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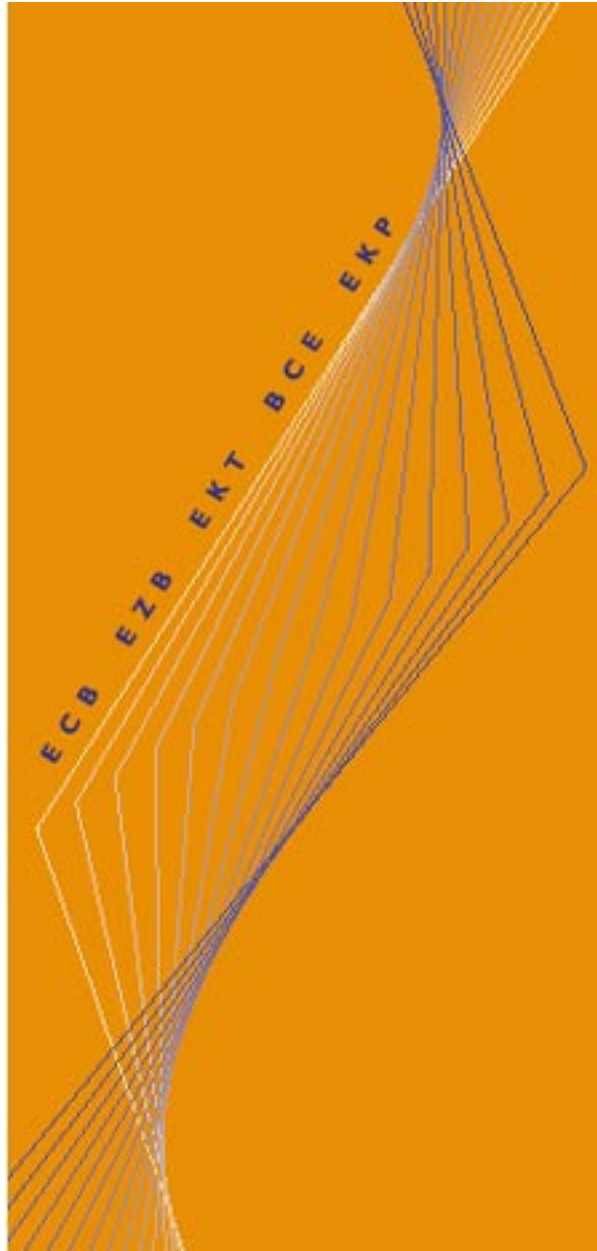
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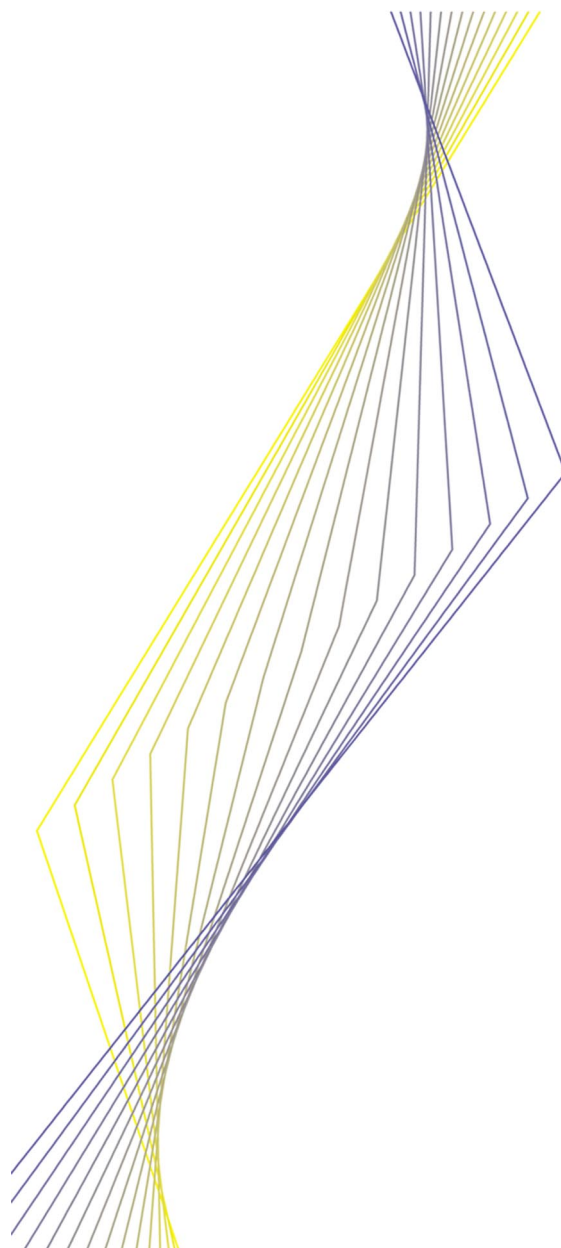
**FINANCIAL STRUCTURE AND
THE INTEREST RATE CHANNEL
OF ECB MONETARY POLICY**

BY BENOÎT MOJON

November 2000



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Abstract:

This paper analyses differences in financial structure across euro area countries and their implications for the interest rate channel of the monetary transmission mechanism. It focuses on those differences in financial structure across countries, which remain in spite of the start of Stage Three of EMU. First, the paper examines the pass-through of money market rates to various bank retail rates and measures how this has evolved over the past two interest rate cycles. An analysis of panel data suggests that current "country asymmetries" in the response of bank rates to monetary policy should decrease over time by virtue of the implementation of the single monetary policy, money market integration and the growth of debt securities markets. The paper also shows that competition among banks reduces the "interest rate cycle asymmetry" of the pass-through. Second, recent developments in the balance sheet structure of households and firms are examined. The paper shows that, at the start of Stage Three of EMU, the income effects of monetary policy are fairly homogenous in the four largest countries of the euro area, although, given the large share of bonds in the financial assets held by Italian households, wealth effects should be stronger in Italy.

JEL codes: E43, E52, G21

Keywords: transmission mechanism, EMU, financial structure

1 Introduction

One important factor which may influence the monetary transmission mechanism (MTM) is the financial structure of the economy. Building on the BIS reports of 1994 and 1995, a number of economists have emphasised that cross-country differences in financial structure may lead to asymmetric effects of the single monetary policy in the countries forming the euro area, thereby complicating its implementation.¹ However, as argued by Arnold and de Vries (1999), the regime shift to EMU may itself trigger convergence in financial structure, thereby reducing the heterogeneity and related asymmetries. At the same time, it should be noted that the empirical literature on the transmission of the single monetary policy has not convincingly established that significant differences in the monetary transmission mechanism exist.² Any attempt to examine this empirically has to acknowledge that there is a lack of consensus on how to identify monetary policy shocks and, more generally, on how to measure their impact on the economy (Kieler and Saarenheimo, 1998). Moreover, these studies do not usually take into account the fact that EMU implies that some key links in the transmission mechanism, such as the money market or the yield curve, are now common to all the participating countries.

Instead of comparing the overall impact of monetary policy shocks on output and prices, this paper follows an alternative approach, limiting its scope to two elements of the monetary transmission mechanism (MTM): the pass-through of policy rates to retail bank rates and the balance sheet structure of the non-financial private sector. This is for two reasons. First, these two elements have a direct bearing on the substitution, wealth and income effects which together constitute the interest rate channel of monetary policy. Second, the harmonisation of these two elements of the MTM is likely to occur only gradually. National segmentation in the European retail banking industry may remain significant regardless of EMU, because retail banking involves heavy investment in brand names, in a network of branches and in relationships with customers (Gual, 1999), as well as country-specific legal expertise (Cecchetti, 1999). As a consequence, the pass-through from policy-controlled interest rates to retail bank interest rates and the effect of those rates on spending decisions may remain country specific. This potential source of asymmetry across countries is particularly relevant in the euro area where bank rates are a key determinant of the cost of capital and the yield on savings (Prati and Shinasi, 1997; McCauley and White, 1997). Similarly, differences in the size and structure of households' and firms' balance sheets (Kneeshaw, 1995) or in the average maturity of interest rate contracts (Borio, 1995), will only gradually adjust to the new policy regime. By definition, assets are accumulated over time, while interest rate contracts depend on national legal constraints, consumer habits and social norms. Such differences will, therefore, continue to affect the relative strength of substitution, income and wealth effects on spending.

Following the work by Borio and Fritz (1995) and Cottarelli and Kourelis (1995), Section 2 of the paper analyses the pass-through of money market rates to bank retail rates. The analysis adds to these studies in three respects. First, the pass-through is measured for several bank credit and deposit rates for each of the six largest countries in the euro area (Belgium, France, Germany, Italy, the Netherlands and Spain). Using an error correction model, I compute the response after three months of 25 credit rates and 17 deposit bank rates to changes in the money market rate. Second, the responses are estimated for each of the past two interest rate cycles, from 1979 to 1988 and from 1988 to 1998, and also separately for the sub-periods in which rates increased or decreased. Dividing the past 20 years into four sub-periods makes it possible to analyse the evolution of the pass-through over an era of major changes in financial structure. Third, by examining differences in pass-through over time and across countries and markets together, I am able to extend the cross

¹ See, for example, Barran et al. (1997), Dornbusch et al. (1998), de Bondt (1998, 1999).

² See also Kieler and Saarenheimo (1998) or Guiso et al. (1999) for recent surveys.

section analysis of Cottarelli and Kourelis (1995) and estimate a model of the impact of financial structure on the pass-through. The main result is that deregulation of European banking markets has had a significant impact on the pass-through to both credit and deposit rates over the past two decades. In particular, it is shown that competition has forced banks to pass on decreases in the money market rate to credit rates and increases in the money market to deposit rates more quickly. Moreover, EMU is likely to speed up the pass-through, if, as it seems likely, the volatility of the money market rate is lower than that which was observed on average in the individual countries. Finally, bank rates are likely to react to market rates more closely owing to increased competition between bank instruments and debt securities, the development of which is stimulated by the monetary integration of euro area financial markets.

Section 3 examines recent developments in the balance sheet structure of both households and firms and in the maturity structure of interest rate contracts. This analysis updates the cross-country comparison of the kind conducted in BIS (1995) for France, Germany, Italy and Spain. It enables me to compare the magnitude of the income and wealth effects of a change in the money market rate in those countries. It appears that the nominal convergence has delivered portfolio and interest rate contract adjustments which tend to reduce country asymmetries in terms of the income effects of monetary policy. However, greater wealth effects of interest rate shocks may continue to characterise the response of Italian households, because the bond portfolio of the latter is significantly larger than is the case in Germany, France or Spain. Finally, Section 4 summarises the main conclusions of the analysis.

2 The pass-through from money market interest rates to retail bank interest rates

This section analyses the pass-through from the overnight money market rate (MMR), which is closely correlated with policy-controlled interest rates, to various bank credit and deposit rates. Section 2.1 discusses some stylised facts. Section 2.2 goes on to describe how the pass-through is measured. Finally, in Section 2.3. the determinants of the pass-through are analysed using a panel data approach.

2.1 Stylised facts

Figures 1a and 1b plot retail bank interest rates against the money market rate. In all countries, the MMR, deposit rates and credit rates follow two cycles of approximately ten years. The first spans the period from 1979 to 1988 and the second the period from 1988 to 1998. Tables 1a and 1b show, for the total period and for each of the two cycles, the cross-correlation between retail bank interest rates and the MMR in six euro area countries, together with aggregates for the euro area. Table 1a focuses on deposit rates, while Table 1b provides similar statistics for bank credit rates.

There is no evidence of a systematic trend in the correlations between retail bank rates and the MMR over time. While in Belgium, France and Spain the correlation has increased, in Germany and Italy it has decreased. These contrasting trends can be observed for almost all categories of credit and deposit rates. Furthermore, during the last interest rate cycle, considerable differences in the correlations of bank rates with the MMR across countries were still present. For instance, the first difference correlation for time deposits is twice as large in Germany as in Spain or Italy. This suggests that the pass-through may still differ to a significant extent among euro area countries.

2.2 Measurement of the pass-through

A number of recent empirical studies have focused on the determinants of interest rate setting by banks.³ These studies use very different methodologies, ranging from panel data either on the average rate for each bank or on individual credit transactions, to more aggregated data. Hence, it is difficult to compare the results.⁴

By contrast, Borio and Fritz (1995) and Cottarelli and Kourelis (1994) (hereafter “BF” and “CK”) have compared the impact of MMRs on short-term retail bank interest rates across countries. For the euro area countries in their samples, they find that the long-term elasticities are quite similar and in general slightly higher than one, except in Finland and France. Most of the adjustment takes place within six months.

The estimates of pass-through presented in this section are very much in the spirit of BF and CK. This paper extends their analysis in two ways. First, it covers the retail bank markets of the six largest countries in the euro area (Belgium, Germany, Spain, France, Italy and the Netherlands), while CK and BF concentrated on short-term credit to firms. These retail bank rates are all published by the central banks of the six countries mentioned above. Most of the rates, specifically 25 credit rates and 17 deposit rates, refer to new businesses (Table 2a). Second, the responses are estimated for each of the two last interest rate cycles, from 1979 to 1988 and from 1988 to 1998, and separately for the sub-periods in which rates increased or decreased. The rates rise until 1981 or 1982, depending on the country, and subsequently fall until 1988. In the course of the second cycle, the rates rise until 1992 or 1993 (1990 in Belgium), before declining more or less smoothly. In this way, it is possible to test whether there are asymmetries in the estimated pass-through depending on whether the MMR is trending up or down (Herrmann and Jahnke, 1994).

