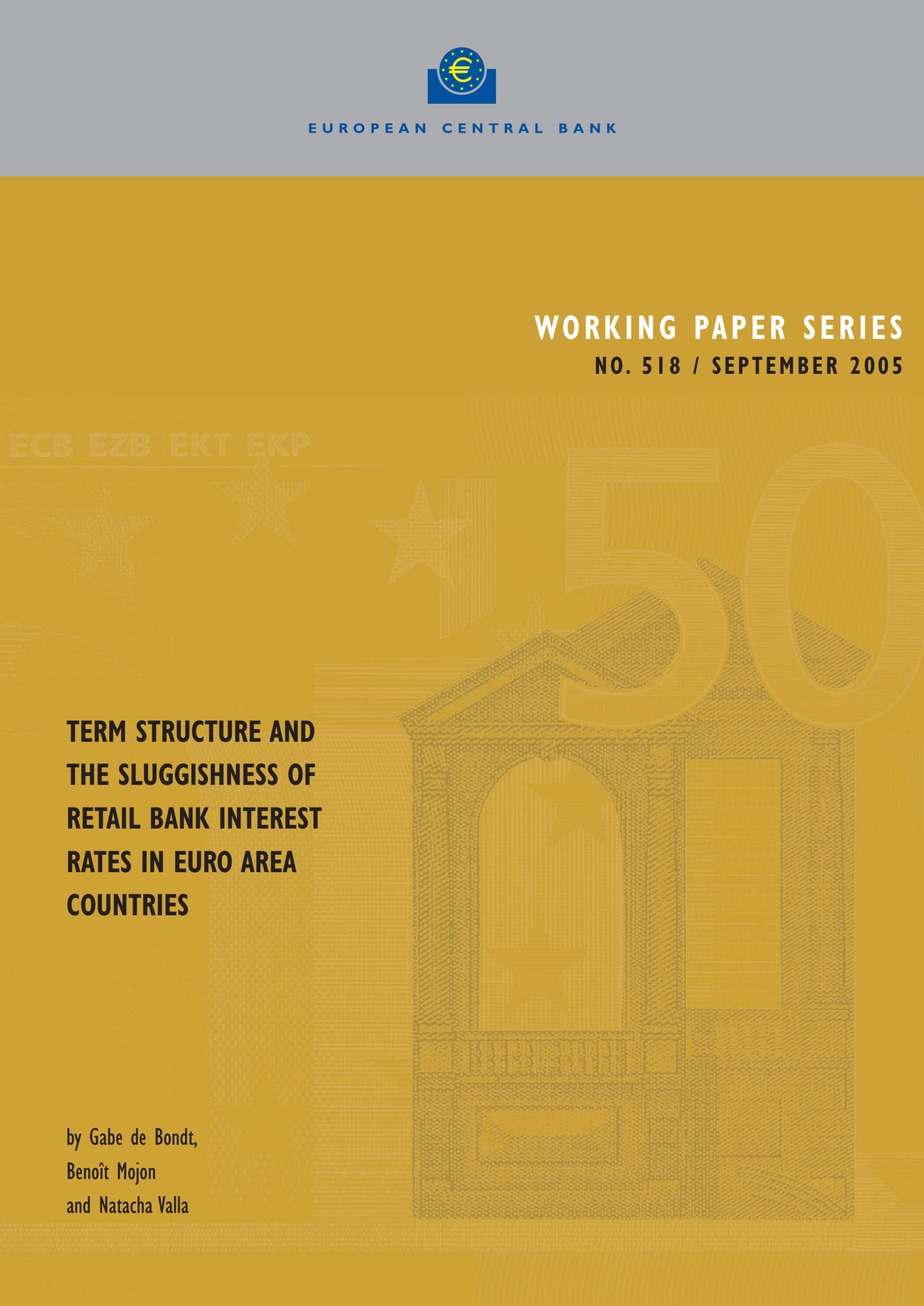

EUROPEAN CENTRAL BANK

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In 2005 all ECB publications will feature a motif taken from the €50 banknote.

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2 Gabe de Bondt and Benoît Mojon are at the European Central Bank.
3 Contact author: Banque de France, B.P. 140-01, 75049 Paris Cedex 01, France; e-mail: natacha.valla@banque-france.fr

Address
Kaiserstrasse 29
60311 Frankfurt am Main, Germany

Postal address
Postfach 16 03 19
60066 Frankfurt am Main, Germany

Telephone
+49 69 1344 0

Internet
http://www.ecb.int

Fax
+49 69 1344 6000

Telex
411 144 ecb d

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CONTENTS

Abstract

This paper analyses the pricing of bank loans and deposits in euro area countries. We show that retail bank interest rates adjust not only to changes in short-term interest rates but also to long-term interest rates. This result, which is arguably intuitive for long-term retail bank rates, is also confirmed for bank interest rates on short-term instruments. The transmission of changes in short-term market interest rates along the yield curve is found to be a key factor explaining the sluggishness of retail bank interest rates. We also show that in the cases where we cannot reject that the adjustment of retail rates has changed since the introduction of the euro, this adjustment has become faster.

Keywords: retail bank interest rates; market interest rates; euro area countries

JEL classification: E43; G21

Non-technical summary

This paper investigates the pricing of retail bank products - loans and deposits - as an important link in the monetary policy transmission mechanism of the euro area. In the euro area, households and firms are mainly confronted with retail bank interest rates when making investment and savings decisions. Corporate financing is predominantly bank rather than market-based and euro area households still prefer bank deposits to money market mutual funds. In addition, on the "supply" side, prices charged by banks influence their profitability and the soundness of the banking system. Retail bank pricing is therefore central to financial stability, which in turn is a necessary condition for an effective transmission of monetary policy impulses.

Research on the pass-through of money market rates has shown that in the euro area, retail bank rates are sticky in the short term, i.e., changes in short-term market interest rates are not immediately fully reflected in retail bank interest rates. These results have attracted a lot of attention because of their sharp contrast with the US, where bank interest rates had been more or less indexed to market conditions already since the mid-1990s (Sellon, 2002, Brender and Pisani, 2005).

One common shortcoming of most pass-through estimates is that they are derived from reduced-form regressions of bank lending rates on the money market rate. While this modelling approach provides a good summary evaluation of the sluggishness of retail interest rates to changes in money market interest rates, it falls short of explaining how banks price their products. Hence, this paper proposes a model of bank pricing, where banks apply a mark up with respect to a "cost" that depends on short and long-term market conditions.

We argue in particular that long-term market interest rates are a particularly important element of this "cost". First, setting retail bank rates in line with long- rather than short-term market interest rates may limit the interest rate risk exposure of banks given that they typically face a maturity mismatch of their balance sheet (short-term liabilities versus long-term assets). Second, in the presence of adjustment and menu costs, uncertainty about the persistence of changes in money market rates or the future path of monetary policy may induce banks to define a target retail rate as a function of long-term market interest rates, as a smooth indicator of future changes in money market rates.

With this in mind, we analyse the term structure of bank pricing for 42 banking markets of the euro area: five different retail bank market segments (retail bank rates on short and long-term loans to firms, mortgage loans to households, consumer loans to households and time deposits) generally in ten countries (Austria, Belgium, Germany, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, the Netherlands and Portugal). We also estimate the model for the euro area as a whole in each of the five markets.

We first argue that the dynamics of each retail bank interest rate can be specified within an error correction model (ECM). In the long run, banks set their retail prices in line with their marginal costs,

i.e. the funding costs of loans and the opportunity costs of deposits, both being modeled as a freely estimated weighted average of the three-month money market rate and the ten-year government bond yield. This way, the marginal costs of retail bank products may be more accurately captured than in studies that examined only a money market interest rate or an interest rate of a given maturity (de Bondt (2005), Heinemann and Schüller (2002), Sander and Kleimeier (2004)).

We then test the stability of the baseline linear ECM before and after the introduction of the euro and assess whether more general state-dependent models are preferable to the linear specification.

In short, our main result is that retail bank interest rates adjust not only to changes in short-term interest rates but also to long-term interest rates. This result, which is arguably intuitive for long-term retail bank rates, is also confirmed for bank interest rates on short-term instruments. The transmission of changes in short-term market interest rates along the yield curve is found to be a key factor explaining the sluggishness of retail bank interest rates. We also show that in some markets, the adjustment of retail rates seems to have changed since the introduction of the euro. In those cases, this adjustment has become faster.

In more details, findings of this study are threefold. First, we show that for all the retail bank interest rates considered, banks price their retail products in line with a "target" of market interest rates. Second, most bank rates, including many short-maturity rates, are not exclusively related to money market interest rates, but also to government bond yields. This widespread relevance of long-term market interest rates explains a fair amount of the widely observed and commented sluggishness in the response of retail bank rates to changes in the short-term market interest rate. Hence this sluggishness is likely to persist even once the euro area retail banking becomes more integrated and competitive. Third, our results suggest that the price-setting behaviour by euro area banks has changed since the introduction of the euro. We find that the adjustment of bank interest rates to market interest rate developments has become faster after 1999. We show in addition that the nature of this adjustment has changed at this time. Simulations indicate for instance that following a level shift in the yield curve, the response of retail bank rates has been muted since the launch of the euro. Hence the increase in the pass-through is largely due to pricing practises that now give more weight to market conditions at short maturities and less to long-term ones.

1. Introduction

The pricing of retail bank products, e.g. loans and deposits, is an important link in the monetary policy transmission mechanism of the euro area. Euro area households and firms are mainly confronted with retail bank interest rates when making investment and savings decisions. Corporate financing is predominantly bank rather than market-based and euro area households still "prefer" bank deposits to money market mutual funds (Angeloni and Ehrmann, 2003, Agresti and Claessens, 2002 and ECB, 2002). Consequently, composite indices of retail bank rates on loans are found to be important determinants of private sector loans (Calza, Gartner and Sousa, 2003 and Calza, Manrique and Sousa, 2003). At the same time, the "own interest rate" of M3, a weighted average of bank rates on deposits, is a key variable for euro area money demand (Calza, Gerdesmeier and Levy, 2001). Furthermore, prices as charged by banks influence their profitability and the soundness of the banking system, which in turn relates to financial stability.

Available studies of the pass-through to retail bank rates show that in the euro area, retail bank rates are sticky in the short term, i.e., changes in short-term market interest rates are not immediately fully reflected in retail bank interest rates. These results have attracted a lot of attention because they sharply contrast with the US where bank interest rates have been more or less indexed on market conditions already since the mid-1990s (Sellon, 2002, Brender and Pisani, 2005). Moreover, the different degree of sluggishness in the national retail markets may introduce country asymmetries in the transmission of "since 1999" single monetary policy.

One common shortcoming of the available estimates of the pass-through is that they are derived from reduced-form regressions of bank lending rates on the money market rate. While this modelling approach provides a good summary evaluation of the sluggishness of retail interest rates to changes in money market interest rates it falls short of explaining how banks price their products. Hence, this paper proposes a model of bank pricing, where bank apply a mark up with respect to a cost that depends on short and long-term market conditions. We argue in particular that long-term market interest rates are particularly important in the price setting behavior of banks.

First, setting retail bank rates in line with long-term market interest rates rather than with short-term ones may limit the interest rate risk exposure of the banks given that they typically face a maturity mismatch of their balance sheet (short-term liabilities versus long-term assets). Second, in the presence of adjustment and menu costs, uncertainty about the persistence of changes in money market rates or the future path of monetary policy may induce banks to define a target retail rate as a function of long-term market interest rates, as a smooth indicator of future changes in money market rates.

We analyse the term structure of bank pricing for 42 banking markets of the euro area: five different retail bank market segments (bank rates on short and long-term loans to firms, mortgage loans to households, consumer loans to households and time deposits) in ten countries. We also estimate the model for the euro area as a whole in each of the 5 markets.

We first show that the dynamics of each retail bank interest rate can be specified within an error correction model (ECM). In the long run, banks set their retail prices in line with their marginal costs, i.e. the funding costs of loans and the opportunity costs of deposits, both being modeled as a freely estimated weighted average of the three-month money market rate (MRS thereafter) and the ten-year government bond yield (MRL thereafter). This way, the marginal costs of retail bank products are more accurately captured than in previous studies that examined only a money market interest rate or an interest rate of a given maturity, since we don't have clear indications what the latter should be for the different retail markets that we cover.[1] We then test the stability of the baseline linear ECM before and after the introduction of the euro and assess whether more general state-dependent models are preferable to the linear specification.

The main lesson of this study is threefold. First, we show that for all the retail bank interest rates covered, banks price their retail bank products in line with a target of market interest rates. Second, most bank rates, including many short-maturity rates, are not exclusively related to money market interest rates, but also to government bond yields. This widespread relevance of long-term market interest rates explains a fair amount of the widely observed and commented sluggishness in the response of retail bank rates to changes in the short-term market interest rate. Hence this sluggishness is likely to persist even once the euro area retail banking becomes more integrated and competitive. Third, our results suggest that the price-setting behaviour by euro area banks has changed since the introduction of the euro. We find a quicker adjustment of bank interest rates to market interest rate developments. We show, however, that the nature of this adjustment has changed since 1999. Simulations show for instance that following a level shift in the yield curve, the response of retail bank rates appears smaller since the launch of the euro than before. Hence the increase in the pass-through is largely due pricing practises that now give more weight to market conditions at short maturities at the expense of long-term ones.

The paper is structured as follows. Section 2 reviews evidence on the interest rate pass-through process in individual euro area countries, Section 3 describes the data. Section 4 presents the model. Section 5 discusses the empirical results and Section 6 concludes.

2. Literature review

Table 1 summarises the main findings of interest rate pass-through studies performed for individual euro area countries. Three main facts emerge.

First, all studies show cross-country differences in the interest rate pass-through, although no clear cross county hierarchy emerges in those differences.

[1] E.g. de Bondt (2002 and 2005), Heinemann and Schüller (2002) and Sander and Kleimeier (2004). See also the survey of the literature in section 2.

Second, studies from the mid-1990s broadly show that changes in official and/or money market rates are not fully reflected in short-term bank lending rates to enterprises after one to three months, but that the pass-through is higher in the long term (BIS, 1994, Cottarelli and Kourelis, 1994, and Borio and Fritz 1995). Recent cross-country studies by Donnay and Degryse (2001), Toolsema et al. (2001) Heinemann and Schüller (2002) and Sander and Kleimeier (2002 and 2004) confirm this finding. Mojon (2000), Hofmann (2000 and 2003), Angeloni and Ehrmann (2003) and Coffinet (2005) also find short-term sluggishness in short-term bank lending rates to enterprises, but assume a priori a complete long-term pass-through. Overall, the short-term pass-through of changes in market interest rates to bank rates on short-term loans to enterprises is at the euro area aggregated level found to vary between 25 and 75 basis points.

