monetary policy

Christian Pfister and Thierry Grunspan¹

Owing to the limited degree of bank restructuring in France,² this article broadens the scope to changes in the environment in which banking activities are conducted. Such changes, as well as banking restructuring itself, can be expected to have implications for both the transmission mechanism (Section 1) and the definition and implementation of monetary policy (Section 2).

1. Implications for the monetary policy transmission mechanism³

The development of capital markets and the increased competition between banks are factors that can be expected to have strengthened the efficiency of the transmission mechanism, at least in its first stages: the response of money market rates and bank lending rates to changes in policy rates should have become both more rapid and larger. As a consequence, the interest rate channel is likely to have been reinforced both in absolute terms and relative to the credit channel. However, the overall impact on the transmission mechanism is unclear to the extent that long-term interest rates, which are not directly under the control of the central bank, play an important and increasing role in the financing of the French economy.

1.1 The response of money market rates to policy rates

Comparing two periods, 1987-91 and 1992-96, it appears that the transmission of monetary policy impulses to money market rates has become much more rapid.⁴

Before 1992, it took the one-month rate one month to adjust up to 85% to a shock to the intervention rates (repurchase tender rate and five-to-ten day repurchase facility rate) and the overnight rate; after the same lapse of time, 80% of the same shock was reflected in the three-month rate.

Since 1992, the passthrough of a change in the overnight rate to the one-month rate takes one week, with 92% of the adjustment taking place on the first day; the lag is approximately two weeks for the transmission of changes in both the overnight rate and the official rates to the three-month rate.

The more rapid response of money market rates to policy rates may be accounted for by the increased efficiency of the French money market resulting from reforms implemented in the mid-eighties (creation of a new compartment open to all economic agents in which certificates of deposit, commercial paper and Treasury bills are traded; improved security through the promotion of repurchase transactions with delivery of securities).

¹ The authors are members of the Economics Department of the Banque de France. The views expressed are theirs and not necessarily those of the Banque de France.

² See Matherat and Cayssials (1998).

³ For a broader view of the monetary policy transmission mechanism in France, see Cordier and Ricart (1995).

⁴ See Pfister (1997a).

1.2 The response of bank lending rates⁵

Previous research has tended to show that bank lending rates in France adjusted only partly and sluggishly to changes in policy rates.⁶ This may reflect two types of factors:

- from a technical point of view, estimations have usually focused on the banking base rate. However, this rate is adjusted infrequently and today applies only to a small and declining part of banks' credit: 6.6% at the end of 1995 as against 10.5% at the end of 1992.⁷ Furthermore, the banking base rate is used as a reference mainly for short-term credit extended to small and medium-sized enterprises. Here, we have recourse to rates compiled quarterly by the Banque de France Business Conditions Division that we consider more representative of the genuine cost of credit and that allow us to differentiate between short, medium and long-term credit as well as between enterprises and individuals;
- from an economic point of view, an important part of French banks' liabilities is still remunerated at regulated interest rates (Table 1). This may hamper the response of bank lending rates to policy rates. Here, we try to account for inertia stemming from regulated interest rates by using the spread between the rate at which the Banque de France provides the bulk of banks' refinancing (the repurchase tender rate) and the weighted level of regulated interest rates as an explanatory variable for bank lending rates.

Table 1
Breakdown of banks' liabilities according to remuneration
Percentage of total, end-year figures

	1984	1997
Sight deposits*	20	14
Regulated interest rates	34	30
<i>Passbook deposits</i>	29	18
<i>Housing saving schemes</i>	5	11
Market interest rates	39	45
<i>Term deposits</i>	18	15
<i>CDS</i>	1	9
<i>Bonds and medium-term notes</i>	20	21
Own funds	8	12

* The remuneration of sight deposits can also be considered as regulated to the extent that it is forbidden to pay interest on French franc-denominated sight deposits which account for the quasi-totality of sight deposits.

Source: Banque de France.

Estimations of short-term loans extended to firms have been run over the period 1983Q1-1998Q2 as well as over the two sub-periods 1983Q1-1989Q4 and 1990Q1-1998Q2. From the results it appears that:

- the short-run response of the bank lending rate to the policy rate has increased over the period. In the 1980s, after one quarter, only 64% of a change in the repurchase tender rate was reflected in

⁵ See the Appendix for more detail.

⁶ See, for instance, Borio and Fritz (1995).

⁷ The corresponding figures for banks' variable rate loans referenced on money market rates were 20.6 and 21.2%; they were 69.6 and 65.0% for fixed rate loans. Figures are quoted from Barillas (1995) and Gervais (1997).

the short-term loan rate under the assumption that the regulated rates adjusted in line with the repurchase rate. In the 1990s, the corresponding percentage is 82%, regardless of whether regulated rates are adjusted or not;

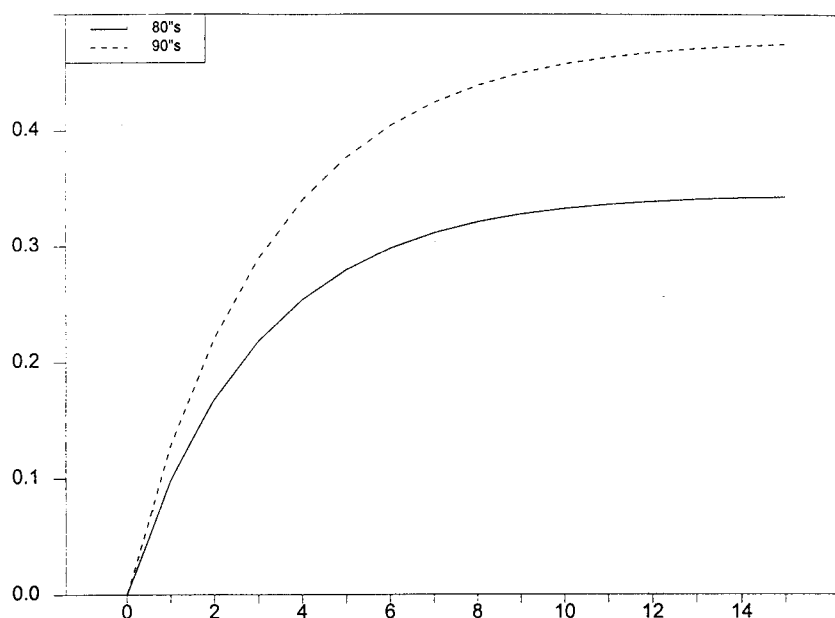
- indeed, in the 1980s, the inertia of regulated interest rates vis-à-vis the main policy rate slowed the adjustment of the lending rate. For instance, after three quarters, the lending rate adjusted by 71% if the regulated rates and the policy rate moved in line, but only by 42% if the repurchase tender rate alone was moved. In the 1990s, the spread between the policy rate and regulated rates is not statistically significant.