To obtain estimates of the pass-through of the MMR to various credit and deposit rates, a two-stage approach is used. First, for each of the retail bank rates, the following error correction model equation is estimated:

$$\Delta r_t = c + \sum_{j=1}^{j \max} \alpha_j \Delta r_{t-j} + \sum_{k=0}^{k \max} \beta_k \Delta i_{t-k} + \gamma (r_{t-1} - i_{t-1})$$

where r and i stand, respectively, for the retail bank rate and the MMR, and Δ is the first difference operator.

The number of lags is chosen according to a general-to-specific approach, with the initial maximum number of lags set at six for monthly rates and at two in the case of France, for which the only quarterly retail rates are available. This specification allows for the case in which both rates are co-integrated. In that case, the coefficient γ , which drives the retail bank rate back to its equilibrium value, will be significant. In the event that the rates are not co-integrated, the error correction term is eliminated and the specification of the first difference prevents any risk of a spurious regression. In all cases, regression in levels leads to approximately the same hierarchy among the estimated

³ For euro area countries, see in particular Cruz Manzano and Galmes (1996) for Spain, Baumel and Sevestre (1997) and Rosenwald (1998) for France, Swank (1995) and Fase (1995) for the Netherlands, Angeloni et al. (1995) for Italy.

⁴ Cruz Manzano and Galmes (1996) use a weighted average of credit rates and a weighted average of deposit rates for each Spanish bank, based on banks' quarterly reports to the Banco de España. Baumel and Sevestre (1997) compute individual bank interest rates as the ratio of interest income to credit taken from profit and loss and balance sheet accounts. They use yearly accounts for a sample of around 50 banks. Rosenwald (1998) uses a sample of individual credit transactions gathered from a sample of 600 bank branches which report their interest rate pricing to the Banque de France every quarter. Swank (1995) and Fase (1995) estimate time series structural models of credit and deposit supply and demand functions on the basis of national aggregate interest rates. Angeloni et al. (1995) also adopt a time series approach. They examine the interest rate response to monetary policy shocks of small banks compared with large banks and of small borrowers compared with large borrowers.

pass-throughs. In a second stage, the estimates are used to compute the dynamic response of the retail bank rate to a permanent increase of one per cent in the level of the MMR. As up to four sub-periods and 42 retail bank rates are included, I only report the response after three months, which provides a good summary of the range of disparities across countries and markets.

Table 2a gives the estimated pass-through for each retail interest rate, while Table 2b summarises the results by providing average credit and deposit rates by country. Several features are noteworthy. First, retail bank rates respond sluggishly to changes in the MMR. In most cases, the response after three months is less than one. Short-term credit rates generally respond faster to the MMR than mortgages or investment credit rates and deposit rates. On average, the full sample estimations show that the three-month elasticity of the short-term credit rate to MMR shocks is equal to 0.73. By contrast, the response of rates associated with mortgage credit is, on average, equal to 0.31 and that of deposit rates is, on average, 0.27.

The stickiness of retail bank rates is a common empirical finding which has been given several justifications in the literature (Nabar, Park and Saunders, 1993). First, raising bank credit rates may lead to a deterioration in the average creditworthiness of borrowers. Second, even small menu costs, incurred when adjusting retail rates, could lead to price rigidities (Mester and Saunders, 1995). Third, banks could be providing their customers with implicit interest rate insurance, especially if they are investing in long-term relationships. Finally, it may also be the case that the response of bank interest rates is less than one because they have a longer maturity than the MMR. The differences between types of bank rates (i.e. the fact that pass-through to mortgage credit and deposit contracts is smaller than that to short-term credit contracts) tend to support this view. In this context, uncertainty about the future evolution of market rates would prevent banks and their customers from immediately adjusting to changes in the MMR.

A second finding is that, especially in the most recent interest rate cycle, the pass-through to credit rates is higher in the first phase of the cycle, when the MMR increases, than in the second phase, that of decreasing interest rates. The opposite is true for the deposit rates. This “interest rate cycle asymmetry” of the pass-through is observed for most rates in Italy, Germany, Spain and France, as well as for Dutch deposit rates. This finding is also rather typical of the empirical literature on interest rate setting by banks. For instance, Mester and Saunders (1995) show that the prime interest rate of commercial US banks exhibits more downward stickiness than upward stickiness. This asymmetric pass-through may reflect the maximisation of banks’ income when their customers are confronted with the costs of switching banks, which reduce the interest rate elasticity of the credit demand curve and the deposit supply curve. Newark and Sharpe (1992) show that this asymmetry is less pronounced when competition among banks is fierce.

Third, the findings of CK and BF, who obtained heterogeneity in the pass-through across countries, are largely confirmed within the euro area. This can easily be observed for the full sample in the first column of Table 2b. The dispersion of countries around the average pass-through slightly decreases from the 1979-88 cycle to the 1988-98 cycle. For Belgium and Spain an increase in the pass-through tends to be observed from the first cycle to the second, while for Germany and Italy the move is in the opposite direction. In spite of this evolution, the responses of retail bank rates to changes in the MMR remain heterogeneous across the countries of the euro area. The issue of the determinants of this heterogeneity, which is obviously of great importance, is addressed in the next section.

2.3 Analysing and testing the determinants of the pass-through

2.3.1 A panel of euro area retail markets

Having measured the pass-through, I go on to analyse which observable features of the institutional and financial structure are likely to explain these differences across countries in the euro area and over time.

CK made a similar attempt to link the stickiness of retail bank interest rates to observable measures of institutional and financial structure. They tested the impact of banking market structure on a cross-section of pass-through elasticities estimated for 31 countries. Their results confirm that a number of indicators of financial structure can explain differences in the pass-through. Five features are found to significantly lower the response of bank rates to the MMR: the absence of a money market for negotiable short-term instruments; relatively high volatility of the MMR; restrictions on international capital flows; the existence of barriers to entry; and public ownership of the banking system. However, neither the existence of a market for commercial paper nor degrees of market concentration significantly affect the pass-through.

My approach is to use the measure of pass-through estimated in the previous section to build a panel of retail bank markets. One important advantage of panel regression over the cross-section estimation implemented by CK is that it can take into account the heterogeneity of bank retail markets both across countries and over time. The latter dimension is of particular interest for the countries considered given that all of them underwent structural reforms of their financial services industries during the period under consideration.

Each individual market (i.e. 25 credit markets and 17 deposits markets) is “represented” by an estimate of the three-month pass-through over four sub-periods (as shown in the last four columns of Table 2a). Owing to limited availability of some of the interest rate statistics, there are 142 pass-through measures altogether; 87 for credit rates and 55 for deposit rates.

Looking separately at those sub-periods in which interest rates increased and those in which they decreased makes it possible to test the impact of competition on the interest rate cycle asymmetry of the pass-through. In the following, indicators of competition are multiplied by dummy variables indicating the upward or downward phase of the interest rate cycle. In this way, it is possible to test whether competition has a positive (negative) impact on the pass-through to credit rates when interest rates fall (rise), and a negative (positive) impact on the pass-through to deposit rates when interest rates rise (fall).⁵ Furthermore, the explanatory variables are constructed as annual averages over the periods 1979-82, 1982-88, 1988-92 and 1992-98.⁶ This low frequency of variation is necessary in view of the fact that financial structures evolve at a relatively slow pace.

⁵ *Moving from imperfect competition to perfect competition should mean that the pass-through increases overall. However, if imperfect competition persists the impact of competition should be asymmetric in the sense that, for instance, banks with declining market power will be slower to cut interest rates on credit in response to decreasing market interest rates, but faster to increase them in response to rising market interest rates.*

⁶ *Owing to limited data availability, the indicators of the rigidity of bank costs (1979-96) are based on the annual average and are computed over the periods 1979-82, 1982-88, 1988-92 and 1992-96, and indicators of competition in banking are based on the annual average and are computed over the periods 1981-82, 1982-88, 1988-92 and 1992-95.*

2.3.2 Determinants of the pass-through

The analysis focuses on four sets of determinants of the pass-through: (1) the monetary policy regime; (2) competition among banks; (3) competition from direct finance; and (4) the rigidity of bank costs.⁷

The first set of factors likely to influence the pass-through relate to the *monetary policy regime*. The most striking result in the previous section is the stickiness of retail bank interest rates. This obviously results from the difference in maturity between credit and deposit contracts and the MMR. For instance, I find in this study that bank rates with a longer maturity respond less rapidly to changes in the MMR than bank rates with a shorter maturity. However, it is also likely that the degree of stickiness is influenced by the monetary policy regime. First, nominal prices are usually adjusted more frequently when inflation is high. It would be interesting to test whether this is also the case for retail bank interest rates, i.e. whether the pass-through is higher when inflation is high. Second, the monetary policy regime may affect the volatility of the MMR. For example, if the central bank targets the exchange rate and lacks credibility, it may have to adjust the overnight interest rate frequently. The retail bank interest rate will not necessarily adjust to every change in the MMR, especially if this would imply adjustment costs. More generally, changes in the MMR are more likely to affect retail interest rates if they are perceived to be permanent than if they are perceived to be temporary.

As the six countries in the sample have experienced very different levels of inflation and MMR volatility, I investigate whether these aspects of the monetary policy regime can explain some of the variance in the pass-through. In the panel regressions, the inflation rate is simply the annual average for each sub-period, while the volatility of the MMR is its standard deviation for each sub-period.

The second and third set of factors affecting the pass-through are, respectively, competition from direct finance and the level of competition among banks.⁸ As found by Neumark and Sharpe (1992), competition can be expected to reduce the interest rate cycle asymmetry of the pass-through.

Competition between banks and financial markets are of relevance to the two major activities of banks. On the liabilities side of banks' balance sheets, the growth of mutual funds is putting pressure on the yields offered on bank deposits. On the assets side, the competition from direct finance should only pose a threat as far as large firms are concerned. In order to test the impact of direct finance on bank pricing, the ratio of commercial paper and of total short-term securities to GDP are introduced in the panel regression.⁹ This should have a negative impact on bank interest rate margins. Following the same line of thought, short-term securities constitute an alternative to traditional bank deposits. Schmidt et al. (1997) argue that deposits are the only instrument for which European banks are under pressure from market instruments. They describe this process as a lengthening of the chain of intermediaries: non-banks collect savings, which they invest in bonds and certificates of deposit issued by banks. Hence, banks obtain more of their funding through the markets and less through the traditional collection of deposits. Even though most money market funds are either controlled or distributed by banks, for which they constitute a source of commission income (ECB, 1999), their rapid expansion has obviously affected deposit collection.

⁷ See also Borio and Fritz (1995) and Enfrun and Cordier (1994) for similar discussions.

⁸ For a general discussion on the ongoing restructuring of the European financial industry, see Gual (1999), Davis and DeBandt (1999) and the Centre for Economic Policy Research (1999).

⁹ Although only large firms can issue commercial paper, the experience of the United Kingdom, France and Belgium, where direct finance has been promoted, shows that even small firms now have access to variable rate credit indexed to the money market.

It is very difficult to find good indicators of the *competitive intensity among banks*. In the context of the euro area, competition is usually considered to have been growing steadily for the past two decades. The European banking sector of today inherited excess capacity from a once highly-regulated banking industry with little competition.¹⁰ The intensification of competition, which started in the 1980s with deregulation, has led to a restructuring of the European banking industry, as can be seen from the decreasing trend in the number of institutions in every Member State (ECB, 1999; Davis and DeBandt, 1999; Gual, 1999). In the following, I use an index of deregulation measures taken by European countries between 1980 and 1995, constructed by Gual (1999), as an indicator of the competitive intensity among banks.¹¹ This indicator has two major advantages over traditional indicators of competition, such as capacity indicators or concentration indicators. First, it is widely accepted that competition in the European banking sector has been stimulated by deregulation. Second, deregulation policies are wholly exogenous. However, the causal links between concentration or capacity and competition are ambiguous. In the case of the euro area, the fall from the peak number of institutions observed in 1980 to the number of institutions listed in 1995 varies from 8% in Belgium to 44% in Finland. It was 35% in Germany, 43% in France and 15% in Italy. Yet it is not clear whether competition increased or decreased as the number of players in the market declined.

Following Gual (1999), both the level and the cumulative level of the indicator are used in the regressions (Table A1). The cumulative indicator may account for, in particular, the fact that deregulation measures should have a lasting effect on competition.

The fourth set of factors likely to determine the magnitude of the pass-through is related to the *rigidity of the costs* of banks (Enfrun and Cordier, 1994). If banks set their interest rates by adding a margin over their costs, one can expect the pass-through to reflect the impact of changes in the MMR on the total costs of the bank. The latter can be broken down into operating costs and funding costs. Operating costs relate to the maintenance of a branch network and to staff costs. A priori, a higher share of operating costs in total costs should imply a smaller pass-through. In the regression, the ratio of staff costs to gross income is used as an indicator of operating costs.¹²

The rigidity of funding costs depends mainly on pricing practices in the banking sector and on the extent to which the interest rate received or paid by banks is itself rigid.¹³ For instance, the estimates in the previous section show that rates paid by banks on traditional deposits respond more sluggishly than market rates. A bank which can rely on traditional deposits is more likely to have more rigid funding costs than a bank which funds itself mostly by issuing debt on the capital markets. The share of deposits from non-banks in the liabilities of banks is then used as an explanatory variable of the pass-through to credit rates. This variable is expected to have a negative coefficient.

¹⁰ See Mac Cauley and White and the references given therein.