Third, all studies also show that the adjustment of bank interest rates is more sluggish for bank rates on long-term loans to enterprises, loans to households for consumer credit and house purchases and time deposits, than the one of rates on short-term loans to firms. The short-term pass-through at the euro area level is found to vary between 20 and 30 basis points for consumer credit, whereas the adjustment of the bank rates on mortgages after one to three months is found to vary between 20 and 85 basis points. For the bank rate on long-term loans to enterprises and time deposits these euro area ranges are found to be 35-55 basis points, respectively, 50-65 basis points.

A wide range of factors can explain the sluggishness of retail bank interest rates (ECB, 2001) and the reasons why the pass-through may differ across countries.

First, a bank will generally only adjust its rate when his (implicit) target or optimal rate differs by such an amount from the existing rate that the revenues from changing it out weight the adjustment costs. Such costs may arise from different sources which lead to several explanations for sticky bank interest rates (Lowe and Rohling, 1992, and Nabar et al., 1993). One may think of menu or administrative costs, such as labor, computing and notification costs, and agency cost due to asymmetric information between banks and borrowers. An extreme case of the latter is credit rationing (Winker, 1999). More generally, the true pricing of bank loans refers not only to the interest rate, but also to collaterals, covenants, fees, etc. Another important explanation of retail bank interest rate stickiness is switching costs (Klemperer, 1987). Bank customers therefore face costs of switching banks, which, in turn, affect the interest elasticity of the retail bank instruments.

Second, differences in the macro financial structure may explain (cross-country) differences in the degree of interest rate pass-through, as argued by Cottarelli and Kourelis (1994). Changes in and convergence of financial structures among euro area countries may eventually lead to some convergence in the interest rate pass-through process. In the period prior to stage Three of EMU there is evidence that the emergence of market instruments that are alternative to bank instruments, such as money mutual funds and corporate debt securities, has significantly affected the pass-through to retail bank rates on deposits but not for loans (Mojon, 2000).

Third, the applied industrial organisation literature typically examines the link between bank interest rate margins and the market structure of the banking system (micro financial structure) using bank data (Hannan and Berger, 1991, Neumark and Sharpe, 1992, Angbazo, 1997, Hannan, 1997, Wong, 1997, and Corvoisier and Gropp, 2001). The main lesson of these banking structure studies is that the pricing behaviour of banks may depend on the degree of competition and contestability in the different segments of the retail bank market. For instance, Corvoisier and Gropp (2001) conclude that for demand deposits and loans, increasing bank concentration in individual euro area countries during the years 1993–1999 may have resulted in less competitive pricing by banks, whereas for savings and time deposits the opposite seem to be the case.

It is striking that the literature has not yet investigated the role of the term structure in the response of bank lending rates to market conditions. First, banks limit this risk by issuing debt at the appropriate maturity for each type of loan. Second, banks may shelter lending activities from market conditions by "using deposits" as an input to produce loans (Hancock, 1991 and Hughes and Mester, 1993a and b)[2]. However, bank deposits rate should also depend on market conditions at the relevant maturity.

The comparison of pass-through across bank products of different maturities suggests that the management of interest rate risk can be another explanation of retail bank interest rate sluggishness (Table 1). Long-term loans to firms, mortgages and consumer credit have in common to have a longer maturity than short-term loans to firms. We therefore conjecture that the implicit assumption that that marginal funding costs can be proxied by money market interest rates is not appropriate because the latter's maturity is too short. Instead, if bank price their loans (deposits) with view to minimise interest rate risk, the relevant market conditions should have a maturity matching the one of these loans (deposits).

We therefore propose to estimate, in the following sections, a model of bank pricing that provides accounts explicitly for the role of the term structure.

3. Data

Our analysis is based on 41 retail interest rate series for all euro area Member States except Luxembourg and Greece, and the euro area, and the associated MRS and MRL. One should note that from January 1999, the MRS is the three-month EURIBOR for all countries. All series have a monthly frequency – for France, we interpolated quarterly series – have been extracted from the ECB national

[2] See also the (overall inconclusive) debate on complementarities and scope in banking. A widespread belief suggests that banks tend to expand the scope, and possibly scale, of their activities because of the allegedly increased competition in traditional banking activities. Scale and scope expansion would be justified (Berger and Humphrey, 2000, Altunbas, 2001 and Bikker, 2001) as means to improve cost efficiency. Another motivation relates to the strategic benefits that may arise from increasing scope and size (Milbourn et al., 1999). There are alternative ways by which banks my wish to hedge against interest rate risk (by varying the proportion of fixed-rate versus variable-rate loans, using interest rate swaps). Investigating these strategies is beyond the scope of this paper.

retail interest rate database. They correspond to five retail bank products: interest rates on short (available in nine countries) and long-term (six series) loans to enterprises, mortgages to households (ten series), consumer credit (seven series) and time deposits (nine series).

Each of those five retail bank products may differ across countries by their maturity, size, risk, habitat and other characteristics. They however nearly all correspond to banking condition on new loans and deposits and refer to the most common bank products in the respective countries[3]. Given that this study considers non-harmonised country data, the comparability of the cross-country results is limited. For the same reason, we do not undertake pooled or panel data regressions.

The rates on short-term loans are reported, when specified, for maturities ranging from up to three months (Spain) to up to 18 months (Italy). Long-term loans to enterprises refer to loans of over one year, but, refer to loans with an agreed maturity of over five years in the case of Germany. Consumer loans include overdrafts (e.g. Ireland), but usually correspond to a weighted-average of short-term credit lines, personal loans and longer-term installment credit. Housing and mortgage loans typically have a longer maturity, specified over 18 months (Italy) to three (Spain) or to five years (Germany and Portugal). Finally we restrict our analysis of the pricing of deposits to the interest rate on time deposits, which are available for a large number of countries. The maturity length of the time deposits is up to two years, with the exception of the Netherlands where the agreed maturity is over two years.

Our sample periods begin in April 1994 in order to exclude the turbulent years of the early 1990s, when for most countries the ERM crises led either to outliers (Belgium, France, Ireland and Italy) or to periods of high volatility of market interest rates (Finland, Portugal and Spain). The sample periods end in December 2002 since harmonised data have become available from January 2003 onwards.

Two observations on the data are noteworthy. First, Charts 1 to 4 indicate a clear downward trend in all retail bank interest rates in the period prior to Stage Three of EMU, following market interest rate developments. In addition to the upturn, which took place after April 1999, the other main episode of rising interest rates corresponds to the winter 1994 crash on bond markets which was triggered by the February 1994 increase in the Federal Reserve Bank's funds rate. Second, the hierarchy in the mark-ups across retail bank markets, i.e. largest on (un-collateralized) consumer credit, lowest on (collateralized) mortgages with loans to firms in between, is consistent across countries.

4. The model

We propose a simple model whereby, in equilibrium, retail bank interest rate on credits and on deposits will be tied to the market conditions at the relevant maturity. This model applies to banks that

[3] Bank interest rates harmonised across countries have recently become available from January 2003 onwards (ECB, 2003).

aim at limiting the exposure of their balance sheet to interest rate risk. Because the management of interest rate risk could take the form of "funding loans by deposits", we first check whether banks actually shield their lending rates from the influence of market conditions stemming from the use of deposits as a marginal funding for their loans (Section 4.1). Section 4.2 introduces an error-correction retail bank pricing model with the short and long-term market interest rates as its determinants.

4.1 Do bank lending rates depend on deposit rates?

By performing Granger causality tests we examine whether deposit rates have predictive power for lending rates. The estimated equations read as follows:

$$[1] \quad rl_t = \sum_{i=1}^{n} \alpha_i rl_{t-i} + \sum_{i=1}^{n} \beta_i rd_{t-i} + \sum_{i=1}^{n} \gamma_i mrs_{t-i} + \sum_{i=1}^{n} \gamma_i mrl_{t-i} + \varepsilon_t$$

for each country, where *rl*, *rd*, *mrs* and *mrl* are the retail lending rate, retail deposit rate, the short-term and long-term market interest rate, while rl_i is alternatively the interest rate on loans to firms (short and long), consumer credit and mortgages. We test which interest rate Granger causes each of our four lending rates.

Results shown in Table 2 reveal that deposit rates[4] are not relevant for interest rates on loans in a clear majority of cases (28 out of 32 across the four types of loans). Out of the four observations where this is not the case, three are concentrated in Austria (all markets but mortgages), suggesting that in this country, loans could be funded in part by deposits. With the exception of Austria, the role of deposits as a marginal buffer to finance loans is therefore not supported by the data. By contrast to this occasional relevance of deposit rates, short and/or long-term market rates contain systematically valid information for lending rates, as suggested by the p values shown in Table 2. We take those two findings as a starting point and specify an empirical bank pricing model based on market rates only.

4.2 Error-correction model of retail bank pricing

Our baseline specification is a symmetric linear error correction model (ECM) relating each retail bank interest rate to short and long-term market interest rates.

$$[2] \quad \Delta br_t = \alpha_0 \Delta mrs_t + \beta_0 \Delta mrl_t + \sum_{j=1}^{2} \alpha_j \Delta mrs_{t-j} + \sum_{j=1}^{2} \beta_j \Delta mrl_{t-j} + \sum_{j=1}^{2} \gamma_j \Delta br_{t-j} + \rho ect_t + \varepsilon_t$$

[4] Table 2 reports the test of the influence of several type of deposits rates on credit rates. While all deposit rates are potentially key determinants of the funding costs of loans, we did not study the adjustment of rates of savings accounts and on current accounts. The former are revised at discrete intervals and/or administered in many countries, and the latter are available only in a minority of countries.

where

[3] $$ect_t = br_{t-1} - (AAmrs_{t-1} + BBmrl_{t-1} + CC)$$

for loans and

[4] $$ect_t = (AAmrs_{t-1} + BBmrl_{t-1} - CC) - br_{t-1}$$

for time deposits.

br_t refers to the retail bank interest rate (which is alternatively the rate on short and long-term loans to enterprises, consumption credit and mortgages), mrs_t is the short-term market interest rates and mrl_t the long-term market interest-rate . Δ is the first difference operator.

Equation [2] relates the first differences of the retail rate to its own lags, the first differences of the long and the short-term market rates and the error-correction term ect_t, where ect_t is a stationary deviation from the average equilibrium relationship between the specific retail rate and the market interest rates. The error correction mechanism would imply that ρ is negative so that the retail bank interest rate adjusts back to its long-run equilibrium. The latter is defined as a weighted average of the short and long-term market interest rate. The coefficients *AA* and *BB* reflect these long-term weights. As to the term *CC*, it jointly reflects (i) the bank marginal costs not related to market interest rates and (ii) market conditions. *CC* is therefore not only a measure of the mark-up but also an indicator of bank costs and the price elasticity related to each retail bank product. This measure may be habitat specific (related e.g. to an instrument-specific market structure, regulation, risk or maturity) or country specific, or both (on account, e.g. of regulatory factors). Finally, the short-run dynamics implied in [7], can be explained by adjustment costs causing deviations of the retail bank rate from its target equilibrium level that we discussed in section 2.[5]

Our ECM approach gives a view on (i) long-term relationships between retail bank and market interest rates, which may reflect the marginal funding or opportunity costs in the banking sector, (ii) the adjustment dynamics of the former, and (iii) their stochastic properties and the equilibrium conditions between them.

The advantage of our approach over an analysis of cointegrating relationships between retail bank and market interest rates following Johansen (1988) is its very intuitive interpretability as a marginal cost model of bank pricing. Under imperfect competition, intermediaries impose a mark-up over expected refinancing conditions when setting their retail interest rates. Given the various maturities of our

[5] Taking a broader perspective, adjustment costs are often invoked to explain the existence of nominal rigidities. See Rotemberg (1982) for a model of nominal price adjustment with quadratic adjustment costs. The price setting by banks is also influenced by the competition regime banks are in. For instance, Neumark and Sharpe (1992) showed it across local deposits markets within the United States.

financial instruments, refinancing conditions are reflected by both short and long-term market interest rates. Our specification is appropriate to discriminate between the short-run dynamics (first-difference terms) and the adjustment towards the long-run equilibrium relation (in-level terms). This can be done here without reducing the specification unless we want to impose specific testable restrictions.[6] The main underlying assumption of the approach followed in this paper is that market interest rates are (weakly) exogenous to retail bank interest rates. This assumption makes economically sense, since bank interest rates are not expected to affect market interest rate developments.

5. Results

Estimation results for the full sample are discussed in Section 5.1, while Section 5.2 examines whether retail bank pricing has changed since the start of Stage Three of EMU and section 5.3 checks the robustness of the specification.

5.1 Baseline estimates

This section describes the estimates[7] of Equation [2] for the full sample. The estimates are reported in the upper panels of Tables 3–7. Chart 5 reports simulations of these equations for two standard shocks: either only the MRS level or both the MRS and the MRL levels are increases permanently by 1%.

First, our results confirm the existence of a long-term equilibrium structure that pulls back retail interest rates towards a linear combination of short and long-term market rates. The error correction coefficient (ECC in the tables) is always negative, while it is significant at the 5% level in 39 cases out of 46.

Second, the MRL enters significantly the long-run equilibrium rate in more than two thirds of the cases. The MRL even has a predominant role, i.e. a larger weight than the MRS in the equilibrium relationship, for most lending rates of long maturity. The economic significance of the long-term bond market rate can also be visualised in Chart 5. Except in the case of the short-term loans to firms, the pass-through to retail bank rates is much higher for a horizontal shift in the yield curve (dotted line)

[6] If we were to give a structural economic interpretation to unit roots that may not be statistically rejected, a fully-fledged cointegration analysis of the system formed by all rates would have been the way to go. More than one cointegration relationship is needed to give a role to expectations, structures and policy regimes as determinants of the interest rate pass-through. Since any linear combination of cointegration relations would also be stationary, cointegrating vectors could not be given a direct interpretation as meaningful economic relations, and identifying restrictions have to be imposed.

[7] These models were estimated by OLS with two lags which were sufficient to deliver well-behaved residuals. We did two robustness checks (not reported). First, estimates of the model on interest rate series specified in real terms are largely consistent with the results presented here. Second, we checked that the endogeneity of the long-term market interest rate does not affect the results. The coefficient of the short-term interest rate reported in the tables is similar to the one obtained when the long terms interest rate is instrumented with the residual of its regression on the short-term interest rate. The downward bias of the short-term market interest rate coefficient in the original specification thus turns out to be minimal.

than when only the MRS rises. A summary view is given by the weighted-average responses which are reported in the right bottom cells of each panel of the chart [8]. The pass-through corresponding to the horizontal shift in the yield curve is, on average, way higher than the one following an increase in only the short end of the yield curve.[9]

Overall, the data confirm a significant role of the MRL in the price determination of most long-term as well as many short-term retail bank products. This "structural" role of long-term markets matters mainly in two respects. To start with, the incomplete response of retail bank rates to changes in the money market does not necessarily reflect, as usually argued when analysing estimates of retail bank pricing models that fully ignore the MRL, rigidities in banking markets. In addition we observe that for a large majority of the retail bank rates in euro area countries the long-run pass-through should be much larger for level shifts in the yield curve than for changes in the MRS that do not affect the MRL.