As a consequence, the response of short-term banks' lending rates to firms in France has become quite similar to the ones observed in other G-10 countries.⁸

Owing to data availability, estimations for short-term loans extended to individuals were confined to the second sub-period only. In this case, the spread between regulated rates and the repurchase tender rate is statistically significant over the estimation period.

Estimations for medium and long-term loans extended to firms have been run over the period 1984Q2-1998Q2 as well as for over the two sub-periods 1984Q2-1989Q4 and 1990Q1-1998Q2. Between the two sub-periods, bank lending rates have become more responsive to changes in the ten-year interest rate: the relative weight of the ten-year in the long-run response has approximately increased from one third to one-half.

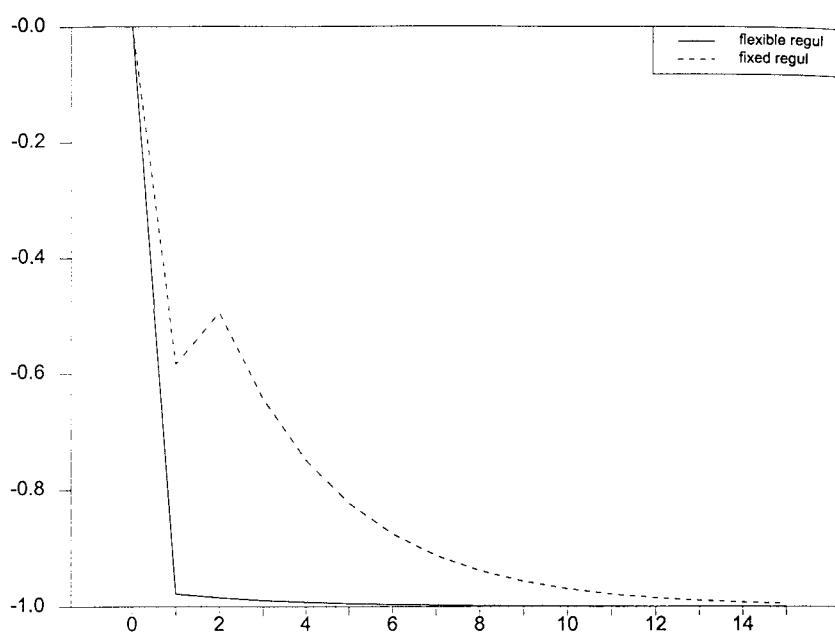
Graph 1
Response of medium and long-term lending rate to firms
 1% increase in 10-year rate (with unchanged policy rate)



As in the case of short-term loans, data availability limits the scope of the estimation for individuals to the 1990s. Ten-year interest rates account for more than three quarters of the long-run response of loan rates, while regulated interest rate inertia slows down the response of the loan rate to the policy rate. For instance, at a two-quarter horizon, loan rates adjust nearly completely to a simultaneous change in the policy, ten-year and regulated rates; however, they adjust only up to 58% if the latter are kept unchanged.

⁸ See Borio and Fritz (1995).

Graph 2
Response of medium and long-term lending rate to households
 Simultaneous 1% fall in the policy rate and 10-year rate



All in all, it appears that, in the 1980s, banks did not behave in a competitive manner, as their average funding cost played an important role in the pricing of credit. By contrast, in the 1990s, growing competition between banks and the creation of a market for commercial paper have rendered bank lending rates more responsive to policy and market rates, as far as loans extended to firms – especially short-term credit – are concerned. However, as individuals do not have direct access to money market financing, banks are still in a position to impose their average funding cost.

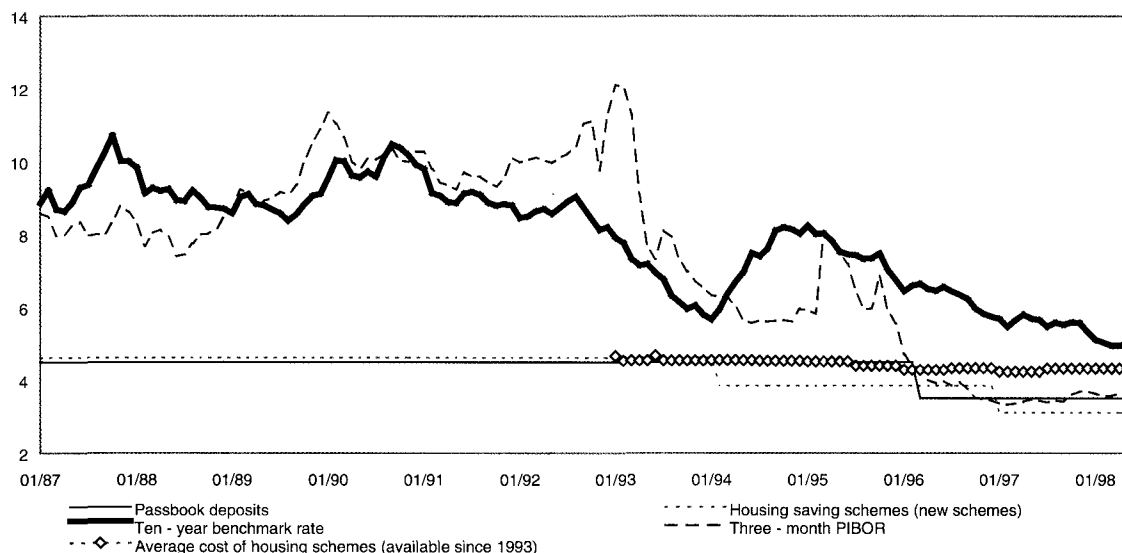
These results may be regarded as ambiguous to the extent that credit growth has been decelerating and interest rates declining during most of the 1990s. However, one should note that policy and market rates have had an increasing influence on bank lending rates in spite of two adverse factors: during the 1990s, assets remunerated at variable interest rates have outweighed liabilities of a similar nature in the aggregated balance sheet of banks and regulated interest rates have declined less than market interest rates (Table 2).

Table 2
Breakdown of banks' balance sheet according to type of remuneration
 French franc-denominated assets and liabilities, as a percentage of total, end-year figures

	1992	1993	1994	1995
Assets remunerated at variable interest rates	29.3	30.9	23.0	24.4
Liabilities remunerated at variable interest rates	24.2	18.5	18.6	17.3

Source: Barillas (1995) and Gervais (1997).

Graph 3
Market and regulated interest rates
In percent



Source: Banque de France.

1.3 Impact on the transmission mechanism

The larger and faster response of money market and bank lending rates to policy rates is suggestive of a strengthening of the interest rate channel. However, this channel remains partially muted as a large part of French banks' liabilities is still remunerated at regulated interest rates that are far stickier than market rates. As a consequence, regulated interest rates influence the cost of credit extended to households. Furthermore, long-term interest rates, that are not under the direct influence of the central bank, play an important role in the financing of the French economy. As mentioned above, this role has even increased in the 1990s as regards medium and long-term bank loans extended to firms. Also, the development of capital markets and the increased competition between banks in France since the mid-1980s are likely to have weakened the credit channel relative to the interest rate channel.