¹¹ Here I quote Gual's own description of his index of competition in footnote 26 of Gual (1999): "For the econometric analysis we have considered nine deregulation indicators, each of them including different deregulation measures or directives. Before the adoption of the deregulation measure, the indicator takes a value of zero, and it takes a value of one in the period in which the measure is adopted. [...] The nine indicators are: (1) interest rate deregulation; (2) freedom of establishment; (3) implementation of the first banking directive; (4) the implementation of the second banking directive; (5) the liberalisation of capital flows; (6) the adoption of the directive on branch establishment and head offices outside the EU; (7) the adoption of directives on consolidated surveillance; (8) the adoption of deposit insurance and money laundering directives, and; (9) the adoption of the directive on prudential regulation."

¹² The impact of staff costs on the pass-through may also be interpreted as indicating imperfect competition in the banking sector. However, this link is not trivial, as inertia in the costs of banks can be consistent with fiercer competition. In their analysis of the recent evolution of the US banking industry, Berger et al. (1999) highlight the development of new services as the driving force behind the increase in costs in US banking, in spite of its restructuring. If this pattern is also relevant for the euro area, the lack of downsizing in terms of numbers of bank employees and branches could be explained by the fact that European banks have mainly been competing by extending their branch networks and expanding their staff to provide more services to their customers.

¹³ Regulation of interest rate setting may increase the rigidity of bank funding costs. French deposit rates, for instance, are administered. It is also often the case that some credit rates are subsidised in order to support a particular sector of the economy. Two recent examples are the subsidised loans which were part of the package to help the convergence of East Germany and the "zero interest rate loans" introduced in France in 1993 to stimulate activity in the real estate sector.

Finally, greater efficiency in the banks' pricing may imply smaller cross-subsidisation between bank products, as reflected in higher shares of non-interest income in gross income. As the competition on the market for each banking product increases, banks are driven to price each product at its marginal cost. Banks then develop fee income from other services and set deposit and credit rates closer to market rates. The share of non-interest income in gross income is therefore expected to have a positive impact on the pass-through. Finally, proxies for credit demand and deposit supply are also included in the regressions. There are two kinds of proxies: the average real growth rate of credit and deposit volumes for each retail market and a "real variable", which should be correlated with credit demand or deposit supply. In the case of credit markets, this is – depending on the credit market – either the average real growth rate of GDP or residential or non-residential investment. In the case of deposit markets, it is the gross national saving ratio and real GDP growth.

A summary presentation of the estimated equation is given in the appendix.

2.3.3 Results of the estimations

A number of preliminary regressions were performed with the result that models with country dummies, dummies for the maturity of the credit or deposit contracts, dummies for deposit rates, or dummies for household or corporate credit markets were all rejected in favour of a specification with individual fixed effects (within estimator). It is nevertheless interesting to note that regressions on country dummies and on credit market category dummies show that Belgium, France and Spain have a significantly lower intercept than Germany, Italy and the Netherlands. Similarly, the pass-through to deposit rates is significantly smaller in Spain than in the other countries. Lastly, the response of interest rates on corporate credit is significantly higher than the panel average, while the response of interest rates on mortgages is significantly lower than the panel average.

The estimation strategy was to regress the three-month elasticities over each of the four groups of explanatory variables and then to estimate a general equation with those variables from each group which appeared to be significant in the group regressions. Every equation includes credit or deposit volume and real variables in order to control for the effects of credit demand or deposit supply on the pass-through.

The results for credit markets (see Table 3a) suggest that the degree of pass-through is indeed related to financial structure. A number of the explanatory variables are significant. First, the volume of credit and real demand both tend to lower the pass-through to credit rates when interest rates are falling, while their impact is not significant when interest rates are rising. This is partially consistent with the ability of banks to preserve their interest rate margin on credit when they face stronger credit demand. Therefore, the two variables are kept in all the regressions. Second, the two indicators of the monetary policy regime – MMR volatility and inflation – are significant. As expected, MMR volatility has a negative coefficient while inflation has a significant positive coefficient. Third, competition among banks, as measured by the Gual cumulative index of bank deregulation, appears to put pressure on banks to adjust interest rates on bank credit in response to a decrease in the MMR. The results also suggest that greater competition reduces the ability of banks to increase interest rates on loans in periods when the MMR increases, but this is not significant. Altogether, it seems that competition in the banking sector tends to reduce the interest rate cycle asymmetry of the pass-through. Fourth, the coefficients for the indicators of direct finance are positive in both phases of the interest rate cycle, but are not significant (see regressions 4, 5 and 6). The fact that it is positive is not consistent with the idea that competition from the commercial paper market puts pressure on banks' margins, but it lends itself to the interpretation that banks follow market interest rates more closely when direct finance is more widely available.

Finally, the indicators of the rigidity of bank funding costs are all significant. As expected, the higher the staff costs, the smaller the impact of monetary policy shocks on bank credit rates. This influence of fixed costs on the impact of variable costs on prices may be seen as confirming that the banking sector was in a regime of imperfect competition during the period under review. However, it is surprising to find that the higher the ratio of non-interest income to gross income, the more slowly banks reduce their credit rates when the monetary policy rate decreases. My sample provides no evidence that higher non-interest income induces banks to set their interest rates closer to money market rate. In the same vein, the fact that changes in the MMR are passed through to credit rates faster when non-bank deposits are smaller (a funding resource at relatively rigid prices) is somewhat surprising.

The results for the pass-through to deposit rates (see Table 3b) also suggest an important role for financial structure.

Regression 1 shows that the volume of deposits cannot easily be interpreted as a proxy for deposit supply. This is probably owing to the lack of reliable data on the deposit volumes which would correspond exactly with the different interest rates used to compute the pass-through. The impacts of the saving ratio and of GDP on the pass-through are easier to interpret as they may indicate, respectively, a larger and smaller supply of deposits for precautionary motives. For instance, when rates increase higher saving ratios seem to allow banks to adjust deposit rates faster than when the rates decrease, while higher GDP growth has the opposite effect. Deposit volumes were excluded from the other regressions because of the difficulty in interpreting the sign of their impact.

Competition has a significant impact on the pass-through to deposit rates. First, competition among banks, as measured either by the Gual index or by the cumulative Gual index (see regressions 3 and 7), induces banks to increase interest rates on bank deposits faster in periods when the MMR increases. Along the lines of the argumentation developed above, it seems that competition among banks reduces the interest rate cycle asymmetry of the pass-through. Second, the size of the market for short-term debt securities increases the responsiveness of the bank deposit rate to the MMR (see regressions 5, 7 and 8). This finding tends to confirm the conclusion of Schmidt et al. (1998) that, in Europe, funding costs of banks increasingly depend on market conditions. Other indicators of financial structure do not have a significant impact on the pass-through to deposit rates. Moreover, only MMR volatility has the sign that was expected.

To sum up, although this panel exercise has some limitations, such as the size of the sample or the lack of detailed data on the structure of the credit or deposit market in each country, it shows that the stickiness of bank interest rates varies according to a number of observable features of the national retail banking industries. First, MMR volatility has a negative impact on the response of credit rates. Second, inflation has a positive impact on the response of bank credit rates. Third, competition, whether from direct finance or among banks, also has an impact. The volume of short-term securities has a positive impact on the pass-through. The competitive intensity within the banking industry seems to reduce the ability of banks to delay credit rate decreases when the market rate declines and deposit rate increases when the market rate rises. Finally, the indicators of the rigidity of bank funding costs seem to matter only for the setting of credit rates, in the sense that higher staff costs result in a smaller degree of pass-through.

2.3.4 The impact of EMU on the determinants of the pass-through

Looking to the future, it is interesting to note that EMU will affect some of the determinants of the pass-through. First, the complete de facto integration of the money market means a single level of MMR volatility throughout the euro area. This should hasten the convergence of the pass-through across the euro area. Second, the current development of short-term securities tends to confirm that, as many observers expected, EMU will further enhance *disintermediation*.¹⁴ The first year of EMU has produced striking results. Altogether, international corporate bond issuance denominated in euro amounted to EUR 21.7 billion in the first quarter of 1999, compared with EUR 3.4 billion in the first quarter of 1998 (see the 29 April 1999 issue of the "Financial Times"). Moreover, the share of top-rated firms (triple and double A) in these issues decreased from 66% of the total in 1998 to 46% in 1999,¹⁵ which shows that the issuance of debt securities is not restricted to the largest firms.

Third, EMU is expected to reinforce competition in the European financial markets. Nonetheless the integration of the retail banking markets at the euro area level will only take place gradually, hence the competitive pressures faced by banks may remain heterogeneous for some time. Cross-border mergers within the euro area remain a marginal phenomenon and the various factors leading to inertia in local banking markets should not be underestimated. Banking is a business in which price is not the only means of product differentiation. Long-term investments in branch networks, personalised services and brand names constitute barriers to entry which will not be removed by harmonised regulation alone (Gual, 1999). Moreover, in a context of over-capacity, the incentive for foreign banks to penetrate domestic markets is also limited by the need to invest in gaining an understanding of local law and accounting procedures, as well as by the prospect of adverse selection among those customers rejected by local banks.

3 Income and wealth effects of monetary policy

This section examines the balance sheet structure of non-financial agents and how it affects the sensitivity both of interest income and payments and of wealth to changes in the money market interest rate. Kneeshaw and other contributors to the BIS report (1995) underline that this is a potential source of asymmetries in the transmission mechanism. Balance sheet structures influence the ability of economic agents to change their intertemporal allocation of resources following a change in the interest rate.

First, these structures shape the interest income and payment flows. There are three major determinants of the income effects of a change in monetary policy: the size and composition of the financial balance sheet, the reference maturity for deposit and credit contracts and the financial asset price responses to monetary policy shocks.¹⁶ For instance, households that have very little debt but hold all their wealth in money market securities are likely to see their disposable income rise following a tightening of monetary policy. By contrast, leveraged firms that issue mainly short-

¹⁴ For example, investment bankers expected the market for corporate bonds to expand in Europe to approach US standards (Brookes and Winkelmann, 1998; ECB, 1999). One reason is that the enhanced substitutability of government debt has removed opportunities for high-yield/high-risk investment. Corporate debt can fill the vacuum. Moreover, institutional investors have increasing amounts of retirement savings to invest which, combined with increased competition in the underwriting business, will lower the costs of commercial paper and corporate bond issuance. Finally, the integrated euro-denominated financial market favours credit risk diversification across corporate sector issuers of debt securities. The fact that institutional investors are looking for new high-risk, high-yield securities also implies that smaller companies will have greater access to direct finance than they have to date. McCauley and White (1997) recall that it took only 16 years for US junk bonds and commercial paper debt to reach a level of USD 200 billion, i.e. around a quarter of bank lending to corporations. Yet there might be some legal constraints on their development in Europe (Cecchetti 1999, Laporta et al. 1997, 1998). See also the January 2000 issue of the ECB Monthly Bulletin.

¹⁵ See also the January 2000 issue of the ECB Monthly Bulletin.

¹⁶ I do not take non-financial wealth into account. See MacLennan et al. (1998) and references therein for a survey on asymmetries in the MTM owing to differences in the institutional features of housing markets in European countries.

term debt would experience a fall in their profits. In theory, the former will raise their consumption and the latter will decrease their investment only if they are subject to a liquidity constraint or if their permanent income is affected. However, as few economists dispute the fact that at least some agents are liquidity constrained in their expenditure decisions, it seems interesting to compare across countries the interest flows that follow changes in the interest rate. In the following I explore recent evidence with regard to balance sheets and interest rate contract practices, after which I summarise this information by compiling weighted asset and liability indicators so as to reflect the exposure of firms and households to income effects of monetary policy.

Turning to wealth effects, balance sheet structures obviously play a role by scaling the changes in asset prices that are triggered by interest rate changes. Again, the change in asset price is most likely to affect expenditure if it is perceived to be permanent. This would occur when prices are misaligned and the monetary policy shock is the catalyst that drives them back to their fundamental value. Agents may then adjust their savings to restore their desired wealth. In comparing the wealth effects across countries, I shall not discuss the response of financial asset prices to monetary policy because, as the yield curve convergence shows, they can be expected to be similar across the euro area. Instead, I simply compare the volume of financial wealth for which the price is sensitive to changes in the interest rate.

3.1 Assets and liabilities of firms and households

The financial accounts of German, Spanish, French and Italian firms and households for 1996, 1997 and 1998 are summarised in Table 4.¹⁷ The asset categories appearing in Table 4 are the sum of the assets held directly or indirectly through mutual funds.

Firms

The increase in the total size of the balance sheet of firms has mostly been driven by the level of the stock market. Similarly, the proportions of shares in liabilities and in assets reflect the increase in stock market prices observed over recent years in the four countries.¹⁸ Bank finance still largely dominates firms' external debt finance, except in France where debt securities and trade credit are much more widespread than in the other three countries.¹⁹ In 1998, overall bank credit ranged from 39% of GDP in Spain to 57% in Germany. On the financial assets side, deposits are much larger in Germany and Spain than in France and Italy. In France, this is offset by a larger portfolio of money market paper. The financial assets of Italian firms remain substantially smaller than those of firms in the other countries.

Households

On the liabilities side of households' balance sheet, the small scale of Italians indebtedness is the most noticeable feature. It should be noted, however, that their debt to GDP ratio almost doubled between 1996 and 1998. This is probably the result of the sharp decrease of interest rates, which came about in the nominal convergence process for Stage Three of EMU. Indeed, in Spain a sharp increase in debt is also observed.