5.2 Has the euro had an impact on retail bank pricing?

This section assesses the stability of our baseline model and presents the baseline model for a sample starting in January 1999.

Tests for structural breaks in January 1999 support the view that our data exhibit pre- and post-1999 specific properties for about 40% of the retail bank rates for which the Chow statistics (see last column in Tables 3–7) and CUSUM tests (not reported for the sake of space) reject the stability of the estimates before and after January 1999. We also notice that no country exhibits a markedly higher number of retail bank interest rates that present a break. This discards the view that breaks would be associated to changes in the monetary policy regime which should impact all the rates of a particular country similarly. Overall, this mixed evidence of a break, which coincides with the launch of the euro and therefore could be caused by it, contradicts somewhat unilateral statements that pass-through have increased in the euro area since the start of EMU (Angeloni and Ehrmann, 2003).

We nevertheless systematically estimate the baseline model for a sample starting in January 1999 (see bottom panel of Tables 3–7) and, in Chart 6, systematically compare the pass-through as estimated for the post-January 1999 sample and for the 1994–2002 sample. Four main results emerge.

First, our estimates show that the weights assigned by banks to the long-term market rate have overall decreased, but still remained relevant after the introduction of the euro. Possibly, long-term interest

[8] The country weights are proportional to the national amount outstanding of the corresponding credit aggregate. We used average weights over the 1994–2002 sample. Weights differ somewhat with GDP weights. We do not report the weighted average pass-through for the time deposit rates because the amount of outstanding deposits associated to the rates cannot easily be identified.

[9] The weighted-average pass-through also indicates a large aggregation bias in the pass-through estimated using euro area synthetic retail bank rates in two cases. For short-term loans to firms, the long-term pass-through for a horizontal shift in the yield curve is close to one according to euro area synthetic data, while the weighted average pass-through is about 0.6. For mortgages we notice that on the contrary pass-throughs estimated with the euro area synthetic are markedly smaller than the weighted average pass-through.

rates have become less informative about future short-term market interest rates as the credibility of the monetary policy settled and inflationary expectations stabilized. Empirical evidence for the first years of Stage Three of EMU at the aggregated euro area level is indeed in favour of this interpretation. Short-term interest rates up to three months have responded fully and immediately following a change in the official interest rate approximated by the EONIA, whereas the pass-through of longer maturities was weaker (de Bondt, 2005). In turn, our results suggest that the impact of short-term market rate movements onto retail rates has increased.

Second, the speed of adjustment towards the "equilibrium price of retail bank products" is significantly higher since the launch of the euro. The introduction of the euro may have coincided or even given a stimulus to competitive forces in the different segments of the retail bank markets, such as the strong development of money market mutual funds (Mojon, 2000) or the increasing use of non-bank sources of corporate finance (de Bondt, 2004). The departure from exclusive traditional banking (granting long-term loans funded by short-term deposits) and the move towards an increased use of market-based instruments (ECB, 2002) may have also increased the speed of adjustment of retail bank interest rates to market interest rate developments since January 1999.

Third, we do not observe a uniform increase in the pass-through. If one considers a shock to the MRS only, the pass-through estimated over the post-euro sample has increased (i.e. the plain line is positive in Chart 6) in half of the cases. If one considers the effects on retail bank rates of a horizontal shift in the yield curve, it appears that the pass-through is larger in EMU (i.e. the dotted line is positive in Chart 6) only for a fourth of the retail bank rates. This is yet another aspect of the importance of the transmission along the yield curve for retail bank rates. We also observe that in most cases when euro area aggregate data point to a higher pass-through for the EMU sample, the weighted average pass-through across countries indicates a decrease in the pass-through. Tests of the effects of EMU that use euro area aggregate retail bank rates may therefore be reflect some aggregation biases.

Finally, the change in the responsiveness of longer term retail rates (long-term loans to firms and mortgages) to long-term market rates (in terms of the immediate and long-term pass-through) has been more systematically negative in countries with a larger credibility problem (in particular Spain, Italy and Portugal) than in countries where accession had longer been seen as credible (e.g. Germany and the Netherlands). This again reinforces the view that short-term market conditions should have a larger effect in EMU than was the case historically.

5.3 State-dependant bank pricing and the change in monetary policy regime

In this section, we test whether the instability of the linear error correction model is due to state-dependent bank pricing by the banks. First, we estimate an asymmetric error correction model. This model allow us to test whether the 1999-break, observed in the estimation of the baseline model, can

be explained by a reversal in the pattern of declining market rates that coincided with the beginning of Stage Three of EMU. Second, we estimate an error correction model that depends on the volatility of market interest rates. This second state dependant pricing model test whether the break since the introduction of the euro is due to a change in the volatility of market rates brought about by the new monetary policy regime[10] (see Appendix).

Asymmetric ECM

Following a time of gradual but continuing decline in money market interest rates during the years of nominal convergence, a reversal took place in the course of 1999. As our baseline estimation was shown to be unstable in a significant number of observations, we examine here whether changes in the pass-through have been associated with an asymmetric price adjustment of retail bank products. One could postulate that banks increase their margins by slowing-down the adjustment of lending (respectively deposit) rates when they are below (respectively above) their equilibrium value, and vice versa.

The asymmetric price model [A.2.1.] is accepted (i.e., we can reject the baseline linear model) in a majority of cases (see Table A.1). However, the asymmetry can not always be interpreted as an increase in the interest rate margins by banks. In about a third of the cases where the asymmetric model is preferred to the baseline model, the adjustment back to equilibrium is faster when bank margins are above their long-term equilibrium. Hence, no systematic pattern emerges from the data. The adjustment tends to be slower when lending rates are below equilibrium in Germany, Belgium and Italy, while the reverse is true in Finland and Spain.

In sum, retail bank products exhibit a rather erratic pattern of asymmetric pricing behaviour. In addition, the asymmetric ECM model is usually not more stable over both samples than the linear ECM model. Altogether, asymmetric pricing does not explain the underlying changes in bank pricing behaviour that have occurred since the start of Stage Three of EMU.

Market interest rates volatility ECM

Another mechanism by which bank pricing could have changed under EMU relates to the volatility of market interest rates. Volatility is of interest because it is synonymous to uncertainty about the path of market-based refinancing conditions. Most euro area countries have seen the volatility of their short and long-term market rates reduced under EMU. This is particularly true in Spain, Italy and Portugal and to some extent Ireland.

[10] We also estimated a state-dependent model where the pricing depends of credit risk, i.e., the error correction term was assumed to be a linear function of either industrial production for the loans to firms, output growth or the unemployment rate for the loans to households. The linear model was hardly ever rejected in favour of this alternative state-dependent pricing model.

Our "GARCH-inspired" specification [A.2.2.] suggests that the volatility of market rates has affected the adjustment speed of retail rates towards equilibrium only in a minority of cases (see Table A.2).

Furthermore, this adjustment was affected upwards in some cases and downwards for others. And again, this specification does not appear to be more stable through-out the sample than the linear model.[11]

All in all, the results on the basis of the "GARCH-inspired" specification are, just as for the asymmetric specification, rather inconclusive and unable to convincingly explain the observed change in retail bank pricing since the introduction of the euro.

6. Conclusion

The pass-through to bank retail rates is key to model money and credit demand in the euro area and to analyse the transmission of monetary policy. We showed in this paper that the long commented sluggishness of retail rates in the euro area is largely due to the difference in maturity between retail bank products and money market interest rates. Long-term market interest rates appear as important as the latter for a complete understanding of retail bank pricing.

To our knowledge, our paper is the first to show that retail rate depend on long-term market interest rate the role of this dependence in the *sluggishness* in their response to changes in the money market interest rate. For retail rates, including a large proportion of bank interest rates with a short maturity, the pass-through would be complete only for horizontal shifts in the yield curve. Since short-term market interest rates movements are not necessarily fully transmitted to market interest rates with longer maturity, the pass-through of official interest rates to retail bank interest rates can be expected to remain incomplete. In this respect, the integration of European banking markets, which has in all likelihood been stimulated by the introduction of the euro, has possibly enhanced the retail bank interest rates pass-through, but it remains only one factor involved in this process.

Our second main result relates to the *effect of Stage Three* of EMU on bank pricing. First, the importance of the long-term market rate in the equilibrium price of retail bank products has often been reduced since the introduction of the euro. To that respect, the euro break may be associated to the perception by banks that the long-term market interest rate doesn't help any more to predict future short-term rates. Second, the speed of adjustment towards the "equilibrium price of retail bank products" is significantly higher since the launch of the euro. The introduction of the euro may have

[11] The effect of volatility, measured by the coefficient $\rho 1$, is strong but contrasted across countries. Nevertheless, in a majority of cases short-term market rate volatility slows down the speed of adjustment. By contrast, the volatility of the long-term market interest rate is associated with a faster adjustment of long-term corporate lending rates in all countries (except Italy), implying that the lower variability of long-term market interest rates coincided with a slowdown in the adjustment of long-term corporate lending rates to equilibrium. However, since this faster adjustment concerns long-term market rates only, and at times when the long-term market interest rate was most volatile, it may relate to the nominal convergence that was particularly strong in Spain, Italy and Portugal in the mid-1990s.

coincided or even given a stimulus to competitive forces in the different segments of the retail bank markets, such as the strong development of money market mutual funds (Mojon, 2000) or the increasing use of non-bank sources of corporate finance (de Bondt, 2004). The departure from exclusive traditional banking (granting long-term loans funded by short-term deposits) and the move towards an increased use of market-based instruments (ECB, 2002) may have also increased the speed of adjustment of retail bank interest rates to market interest rate developments since January 1999. At the same time however, we do not observe a systematic increase in the degree of the overall, i.e. from short and long-term market interest rates, pass-through after the launch of the euro. The pass-through from short-term market interest rates is found to be higher in the new monetary policy regime in the majority of all cases.

Finally, we find that although most interest rates can be modeled within the framework of our error correction mechanism, they still react *differently across countries*. While those differences may marginally reflect contrasting definitions of national retail rates and hence should not be given strong structural interpretations, they also point to the potential risk of overlooking aggregation biases when monitoring and analysing the euro area aggregate retail bank interest rates.

Appendix: State dependent pricing

(i) Asymmetry

Broadly speaking, the start of Stage Three of EMU coincides with a change in the sign of interest rate changes. While policy and money market rates have followed a downward trend in the mid and late 1990s, 1999 has coincided with rising short-term rates until mid-2000. As such, this reversal may suggest a break in the behavior of banks that could be misleadingly attributed to the introduction of the euro. Several studies have examined the possibility of an asymmetric adjustment of bank lending rates.[12] Such asymmetries would correspond for instance to the exploitation of monopolistic power by banks in order to increase margins.

In order to explore such asymmetry in the dynamics of retail bank interest rates, we estimate a natural extension of the linear model, allowing for sign asymmetry in the error correction mechanism.[13] The estimated relation can be represented as

$$[A.2.1] \qquad \Delta br_t = \alpha_0 \Delta mrs_t + \beta_0 \Delta mrl_t + \sum_{j=1}^{2} \alpha_j \Delta mrs_{t-j} + \sum_{j=1}^{2} \beta_j \Delta mrl_{t-j} + \sum_{j=1}^{2} \gamma_j \Delta br_{t-j} + \rho_1 ect_t\big|_{>0} + \rho_2 ect_t\big|_{<0}$$

This specification allows for sign asymmetry via the error correction coefficient ρ. This coefficient takes one of two values depending on whether the deviation from equilibrium term is positive or negative – that is, depending on whether the retail interest rate is above or below its long-run equilibrium value for given market interest rates.

(ii) Market interest rate volatility

The shift to EMU may have affected the pricing of bank loans and deposits due to a change in the uncertainty about market interest rates. After 1999 the new monetary policy regime has homogenised the underlying money market rate volatility across euro area countries and induced convergence among the – still country-specific – nominal bond yields. In particular the role of volatility may be reflected in the strength of the error-correction coefficients and imply a different long-term weighting in the pricing rule of banks. To condition our model on volatility, we estimate another extension of [6]

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[12] Conditional responses of retail bank rates depending on whether short-term interest rates are rising or falling have already been examined for euro area countries. The response of bank rates to changes in official rates and/or money market rates seems to be sometimes asymmetric (Borio and Fritz, 1995, and Mojon, 2000) or to depend on whether bank interest rates are below or above equilibrium levels as determined by cointegration relations (Hofmann, 2000, and Kleimeier and Sander, 2000 and 2002). For the United States, Mester and Saunders (1995) show that the prime rate adjusts faster upward than downward. Scholnick (1996) examines an asymmetric interest rate pass-through process in Malaysia and Singapore.

[13] Hofman (2000) implemented alternative asymmetric models of retail rates adjustment in six euro area countries. His model however does not include the long rate in the equilibrium relationship. Moreover, his estimation strategy proceeds in two steps. He first estimates the long-run equilibrium and then tests for the relevance of the asymmetric adjustments. This forces the long-run equilibrium to be independent from the short-run adjustment.

whereby the adjustment back to equilibrium is a function of the volatility of the MRS or of the MRL. This volatility dependent model is given by

[A.2.2] $$\Delta r_t = \alpha_0 \Delta i_t + \beta_0 \Delta l_t + \sum_{j=1}^{2} \alpha_j \Delta i_{t-j} + \sum_{j=1}^{2} \beta_j \Delta l_{t-j} + \sum_{j=1}^{2} \gamma_j \Delta r_{t-j} + (\rho_0 + \rho_1 * h_{t-1}) ect_t$$

with

$$h_t = \eta_t * \eta_t$$

and η_t is the residual of a simple auto-regressive distributed lag model of either the MRS or the MRL:

$$\Delta i_t = \sum_{j=1}^{2} \alpha_j \Delta i_{t-j} + \sum_{j=1}^{2} \beta_j \Delta l_{t-j} + \eta_t \quad \text{or} \quad \Delta l_t = \sum_{j=1}^{2} \alpha_j \Delta i_{t-j} + \sum_{j=1}^{2} \beta_j \Delta l_{t-j} + \eta_t$$

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Table 1 Overview interest rate pass-through studies on individual euro area countries[1)]

(Adjustment of retail bank rates to 100 basis points change in market interest rate in basis points)