Table 3
Relative importance of short versus long-term interest rates for the private sector
1995, as a percentage of GDP, end-year figures

	Non-financial companies	Households
Assets		
• Short-term rates	12.0	12.2
• Long-term rates	4.0	47.0
Liabilities		
• Short-term rates	20.0	6.0
• Long-term rates	22.9	25.7
Net assets		
• Short-term rates	-8.0	6.2
• Long-term rates	-18.9	21.3

Source: Cailleteau and Grunspan (1998).

At the same time, the concentration of the French banking sector has only marginally increased over the past fifteen years and thus not acted as a constraint on the financing of small and medium-sized firms. Moreover, recourse to credit still plays the major role in the financing of most French companies, with the growth of the share of financing on domestic capital markets in the total domestic debt reflecting mainly the deterioration of the public finances over the period. In fact, although the banking credit channel is unlikely to play a significant macroeconomic role in the transmission mechanism of French monetary policy,⁹ there are signs that a broad credit channel complementary to the money channel is at play.¹⁰

Table 4
Breakdown of total domestic debt
As a percentage of total, end-year figures

	1985	1997
Credit to the economy	71.8	57.7
<i>Companies</i>	34.4	25.7
<i>Households</i>	28.5	23.9
<i>Others*</i>	8.9	8.2
Central government non-negotiable debt	5.5	2.9
Financing on domestic capital markets	19.6	37.1
<i>Central government</i>	14.5	30.0
<i>Companies</i>	4.1	5.8
<i>Others*</i>	1.0	2.6
Credits obtained from non-residents	2.1	1.0
Bonds issued abroad	1.1	1.3

* Non-central government, private administrations and insurance companies.

Source: Banque de France.

2. Implications for the definition and implementation of monetary policy

The pursuit of price stability, the final objective of monetary policy, has by no means been endangered by the restructuring of the French banking industry. Indeed, the capacity of the Banque de France to influence short-term interest rates through its role as provider of the final means of settlement has not diminished. On the contrary, it has increased and French monetary policy has been successful in bringing down inflation and keeping it at a low level.¹¹

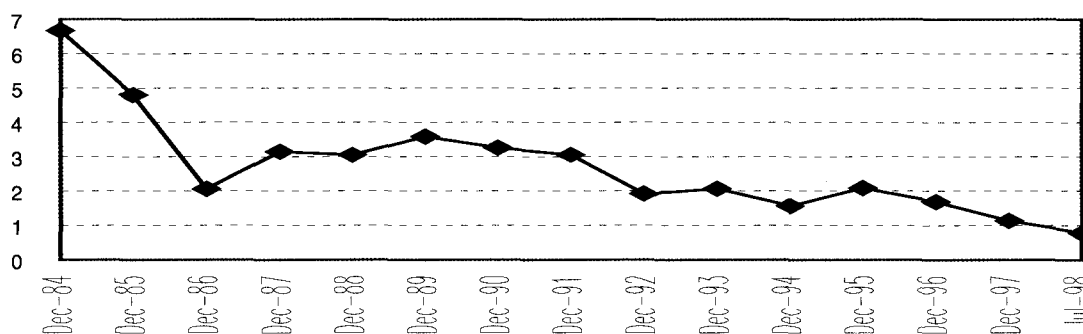
However, the broader context of deregulation, globalization, and financial innovation in which bank restructuring has taken place has deprived the central bank of some of its instruments and constrained more tightly the use of the remaining ones. It has also made the intermediate objectives of the French monetary policy at times more difficult to achieve or to define and led to more emphasis being put on price indicators.

⁹ See Rosenwald (1998b).

¹⁰ See Rosenwald (1998a).

¹¹ Conversely, the issuance of electronic money is likely to have significant implications for monetary policy in the future. See European Central Bank (1998).

Graph 4
Consumer price inflation



Source: INSEE.

2.1 Implications for the monetary policy instruments

In order to reap the benefits of the development of capital markets and improve resource allocation, recourse to direct control instruments, that had been a feature of the French monetary policy since the end of 1972,¹² clearly had to be discontinued. This was done progressively as limits on domestic credit expansion were lifted in 1987 and the last controls on capital movements removed at the end of 1989. However, as noted above, some elements of direct control still remain, such as regulated interest rates that may be useful in a context of excessive competition between banks but slow the response of loan rates to individuals.

Growing capital mobility and asset substitutability in a context of participation in the Exchange Rate Mechanism (ERM) led to a tighter constraint on other instruments, in particular the setting of reserve requirements and policy rates.¹³

In face of a heightened risk of relocation of money market activities and as a part of the efforts to disconnect temporarily the domestic impact of monetary policy from its external effects in situations of tension on the foreign exchange markets, reserve requirements were substantially eased in the early 1990s. The lowering of reserve requirements, that were unremunerated, was to some extent also useful against the background of slow growth in money and credit aggregates. But, as minimum reserves reached a level close to that of settlement balances, they lost their properties of stabilising very short-term interest rates and enlarging the demand for central bank money. These properties are, however, to be restored with the progressive introduction, from 16th October 1998, of a flat 2% ratio on most items of the liability base, in anticipation of the minimum reserve system that will be applied by the European Central Bank from the beginning of 1999. This restoration will nevertheless be achieved at the cost of abandoning, at least temporarily, the monetary control function of required reserves, as these are now fully remunerated in line with the main features of the ECB minimum system.

¹² See Castel and Masse (1983).

¹³ See Pfister (1997).

As reserve requirements were brought to very low levels, open market operations had to bear the brunt of the Banque de France's money market management. Furthermore, following the widening of ERM fluctuations bands in August 1993, there was uncertainty among market participants about the monetary policy that would be followed. Consequently, the Bank wished to show increased caution in adjusting money market interest rates towards their "baseline" levels in the wake of speculative attacks and tightened its control over very short-term interest rates. Both the lowering of reserve requirements and the wish to control very short-term interest rates led the Bank to increasingly rely on daily fine-tuning operations rather than its main refinancing operations to steer money market rates. As a consequence, the steering function performed by the official rates declined and, as seen above, changes in the one-month money market today reflect only those in the overnight rate. The focus on very short-term interest rates also reflected the wish of the Bank to minimize the impact on longer-term interest rates when the exchange had to be defended, in view of the important role played by medium and long-term interest rates in the financing of the economy. Finally, speculators were all the more penalized in such situations as short positions on the French franc were usually financed at conditions referenced on the overnight rate.

2.2 Implications for the monetary policy intermediate objectives and indicators

In the same way as they have constrained the use of monetary policy instruments, growing capital mobility and asset substitutability have, at times, rendered the intermediate objectives that French monetary policy pursues more difficult to achieve or define: a domestic objective based on a growth target for a money aggregate and an external objective of keeping the exchange rate stable vis-à-vis the most credible currencies in the ERM. Thus the broad monetary aggregate M3 has had to be redefined twice: in 1986, through its extension to money market paper held by non-financial agents and to assets held by money market mutual funds;¹⁴ and in 1991, through the direct inclusion of money fund shares in M3. These changes reflected both the spreading of the holding of money market fund shares by the public and the wish to protect M3 developments against portfolio shifts decided by fund managers rather than directly by investors, such as delocation to circumvent minimum reserves.