¹⁷ Longer evolutions for these indicators are available in Mojon (1998) for France, Germany and Italy, and in Gonzales Minguez (1997) for Germany and Spain.

¹⁸ In the case of France, unlisted shares were excluded from the balance sheet reported in Table 4. They amount to more than 80% of the shares issued by the corporate sector, and to more than 95% of the shares appearing on the assets side. As a consequence, the valuation of unlisted shares at listed share prices led to the values of French shares rocketing, which did not reflect the true market capitalisation.

¹⁹ In Germany, private sector bonds are in fact more significant than in France, but around 90% of these bonds are issued by the financial sector. Private bonds are also issued almost exclusively by financial institutions in Italy, while they are evenly distributed across the financial and the non-financial private sector in Spain and the non-financial private sector represents one-third of total private bonds in France.

The composition of household assets seems to depend mainly on the kind of product available in each country. For instance, the Italian household sector holds a lot more debt securities and far fewer time and savings deposits than the same sector in the other countries.

3.2 Recent evidence on the reference maturity and the effective interest rate

This section briefly outlines the determinants of the effective interest rate which applies to the debt liabilities or assets of a household or a firm. Interest rate statistics provide some evidence on new business contracts.²⁰ However, it is difficult to trace the link between interest rates on new loans or deposits and effective rates, because precise data on the maturity of interest rate contracts are very scarce. The composition of the assets side and liabilities side are discussed in turn.

On the financial assets side, time deposits, bonds and short-term securities, essentially held through money mutual funds, are the main sources of interest income. The sluggishness of most bank deposit rates is such that the key parameter of the response of interest income to the monetary policy instrument is likely to be the size of the short-term securities portfolio. Table 4 shows that this has been fairly small in the recent years. As a proportion of the assets of Italian households, short-term securities are decreasing substantially, probably because of the recent decrease in short-term rates.

On the financial liabilities side, the response of interest payments to changes in the MMR is slightly more complicated. As far as short-term credit is concerned, the response should be rapid because credit has to be renewed frequently. As far as the effective interest payments on medium to long-term credits are concerned, the speed of transmission should depend on the share of variable interest rate contracts, the frequency of the interest rate variations defined in the contract and the correlation of the MMR with the reference interest rate used in the contract (Borio, 1995 and European Mortgage Federation, 1998). These patterns of interest rate contracts adjust to the credibility of the monetary policy regime. For instance, in some countries of the euro area fixed interest rate contracts are likely to develop because they are less risky in the context of EMU than they were in the context of volatile inflation and interest rates which prevailed in these countries prior to the start of Stage Three. However, the patterns of interest rate contracts in use also depend on national regulations to protect consumers. Such regulations could constitute rather persistent legal obstacles to the harmonising impact of EMU on interest rate contract practices.

I shall now describe how long-term credit contracts evolved during the run-up to EMU. Borio (1995) provides a first point of comparison concerning the maturity structure of debt in the seven largest European countries (see Table 5a). In 1993, the share of outstanding debt bearing interest rates which were either predominantly fixed or indexed to long-term interest rates amounted to more than 55%, except in Italy. The maturity of firms' debt was lower than that of households. In the case of mortgage debt, Borio (1995) uses the typology of the EMF, which divides variable rates into three categories: renewable, renegotiable and reference contracts.²¹ The available evidence for 1993 shows that fixed long-term contracts were relatively insignificant in Italy, Spain and the United Kingdom. More recent evidence, collected by the EMF (1998) through its network of national members, shows a dramatic change in Italy (see Table 5b). The share of mortgages at fixed long-term interest rates increased from

²⁰ For instance, the previous section has shown that, in the euro area, short-term credit rates usually react faster than long-term credit rates; deposit rates are more sluggish than credit rates; and the elasticity of time deposit and of saving deposit rates increases with maturity.

²¹ Renegotiable contracts set in advance dates on which the two parties have to agree upon a new level of interest rate. Reference contracts set a reference interest rate, usually a MMR or an interest rate on bonds, which the mortgage rate has to follow at discrete intervals. It should be kept in mind that, even when using these categories, the comparability of interest rate contracts across countries is limited. In Belgium, Germany, the Netherlands and Spain, household debt is dominated by long-term rates, although mortgage rates are not fully fixed. For instance, some reference contracts can involve indexation to a MMR (France) adjusted every month, or to a one-year rate (Spain), or indexation to a bond rate which can be adjusted after ten years (Belgium). In some cases the interest rate variation cannot exceed a cap which is set at the beginning of the contract. In addition, information on the distribution of each kind of credit contract is very limited.

25% in 1993 to 50% in 1997. The 1997 statistics also show that the proportion of variable rates with a reference rate with a maturity of less than one year is spreading in countries such as France and the Netherlands, which are usually associated with longer-term contracts. Belgian and German markets continue to be dominated by long-term fixed interest rate contracts and by contracts under which the interest rate is updated only infrequently. However, it should be stressed that in Germany the reference maturity for mortgage contracts is decreasing.

Altogether, the maturity structure of mortgage debt in the largest countries of the euro area appears to be converging to some extent.

3.3 Does the single monetary policy have asymmetric income effects?

Having taken stock of the evidence on retail rates, balance sheet structure and the reference maturity, I now turn to the task of evaluating the risk of asymmetric income effects in France, Germany, Italy and Spain. Even though the scarcity of the data rules out a rigorous accounting approach, such an analysis should bring out whether the risks of important asymmetries in the income effects exist in these early stages of EMU.

The approach taken starts with the financial balance sheet of firms and households and weights each balance sheet item in proportion to the likely response of the associated interest rate to changes in the MMR. Those items which provide an interest rate income to the holder are deposits and short-term securities, either held directly or through money market funds and bonds. Similarly, issuers of short-term securities, bonds, short-term and long-term credit are subject to interest payments. The "Size" columns in Table 6 set out these items for 1998 (1997 for France) as a percentage of GDP. However each item should not be weighted equally in the evaluation of the income effects of monetary policy. For instance, the interest income from money market fund shares closely follows changes in the MMR. The income flows associated with other assets, such as deposits and bonds, tends to respond more sluggishly. On the liabilities side, proportion of long-term credit that is granted at variable interest rates is computed. For firms, this is done on the basis of Borio (see Table 5a) because this is the latest available data on the maturity structure of their medium to long-term borrowing. For mortgage credits, this proportion is the unweighted average of the figure given by Borio (see Table 5a) and more recent figures obtained from the EMF (see Table 5b). This approximation is intended to capture the fact that the amount outstanding of mortgage credit results from accumulated new issuance over the last 15 to 20 years. Finally, the interest payments which would arise from new long-term credit and the issuance or acquisition of new bonds are disregarded.

The weighting of each balance sheet item is as follows. On the assets side, German sight deposits and all French deposits are given a weight of zero either because they pay no interest or because the government adjusts their rates for political reasons, while short-term securities are given a weight of 1 and bonds a weight of 0.10. In addition, two assumptions are made concerning the response of interest rate payments on bank deposits. According to the first assumption (see column "I" in Table 6) the three month pass-through estimated for the period 1988-98 is used as a weight for the corresponding deposit. According to the second assumption, Assumption II, the weight is the pass-through estimated for the last upward phase of the interest rate cycle, from 1988 to 1992. This second assumption takes account of both the interest rate cycle asymmetry of the pass-through and the fact that interest rates appeared to reach a through in 1999 (see Figures 1a and 1b).

The same procedure is used for short-term credit which appears on the liabilities side. It is assumed that short-term credit is renewed rapidly enough for the "weights" to be derived directly from the estimated pass-through to the interest rates on "new business". For German, French and Italian firms, as well as for Italian households, no variable rates on long-term credit are available. The weight of long-term credit at variable rates is arbitrarily set to either a low bound of 0.25 (for Assumption I) or

to an upper bound of 0.75 (for Assumption II). In Table 6, the figures that appear in the rows labelled "Weighted assets", "Weighted liabilities" and "Net weighted assets" are weighted sums of the figures appearing in the "Size" column, using in turn the two assumptions for the weights.

The overall impression given by the approximation presented in Table 6 is that the income effects of monetary policy are quite homogeneous. There are exceptions, though, such as the large volume of short-term securities held by French firms or the small volume of Spanish debt at short-term interest rates. Yet the magnitude of the differences does not seem to be such that strong asymmetries in the income effects of the single monetary policy could arise across the four largest countries in the euro area. It should be stressed that the recent adjustment in Italian household portfolios, i.e. the sharp increase in their indebtedness and the sharp decrease in their holdings of short-term securities, has reduced the gap usually observed vis-à-vis the other three countries in terms of net income effects.

This evaluation of the income effects of monetary policy should be seen as qualitative rather than strictly quantitative. Income effects are more difficult to observe for at least two reasons. First, non-financial agents adjust their portfolios following a monetary policy shock. Second, owing to the lack of data, only approximate effective interest rates can be calculated. Nevertheless, it appears that, at the start of Stage Three of EMU, there are no risks of strong asymmetries in the income effects of the single monetary policy across France, Germany, Italy and Spain.

3.4 Does the single monetary policy have asymmetric wealth effects?

The wealth effects of monetary policy obviously depend on the volume of assets held by households and firms and on how much their value responds to changes in the MMR. Bond and share prices respond almost instantaneously to a change in the short-term rate. In the case of households, these financial assets can be held either directly or through pension funds. In the case of firms, the bond portfolio is negligible and net holdings of shares are negative. In principle, the wealth effect does not apply to the liabilities side of firms' balance sheets.²² Therefore, I concentrate on the household sector and do not comment on the potential wealth effect on the shares held by firms. First the issue of asset price responses to changes in the MMR is addressed. This is followed by a comparison of the size of portfolios of bonds and stocks held by households in the four largest countries in the euro area.

The response of the value of a bond portfolio to horizontal shifts in the yield curve depends on the maturity of the portfolio. The longer the average maturity of a portfolio, the greater its capital gains will be following a downward shift in the yield curve. The average maturity of bonds in the euro area is difficult to compute precisely. It is probably somewhere between five and ten years. As a first approximation, the variation in the value of a bonds portfolio can be taken as the response of the value of a bond with the average maturity of the portfolio. For instance, if the average maturity of the portfolio of bonds held by households is seven years, the decrease in the value of the portfolio following a 100 basis point upward shift in the yield curve is around 6%. This effect should be considered as an upper bound to the potential impact of a change in the MMR on the value of bonds, because monetary policy shocks also affect the shape of the yield curve.^{23, 24}

²² Nevertheless, a decrease in the market value of the shares of a firm may have an adverse impact. For instance, it may reduce the firm's willingness or ability to issue new debt or new shares. The theory of the balance sheet channel of monetary policy stresses the importance of the fall in the net asset value of borrowers (Bernanke and Gertler, 1995). This may lead to a decrease in credit supply proportional to the fall in the value of borrowers' collateral. The empirical evidence of the credit channel in the euro area is surveyed in Mojon (1999).

²³ See Buttiglione et al. (1998) for measures of the yield curve response to monetary policy shocks in euro area countries.

²⁴ Nonetheless, in some circumstances, a monetary policy shock can trigger a bond crash. This happened, for instance, in the United States in 1994, when long-term rates suddenly overshoot the increase in the federal funds rate. In such circumstances, the drop in the value of the bond portfolio will reflect the overshoot of the long-term rate over the MMR.

The price of stocks is also highly sensitive to interest rates. The share price is usually defined as the present value of the future stream of dividends. The discount rate used in the computation of the present value is, again, the long-term interest rate. The lower the level of long-term interest rates, the higher the impact of a change in the long-term rate on the underlying value of stocks. At the current level of long-term rates in Europe (the 10-year government bond rate currently stands at around 6%), an increase of 100 basis points in the long-term real rate translates into a decrease in the underlying stock value of around 15%. In addition, higher interest rates lower the profits of indebted firms and could, if the interest rate shock were expected to impact on growth, negatively affect the prospect of future cash flows. However, it cannot be taken for granted that the stock price will decrease in line with its fundamental value. If the interest rate shock triggers a change in market expectations regarding the sustainability of stock prices, the latter can fall even more. In particular, if markets become convinced that they have been too optimistic and that it is time for the "bubble" to burst, an adverse monetary policy shock can be the catalyst for this burst. To sum up, the impact of monetary policy on the stock market can be strong either in periods of low interest rates or in periods when the prices of stocks deviate from their fundamental values.

A given decrease in bond prices and stock prices is likely to have greater wealth effects in countries where households hold more bonds or more shares. As is widely known, Italian households own more bonds than households in the other countries. This is a consequence of the size of the debt of the Italian public sector.

Evaluating the portfolio of "marketable" shares is more difficult because, except in France, financial accounts do not distinguish between listed and unlisted shares. This is an important distinction because only the former are subject to losses in value following increases in the level of interest rates. According to OECD estimates of quoted shares held directly by households, in 1998 the total wealth of households in the form of shares amounted to around 25% of GDP in France and in Germany and to around 40% of GDP in Italy. Based on the Spanish stock exchange (Bolsa) figures, the value of quoted shares held by Spanish households reached approximately 34% of GDP by the end of 1998. In fact, these magnitudes are very small compared with a US stock market capitalisation of 113% of GDP at the end of 1998. Moreover, the propensity to consume out of wealth is much smaller than the propensity to consume out of income. Boone, Giorno and Richardson (1998)²⁵ estimate the elasticity of consumption to the real equity price in the G7 countries. Unsurprisingly, it is much smaller in continental Europe than in the United States. It is equal to 0.018 in Germany, 0.014 in France and 0.008 in Italy, where it is not significant. In the United States it reaches 0.064.