Study		AT	BE	DE	ES	FI	FR	GR	IE	IT	LU	NL	PT	Euro area
Short-term loans to firms														
BIS (1994)	ST	-	85	18	78		15			10		58		28
	LT	68	112	106	110		-			61		107		89
Cottarelli and	ST		67	87	78	23		61	107	60		82	95	75
Kourelis (1994)	LT		87	100	94	28		82	107	83		82	95	90
Borio and Fritz	ST		95	36	100		53			72		95		65
(1995)	LT		93	98	105		59			107		103		95
Hofmann (2000)	ST		44	63	48		43			43		110		55
	LT		100	100	100		100			100		100		100
Mojon (2000)	ST		100	36	55		71			62		112		62
	LT		100	100	100		100			100		100		100
Donnay and	ST	15	85	66	102		43	36	20	60		53	11	58
Degryse (2001)	LT	18	92	72	100		75	42	18	86		87	14	74
Toolsema et al.	ST		76	72	103		53			61		84		70
(2001)	LT		102	90	114		62			62		97		80
Heinemann and	ST	44	83	13	75		45		-3	167		62	53	76
Schüller (2002)	LT[2)]	100	100	100	100		100		100	100		100	100	100
Kleimeier and	ST	25	92	10	59		39		24	15		37	48	29
Sander (2002)	LT	74	97	69	100		96		60	85		99	150	87
Sander and	ST	-18	77	19	71	25	7	50	67	20	8	12	17	25
Kleimeier (2002)	LT	22	94	101	107	101	51	46	91	87	48	98	118	92
Angeloni and	ST													53
Ehrmann (2003)	LT													111
Hofmann (2003)	ST			28	64		11			17				25
	LT			100	100		100			100				100
Sander and	ST													33
Kleimeier (2004)	LT													100
Long-term loans to firms														
Mojon (2000)	ST		61		18		42							36
	LT		100		100		100							100
Donnay and	ST		21		69	87	23	25	17	78				54
Degryse (2001)	LT		10		40	93	50	64	16	99				67
Hofmann (2003)	ST			57	36		17			31				39
	LT			100	100		100			100				100
Sander and	ST													39
Kleimeier (2004)	LT													100
Consumer loans														
Heinemann and	ST	60	98	23	46								32	32
Schüller (2002)	LT[2)]	100	100	100	100								100	100
Kleimeier and	ST	15	103	17	68	53	-8						31	18
Sander (2002)	LT	85	145	49	122	80	66						160	68
Angeloni and	ST													30
Ehrmann (2003)	LT													83
Sander and	ST													32
Kleimeier (2004)	LT													100
Mortgages														

BIS (1994)	ST		-	48	-		-		26	21		41
	LT		82	89	27		90		88	88		82
Hofmann (2000)	ST		14	27	6		16		23	16		21
	LT		100	100	100		100		100	100		100
Mojon (2000)	ST		5	45	-11		41			33		35
	LT		100	100	100		100			100		100
Donnay and	ST	26	19	20	40	39		16	63	34	7	27
Degryse (2001)	LT	32	48	44	14	61		-6	103	27	35	40
Heinemann and	ST	14	107	99	35			56	47	97	11	84
Schüller (2002)	LT[2)]	100	100	100	100			100	100	100	100	100
Kleimeier and	ST	14	32	49	15	30	14	16	30	13	16	32
Sander (2002)	LT	72	57	77	108	77	63	78	68	43	103	73
Angeloni and	ST											39
Ehrmann (2003)	LT											84
Sander and	ST											22
Kleimeier (2004)	LT											100
Time deposits												
Mojon (2000)	ST		94	82	15				63	83		65
	LT		100	100	100				100	100		100
Angeloni and	ST											40
Ehrmann (2003)	LT											84
Sander and	ST											51
Kleimeier (2004)	LT											100

Sources: BIS (1994), Table 5, 1984–1993; Cottarelli and Kourelis (1994), Table 1, model 2; Borio and Fritz (1995), Table 8, 1990–1994; Hofmann (2000), Table 3, 1979–2000; Mojon (2000), Table 2a, 1992–1998; Donnay and Degryse (2001), Table 3, 1992–2000; Toolsema et al. (2001), Table 3, 1980–2000; Heinemann and Schüller (2002), Table 6, 1995-1999 with falling market interest rates; Kleimeier and Sander (2002), Table A.6, 1995.4-2000.12; Sander and Kleimeier (2002), Table 6, 1994–1998; Angeloni and Ehrmann (2003), Table 2, 1999.1-2002.7, country results were not reported; Hofmann (2003), Table 1, 1995-2002; Sander and Kleimeier (2004), Table 2, post-break sample between January 1993 up to October 2002, cost of funds approach, country results were not reported.

[1)] ST = short-term pass-through, i.e., adjustment after one or three months; LT = long-term pass-through; [2)] majority of cases no co-integration; euro area figures are based on available country results using average 2001 country weighting structures as applied for euro area retail bank interest rates.

Table 2: Granger causality test between lending rates and money market rates, bond rates and

	AT	BE	DE	ES	FI	IT	NL	PT	EA
Short-term loans to entreprises equation									
MMR	0.00	0.06	0.12	0.13	0.00	0.00	0.00	0.01	0.00
BR	0.00	0.06	0.38	0.00	0.29	0.00	0.46	0.92	0.01
TD	**0.00**	0.10	0.57	0.57	0.85	0.19	0.06	0.82	0.09
N7(1)	0.31	..	..	0.53	0.06	0.22	0.05	..	..
N9	..	**0.00**	0.91	..	..	..	..	..	..
own lags	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Long-term loans to entreprises equation									
MMR	0.02	0.06	0.12	0.63	0.00	0.00	..	..	0.80
BR	0.00	0.06	0.38	0.00	0.29	0.00	..	..	0.01
TD	**0.01**	0.10	0.57	**0.02**	0.85	0.19	..	..	0.09
N7(1)	0.56	..	..	0.05	0.06	0.22	..	..	
N9	..	**0.00**	0.91	..	..	..	..	..	..
own lags	0.00	0.00	0.00	0.00	0.00	0.00	..	..	0.67
Consumer-credit equation									
MMR	0.02	0.53	0.78	0.25	0.80	..	..	0.98	0.43
BR	0.00	0.03	0.06	0.00	0.22	..	..	0.25	0.07
TD	**0.01**	0.88	0.86	0.74	0.36	..	..	0.66	0.73
N7(1)	0.56	..	..	0.66	0.24	..	..	..	..
N9	..	0.06	0.80	..	..	..	..	..	..
own lags	0.00	0.00	0.00	0.00	0.00	..	..	0.00	0.00
Mortgages equation									
MMR	0.00	0.53	0.14	0.03	0.07	0.03	0.21	0.14	0.12
BR	0.00	0.01	0.20	0.35	0.22	0.00	0.86	0.01	0.00
TD	0.05	0.78	0.37	0.40	0.04	0.07	0.74	..	..
N7(1)	0.27	..	..	0.44	0.00	0.20	0.57	0.33	0.43
N9	..	0.71	0.88	..	..	..	..	..	..
own lags	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Authors' calculations. Reports the p-value of the hypothesis that the coefficients of the explanatory rates (listed in column) are zero. Bold figures indicate rejection that time deposits rates contains no information on lending rates.

Table 3: Retail bank rates on time deposits
(a) Baseline model (1994:4 to 2002:12)

	Equilibrium		Immediate pass-through				Tests				Chow
	AA	BB	CC	MMR	BR	ECC	Nobs	DW	AA=0	BB=0	EMU
Austria	0.46	0.33	0.81	0.08	-0.01	-0.16	90	1.88	0.00	0.00	0.46
	4.80	5.44	2.05	1.43	-0.25	-3.42					
Belgium	0.75	0.07	0.18	0.82	-0.01	-0.29	105	1.91	0.00	0.04	**0.00**
	13.71	2.11	1.13	14.22	-0.11	-2.79					
Germany	0.89		0.06	0.54	-0.02	-0.17	105	1.92	0.00	0.83	0.07
	13.44		0.45	19.70	-0.80	-2.48					
Spain	0.53	0.35	0.89	0.35	0.02	-0.22	105	2.01	0.00	0.00	0.08
	4.44	3.41	6.00	5.22	0.31	-3.16					
Finland		0.56	-0.49	0.09	0.03	-0.06	105	2.01	0.99	0.00	0.18
		4.13	-0.54	0.98	0.44	-2.18					
Italy	0.43	0.46	0.86	0.08	0.04	-0.27	92	2.18	0.00	0.00	0.66
	8.12	8.83	7.54	1.43	0.91	-5.56					
Netherlands	0.59	0.39	0.61	0.29	0.31	-0.13	105	2.15	0.00	0.00	**0.03**
	4.95	3.90	1.22	3.60	4.50	-2.86					
Portugal	0.37	0.46	0.82	0.11	0.04	-0.22	105	1.98	0.00	0.00	**0.01**
	5.74	6.51	4.94	3.34	0.71	-4.77					
Euro area	0.68	0.22	0.60	0.36	0.04	-0.21	105	1.92	0.00	0.00	0.14
	15.19	5.95	6.79	11.44	1.55	-4.34					

EMU sub-sample (1999:1 to 2002:12)

	Equilibrium		Immediate pass-through				Tests			
	AA	BB	CC	MMR	BR	ECC	Nobs	DW	AA=0	BB=0
Austria	0.51		-0.63	0.08	0.00	-0.24	48	1.91	0.00	0.73
	5.27		-1.66	1.02	0.06	-1.74				
Belgium	0.86		0.25	1.04	0.12	-0.39	48	2.00	0.00	0.60
	19.78		1.46	12.15	1.59	-2.25				
Germany	0.91	-0.18	-0.58	0.52	0.05	-0.31	48	1.74	0.00	0.01
	25.61	-2.61	-2.16	13.02	1.33	-2.59				
Spain	0.72		-0.20	0.61	-0.20	-0.24	48	1.82	0.00	0.43
	6.28		-0.47	4.83	-1.59	-1.79				
Finland		-0.34	-4.99	0.13	0.09	-0.17	48	2.06	0.48	0.35
		-0.73	-2.10	0.68	0.51	-2.01				
Italy	0.56	0.17	-0.13	0.13	0.04	-0.35	48	2.02	0.00	0.08
	12.39	1.81	-0.31	2.08	0.61	-2.45				
Netherlands		1.05	1.68	0.31	0.30	-0.12	48	2.23	0.90	0.29
		3.50	1.12	3.29	3.55	-3.17				
Portugal	1.25		1.64	0.03	0.14	-0.05	48	2.08	0.34	0.72
	0.92		0.33	0.30	1.42	-0.60				
Euro area	0.76		-0.21	0.39	0.05	-0.30	48	1.94	0.00	0.52
	21.54		-1.53	8.70	1.22	-2.44				

Note: AA, BB and CC refer to the parameters with the same notation in equation [6'], MMR and BR to the coefficients alpha and beta in [6], and ECC to the error correction coefficient rho in [6]. The Chow test for a structural break at Stage III is reported on the last column of panel (a). The Durbin-Watson and tests for H0: AA=0 and H0: BB=0 are also reported

Table 4: Retail bank rates on short term loans to firms

(a) Baseline model (1994:4 to 2002:12)

	Equilibrium		Immediate pass-through				Tests				Chow
	AA	BB	CC	MMR	BR	ECC	Nobs	DW	AA=0	BB=0	EMU
Austria	0.38	0.65	1.36	0.24	-0.02	-0.12	90	2.03	0.00	0.00	**0.02**
	3.17	7.31	2.49	3.98	-0.40	-4.12					
Belgium	0.59	0.21	1.25	0.75	0.31	-0.23	105	1.52	0.02	0.07	0.10
	2.35	1.81	2.64	7.87	3.56	-1.52					
Germany	0.36		6.88	0.18	-0.02	-0.02	105	2.08	0.64	0.78	0.01
	0.50		2.41	3.19	-0.48	-0.71					
Spain	0.96		1.08	0.76	0.03	-0.41	105	1.99	0.00	0.26	**0.04**
	46.29		8.85	6.75	0.31	-3.84					
France	0.86	0.37	-0.46	0.35	-0.09	-0.30	105	1.47	0.00	0.06	0.13
	4.18	1.87	-0.76	2.88	-0.42	-3.18					
Ireland	0.55		6.86	0.43	-0.14	-0.09	105	2.06	0.00	0.24	**0.00**
	4.99		12.37	7.77	-2.24	-1.59					
Italy	0.93	0.12	1.86	0.19	-0.01	-0.15	105	1.96	0.00	0.08	0.20
	13.17	1.74	12.24	6.38	-0.30	-4.90					
Netherlands	1.15	-0.31	1.44	0.57	-0.02	-0.31	105	1.94	0.00	0.00	**0.00**
	17.34	-5.24	4.90	5.31	-0.23	-3.72					
Portugal	1.24		0.71	0.36	-0.37	-0.25	105	1.95	0.00	0.27	0.57
	26.72		2.39	3.68	-2.31	-5.22					
Euro area	0.68	0.41	1.70	0.14	0.06	-0.11	105	2.03	0.00	0.00	**0.03**
	7.62	5.71	9.66	4.41	1.95	-5.04					

(b) EMU sub-sample (1999:1 to 2002:12)

	Equilibrium		Immediate pass-through				Tests			
	AA	BB	CC	MMR	BR	ECC	Nobs	DW	AA=0	BB=0
Austria	0.62		3.76	0.38	-0.01	-0.37	48	2.14	0	0.22
	14.01		22.17	4.85	-0.15	-3.23				
Belgium	0.81	0.28	0.14	0.96	0.38	-0.52	48	2.05	0	0.05
	11.02	2.04	0.27	6.21	3.04	-2.20				
Germany		0.73	5.79	0.08	0.01	-0.02	48	2.07	1	0.66
		0.53	0.83	1.14	0.10	-0.90				
Spain	0.87		1.48	0.58	0.08	-0.73	48	2.04	0	0.68
	13.61		6.03	2.58	0.40	-3.21				
France	0.78		1.71	0.90	-0.36	-0.77	48	1.48	0	0.48
	6.79		3.79	2.47	-1.07	-1.63				
Ireland	0.87		5.82	0.21	0.01	-0.19	48	1.89	0	0.51
	7.44		13.38	2.21	0.18	-2.37				
Italy	0.76	-0.15	3.93	0.16	-0.07	-0.60	48	1.93	0	0.01
	38.55	-2.85	15.38	3.14	-1.53	-4.75				
Netherlands	1.05		0.37	0.44	-0.01	-0.77	48	2.07	0	0.52
	26.81		2.47	3.17	-0.09	-4.33				
Portugal	0.93		1.93	0.64	-0.28	-0.27	48	1.78	0	0.67
	4.39		2.27	3.15	-1.31	-2.07				
Euro area	0.73	0.27	2.22	0.28	0.01	-0.23	48	2.10	0	0.07
	13.00	1.88	3.31	5.10	0.12	-2.86				

Note: AA, BB and CC refer to the parameters with the same notation in equation [6'], MMR and BR to the coefficients alpha and beta in [6], and ECC to the error correction coefficient rho in [6]. The Chow test for a structural break at Stage III is reported on the last column of panel (a). The Durbin-Watson and tests for H0: AA=0 and H0: BB=0 are also reported

Table 5: Long-term loans to firms
(a) Baseline model (1994:4 to 2002:12)