As shown in Table 5, the monetary target itself was based on M2 (in its former definition comprising cash, sight and term deposits) until 1985, M3 (in its new definition) in 1986, M2 and M3 in 1987, M2 from 1988 to 1990, M3 from 1991 to 1996 and on a range of monetary aggregates (M1, M2, M3 and M3 + P1¹⁵) in 1997 and 1998. The target was alternatively set as a reference rate (from 1977 to 1980, in 1983 and from 1994) and as a corridor (in 1981, 1982 and from 1984 to 1993). Also, the target horizon that was set at one year until 1993, and was extended to the medium term from 1994 to 1997.

Despite the changes in the definition of the monetary target, deviations became more frequent and larger. This probably reflected four factors: the loss of direct instruments that had made monetary targets easier to achieve and the increased difficulty to control broad monetary aggregates in the short-run as the share of non-renumerated assets in M3 decreased and financial innovation led to monetary assets being remunerated at rates closer to money market rates.

¹⁴ In 1986, deposits with savings banks were also reclassified into M1 (cash and sight deposits in French francs), M2-M1 (passbook deposits) and M3-M2 (term deposits, sight deposits in foreign currencies, money market fund holdings and money market paper) according to their nature.

¹⁵ P1 consists of contractual savings (housing saving schemes and peoples' saving schemes) that have an initial maturity of four years or more.

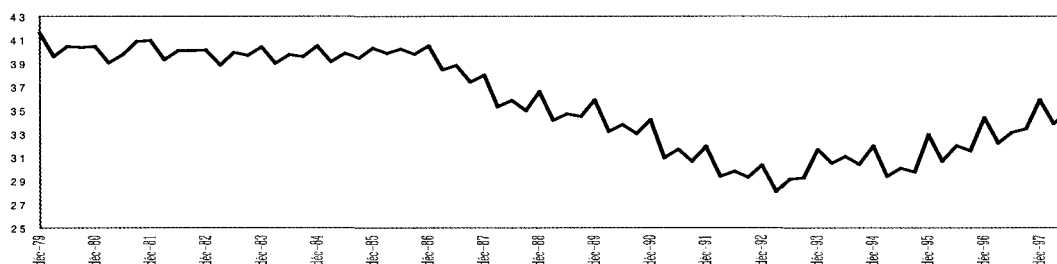
Table 5
Monetary targets

Years	Benchmark aggregates	Target (in %)	Outturn	Deviation from target (in %)
1977	M2	12.5	13.9	+1.4
1978	M2	12	12.2	+0.2
1979	M2	11	14.4	+3.4
1980	M2	11	9.8	-1.2
1981	M2	10-12	11.4	-
1982	M2	12.5-13.5	11.5	-1.0
1983	M2	9	9.9	+0.9
1984	M2R ¹	5.5-6.5	7.6	+1.1
1985	M2R	4-6	6.5	+0.5
1986	M3	3-5	4.5	-
1987	M2	3-5	4	-
	M3	4-6	9.1	+3.1
1988	M2	4-6	3.9	-0.1
1989	M2	4-6	4.4	-
1990	M2	3.5-5.5	-0.7	-4.2
1991	M3	5-7	4.2	-0.8
1992	M3	4-6	5.9	-
1993	M3	4-6.5	-1.2	-5.2
1994-96	M3	5	1.0 ²	-4.0
1997	M1	5	6.5	+1.5
	M2	5	7.8	+2.8
	M3	5	1.9	-3.1
	M3 + P1	5	4.8	-0.2
1998	M1	5		
	M2	5		
	M3	5		
	M3 + P1	5		

¹ Monetary aggregates were defined either in terms of holdings or both holdings and residence until 1985 (the differences between the two aggregates were negligible before that date, due to exchange controls); the letter "R" was dropped from 1986 as from then on aggregates were defined of both holdings and residence. ² Average yearly rate of change.

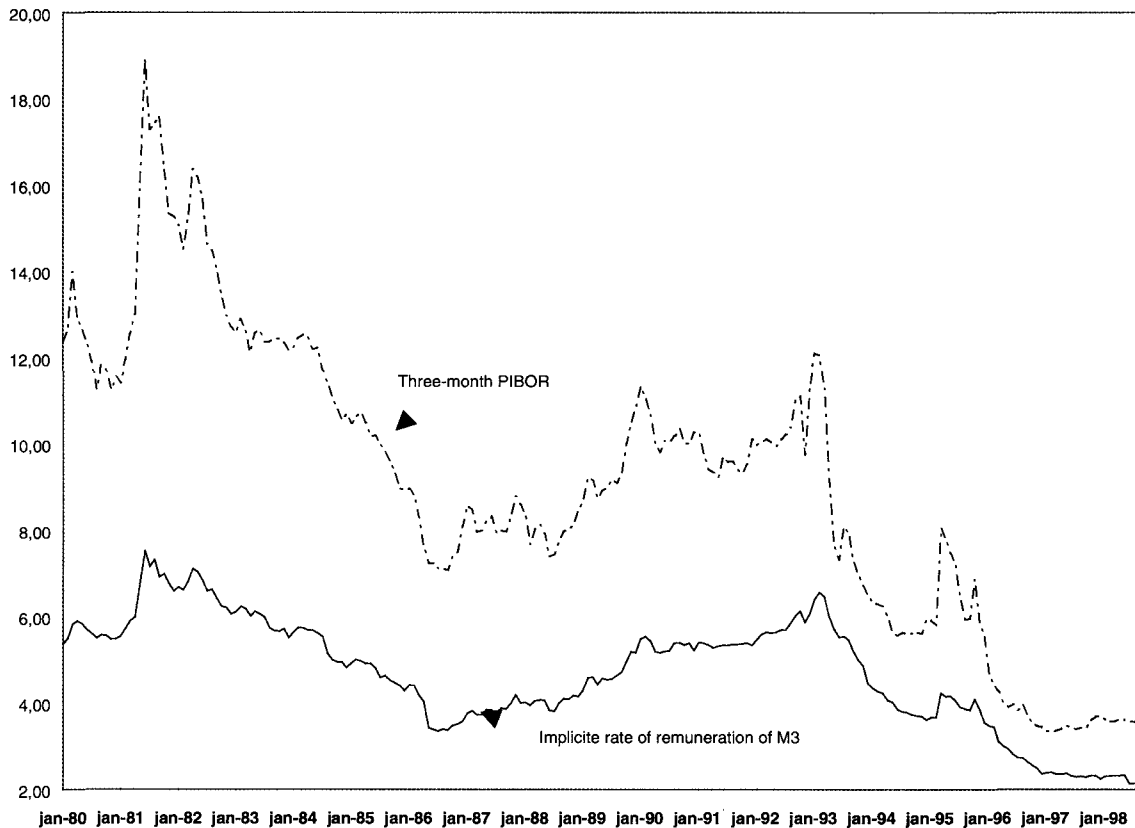
Source: Banque de France.