Altogether, the total portfolio held by households which can experience a fall in value amounts to around 80% of GDP in Italy, 55% in Germany, 50% in Spain and 36% in France (see the last line of Table 4). Yet the likelihood that national asymmetries in "financial" wealth effects will lead to significant asymmetric responses of consumption seems fairly limited.

²⁵ See also Kennedy, Palerm, Pigott and Terribile (1997).

Conclusion

This paper has focused on two aspects of financial structure in the euro area, which may contribute to national asymmetries in the interest rate channel of the single monetary policy. The first is the heterogeneity of retail banking markets. The second is the balance sheet structure of firms and households. These two determinants of the interest rate channel of monetary policy are particularly interesting to monitor because they may be slow to adapt to the new monetary policy regime. While the move to EMU has created a single money market and the resulting disappearance of exchange rate risk has homogenised the yield on debt securities at every maturity, retail banking remains mainly national, if not local, and opportunities for cross-country arbitrage continue to be limited. Similarly, balance sheets will only gradually adjust as households and firms exploit new investment and saving opportunities in the single currency area.

The heterogeneity of national bank retail markets in the euro area is reflected in the pass-through of the MMR to banks' credit and deposit rates. As a summary indicator of this pass-through I use the response after three months of the bank retail rate to a 100 basis point permanent increase in the MMR. I find that during the last ten years, which cover a complete interest rate cycle, the pass-through has been different both across countries and across markets. Short-term credit rates typically respond faster than mortgages or deposit rates. However, within each segment national asymmetries remain substantial. For instance, during the last interest rate cycle, the average impact of the MMR on short-term credit rates ranged from 0.50 in Italy to 0.96 in Belgium and 0.99 in the Netherlands.

A panel of 25 credit markets and 17 deposit markets over four sub-periods is then constructed in order to identify the determinants of the response of bank retail rates to the MMR. The main results of this analysis can be summarised as follows. First, for both credit and deposit rates, the higher the volatility of the MMR the lower the pass-through. The latter implies that the establishment of a single monetary policy is likely to contribute to a more homogenous pass-through to bank rates across countries. In addition, to the extent that money market volatility in the euro area is considerably less than it was in most euro area countries in the past, it will also increase the average pass-through. For example, volatility in the MMR has fallen sharply in countries such as Spain, where the pass-through has typically been smaller than the average. Second, higher competition from other sources of finance or alternative forms of investment increase the pass-through from the MMR to bank rates. To the extent that such competition is likely to increase in the near future, partly as a consequence of EMU, this again implies the likelihood of a faster average pass-through in the euro area than before. Third, using admittedly imperfect indicators of banking competition, such as the indicator of national and European deregulation policies, I find evidence in favour of the hypothesis that the degree of competition among banks reduces their ability to smooth their interest rate margin across the interest rate cycle, i.e. competition reduces the interest rate cycle asymmetry of the pass-through. Finally, with the exception of staff costs, I do not find any link between indicators of the rigidity of bank funding costs and the pass-through. These results show unambiguously that, in the euro area, retail banking market structures have had an impact on the pass-through. The results also point to the need to monitor retail banking market structure in the euro area closely, in order to evaluate how the pass-through might evolve.

The second part of the paper provides a comparison of the balance sheets of the corporate and household sectors in Germany, Spain, France and Italy at the start of Stage Three of EMU. These balance sheets will be important factors in determining the income and wealth effects of the changes in interest rates triggered by monetary policy. I show that – partly because of recent adjustments in the reference maturity of credit contracts and in the composition of balance sheets, especially in Italy – there should not be strong national asymmetries in the income effects of the

single monetary policy. On the contrary, the “financial” wealth effects on households could be twice as great in Italy as in the other three countries. However, the impact of monetary policy shocks on financial wealth is highly uncertain and the propensity to spend financial wealth seems to be rather small in the euro area.

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Appendix: Summary presentation of the panel estimation

The estimated equations can be summarised as follows:

$$\begin{aligned} \partial r_t / \partial i_{t-3} = & \alpha V \times up + \alpha' V \times dn + \beta Y \times up + \beta' Y \times dn \\ & + \gamma vol(i) + \delta \Delta p \\ & + \varepsilon Gual\ index \times up + \varepsilon' Gual\ index \times dn \\ & + \phi cp \times up + \phi' cp \times dn + \varphi st-sec \times up + \varphi' st-sec \times dn + \\ & + \lambda staff-cost + \mu dep-share + \nu nii \end{aligned}$$

where $\partial r_t / \partial i_{t-3}$ is the three-month elasticity of the bank retail rate r_t to the MMR i_t as derived from estimates for each sub-period. Up (dn) are time dummies which take, respectively, the value one (zero) for 1979-82 and 1988-92 and zero (one) for 1982-88 and 1992-98. The explanatory variables are:

- V : growth in the volume of credit or deposits;
- Y : either growth in GDP, investment or residential investment in the case of credit markets, or growth in GDP and saving ratio in the case of deposit markets;
- $vol(i)$: standard deviation of the MMR time series;
- Δp : inflation rate;
- $Gual\ index$: Gual index of competition;
- cp : ratio of commercial paper to GDP;
- $st-sec$: ratio of all short securities to GDP;
- $dep-share$: share of non-bank deposits in the assets of banks;
- $staff-cost$ and nii : ratios of banks' staff costs and non-interest income to banks' gross income.

A priori, the parameters to be estimated, α , β , ε' , ϕ' and φ' should be positive in the equation for the credit rates pass-through; and negative for that of the deposit rates. α' , β' , ε , ϕ and φ should be negative in credit rates pass-through and positive for that of deposit rates. γ and λ should be negative, while δ and ν should be positive, in both the credit and the deposit equations. Finally, μ , which is estimated only for the credit equation, should be negative.

The values taken for the exogenous variables are given in Tables A1, A2 and A3.

Table 1a

Stylised facts on the link between money market rates and bank deposit rates

Level correlation						
	Time deposits			Savings accounts		
	1979-98	1979-88	1988-98	1979-98	1979-88	1988-98
Germany	1.00	0.99	1.00	0.78	0.94	0.94
Spain	0.76	0.38	0.95			0.79
Italy	0.96	0.96	0.94			
Netherlands				0.67	0.84	0.90
Euro area*			0.99			0.98

First difference correlation						
	Time deposits			Savings accounts		
	1979-98	1979-88	1988-98	1979-98	1979-88	1988-98
Germany	0.72	0.74	0.67	0.39	0.44	0.13
Spain	0.03	-0.02	0.24			0.18
Italy	0.46	0.61	0.36			
Netherlands				0.02	0.01	0.15
Euro area*			0.72			0.47

Sources: Author's computation on the basis of ECB and BIS databases. The bank rates used to compute the table are listed in Table 2. In cases when several rates are available, the following were chosen: Germany, time deposits on amounts below DEM 1 million and savings accounts at three months' notice; Spain, time deposits and savings deposits; Italy, time deposits (maximum rate); Netherlands, savings accounts (ordinary).

Table 1b

Stylised facts on the link between money market rates and bank credit rates

Level correlation									
	Short-term credit to firms			Investment credit to firms			Mortgage credit		
	1979-98	1979-88	1988-98	1979-98	1979-88	1988-98	1979-98	1979-88	1988-98
Belgium	0.95	0.93	0.98	0.83	0.82	0.85	0.84	0.82	0.85
Germany	0.91	0.97	0.88				0.95	0.94	0.96
Spain	0.92	0.78	0.98	0.78	0.4	0.98	0.78	0.29	0.97
France*	0.92	0.73	0.94	0.94	0.76	0.96			0.95
Italy	0.97	0.96	0.94						
Netherlands	0.98	0.96	0.99				0.85	0.81	0.92
Euro area**			0.98			0.95			0.97

First difference correlation									
	Short-term credit to firms			Investment credit to firms			Mortgage credit		
	1979-98	1979-88	1988-98	1979-98	1979-88	1988-98	1979-98	1979-88	1988-98
Belgium	0.54	0.53	0.61	0.19	0.14	0.38	0.13	0.15	0.15
Germany	0.60	0.60	0.61				0.54	0.56	0.49
Spain	0.27	0.24	0.55	-0.06	-0.17	0.37	-0.03	-0.09	0.30
France*	0.59	0.60	0.59	0.59	0.58	0.64			0.53
Italy	0.67	0.76	0.63						
Netherlands	0.69	0.69	0.66				0.21	0.23	0.21
Euro area**			0.32			0.44			0.35

Sources: Author's computation on the basis of ECB and BIS databases. The bank rates used to compute the table are listed in Table 2. In cases when several rates are available, the following were chosen: Germany, overdraft over DEM 1 million and mortgages at fixed rates; Spain, credit at floating rate, medium-term credit and mortgage loans; France, short-term and long-term loans to firms and fixed rates housing loans; Italy, short-term loans to firms (minimum rate); Netherlands, cash advance (minimum)

* France: Rates are quarterly and the sub-periods are 1984-98, 1984-93 and 1988-98..

** Euro area: Starts in 1990.

Table 2a

Three-month pass-through of the MMR to the bank retail interest rates over the sample sub-periods

Belgium	1979-98	1979-88	1988-98	1979-81	1982-88	1988-90	1990-98
Cash advance credit (N4)	0.64	0.47	0.96	0.7	0.22	0.15	1.00
Investment loans (N5)	0.20	0.22	0.45	0.31	0.06	0.10	0.61
Mortgage loans (N2)	0.20	0.25	0.26	0.68	0.06	0.47	0.05
							1993-98
Time deposits, 3 months, average rate (N8)							0.94
Savings deposits, average rate (N9)							0.27
Germany	1979-98	1979-88	1988-98	1979-81	1982-88	1988-92	1992-98
Current account < DEM 1 million	0.63	0.79	0.68	0.57	1.12	0.88	0.39
Current account > DEM 1 million (N4)	0.67	0.95	0.68	0.64	1.02	0.85	0.36
Discount on commercial bills	0.66	0.89	0.94	1.08	1.17	1.14	1.02
Mortgages, variable	0.53	0.5	0.56	0.39	0.75	0.59	0.47
Mortgages, fixed (N2)	0.54	0.57	0.45	0.39	0.70	0.44	0.45
Time deposits < DEM 1 million (N8-2)	0.90	0.96	0.66	0.85	1.18	0.65	0.76
Time deposits > DEM 1 million	1.13	1.43	0.78	1.48	1.44	0.68	0.82
Savings deposits, 3 months' notice	0.21	0.33	-0.04	0.29	0.51	-0.06	0.03
Savings deposits, 12 months' notice	0.20	0.32	0.002	0.28	0.42	-0.01	0.09
Spain	1980-98	1980-88	1988-98	1980-83	1983-88	1988-92	1992-98
Credit, average rate (N6)	0.01	0.01	0.21	0.00	0.11	0.32	0.24
Bank floating lending rate (almost N4)	0.51	0.56	0.65	0.21	0.49	1.21	0.55
Medium-term credit (1-3 years) (N5)	0.00	0.05	0.20	-0.01	0.08	0.71	0.18
Mortgages (N2)	0.07	0.06	0.07	-0.01	0.08	0.31	-0.11
Bank prime lending rate			0.21			0.14	0.23
Savings deposits, average (N10)	0.02	0.02	0.11	0.00	0.03	0.08	0.13
	1979-98	1979-88	1988-98	1979-83	1983-88	1988-92	1992-98
Time deposit rate (N8)	0.00	-0.01	0.10	0.00	0.03	0.08	0.15
			1987-98			1988-92	1992-98
Sight deposit rates (N7)			0.14			0.18	0.05
Savings deposit rate			0.07			0.16	0.12
France	1984-98	1984-93	1988-98		1984-88	1988-93	1993-98
Firms, short-term, average (almost N4)	0.81	0.75	0.86		0.41	0.76	0.71
Firms, med. to long-term, average (N5)	0.84	0.83	0.63		1.37	0.75	0.42
			1990-98			1990-95	1993-98
Household, permanent overdraft			0.32			0.43	0.23
Household, other personal loans (N3)			0.50			0.52	0.46
Mortgage, fixed (N2)			0.34			0.34	0.41
Mortgage, variable			0.22			0.18	0.28
Italy	1979-98	1979-88	1988-98	1979-82	1982-88	1988-92	1992-98
Prime rate	0.85	1.19	0.80	1.76	0.69	1.32	0.58
Minimum credit rate (N4-2)	0.62	0.95	0.50	1.23	0.64	0.65	0.62
	1984-98	1984-93	1988-98		1984-88	1988-92	1992-98
Normal credit rate (almost N4-1)	0.54	0.55	0.55		0.40	0.87	0.53
	1979-98	1979-88	1988-98	1979-82	1982-88	1988-92	1992-98
Maximum deposit rate	0.27	0.42	0.18	0.22	0.39	0.21	0.39
	1984-98	1984-93	1988-98		1984-88	1988-92	1992-98
Normal deposit rate	0.14	0.12	0.10		0.24	0.08	0.63
			1989-98			1988-92	1992-98
Sight deposit rate (N7)			0.15			0.15	0.26
Netherlands	1979-98	1979-88	1988-98	1979-81	1982-88	1988-92	1992-98
Cash advance, minimum	1.03	0.91	0.99	1.29	1.33	1.00	1.12
Cash advance, maximum	1.04	1.08	0.99	1.29	1.33	1.00	1.12
Mortgage credit (N2)	0.23	0.3	0.27	0.07	0.38	0.16	0.33
Ordinary savings deposits	0.01	0.01	0.04	-0.01	0.07	-0.01	0.06
Time savings deposits, 3 months' notice	0.07	0.02	0.1	0.05	0.14	0.11	0.11
Time savings deposits, 12 months' notice	0.09	0.09	0.19	0.05	0.11	0.15	0.26
Time savings deposits, 2 years' notice (N8-1)	0.25	0.26	0.41	0.07	0.65	0.19	0.83

Sources: Author's computation on the basis of retail bank rates published by national central banks. The bank rates are available in the BIS database, except for French rates, which are taken from the statistical supplement of the Banque de France Monthly Bulletin, and the Spanish mortgage rate and the Italian sight deposit rate, which are taken from the ECB database. Money market rates are overnight rates from the BIS database. The abbreviation in parenthesis refers to the rates available in the ECB database of national retail interest rates. See the statistics page on www.ecb.int.