	Equilibrium	Immediate pass-through					Tests				Chow
	AA	BB	CC	MMR	BR	ECC	Nobs	DW	AA=0	BB=0	EMU
Belgium		0.94	1.79	0.26	0.88	-0.05	105	1.9504	0.4737	0.0009	0.53
		4.02	1.32	4.10	10.95	-1.31					
Germany		0.96	1.76	0.16	0.49	-0.03	71	1.9255	0.9898	0.2647	0.59
		1.95	0.74	3.67	14.11	-1.50					
Spain	0.81	0.22	1.96	0.28	0.21	-0.44	105	2.0278	0	0.0014	0.11
	10.80	3.30	16.92	2.64	2.44	-4.67					
Finland	1.23		0.21	0.54	0.20	-0.12	105	1.8551	0.0001	0.1253	0.35
	5.33		0.21	3.14	1.52	-1.80					
France	0.60	0.71	-0.81	0.06	0.17	-0.20	105	1.8063	0	0	**0.02**
	4.74	5.68	-1.97	1.17	1.78	-5.27					
Ireland	0.42		6.59	0.37	-0.13	-0.04	105	2.1365	0.2248	0.4314	**0.01**
	1.55		4.91	6.13	-1.95	-0.85					
Italy	0.72	0.33	0.60	0.41	0.22	-0.33	93	2.0823	0	0.001	0.11
	7.56	3.41	2.78	3.98	2.32	-4.96					
Euro area	0.48	0.50	1.49	0.38	0.26	-0.25	71	2.0259	0	0	0.06
	7.44	6.53	4.59	5.78	5.01	-3.30					

(b) EMU sub-sample (1999:1 to 2002:12)

	Equilibrium	Immediate pass-through					Tests			
	AA	BB	CC	MMR	BR	ECC	Nobs	DW	AA=0	BB=0
Belgium		1.26	0.00	0.18	0.81	-0.08	48	2.21	0.36	0.07
		1.77	0.00	1.14	5.08	-1.15				
Germany		1.28	0.22	0.15	0.54	-0.12	48	1.97	0.31	0.00
		7.87	0.27	3.26	12.94	-3.03				
Spain	0.78		3.20	0.43	-0.09	-0.74	48	2.05	0.00	0.17
	16.37		17.69	2.77	-0.64	-3.83				
Finland	1.05		0.68	0.96	-0.18	-0.33	48	2.00	0.00	0.25
	7.25		1.25	5.50	-0.97	-1.42				
France	0.71	0.99	-2.42	0.42	0.17	-0.20	48	1.88	0.00	0.04
	3.38	2.09	-1.10	2.34	1.04	-2.20				
Ireland	0.66		5.81	0.19	0.00	-0.11	48	1.77	0.00	0.98
	3.42		7.55	2.02	0.03	-1.44				
Italy	0.74		2.24	0.78	-0.16	-0.87	48	1.76	0.00	0.52
	22.18		17.34	5.89	-1.23	-3.36				
Euro area	0.40	0.94	-0.38	0.36	0.26	-0.19	48	1.81	0.00	0.00
	4.75	3.79	-0.36	5.64	4.51	-2.47				

Note: AA, BB and CC refer to the parameters with the same notation in equation [6'], MMR and BR to the coefficients alpha and beta in [6], and ECC to the error correction coefficient rho in [6]. The Chow test for a structural break at Stage III is reported on the last column of panel (a). The Durbin-Watson and tests for H0: AA=0 and H0: BB=0 are also reported.

Table 6: Retail bank rates on consumer credit
(a) Baseline model (1994:4 to 2002:12)

	Equilibrium	Immediate pass-through					Tests				Chow
	AA	BB	CC	MMR	BR	ECC	Nobs	DW	AA=0	BB=0	EMU
Austria	0.33	0.81	1.69	0.13	-0.03	-0.13	90	1.96	0.04	0.00	**0.02**
	2.11	7.01	2.35	1.55	-0.35	-4.19					
Belgium	1.08	0.92	-1.43	0.30	0.50	-0.17	105	1.89	0.00	0.00	0.08
	3.05	3.74	-1.35	1.81	2.47	-2.77					
Germany	0.67	0.49	5.65	0.10	0.04	-0.07	105	2.11	0.00	0.00	0.24
	3.85	3.27	10.56	2.02	0.94	-3.60					
Spain	0.70	0.47	3.01	0.24	0.05	-0.39	105	1.95	0.00	0.00	0.23
	4.27	3.31	11.95	1.19	0.30	-4.71					
Finland	0.60	0.53	1.29	0.53	0.15	-0.13	105	2.06	0.02	0.00	0.48
	2.40	3.72	1.82	3.52	1.35	-2.19					
France		1.23	2.24	-0.01	0.04	-0.04	105	2.09	0.13	0.00	0.86
		11.13	3.39	-0.30	1.25	-4.32					
Portugal	0.58	0.64	4.33	-0.10	-0.09	-0.29	105	2.06	0.04	0.04	0.38
	2.07	2.07	5.69	-0.52	-0.27	-4.20					
Euro area	0.51	0.32	6.22	0.10	0.09	-0.12	105	2.04	0.00	0.00	0.41
	4.66	3.46	27.66	2.16	2.33	-4.29					

(b) EMU sub-sample (1999:1 to 2002:12)

	Equilibrium	Immediate pass-through					Tests			
	AA	BB	CC	MMR	BR	ECC	Nobs	DW	AA=0	BB=0
Austria	0.59		4.78	0.29	-0.04	-0.48	48	2.06	0	0.27
	17.00		35.75	3.67	-0.50	-4.04				
Belgium		0.62	4.07	0.32	-0.02	-0.27	48	1.94	0	0.14
		2.48	3.16	1.63	-0.09	-2.89				
Germany		-0.93	14.81	0.12	0.05	0.04	48	2.20	1	0.69
		-0.74	2.49	2.13	1.01	1.06				
Spain	0.60		5.82	0.53	-0.49	-1.07	48	1.61	0	0.47
	10.17		25.92	1.84	-1.82	-4.28				
Finland	1.00		2.36	0.53	0.10	-0.10	48	1.76	0	0.75
	2.95		1.67	3.42	0.75	-0.78				
France	0.64		5.92	0.06	-0.01	-0.03	48	1.91	0	0.87
	0.93		2.08	1.18	-0.14	-0.52				
Portugal	0.51		7.98	-0.81	0.50	-0.36	48	2.03	0.16	0.60
	1.65		6.71	-1.59	1.01	-2.36				
Euro area	0.44	0.23	6.98	0.13	0.00	-0.25	48	2.08	0	0.05
	7.14	2.01	12.62	2.15	0.03	-3.42				

Note: AA, BB and CC refer to the parameters with the same notation in equation [6'], MMR and BR to the coefficients alpha and beta in [6], and ECC to the error correction coefficient rho in [6]. The Chow test for a structural break at Stage III is reported on the last column of panel (a). The Durbin-Watson and tests for H0: AA=0 and H0: BB=0 are also reported

Table 7: Retail bank rates on mortgages

(a) Baseline model (1994:4 to 2002:12)

	Equilibrium		Immediate pass-through				Tests				Chow
	AA	BB	CC	MMR	BR	ECC	Nobs	DW	AA=0	BB=0	EMU
Austria	0.40	0.63	1.02	0.11	-0.04	-0.14	90	2.14	0.00	0.00	**0.02**
	4.11	8.87	2.32	1.89	-0.82	-4.26					
Belgium	0.70	0.44	1.12	0.08	0.30	-0.13	105	2.25	0.00	0.00	0.58
	4.05	3.50	1.88	1.12	3.29	-2.91					
Germany	0.36	0.77	0.60	0.24	0.67	-0.14	105	2.02	0.00	0.00	0.10
	5.08	13.91	2.12	4.77	16.28	-3.15					
Spain	0.81	0.26	0.92	0.06	0.14	-0.17	105	2.05	0.00	0.00	0.08
	8.95	3.19	6.54	1.15	3.35	-3.24					
Finland	0.54	0.52	0.17	0.38	0.08	-0.05	105	1.99	0.07	0.00	0.16
	1.83	3.16	0.19	5.55	1.59	-1.80					
France		1.14	0.65	0.02	-0.01	-0.05	105	2.09	0.73	0.00	0.31
		14.66	1.38	1.60	-0.56	-5.07					
Ireland	1.07		0.91	0.45	-0.05	-0.18	105	2.01	0.00	0.31	0.47
	12.14		2.02	5.94	-0.55	-3.74					
Italy	0.77	0.48	0.57	0.29	0.03	-0.18	93	2.00	0.00	0.02	0.13
	3.92	2.35	1.22	2.56	0.31	-4.51					
Netherlands	0.30	0.73	1.07	0.16	0.19	-0.29	105	1.96	0.00	0.00	0.14
	6.74	19.51	5.57	2.44	3.30	-3.79					
Portugal		1.26	-1.36	0.04	-0.04	-0.03	105	1.98	0.55	0.09	0.09
		9.01	-1.24	0.99	-0.63	-2.87					
Euro area		0.74	2.09	0.04	0.36	-0.08	105	2.06	0.98	0.00	**0.00**
		16.19	7.19	1.13	10.00	-3.17					

(b) EMU sub-sample (1999:1 to 2002:12)

	Equilibrium		Immediate pass-through				Tests			
	AA	BB	CC	MMR	BR	ECC	Nobs	DW	AA=0	BB=0
Austria	0.58	0.13	2.85	0.19	-0.06	-0.68	48	2.2792	0.00	0.02
	26.93	2.41	12.19	3.28	-1.14	-5.51				
Belgium	0.34	1.09	-0.83	0.00	0.27	-0.49	48	1.95	0.00	0.00
	5.63	9.43	-1.73	0.03	2.25	-3.55				
Germany	0.19	1.00	0.11	0.31	0.69	-0.30	48	2.05	0.00	0.00
	3.03	7.89	0.23	4.13	11.47	-2.65				
Spain	0.83		2.18	0.10	0.07	-0.17	48	1.62	0.00	0.44
	9.63		6.49	1.41	1.07	-1.83				
Finland	0.99		1.23	0.39	0.18	-0.08	48	1.78	0.30	0.79
	3.39		1.00	3.45	1.89	-0.91				
France	0.54		4.36	0.12	0.01	-0.18	48	1.99	0.00	0.57
	10.77		22.87	2.91	0.31	-3.27				
Ireland	1.08	-1.22	7.15	0.50	-0.10	-0.41	48	1.89	0.00	0.00
	8.49	-4.97	6.63	2.22	-0.56	-3.29				
Italy	0.74		3.29	0.40	-0.11	-0.55	48	1.93	0.00	0.86
	9.99		11.33	2.34	-0.73	-3.54				
Netherlands	0.20	0.79	1.17	0.13	0.21	-0.39	48	2.05	0.00	0.00
	3.32	6.73	2.57	1.46	2.66	-3.40				
Portugal	0.84		2.29	0.05	-0.03	-0.07	48	1.90	0.00	0.54
	2.46		1.80	0.44	-0.33	-0.77				
Euro area	0.33	0.70	1.01	0.20	0.40	-0.16	48	2.22	0.04	0.07
	2.12	1.87	0.72	3.08	8.78	-1.04				

Note: AA, BB and CC refer to the parameters with the same notation in equation [6'], MMR and BR to the coefficients alpha and beta in [6], and ECC to the error correction coefficient rho in [6]. The Chow test for a structural break at Stage III is reported on the last column of panel (a). The Durbin-Watson and tests for H0: AA=0 and H0: BB=0 are also reported

Table A.1. Asymmetric Error correction mechanism in cases where the symetric ECM is rejected in favour of the asymmetric one

	Equilibrium		Immediate pass-through			Tests							Chow
	AA	BB	CC	MMR	BR	Above	Below	Sym. EC	Nobs	DW	AA=0	BB=0	EMU
(a) Time deposits (4/9)													
Belgium	0.74	0.06	-0.03	0.79	-0.01	-0.77	-0.02	0.00	105	2.09	0.00	0.04	**0.00**
	16.95	2.42	-0.27	14.34	-0.17	-3.84	-0.25						
Finland		0.51	-0.51	0.11	0.02	**-0.04**	**-0.22**	0.05	105	2.03	0.99	0.00	0.20
		8.49	-1.11	1.20	0.26	**-1.62**	**-1.56**						
Italy	0.36	0.53	0.86	0.07	0.02	-0.46	-0.15	0.00	92	1.80	0.00	0.00	**0.00**
	9.09	13.46	11.35	1.36	0.44	-6.27	-3.56						
Portugal	0.38	0.48	0.74	0.13	0.05	-0.48	-0.09	0.00	105	2.12	0.00	0.00	**0.06**
	6.72	9.12	7.89	4.28	1.00	-5.23	-2.58						
(b) Short-term loans to firms (6/10)													
Austria	0.51	0.62	0.90	0.26	-0.02	**-0.09**	**-0.35**	0.03	90	2.04	0.00	0.00	**0.05**
	5.80	5.47	1.51	4.11	-0.37	**-3.54**	**-1.98**						
Belgium	0.21	0.20	3.67	0.62	0.35	-0.84	-0.02	0.00	105	2.04	0.02	0.07	**0.00**
	0.31	1.46	1.43	7.81	4.48	-1.58	-0.84						
Germany	0.19		7.92	0.16	-0.01	-0.07	0.00	0.07	105	2.07	0.64	0.78	**0.00**
	0.45		4.39	2.99	-0.32	-0.96	-0.37						
Netherlands	1.14	-0.22	1.27	0.53	0.00	-1.53	-0.09	0.00	105	2.05	0.00	0.00	**0.00**
	41.45	-8.64	11.65	4.92	0.00	-3.01	-1.76						
Portugal	1.28		0.85	0.35	-0.34	-0.35	-0.06	0.05	105	1.91	0.00	0.27	**0.60**
	28.06		2.77	3.63	-2.09	-4.27	-0.76						
Euro area	0.73	0.33	1.76	0.16	0.05	**-0.10**	**-0.29**	0.01	105	2.04	0.00	0.00	**0.07**
	13.73	7.22	14.52	4.85	1.61	**-4.66**	**-3.25**						
(c) Long-term loans to firms (7/8)													
Belgium		0.90	2.44	0.26	0.85	-5.27	-0.03	0.00	105	1.91	0.47	0.00	0.13
		2.28	0.95	4.40	10.94	-0.05	-0.74						
Germany		1.29	0.30	0.16	0.50	-0.19	-0.02	0.02	71	1.98	0.99	0.26	0.58
		8.74	0.42	3.84	15.37	-1.20	-1.83						
Finland	1.39		-1.00	0.56	0.19	**-0.04**	**-0.58**	0.02	105	1.84	0.00	0.13	**0.04**
	13.33		-1.90	3.20	1.45	**-1.28**	**-1.79**						
France	0.69	0.56	-0.53	0.10	0.13	**-0.16**	**-0.54**	0.00	105	1.80	0.00	0.00	**0.02**
	10.35	7.51	-2.08	2.01	1.48	**-5.60**	**-3.97**						
Ireland	0.39		7.16	0.31	-0.12	-23.36	-0.02	0.00	105	2.20	0.22	0.43	1.00
	14.02		74.55	4.74	-1.77	-0.17	-0.98						
Italy	0.74	0.35	0.62	0.43	0.19	-0.77	-0.17	0.00	93	1.97	0.00	0.00	0.08
	14.61	6.58	4.94	4.38	2.06	-4.54	-3.69						
Euro area	0.58	0.41	1.48	0.43	0.24	**-0.15**	**-0.84**	0.02	71	2.03	0.00	0	**0.03**
	19.80	10.13	7.79	6.66	4.53	**-2.73**	**-2.08**						
(c) Consumer credit (4/8)													
Belgium	1.95	0.71	-1.71	0.26	0.36	-8.74	-0.02	0.00	105	1.90	0.00	0.00	1.00
	2.92	0.64	-0.60	2.64	2.86	-0.13	-1.63						
Germany	0.74	0.50	5.65	0.10	0.05	-0.14	-0.04	0.01	105	2.12	0.00	0.00	0.61
	7.34	6.59	19.77	2.16	1.33	-3.83	-2.29						
Finland	0.74	0.47	1.96	0.53	0.12	-16.97	0.01	0.00	105	1.47	0.02	0.00	0.14
	76.93	63.60	53.68	4.85	1.42	-5.50	0.34						
France		1.20	2.24	-0.01	0.04	**-0.03**	**-0.11**	0.08	105	2.07	0.13	0.00	0.94
		15.95	4.69	-0.39	1.37	**-3.78**	**-1.93**						
(d) Mortgages (6/11)													
Germany	0.38	0.77	0.68	0.25	0.68	-1.06	-0.07	0.01	105	2.10	0.00	0.00	0.33
	11.05	30.74	10.81	5.08	16.94	-1.83	-2.59						
Finland	0.6471	0.55	-0.63	0.38	0.06	-0.04	0.30	0.06	105	1.96	0.07	0.00	0.00
	1.9324	3.07	-0.45	5.68	1.11	-1.52	0.59						
Ireland	1.10		0.53	0.45	-0.05	**-0.14**	**-0.69**	0.01	105	2.04	0.00	0.31	0.58
	27.63		2.40	6.12	-0.54	**-3.84**	**-2.79**						
Italy	0.79	0.55	0.29	0.30	0.03	-0.25	-0.08	0.03	93	2.02	0.00	0.02	0.19
	4.49	2.96	0.59	2.63	0.30	-3.34	-1.98						
Netherlands	0.23	0.81	0.71	0.14	0.16	**-0.08**	**-1.42**	0.00	105	1.94	0.00	0.00	0.08
	12.50	42.39	7.80	2.36	2.87	**-2.36**	**-4.37**						
Euro area		0.79	1.64	0.04	0.36	**-0.05**	**-0.35**	0.01	105	1.99	0.98	0.00	0.01
		45.00	12.36	1.05	10.27	**-2.49**	**-2.25**						