Graph 5
Share of non-remunerated assets in M3 (in %)



Source: Banque de France.

Graph 6
Implicit rate of remuneration of M3* and three-month PIBOR (in%)



* Weighted pre-tax creditor interest rates.

Source: Banque de France.

At times the exchange rate objective also became more difficult to achieve as capital flows developed, leading to a sweeping change in the structure of the French balance of payments: in 1984, current account transactions accounted for 70% of all operations registered in the balance of payments and 35% of GDP ; whereas the latter percentage remained more or less constant over the following ten years, capital flows accounted for more than 70% of all operations in 1993 and far exceeded GDP.¹⁶ More specifically, the holdings of French central government securities by non-residents increased sharply from 3% of the outstanding public negotiable debt in 1987 to a peak of 34.5% at the end of 1992. This raised questions about the stability of that demand and the potential adverse consequences of portfolio shifts.¹⁷

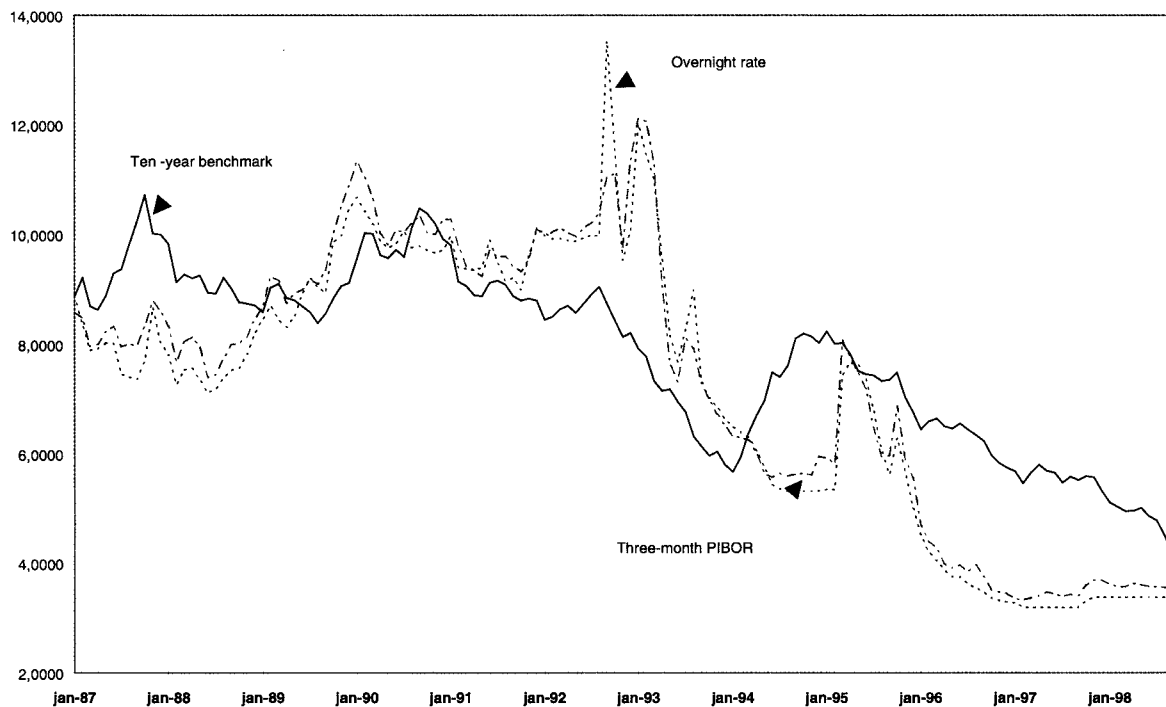
Indeed, it was at times necessary to raise policy rates to defend the currency, in some cases during rather long periods (from September 1992 to March 1993 and March to June 1995). However, interest rate hikes in defence of the franc in 1992-93 have apparently had a smaller impact on the economy than generally thought,¹⁸ possibly reflecting the rather modest response of longer-term interest rates and thus a much reduced impact of these interest rates on the financing conditions of the economy.

¹⁶ See Dedryver (1994).

¹⁷ See Patat (1994).

¹⁸ See Levy and Halikias (1997).

Graph 7
Short and long-term interest rates (in %)



Source: Banque de France.

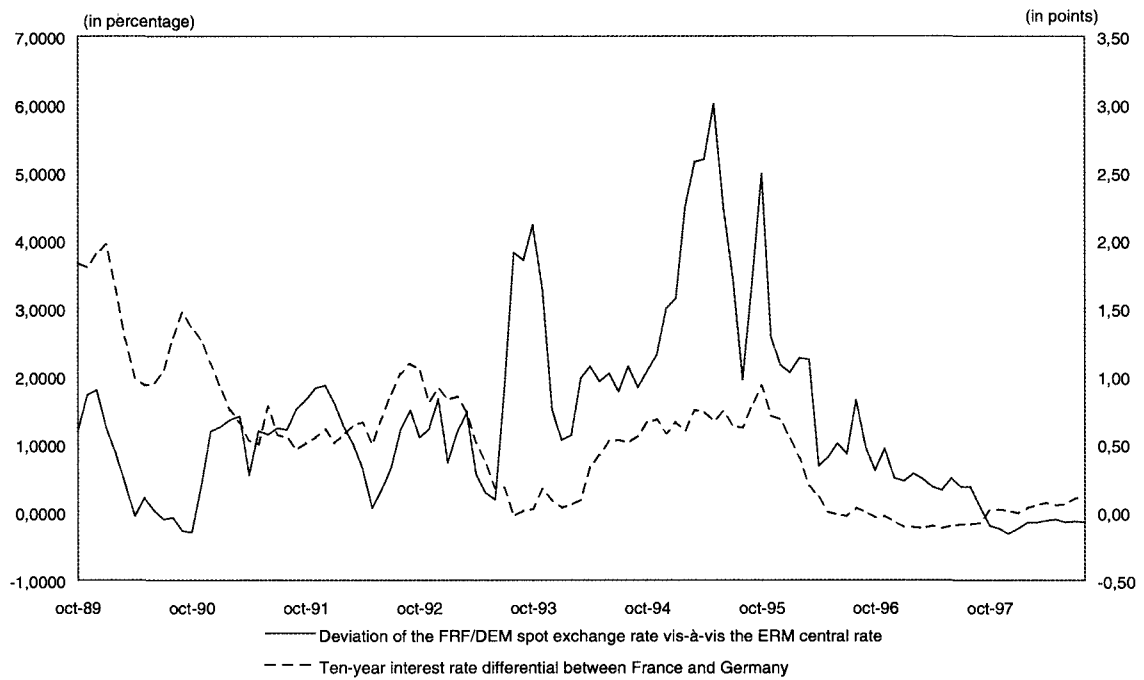
Three factors were at the root of the stronger emphasis by the Banque de France on price indicators:

- the role played by the exchange rate, that is itself a price, in the day-to-day conduct of monetary policy; this favoured the use of indicators that are available on a permanent basis;
- the development of deep and liquid financial markets, the prices of which can be considered as representative of investors' judgements and which incorporate information rapidly;
- the growing influence of market interest rates in the financing of the economy as well as the growing presence of banks in financial markets.