Table 2b**Averages of the three-month pass-through reported in Table 2a**

	1979-98	1979-88	1988-98	1979-81	1982-88	1988-92	1992-98
All	0.43	0.50	0.45	0.50	0.55	0.49	0.47
Credit	0.53	0.59	0.59	0.62	0.62	0.68	0.53
Breakdown by borrower							
Short-term credit to firms	0.73	0.83	0.78	0.97	0.80	0.89	0.73
Mortgages	0.31	0.34	0.31	0.30	0.39	0.36	0.27
Breakdown by country							
Belgium	0.35	0.31	0.56	0.56	0.11	0.24	0.55
Germany	0.61	0.74	0.66	0.61	0.95	0.78	0.54
Spain	0.15	0.17	0.28	0.05	0.19	0.64	0.22
France	0.83	0.79	0.75		0.89	0.50	0.42
Italy	0.67	0.90	0.62	1.50	0.58	0.95	0.58
Netherlands	0.77	0.76	0.75	0.88	1.01	0.72	0.86
All deposits	0.27	0.33	0.20	0.30	0.43	0.18	0.35
Breakdown by country							
Belgium							0.61
Germany	0.61	0.76	0.35	0.73	0.89	0.32	0.43
Spain	0.01	0.01	0.11	0.00	0.03	0.13	0.11
Italy	0.21	0.27	0.14	0.22	0.32	0.15	0.43
Netherlands	0.11	0.10	0.19	0.04	0.24	0.11	0.32

Sources: Author's computation on the basis of Table 2a. Averages of the estimated pass-through.

Table 3a

Fixed effects regressions of the three-month pass-through to credit rates on financial structure indicators

	Regression 1		Regression 2		Regression 3		Regression 4		Regression 5		Regression 6		Regression 7		Regression 8	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
Demand control																
Credit volume																
* up	-0.005	[.849]	0.028	[.339]	0.0183	[.534]	4E-04	[.993]	0.0412	[.194]	0.012	[.668]	9E-03	[.707]	0.006	[.822]
Credit volume																
* down	-0.033	[.127]	-0.034	[.110]	-0.015	[.561]	-0.026	[.235]	-0.047	[.119]	-0.017	[.515]	-0.016	[.527]	-0.018	[.460]
Demand																
* up	-0.024	[.023]	-0.013	[.285]	-0.012	[.317]	-9E-03	[.514]	-3E-03	[.818]	-0.02	[.140]	-0.021	[.083]	-0.022	[.067]
Demand																
* down	-0.176	[.000]	-0.149	[.001]	-0.024	[.703]	-0.132	[.001]	-0.121	[.014]	-0.062	[.263]	-0.063	[.245]	-0.069	[.188]
Monetary policy regime																
MMR																
volatility	-0.024	[.000]									-0.02	[.211]	-0.022	[.040]	-0.024	[.000]
Inflation	0.063	[.001]									0.062	[.029]	0.0569	[.041]	0.058	[.036]
Bank competition																
Gual index * up			-0.196	[.326]												
Gual index *down			0.4139	[.309]												
Gual cumulated index * up					-0.039	[.595]					-0.038	[.803]	-0.072	[.528]	-0.061	[.596]
Gual cumulated index *down					0.1642	[.009]					0.1601	[.097]	0.1471	[.065]	0.145	[.065]
Direct finance competition																
Commercial paper/GDP * up							0.1822	[.127]								
Commercial paper/GDP * down							0.1588	[.349]								
Commercial paper/GDP											0.0557	[.751]	0.0584	[.741]		
Bank funding rigidity																
Bank staff cost/bank gross income									-0.033	[.013]	-0.004	[.801]				
Bank deposit share/bank total asset									0.0364	[.062]						
Non-interest income/bank gross income									-0.027	[.092]						
Dummy																
1979-82	-0.319	[.031]	0.358	[.454]	1.324	[.018]	0.005	[.980]	-0.396	[.030]	1.074	[.036]	1.077	[.036]	1.020	[.031]
1982-88	0.125	[.143]	0.510	[.121]	0.998	[.002]	0.239	[.013]	-0.056	[.715]	0.938	[.040]	0.878	[.017]	0.850	[.017]
1988-92	-0.115	[.189]	0.428	[.333]	1.466	[.012]	-0.039	[.830]	-0.292	[.031]	1.327	[.008]	1.378	[.008]	1.321	[.006]
Adjusted R ²	0.70		0.57		0.60		0.59		0.64		0.73		0.73		0.74	

Sources: Author's computation on the basis of 87 observations from 25 individuals. Significant coefficients are in bold characters.

Table 3b

Fixed effects regressions of the three-month pass-through to deposit rates on financial structure indicators

	Regression 1		Regression 2		Regression 3		Regression 4		Regression 5		Regression 6		Regression 7		Regression 8	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
Demand control																
Deposit volume																
* up	0.033	[.055]														
Deposit volume																
* down	-0.038	[.068]														
Saving rate																
* up	-0.020	[.370]	0.026	[.324]	0.070	[.027]	0.018	[.377]	-0.043	[.086]	0.052	[.140]	0.1444	[.466]	-0.087	[.006]
Saving rate																
* down	0.102	[.008]	0.109	[.011]	0.134	[.003]	0.121	[.007]	-0.005	[.917]	0.168	[.009]	0.1182	[.394]	-0.038	[.461]
Real GDP																
growth * up	0.002	[.718]	0.006	[.503]	0.002	[.814]	0.003	[.737]	0.011	[.098]	0.004	[.681]	-0.106	[.701]	0.1767	[.005]
Real GDP																
growth																
* down	-0.214	[.002]	-0.122	[.061]	-0.207	[.002]	-0.223	[.045]	-0.360	[.001]	-0.163	[.003]	-0.419	[.000]	-0.248	[.036]
Monetary policy regime																
MMR volatility			-0.004	[.166]												
Inflation			-0.089	[.112]												
Bank competition																
Gual index * up					0.404	[.010]							0.962	[.069]		
Gual index *down					-0.495	[.150]							-1.545	[.331]		
Gual cumulated index * up							0.106	[.030]							0.220	[.000]
Gual cumulated index *down							0.001	[.984]					0.140	[.065]		
Direct finance competition																
Total short term securities/GDP * up									0.093	[.025]						
Total short term securities/GDP * down									0.117	[.023]						
Total short term securities/GDP													0.137	[.000]	0.154	[.000]
Bank funding rigidity																
Bank staff cost/bank gross income													0.011	[.592]		
Non-interest income/bank gross income													-0.025	[.878]		
Dummy																
1979-82	2.159	[.004]	1.719	[.028]	0.214	[.811]	1.554	[.074]	0.332	[.649]	2.393	[.020]	-3.08	[.276]	1.061	[.148]
Dummy																
1982-88	0.168	[.070]	0.108	[.191]	-0.330	[.256]	0.082	[.799]	0.417	[.007]	0.240	[.082]	-0.845	[.532]	1.108	[.005]
Dummy																
1988-92	2.057	[.005]	1.358	[.058]	-0.057	[.952]	1.184	[.143]	0.239	[.747]	2.131	[.027]	-3.544	[.235]	0.33	[.640]
Adjusted R ²	0.79		0.79		0.78		0.77		0.84		0.75		0.85		0.86	

Source: Author's computation on the basis of 55 observations from 17 individuals. Significant coefficients are in bold characters.

Table 4

Financial balance sheet of enterprises and households (in percent of GDP)

	Firms											
	Germany			Spain			France		Italy			
	1996	1997	1998	1996	1997	1998	1996	1997	1996	1997	1998	
Assets	73	76	83	78	84	94	89	92	36	39	41	
Sight deposits	17	18	20	7	8	11	0	0	5	6	7	
Other deposits	5	4	4	7	5	4	5	5	0	1	1	
Short-term securities	1	0	0	2	2	2	10	11	0	0	0	
Bonds	2	2	1	1	2	2	6	5	4	3	3	
Shares	22	24	28	15	17	21	9	11	18	20	22	
Trade credit				32	33	34	40	39	4	4	4	
Liabilities	115	125	136	122	130	145	135	141	108	115	123	
Short-term securities	0	0	0	2	2	2	3	3	0	0	0	
Bonds	3	2	2	3	3	3	10	10	1	1	1	
Shares	41	49	56	38	43	53	39	49	55	59	67	
Stock mkt. capitalisation	29			42			38		21			
Short-term loans	17	17	18				10	10	26	26	26	
Long-term loans	36	37	39	34	37	39	33	32	17	20	20	
Trade credit				23	25	26	37	36	3	2	2	
Assets subject to a wealth effect *	24	25	29	16	19	24	15	16	22	23	26	
	Households											
	Germany			Spain			France		Italy			
	1996	1997	1998	1996	1997	1998	1996	1997	1996	1997	1998	
Assets	138	146	150	135	146	155	136	142	179	202	220	
Sight deposits	12	13	13	10	10	9	19	20	17	29	30	
Other deposits	37	37	36	63	61	56	47	48	31	17	11	
Short-term securities	1	0	0	7	7	5	4	3	14	10	5	
Bonds	27	28	26	8	11	16	11	10	40	45	39	
Shares	10	14	15	36	53	67	16	20	38	50	67	
OECD estimates**		27				34		26		38		
Liabilities	58	60	62	57	60	64	48	48	12	18	19	
Short-term loans	2	2	2				2	2	2	4	4	
Long-term loans	55	50	52	33	36	41	31	31	8	13	14	
Trade credit				13	12	11	8	8				
Assets subject to a wealth effect*	37	41	41	44	64	83	28	30	78	95	106	
As per with OECD source**		55			50		36			83		

Sources: Author's computation on the basis of national accounts published by national central banks.

* Asset subject to a wealth effect is the sum of shares and bonds.

** OECD (or Bolsa for Spain) estimates of the listed shares held by households.

Table 5a**Share of outstanding debt at predominantly fixed long-term rates for 1993**

	Mortgages*	Households	Firms	Total
Belgium		82	33	56
Germany	10	64	60	62
Spain	20			57
France	95	87	44	57
Italy	25	31 < 41	>23/24	26
Netherlands	< 10	92	<62	75
Austria	75			< 73

Source: Borio (1995), Tables 12, 13 and 14.

* Share of debt contracts with fully fixed interest rate.

Table 5b**Mortgage debt: distribution of interest rate contracts in new businesses for 1997**

	Fixed rate	Renegotiable	Reviewable: Lenders' disposure	Reference	Variable < 1year	Fixed >=1y <5y	Fixed >= 5 y
Belgium	21	None	Some com. loans	79	0	13	87
Germany	Some	Some	Some	Small	2.5	60	37.5
Spain	5 to 10	None	None	90-95	0.5	95	4.5
France	50	None	None	50	40	0	60
Italy	>50	None	None	<50	50	0	50
Netherlands	Small	None	100	No	25	30	45
Austria	Small	60	10	30	77	4	19

Source: European Mortgage Federation (1997).