Table A.2. "Garch" Error correction mechanism in cases where the linear ECM is rejected in favour of the Garch one

	Equilibrium		Immediate pass-through					Tests					Chow
	AA	BB	CC	MMR	BR	ECC	ECC-vol	Sym. EC	Nobs	DW	AA=0	BB=0	EMU
(a) Time deposits (3/9)													
Belgium	0.78	0.08	0.32	0.83	0.00	-0.22	-1.48	0.02	104	1.97	0.00	0.04	**0.00**
	15.17	1.89	2.38	13.00	-0.04	-2.06	-2.17						
Spain	0.45	0.41	0.82	0.30	0.01	-0.21	1.05	0.03	104	2.05	0.00	0.00	0.01
	3.11	3.44	5.05	4.37	0.17	-2.94	2.12						
Euro area	0.73	0.26	1.05	0.33	0.05	-0.10	0.71	0.00	104	1.86	0.00	0.00	0.00
	8.26	3.17	3.78	11.87	1.96	-2.38	3.06						
(b) Short-term loans to firms (3/10)													
France	0.72	0.44	-0.33	0.36	-0.16	**-0.33**	**-0.11**	0.05	104	1.47	0.00	0.06	**0.09**
	4.25	2.59	-0.62	2.99	-0.76	**-3.54**	**-1.56**						
Ireland	0.64		6.37	0.43	-0.12	-0.06	-1.50	0.00	104	1.97	0.00	0.2426	**0.00**
	12.77		23.20	8.25	-2.08	-1.35	-2.76						
Netherlands	1.17	-0.29	1.26	0.58	0.01	-0.28	-2.70	0.01	104	1.94	0.00	0.00	**0.00**
	18.83	-5.60	4.97	5.58	0.14	-3.34	-2.28						
(c) Long-term loans to firms (1/8)													
Ireland	0.29		6.86	0.37	-0.14	0.06	-2.42	0.01	104	2.14	0.22	0.43	0.04
	2.22		10.89	6.21	-2.09	1.25	-2.01						
(c) Consumer credit (1/8)													
Finland	1.00	0.32	0.72	0.47	0.13	0.01	-4.41	0.00	104	1.73	0.02	0.00	0.00
	5.45	3.73	2.40	3.67	1.33	0.25	-5.06						
(d) Mortgages (4/11)													
Finland	0.41	0.33	1.29	0.41	0.06	-0.04	0.19	0.04	104	1.95	0.07	0.00	0.03
	0.85	1.10	0.93	5.80	1.12	-1.11	0.97						
Ireland	1.10		0.76	0.44	-0.06	**-0.30**	**2.50**	0.00	104	1.93	0.00	0.31	0.14
	16.04		2.20	6.05	-0.69	**-4.57**	**2.84**						
Italy	0.78	0.49	0.48	0.25	0.07	-0.20	0.19	0.03	93	2.00	0.00	0.02	0.26
	4.44	2.64	1.07	2.21	0.67	-4.90	2.10						
Netherlands	0.31	0.78	0.83	0.16	0.21	**-0.15**	**-3.66**	0.02	104	1.92	0.00	0.00	0.01
	5.39	17.35	3.87	2.41	3.75	**-1.93**	**-2.31**						

Chart 1: Market interest rates

3 months money market rate and 10 years government bond yield (dotted)

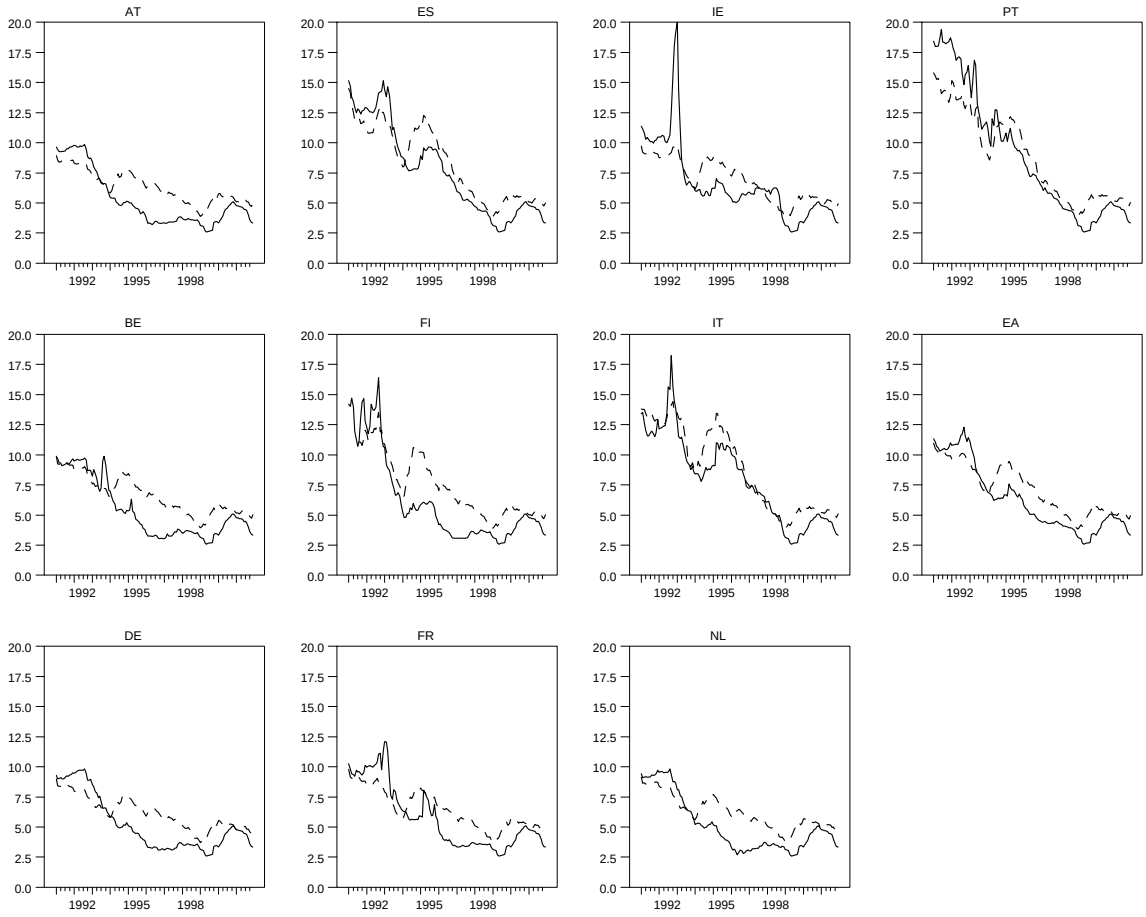


Chart 2: Retail bank rates on loans to firms

Short-term loans and long-term loans (dotted)

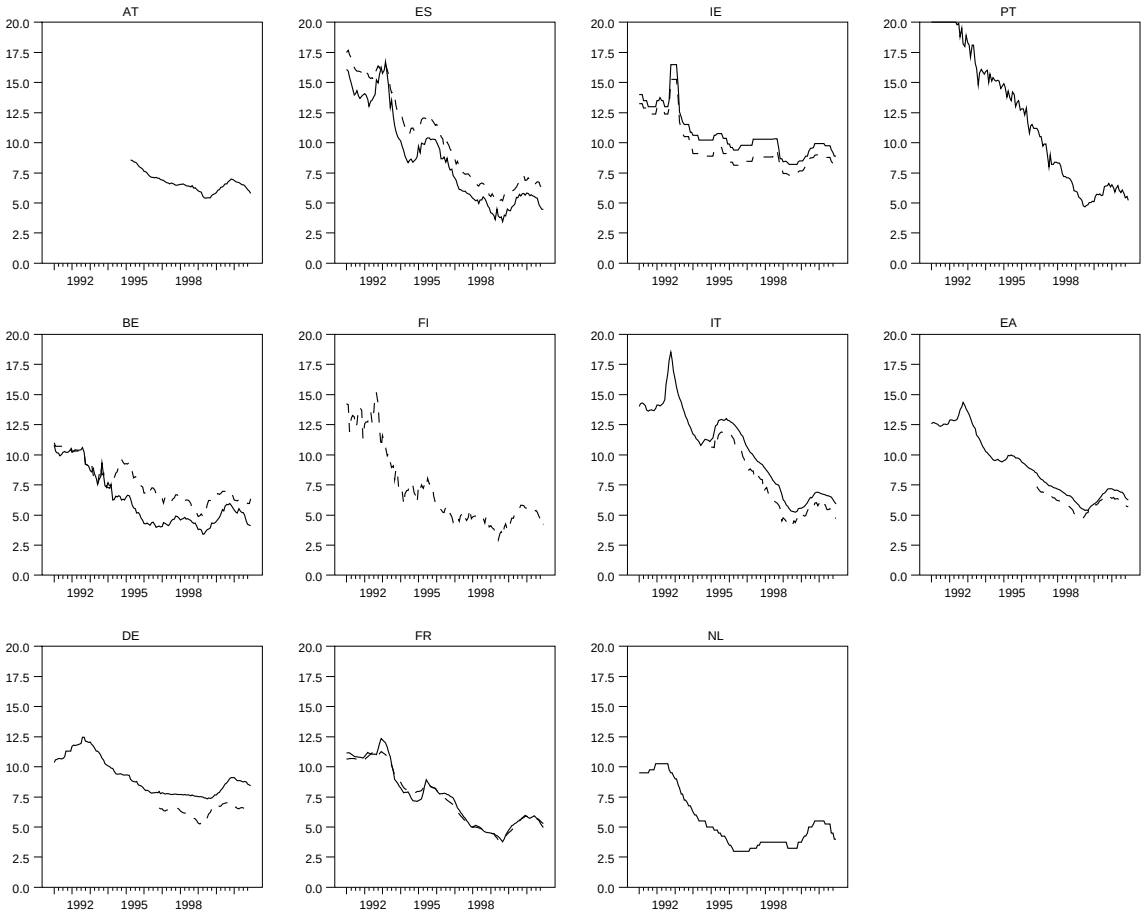


Chart 3: Retail bank rates on loans to households

Short-term loans and long-term loans (dotted)