Four types of price indicators stand out among those monitored by the Banque de France: the yield curve, monetary conditions indicators, asset prices and derivatives. The *yield curve* is an important indicator for three main reasons. First, as mentioned above, medium and long-term interest rates play an increasing role in the setting of banking conditions and more generally in the French economy. Second, it has been possible to show that, over the period 1985-95, the term structure contains information for certain maturities. On the one hand, spreads vis-à-vis two-year rates are informative for future changes in both short and long-term rates; on the other hand, the spreads from (two- versus one-year rates) to (five- versus one-year rates) and (four- versus two-year rates) are the most informative for future changes in the inflation rate.¹⁹ Third, long-term interest rates differentials are used in conjunction with deviations of the spot exchange rates vis-à-vis the ERM central rates of the other most credible participating currencies as indicators of credibility of the exchange rate objective (Graph 8).

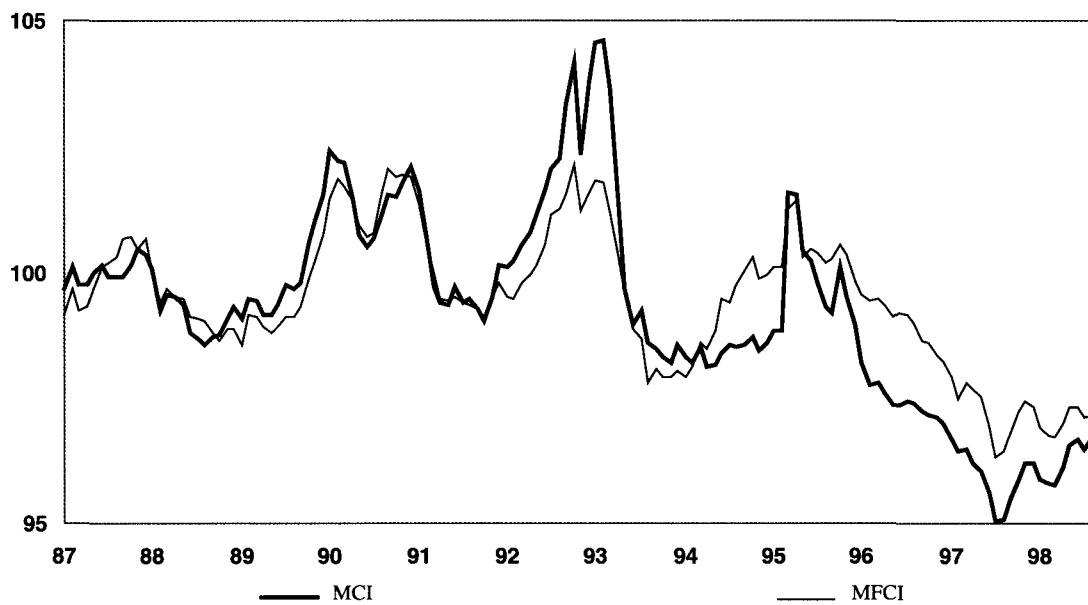
¹⁹ See Jondeau and Ricart (1997).

Graph 8
Long term interest rate differential and deviation vis-à-vis the Deutsche mark's central rate



Source: Banque de France.

Graph 9
MCI and MFCI in France

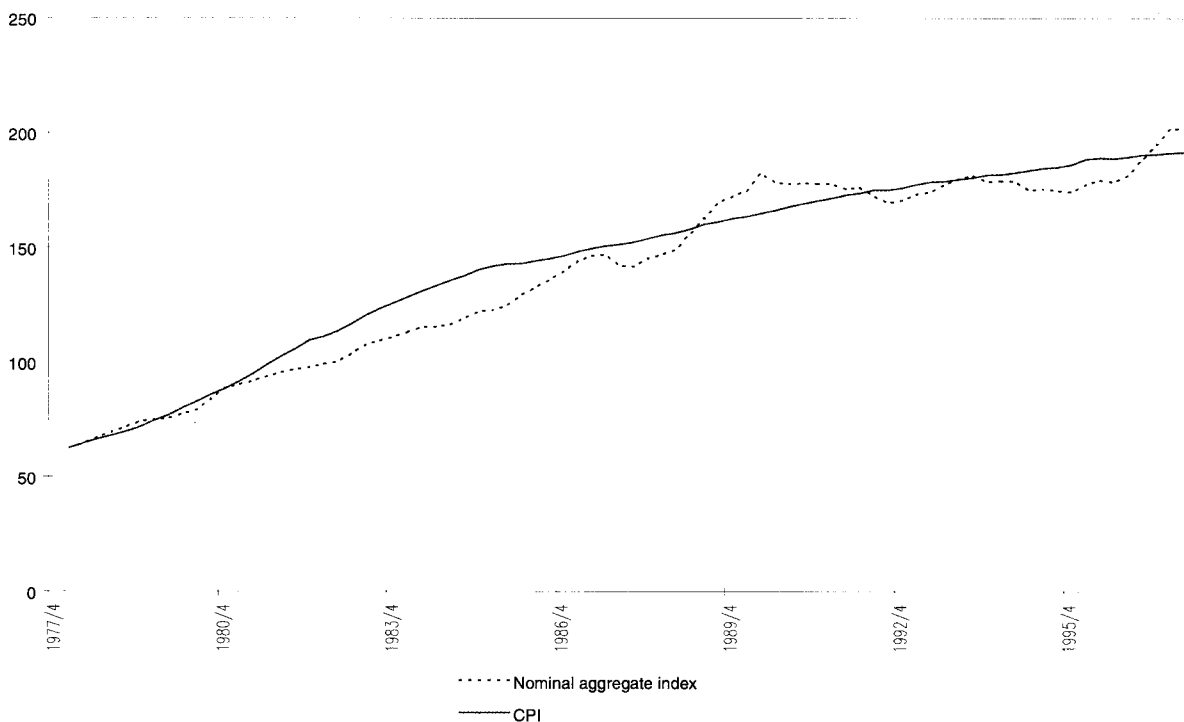


Base : 100 = 1987 average
 Source : Banque de France

The Banque de France also monitors *monetary conditions indicators* despite the inherent limits on the use of such tools, especially the fact that they reflect changes in monetary conditions from a given base year, so that they can only represent a relative degree of tightness and not an absolute one. Indeed, these indicators have the merit of synthesising in a readily available and internationally comparable manner the joint effects of variations in interest rates and exchange rates on economic activity, regardless of whether they originate from monetary policy or market behaviour. Moreover, the coverage of a monetary conditions index (MCI) can easily be extended to broader financial variables, such as long-term interest rates, in order to build a monetary and financial conditions index (MFCI). This is particularly justified in the case of France.²⁰

The reason why the Banque de France monitors *asset prices* is not so much related to a wealth effect, since available data do not validate the hypothesis of such an effect.²¹ It has more to do with their overall contribution to maintaining a high level of financial stability conducive to an efficient conduct of monetary policy²² and with the high degree of involvement of French banks in financial markets and real estate credit.