Table 6

Weighted assets proportional to income effects in 1998 as percentage of GDP

	Firms											
	Germany			Spain			France			Italy		
	Size	I	II	Size	I	II	Size	I	II	Size	I	II
Sight deposits	19.73	0.00	0.00	10.94	0.14	0.18	0.05	0.00	0.00	6.72	0.15	0.15
Other deposits	3.67	0.35	0.32	3.59	0.09	0.12	5.38	0.00	0.00	0.86	0.14	0.14
Short-term securities	0.47	1.00	1.00	1.75	1.00	1.00	10.83	1.00	1.00	0.20	1.00	1.00
Bonds	0.93	0.10	0.10	2.24	0.10	0.10	5.11	0.10	0.10	3.10	0.10	0.10
Weighted assets*		1.8	1.7		3.8	4.4		11.3	11.3		1.6	1.6
Short-term securities	0.20	1.00	1.00	1.88	1.00	1.00	2.72	1.00		0.39	1.00	
Bonds	2.37	0.10	0.10	3.42	0.10	0.10	10.12	0.10		1.20	0.10	
Short-term loans	18.09	0.68	0.87				10.41	0.86	0.76	26.13	0.62	0.94
Long-term loans	38.65			39.44			31.63			20.08		
Inc. variable rate	15.46	0.25	0.75	16.96	0.65	1.21	20.88	0.25	0.75	15.26	0.25	0.75
Weighted liabilities*		16.6	27.7		13.2	22.7		17.9	23.6		20.5	36.0
Net weighted asset*		-14.8	-26.0		-9.4	-18.4		-6.6	-12.2		-18.9	-34.4
	Households											
	Germany			Spain			France			Italy		
	Size	I	II	Size	I	II	Size	I	II	Size	I	II
Sight deposits	13.17	0.00	0.00	9.23	0.1	0.2	20.27	0.00	0.00	30.12	0.15	0.15
Other deposits	36.44	0.35	0.32	56.11	0.1	0.1	48.35	0.00	0.00	10.97	0.14	0.14
Short-term securities	0.47	1.00	1.00	5.46	1.0	1.0	2.90	1.00	1.00	5.02	1.00	1.00
Bonds	26.47	0.10	0.10	16.05	0.1	0.1	9.73	0.10	0.10	38.88	0.10	0.10
Weighted assets*		15.9	14.6		13.1	15.5		3.9	3.9		15.0	15.0
Short-term loans	2.38	0.68	0.88				2.29	0.41	0.47	3.91	0.55	0.87
Long-term loans	52.38			40.7			31.11			13.73		
Share at variable rate in 1993	na			<0.1			0.00			0.75		
Share at variable rate in 1997	0.03			0.0			0.40			0.50		
	1.31	0.56	0.59	2.0	0.7	1.2	6.22	0.22	0.18	9.27	0.25	0.75
Weighted liabilities*		2.4	2.9		1.3	2.5		2.3	2.2		4.5	10.4
Net weighted asset*		13.5	11.7		11.8	13.0		1.6	1.7		10.5	4.6

Sources: Author's computation on the basis of Table 2, Table 4 and Tables 5a and 5b. The "size" column reports the item as percentage of GDP for 1998 (1997 for France) as in Table 4 and the share of variable rates in long-term loans as in Tables 5a and 5b. The "Assumption I" column reports either the estimated pass-through over 1988-98 for "other deposits", "short-term loans" and, when a variable interest rate is available, for long-term loans, or is set to 0.1 for bonds, 1.0 for short-term securities or 0.25 for German and French long-term loans to firms and Italian long-term loans to households. The Assumption II column reports either the estimated pass-through over 1988-92 for other deposits, short-term loans and, when a variable interest rate is available, for long-term loans, and is set to 0.1 for bonds, 1.0 for short-term securities and 0.75 for German and French long-term loans to firms and Italian long term loans to households.

* Weighted assets, weighted liabilities and weighted net assets are weighted sum of the balance sheet items of the Size column, using in turn the weights of columns I and II.

Note: Column I and II give the results for assumptions I and II respectively.

Annex: Variables used in the regression of the panel pass-through
(Annual averages for each sub-period)

Table A1

Banking sector capacity and rigidity of bank funding costs

	1979-82	1982-88	1988-92	1992-96
Staff cost/gross income				
Belgium	21.6	36.1	34.2	40
Germany	45.8	40.1	42.1	38.5
Spain	45.7	43.4	38.9	37.4
France		41.4	37.6	36.9
Italy	38.5	41.2	41.8	42.6
Netherlands	42.6	41	39.1	37.3
Non-interest income/gross income				
Belgium	17	19.3	21.9	27.2
Germany	19.5	18.9	23.8	21.7
Spain	14.7	16.1	18.9	23.5
France		13.9	27.3	43
Italy	20.3	25.6	21.5	22.4
Netherlands	25.7	24.6	28.1	32.2

Source: Author's computation on the basis of the OECD's "Profitability of Banks" statistics.

Gual index of deregulation and competition				
	1980-82	1982-88	1988-92	1992-95
Belgium	0.33	0.12	1.00	0.98
Germany	1.00	0.05	0.64	0.77
Spain	0.00	0.40	0.79	1.15
France	0.67	0.05	1.09	0.62
Italy	0.00	0.19	1.00	0.84
Netherlands	1.00	0.05	0.55	0.97
Gual cumulated index of deregulation and competition				
	1980-82	1982-88	1988-92	1992-95
Belgium	1.00	1.40	3.80	8.01
Germany	2.67	3.24	4.24	6.90
Spain	0.00	1.06	3.85	7.78
France	2.00	2.19	4.66	8.21
Italy	0.00	0.72	3.31	7.05
Netherlands	2.67	3.14	3.96	6.90

Sources: Author's computation on the basis of the index created by Gual (1999).

Table A2

Real credit and deposit volumes (average annual gross rates as a percentage)

	1979-82	1982-88	1988-92	1992-98
Short-term credit				
Belgium	1.74	-0.08	4.68	-12.62
Germany	3.27	-0.21	5.89	-0.93
France		-1.82	0.95	-10.26
Italy	-0.69	0.50	3.39	0.90
Netherlands	1.80	0.48	2.15	0.51
Mortgage credit				
Belgium	0.31	0.38	3.86	1.37
Germany	3.01	1.45	1.94	2.40
Spain	1.00	1.53	3.20	0.04
France		1.52	0.89	0.11
Netherlands	2.57	1.72	1.28	4.84
Investment credit				
Belgium	-0.26	1.90	4.79	2.51
France		1.62	1.08	-1.41
Credit to firms				
Spain	-1.54	-1.16	3.01	-0.16
Italy	-0.69	0.50	3.39	0.90
Total credit				
Spain	-2.03	0.98	3.15	0.22
Italy		1.16	3.36	1.08
Sight deposits				
Spain	3.36	-0.98	1.55	1.69
Italy			0.40	-0.80
Time deposits				
Belgium				-3.31
Germany	-0.94	1.93	0.52	3.01
Spain	-0.22	1.71	2.67	1.31
Netherlands	2.59	2.85	5.27	-1.57
Savings accounts				
Belgium				4.74
Germany	5.22	-0.03	5.42	-3.15
Spain	3.36	-0.98	1.55	1.69
Netherlands		1.37	3.09	1.18
Total deposits				
Italy	-0.77	0.20	0.40	-0.80

Sources: Author's computations of average annual real growth rates as percentages, based on BIS database.

Table A3
Volume of short-term securities, money market rate volatility and real variables

	1979-82	1982-88	1988-92	1992-98
Commercial paper/GDP (%)				
Belgium	0	0	0	0.7
Germany	0	0	0	0.3
Spain	0.8	2	3	2.2
France		0.5	2	2.1
Italy	0	0	0.1	0.2
Netherlands	0	0	0.2	0.2
<i>Sources: Author's computation based on financial accounts or capital market statistics published by national central banks and balance sheets of Dutch non-financial corporations published by the OECD.</i>				
Short-term securities / GDP (%)				
Belgium	15.7	27.4	32.3	29.2
Germany	0.1	0.3	0.5	1.2
Spain	1.4	4	6.7	4.2
France		3	17.7	17.2
Italy	12.4	22.3	29.7	28.9
Netherlands	0	0.6	1	0.9
<i>Sources: Author's computation based on financial accounts or capital market statistics published by national central banks and BIS for the Netherlands.</i>				
MMR volatility (%)				
Belgium	3.88	1.33	0.5	0.21
Germany	0.39	0.07	0.06	0.02
Spain	36.83	11.57	0.46	1.06
France		0.29	0.32	0.77
Italy	0.25	0.25	0.26	0.16
Netherlands	4.17	0.26	0.13	0.03
<i>Sources: Author's computation on the basis of BIS data.</i>				
Inflation (GDP deflator in %)				
Belgium	4.5	3.2	2.8	1.4
Germany	4.4	1.9	3.1	1.4
Spain	13.4	7.3	5.5	2.8
France	10.9	4.6	2.2	1.1
Italy	18.6	7.5	5.0	3.2
Netherlands	5.3	0.7	1.8	1.6
GDP growth (%)				
Belgium	1.8	1.9	2.9	1.7
Germany	1.8	1.9	3	2
Spain	1.2	3.1	2.1	2.1
France		2.5	1.7	1.7
Italy	3.2	2.4	1.1	1.1
Netherlands	1	2	2.8	2.6
Non-residential investment growth (%)				
Belgium	-2.5	2.33	5.76	-0.16
Spain	-0.23	2.31	2.54	-0.34
France		2.05	1.17	-0.47
	1979-82	1982-88	1988-92	1992-98
Residential investment growth (%)				
Belgium	-20.88	1.67	6.72	1.14
Germany	0.55	-0.39	2.4	0.67
Spain	-1.68	1.02	1.08	0.62
France		0.41	-0.2	-0.53
Netherlands	-1.57	0.96	1.23	1.74
<i>Sources: Author's computation on the basis of quarterly national accounts published by the OECD.</i>				
Gross national savings ratio (%)				
Belgium	16.5	15.5	20.4	21.5
Germany	21.5	22.4	25	20.7
Spain	19.7	21.1	21.2	19.8
France		19.8	20.6	18.9
Italy	23.9	21.6	19.2	18.9
Netherlands	21	23.2	25.4	24.5
<i>Sources: OECD Economic Outlook, December 1998.</i>				

Figure 1a

Money market rate and interest rates on bank deposit

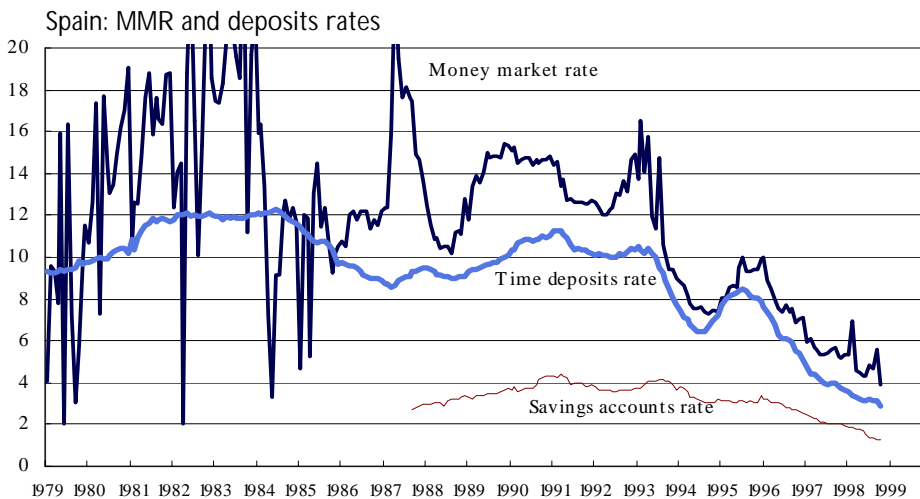
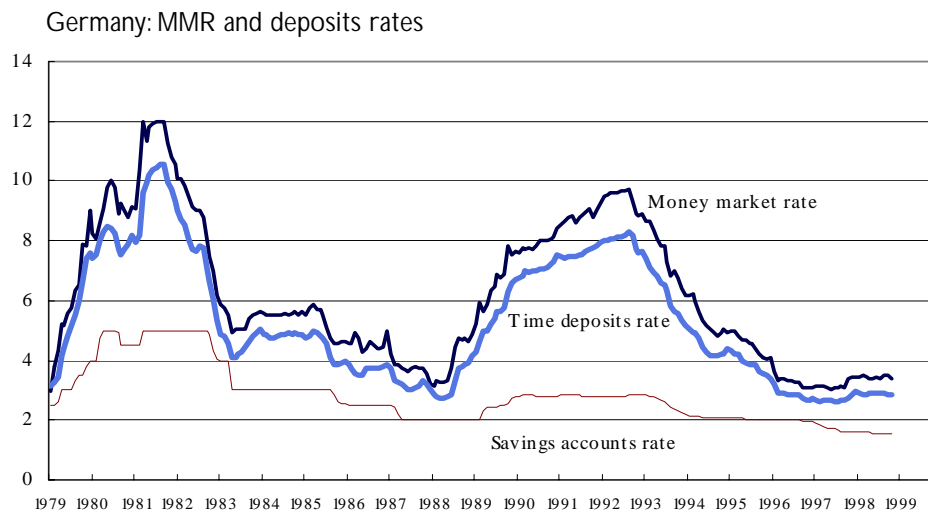
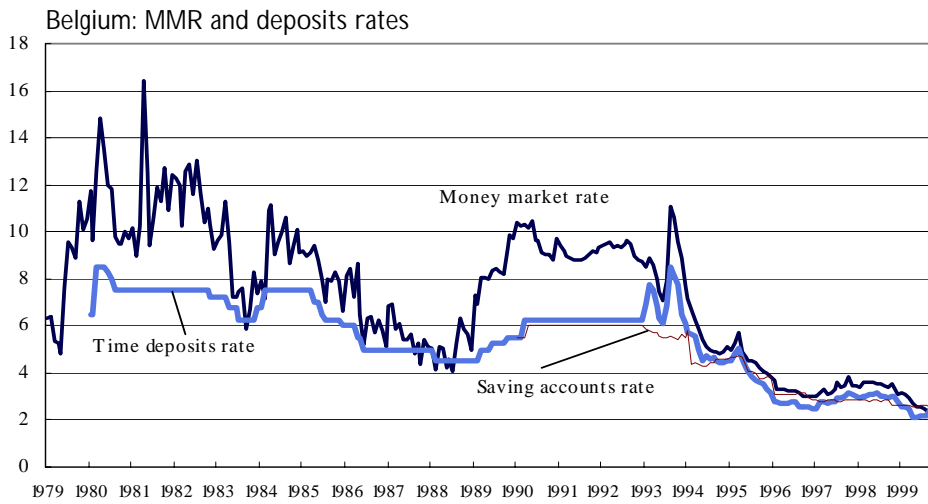


Figure 1a (continued)