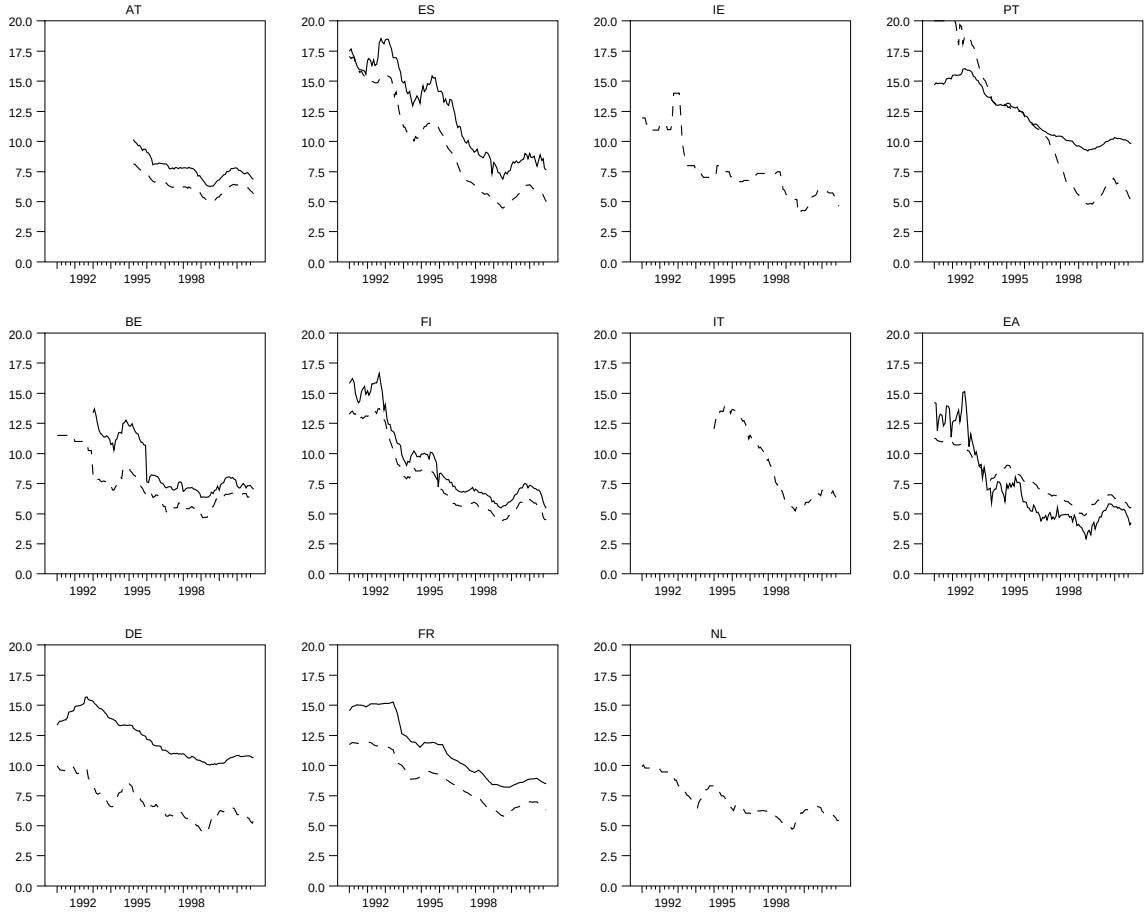


Chart 4: Retail bank rates on time deposits

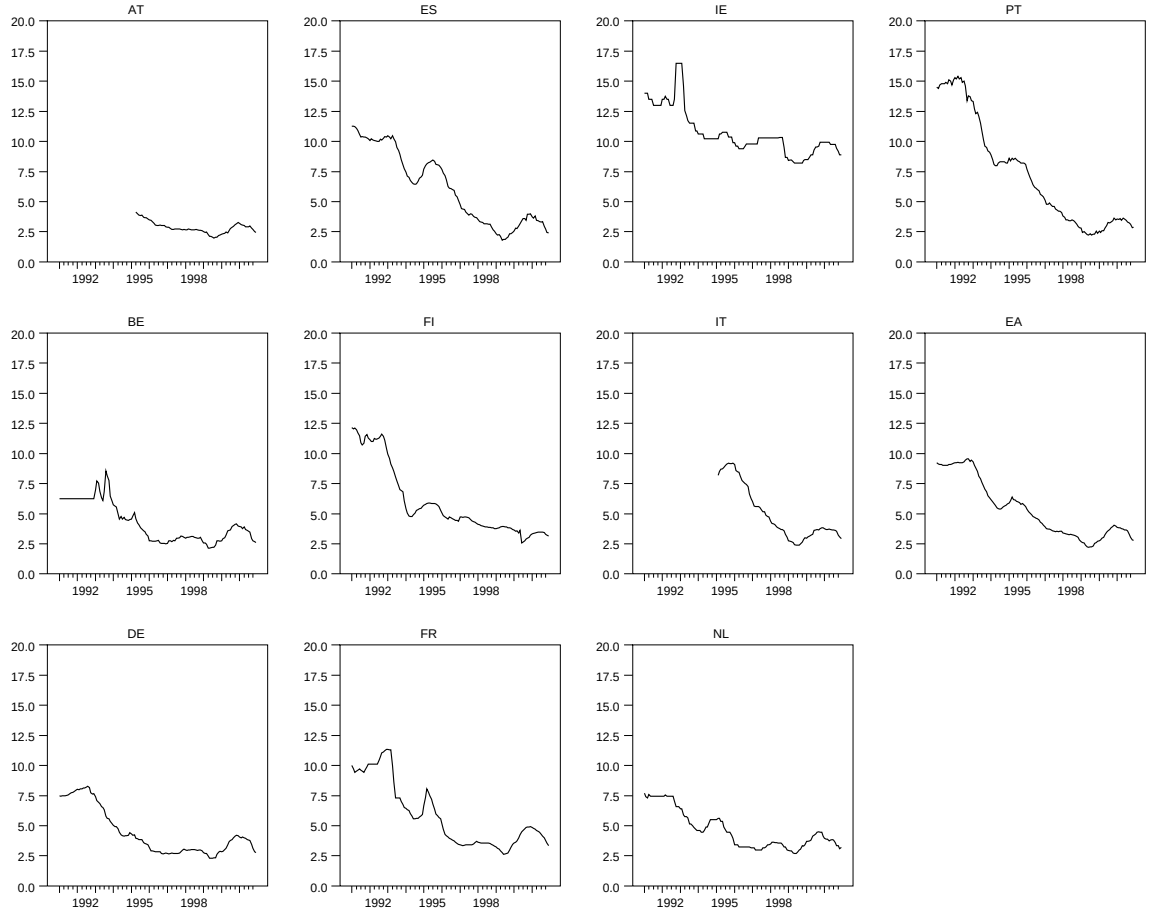
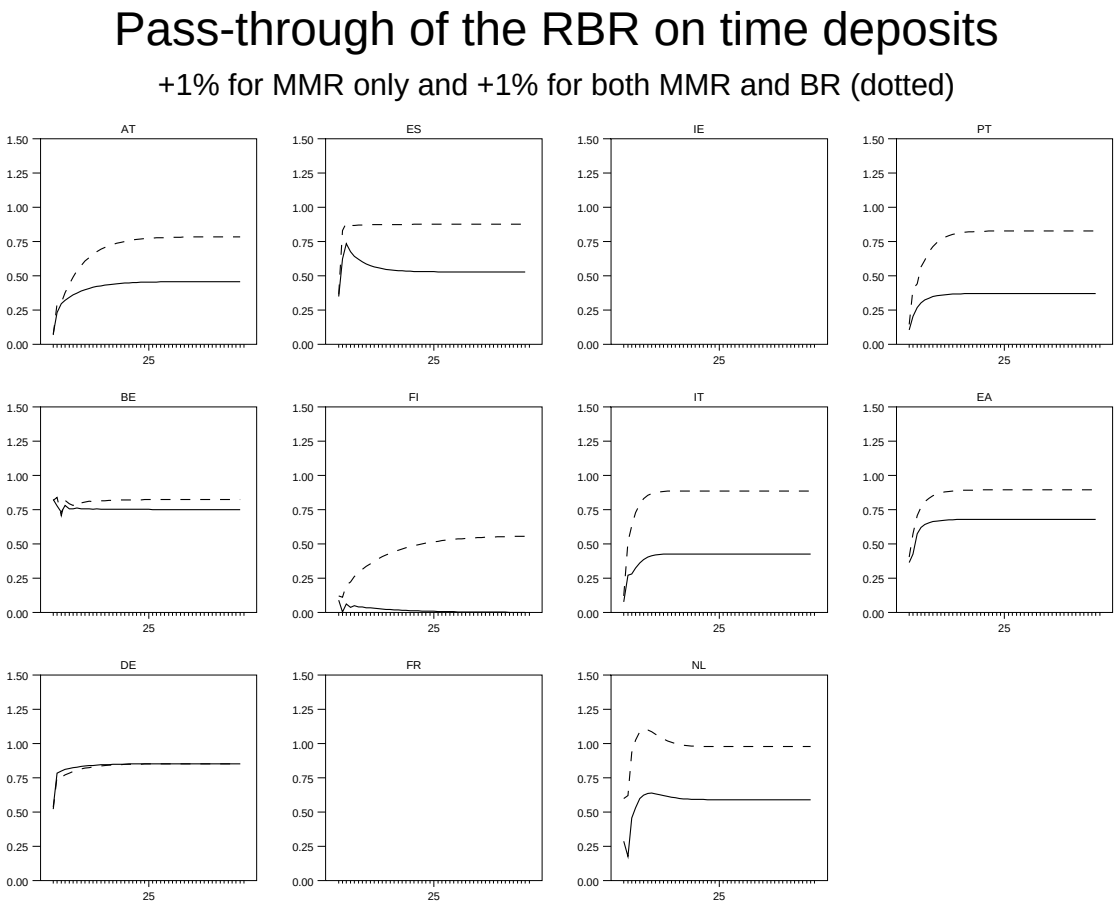


Chart 5a: Pass-through simulations based on full sample estimates

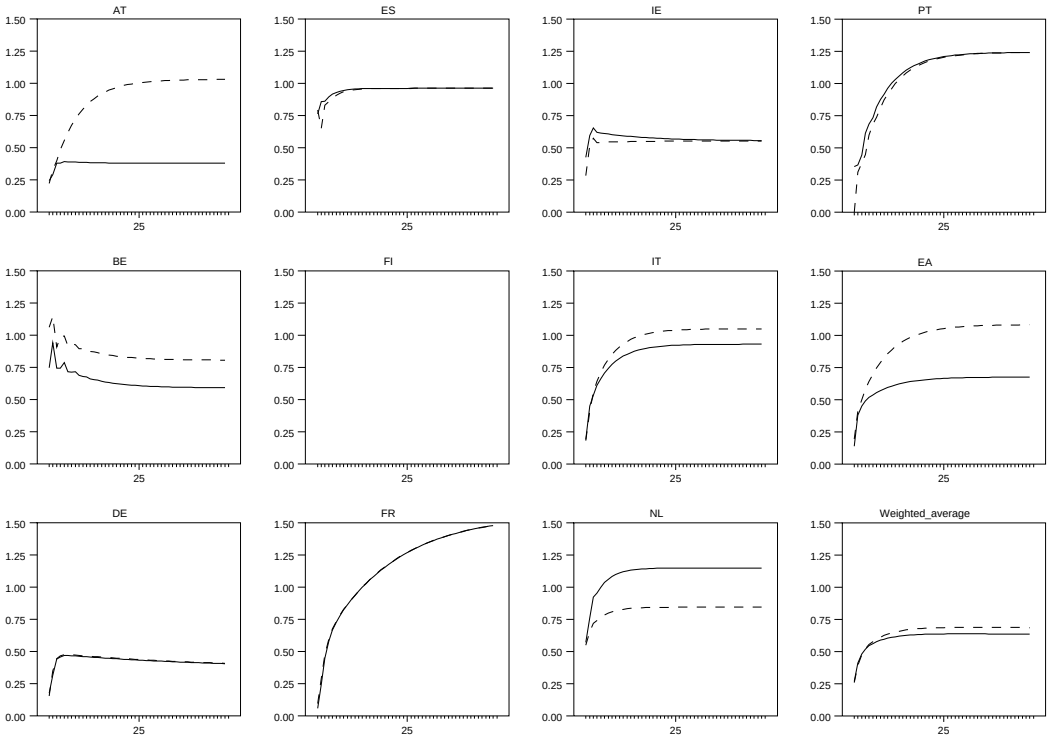


Note: Responses in % over 48 months. Simulation of equation [10]

Chart 5b: Pass-through simulations based on full sample estimates

Pass-through of the RBR on short-term loans to firms

+1% for MMR only and +1% for both MMR and BR (dotted)



Pass-through of the RBR on long-term loans to firms

+1% for MMR only and +1% for both MMR and BR (dotted)

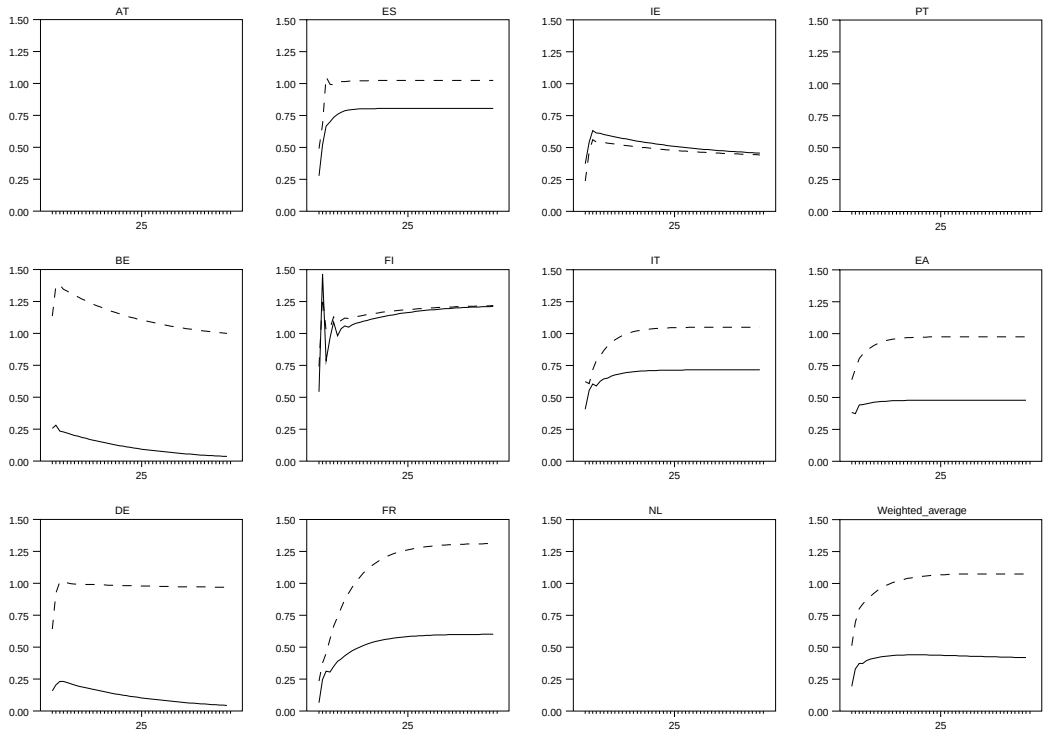
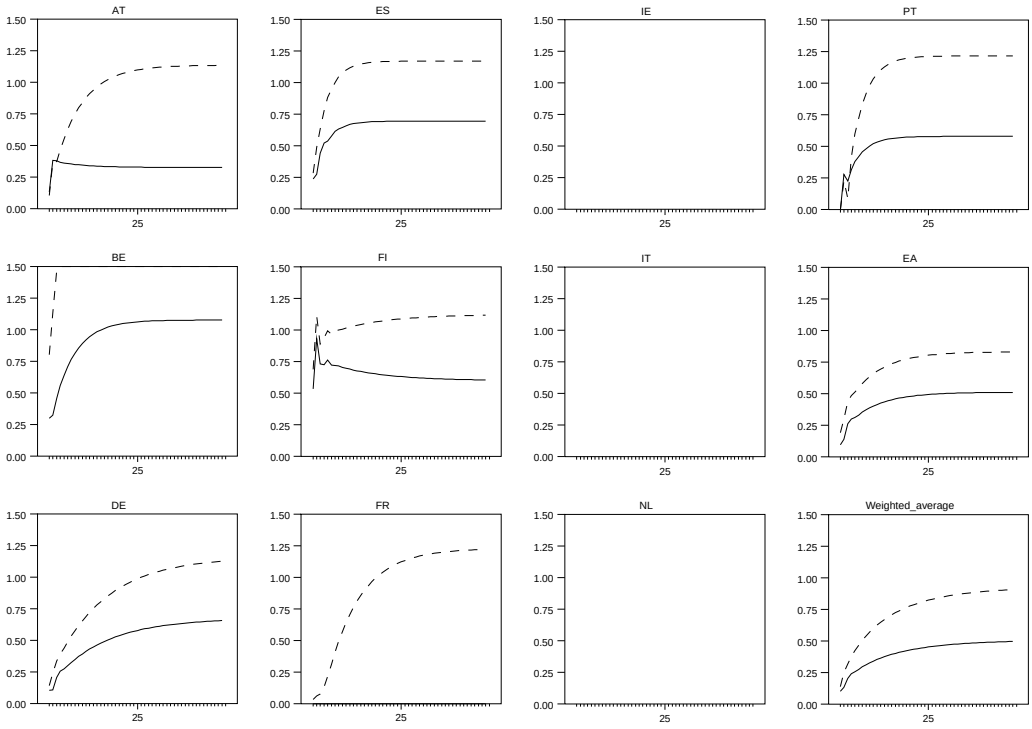