Graph 10
Aggregate index of asset prices



Source: Grunspan (1998).

Derivatives, in particular options, provide central banks with new opportunities for gauging market sentiment.²³ Notably, implied volatilities, call put volume ratios, smile curves and risk-neutral probability density functions on the three-month PIBOR and the Notional contract are used by the

²⁰ See Frochen (1996) and Verdelhan (1998).

²¹ See Jaillot and Sicsic (1998).

²² See Pfister (1997b).

²³ See ECSC/BIS (1994).

Banque de France to assess the direction and distribution of market expectations about future short and long-term interest rates.²⁴ Implied volatilities, risk reversals and risk-neutral probability density functions are used to assess the direction and distribution of market expectations about future exchange rates, especially the bilateral French franc/Deutsche mark rate.²⁵

Tighter constraints on the use of instruments and difficulties to achieve or to define intermediate targets have increased the need to explain to the public the reasons and the consequences for the economy of monetary policy decisions. This has been done mainly by referring to the final objective of price stability and to developments in some price indicators, notably long-term interest rates. Bank restructuring and changes in the broader context of banking activities have thus led the Banque de France to be more transparent and accountable. Another motive for enhanced transparency was found in the increasing reliance on price indicators in the day-to-day conduct of monetary policy. This increased the need to dispel any uncertainties in the markets about the monetary policy thrust, if only to avoid the “noise” such uncertainties might create in the information recovered from market prices.

²⁴ See Coutant, Jondeau and Rockinger (1998).

²⁵ See Rzepkowski (1997).

Appendix

The appendix is organised as follows. The first section presents the data used, while the second analyses the response of short-term bank lending rates to policy rates and the third focuses on medium and long-term bank lending rates. The fourth section makes an overall assessment.

A1. The data

As mentioned in the core paper, the estimations were based on quarterly data compiled by the Banque de France Business Conditions Division instead of the base rate. Although the latter is usually used for research, it is adjusted infrequently and today applies only to a small and declining part of total bank credit. The loan rates used in this paper are more representative of the cost of credit for non-financial firms and individuals. Moreover, the data allow us to differentiate between both short and medium and long-term loans, and non-financial firms and individuals.

Data from the Banque de France Business Conditions Division (1984Q2-1998Q2 for firms and 1990Q2-1998Q2 for individuals) could be backdated to 1983 for firms, using a survey from “*Institut National de la Statistique et des Etudes Economiques*”.

The market rates used are the three-month interbank interest rate and the ten-year interest rate on government securities. The tender rate has been chosen to model policy rates. Finally, a quarterly indicator representing the average cost of resources collected at regulated rates²⁶ by the banking sector has been computed since 1983. The indicator is built by weighting the level of each regulated rate (*passbook deposit rates, housing saving schemes rate*)²⁷ according to their weight in the resources of the banking sector.

All the data used are stationary in first differences. The spread between the three-month rate and the tender rate is found to be stationary in level. All regressions are estimated by OLS.

A2. The response of short-term bank lending rates to policy rates

The behaviour of bank lending rates is modelled by an error-correction model which allows flexibility in capturing the dynamic interaction between the variables. In the long run, the lending rate is supposed to reflect variations in the cost of central bank refinancing (the *tender rate*). In the short run, it can deviate from the long-term target and respond to other explanatory variables such as the level of regulated rates or short-term market rates.

We estimate the following relation:

$$\Delta debit(t) = \sum_{i=1}^p a_i \Delta debit(t-i) + \sum_{j=0}^q b_j \Delta ao(t-j) + \sum_{k=0}^r c_k Spread(t-k) + \sum_{l=0}^s d_l \Delta (ao - reglem)(t-l) + \alpha (debit - \beta ao)(t-1) + \varepsilon_t$$

²⁶ Regulated rates are set by the Government.

²⁷ In some cases, the Government adds a premium (perceived by the owner of the asset) to the remuneration paid by the credit institution which collects the funds. Since we compute the average cost of resources for the banking sector, such premiums have not been taken into account. They may generally lower the actual bank funding cost. However, they could also increase such costs if they apply to products that would have been supplied at lower rates in the absence of regulation, since the share of such products in the resources of banks would have been lower.

where *debit* is the lending rate, *ao* the tender rate, *spread* the spread between the three-month rate and the tender rate and *reglem* the average cost of resources collected at regulated rates. Since the tender rate is one of the explanatory variables in the short-term dynamics regulated rates and market rates appear in the error correction form by the spread they make with the tender rate in order to avoid multicollinearity problems.

The response of short-term bank lending rates to non-financial firms and to individuals was estimated as follows. Estimations were carried out over the period 1983Q1-1998Q2 as a whole separately and over the two sub-periods 1983Q1-1989Q4 and 1990Q1-1998Q2. Results are reported in Table A1 leaving out non-significant parameters. Three elements can be inferred from the results:

- the short-run response of the bank lending rate to the policy rate has increased. In the 1980s, after one quarter, only 64% of a change in the repurchase tender rate was reflected in the short-term loan rate under the assumption that the regulated rates adjusted in line with the tender rate. In the 1990s, the corresponding percentage is 82%, regardless of whether regulated rates are adjusted or not;
- in the 1980s, the inertia of regulated interest rates vis-à-vis the tender rate slowed down the adjustment of the lending rate. For instance, after three quarters, the lending rate adjusted by 71% if regulated rates and the tender rate moved in line but by 42% if only the tender rate was moved. During this period, the banking sector used to price to customers the average cost of their resources, so that the efficiency of monetary policy was affected by the sluggishness of regulated rates;
- in the 1990s, the spread between regulated rates and the policy rate is no longer statistically significant. This suggests that, facing increasing competition inside the banking sector as well as with financial markets, credit institutions are no longer able to price to firms the real average cost of their resources but are compelled to price market rates.