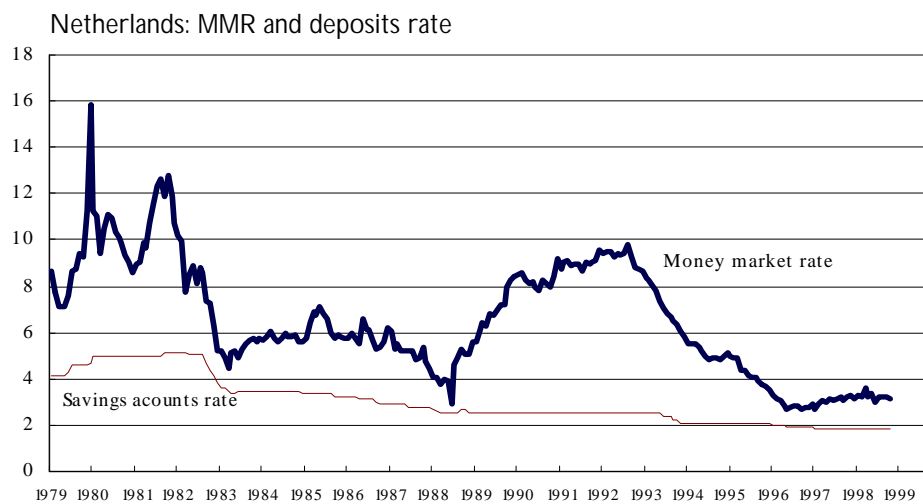
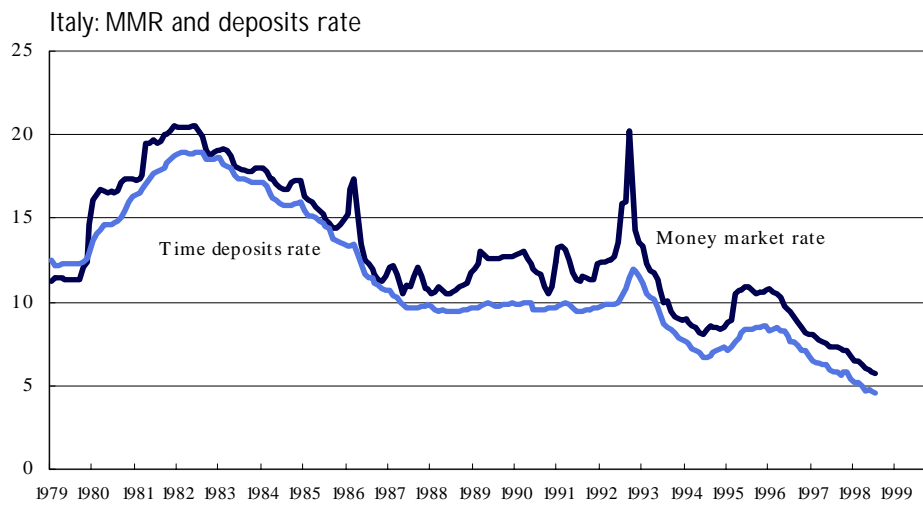
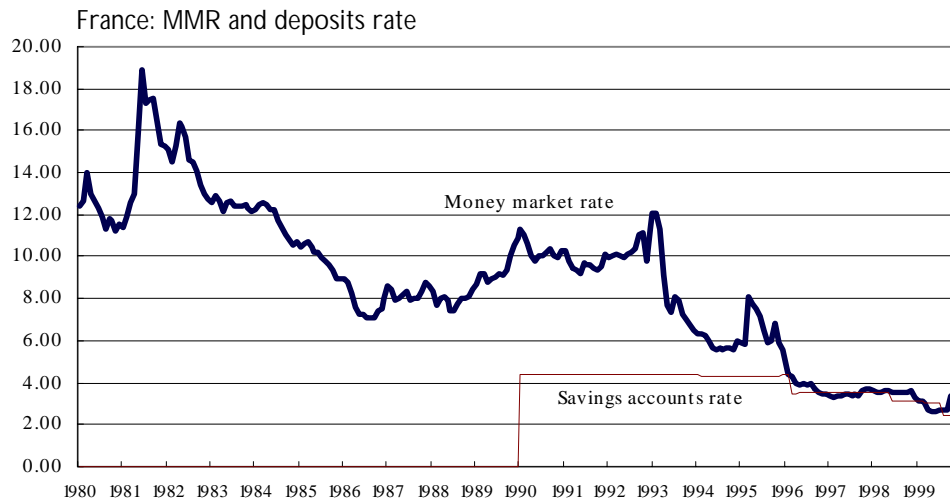


Figure 1b

Money market rate and interest rates on bank credit

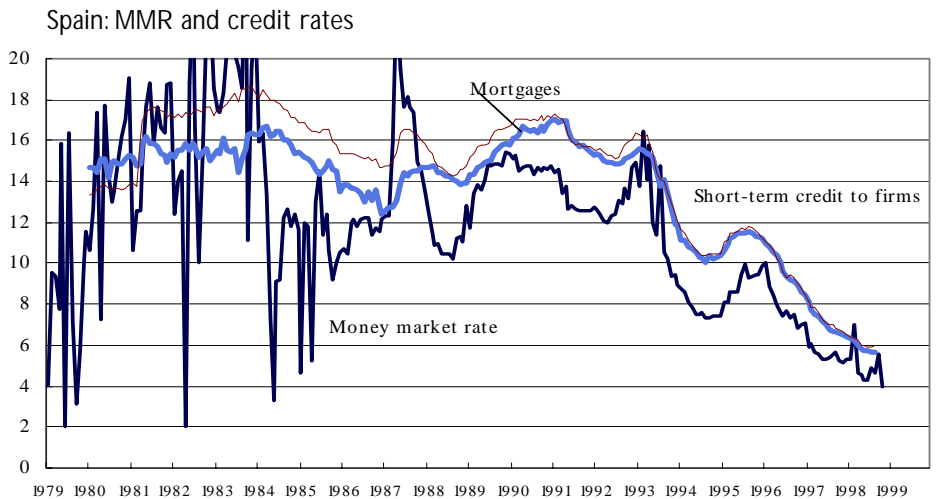
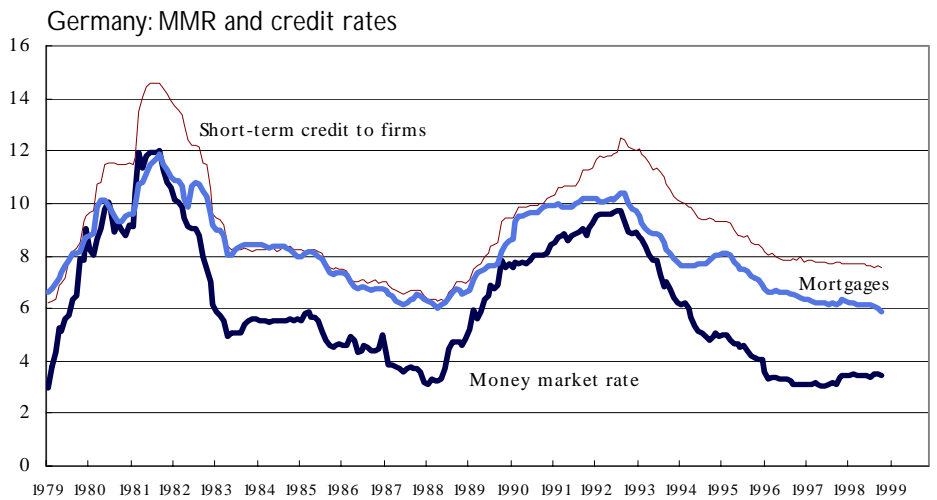
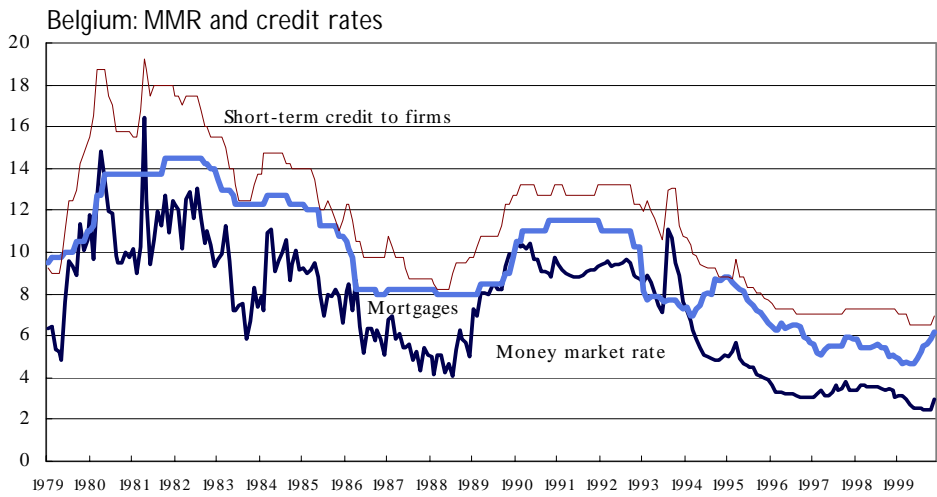
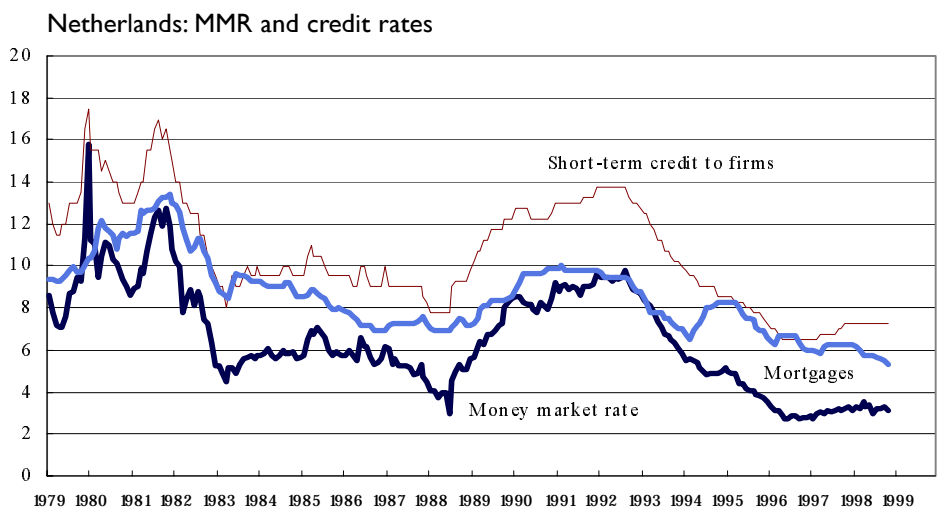
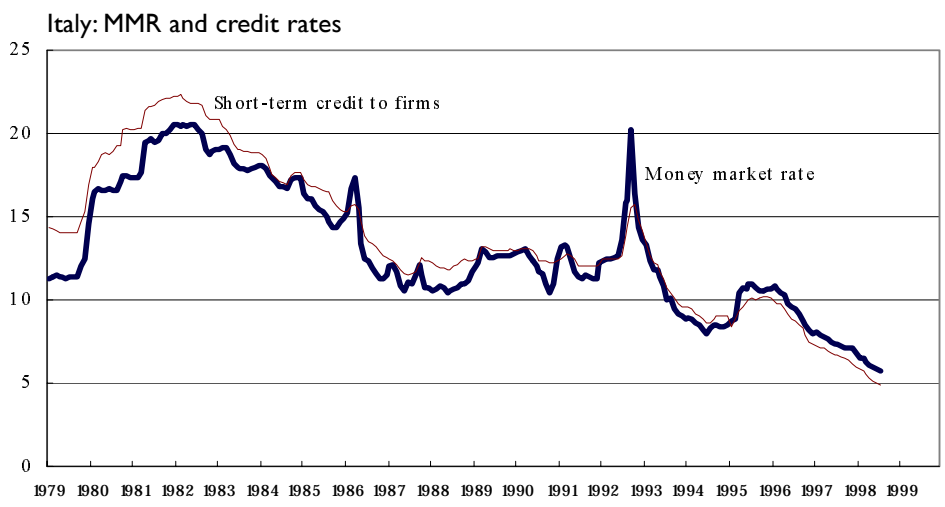
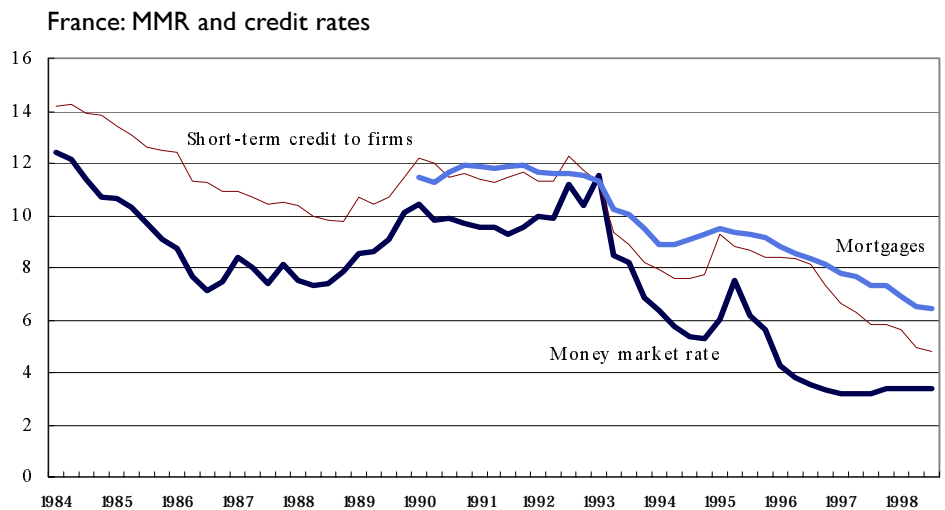


Figure 1b (continued)



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