Table A1
Modelling of the short-term bank lending rates to firms
Dependent variable : $\Delta debit$

Independent variable	1980s		1990s		Whole period	
<i>debit</i> (-1)	-0.17	(-1.8)	-0.22	(-1.9)	-0.14	(-1.9)
<i>AO</i> (-1)	0.15	(2.2)	0.17	(1.9)	0.14	(2.4)
ΔAO (-1)	0.49	(3.2)	0.65	(3.1)	0.57	(4.3)
<i>Spread</i>	-		0.32	(2.4)	0.22	(2.0)
Δs_ao_reglem (-3)	-0.30	(-2.9)	-		-0.15	(-1.4)
<i>c</i>	0.62	(1.0)	0.73	(1.3)	0.20	(0.5)
R ²	0.66		0.51		0.49	
DW	2.29		2.04		2.08	
SEE	0.27		0.44		0.39	
No. of observations	28		34		62	

Notation: *AO*: tender rate

Spread = 3-month rate less tender rate

s_ao_reglem = Tender rate less average resources cost collected at regulated rates

debit: short-term lending rates to firms.

Owing to data availability, estimations for loans to individuals were confined to the second sub-period 1990Q1-1998Q2. It appears that the spread between regulated rates and the tender rate is statistically significant over the estimation period (see Table A2). This suggests that, since individuals do not have direct access to financial markets, the banks are able to price the exact cost of their resources, including the cost of resources collected at regulated rates.

Table A2
Modelling of short-term bank lending rates to households
 Dependent variable : Δpar_tres over the period 1990Q2-1998Q2

Independent variable	Loans \leq 10,000 FRF		Overdrafts, permanent loans, installment credits $>$ 10,000 FRF		Personal loans and other loans $>$ 10,000 FRF	
$par_tres(-1)$	-0.50	(-3.4)	-0.42	(-2.9)	-0.32	(-2.5)
$AO(-1)$	0.41	(3.5)	0.26	(2.7)	0.27	(2.7)
$\Delta AO(-1)$	1.35	(1.9)	1.61	(2.7)	0.54	(1.1)
$\Delta s_ao_reglem(-1)$	-1.30	(-1.9)	-1.21	(-2.0)	-	
<i>Spread</i>	-		-		0.14	(1.6)
<i>c</i>	6.00	(3.3)	4.64	(2.9)	2.14	(2.2)
R^2	0.50		0.46		0.62	
SEE	0.39		0.36		0.27	
DW	2.00		1.89		2.10	
No. of observations	32		32		32	

Notation: par_tres : short-term lending rates to households
 AO : tender rate
 $reglem$: average cost of resources collected at regulated rates
 s_ao_reglem = tender rate less average cost of resources collected at regulated rates
 $Spread$ = 3-month rate less tender rate.

A3. The response of medium and long-term bank lending rates to policy rates

Following previous research, a long-run relation of the following form is sought:

$$(1) \quad debit = a + \lambda * Tx10ans + (1 - \lambda) * Ao$$

where $debit$ is the bank lending rate, $Tx10ans$ the ten-year rate and Ao the tender rate. However, as in the case of short-term bank lending rates, the behaviour of medium and long-term bank lending rates is modelled within an error correction model:

$$\Delta debit(t) = c + \sum_{i=0}^p a_i \Delta ao(t-p) + \sum_{j=0}^q b_j \Delta tx10ans(t-j) + \sum_{k=0}^r c_k Spread(t-k) + d \times debit(t-1) + e \times Tx10ans(t-1) + f \times Ao(t-1) + \varepsilon_t$$

with the same notation as that used in the previous section. A constraint in the long-run relation ($f = -d - e$) is imposed.

The parameter d depicts the convergence speed of lending rates towards the long-run target defined by relation (1). The relative weight of the ten-year rate in the long-run relation (λ) can be assessed from the ratio of parameter e to parameter d .

As in Section A2, estimations for lending to firms have been run over the period 1984Q2-1998Q2 as a whole and over the two sub-periods 1984Q2-1989Q4 and 1990Q1-1998Q2 separately. From the first to the second sub-period, bank lending rates have become more responsive to changes in the ten-year interest rate: the relative weight of the ten-year rate in the long-run response has approximately increased from one third to one-half (see Table A3).

Table A3
Modelling of medium and long-term lending rates
 Dependent variable : $\Delta debit$

Independent variable	Medium and long-term loans to firms			Household mortgages at fixed rates		Household mortgages at variable rates	
	1980s	1990s	Whole period	1990s	1990s		
c	0.35 (1.7)	0.20 (1.6)	0.22 (1.9)	0.66 (6.4)	0.85 (4.4)		
$\Delta AO (-1)$	0.41 (2.2)	0.29 (2.2)	0.37 (3.3)	0.68 (3.2)	0.14 (1.2)		
δ	-0.28 (-2.,6)	-0.27 (-3.7)	-0.26 (-4.0)	-0.30 (-7.7)	-0.43 (-5.1)		
λ	0.34 (1.2)	0.48 (2.9)	0.42 (2.8)	0.76 (7.9)	0.52 (4.6)		
<i>Spread</i>	–	0.21 (3.0)	0.18 (2.5)	–	–		
$\Delta s_{ao_reglem} (-1)$	–	–	–	-0.39 (-1.9)	–		
$\Delta s_{ao_reglem} (-2)$	–	–	–	-0.21 (-3.2)	-0.29 (-2.7)		
R^2	0.70	0.67	0.66	0.85	0.62		
SEE	0.29	0.23	0.27	0.12	0.19		
DW	2.71	2.15	2.3	2.15	2.16		
No. of observations	26	34	56	31	31		

Bank lending rates are estimated as follows:

$$\Delta debit(t) = c + \delta(debit - \lambda Tx10ans - (1 - \lambda)AO)_{-1} + \sum_{i=1}^p a_i \Delta ao(t - p) + \sum_{j=1}^q b_j Spread(t - j) + \sum_{k=1}^r c_k \Delta s_{ao_reglem}(t - k) + \varepsilon$$

Notations : AO : tender rate

$debit$: lending rate

$Spread$ = 3-month rate less tender rate

s_{ao_reglem} = tender rate less average cost of resources collected at regulated rates

$Tx10ans$: 10-year rate.

As in the case of short-term loans, data availability limits the scope of the estimation period for individuals to the 1990s. Ten-year interest rates account for more than three-quarters of the long-run response of loan rates (see Table A3). Moreover, regulated interest rate inertia slows the response of the loan rate to the policy rate: at a two-quarter horizon, loan rates adjust nearly completely to a simultaneous change in the policy, ten-year and regulated rates, but only up to 58% if the latter are kept unchanged.

A4. Conclusion

In the 1980s, banks apparently did not behave in a competitive manner. Their average funding cost – including the cost of resources collected at regulated rates – played an important role in the pricing of the credit. In the 1990s, two effects could account for the increasing part played by policy and market rates: the growing competition inside the banking sector on the one hand and the creation of a market for commercial paper and the development of bond markets on the other hand. Unfortunately, it does not seem possible to disentangle these two effects on the basis of the aggregate data used. For that purpose, it would have been useful to distinguish between loans to large firms – which are able to issue commercial paper and bonds – and loans to small firms. However, results for individuals give some indication as banks are still in a position to impose on their customers their average cost of funding-including the cost of resources collected at regulated rates.

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