Chart 5c: Pass-through simulations based on full sample estimates

Pass-through of the RBR on consumer credit

+1% for MMR only and +1% for both MMR and BR (dotted)



Pass-through of the RBR on mortgages

+1% for MMR only and +1% for both MMR and BR (dotted)

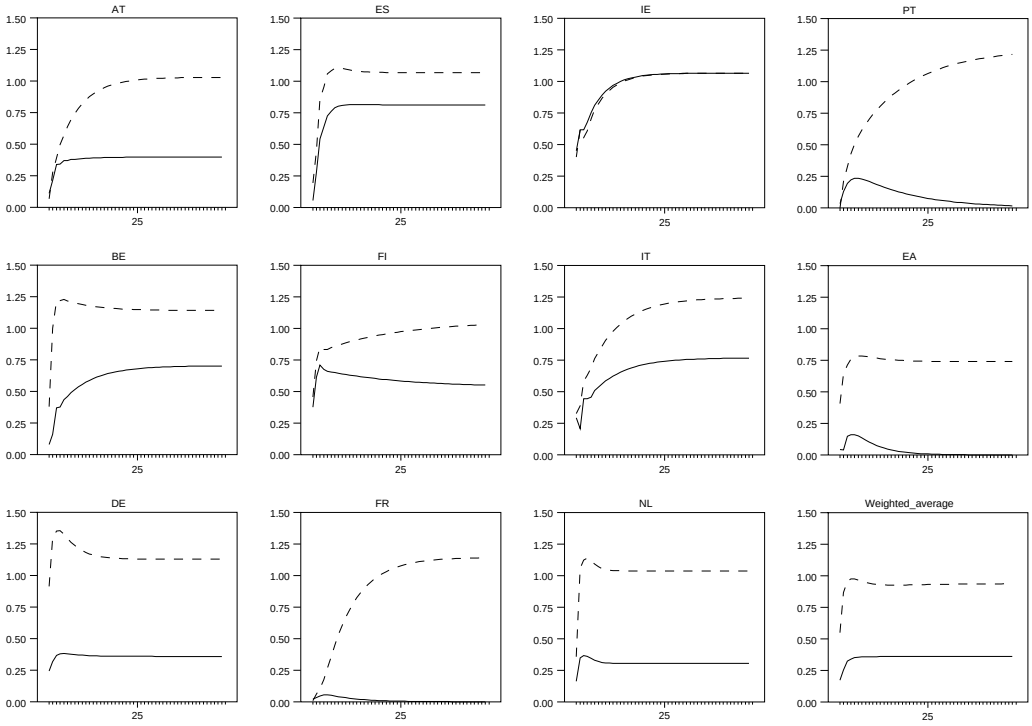
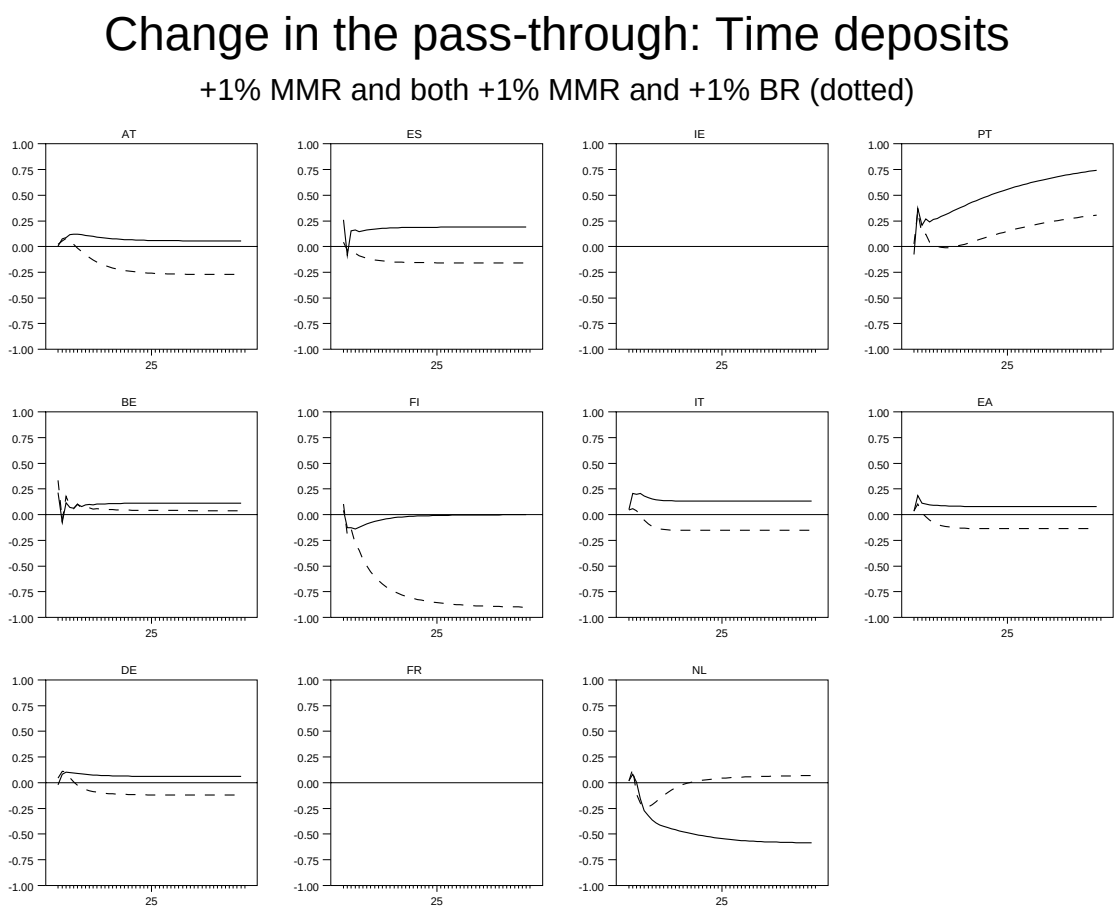
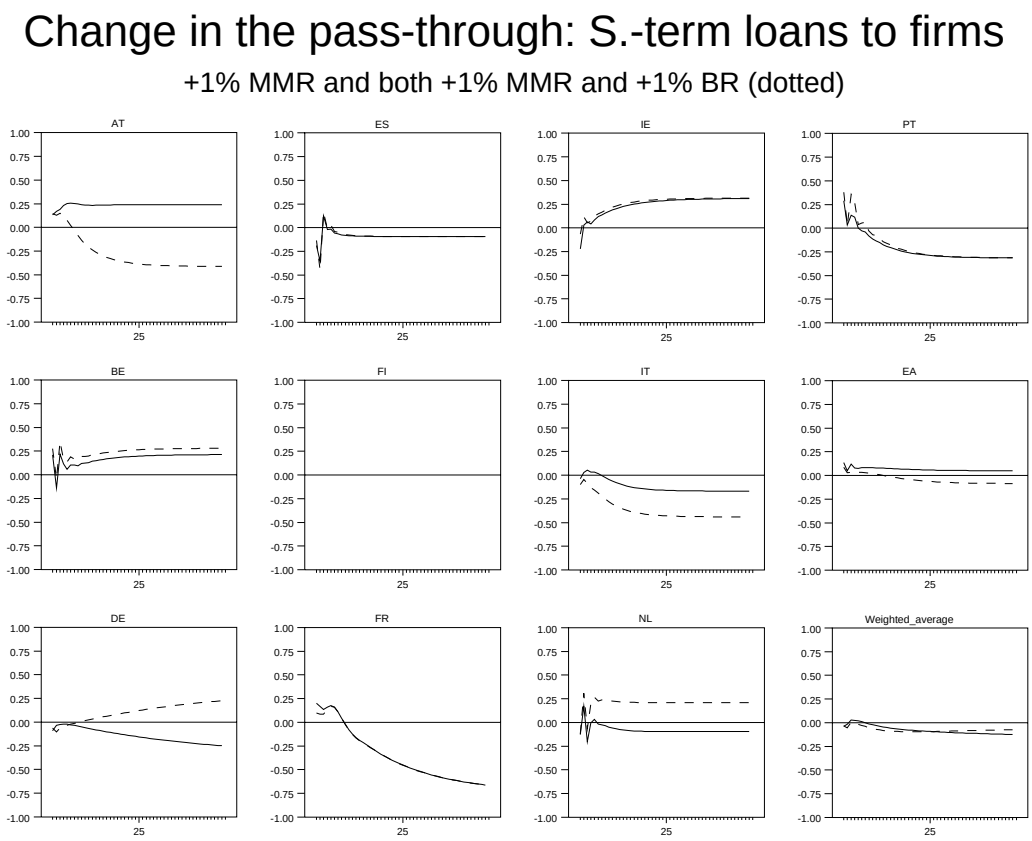


Chart 6a: Difference between the pass-through estimated over the "EMU" sample (1999-2002) and the one estimated over the full sample (1994-2002)



Note: Differences in the responses in % over 48 months.
Positive differences indicate a higher pass-through during the EMU sample

Chart 6b: Difference between the pass-through estimated over the "EMU" sample (1999-2002) and the one estimated over the full sample (1994-2002)



Change in the pass-through: L.-term loans to firms

+1% MMR and both +1% MMR and +1% BR (dotted)

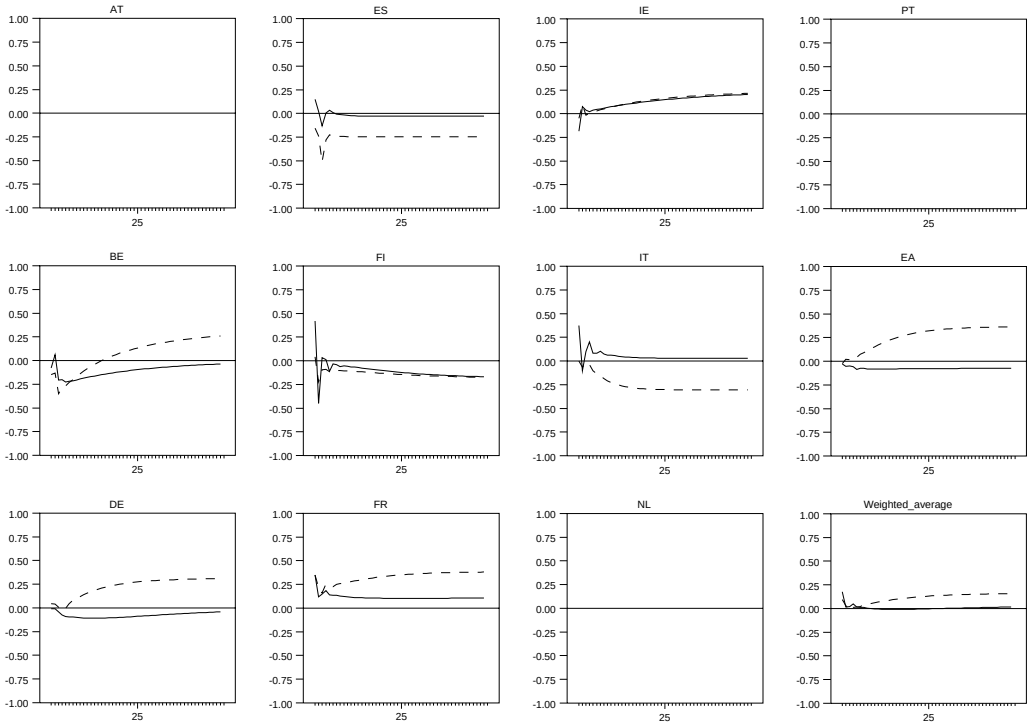
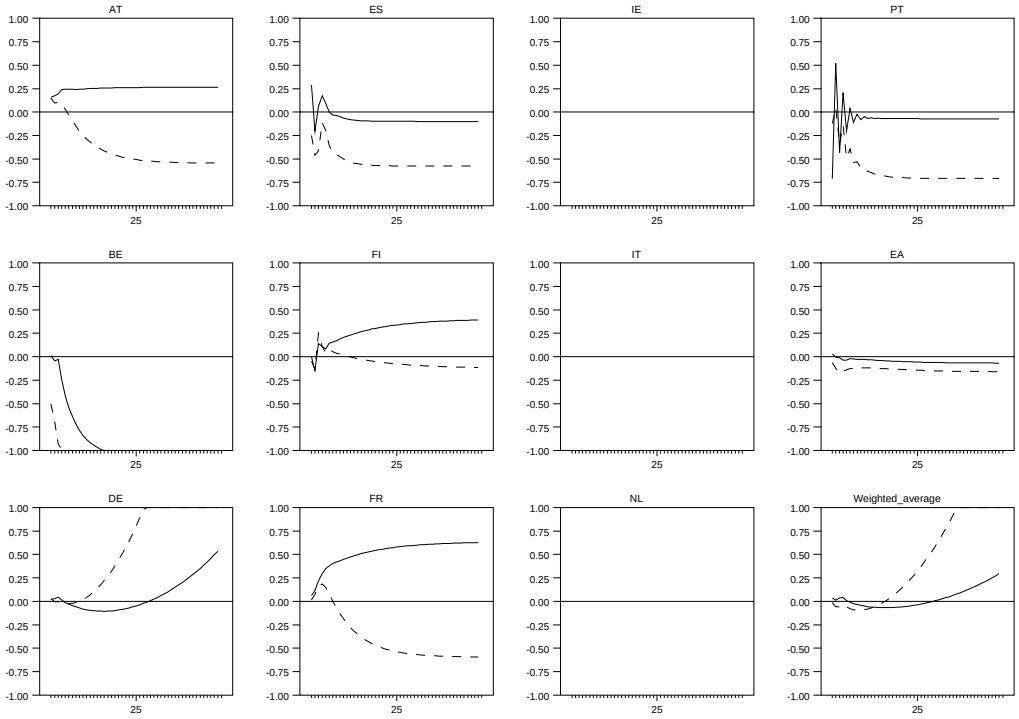


Chart 6c: Difference between the pass-through estimated over the "EMU" sample (1999-2002) and the one estimated over the full sample (1994-2002)

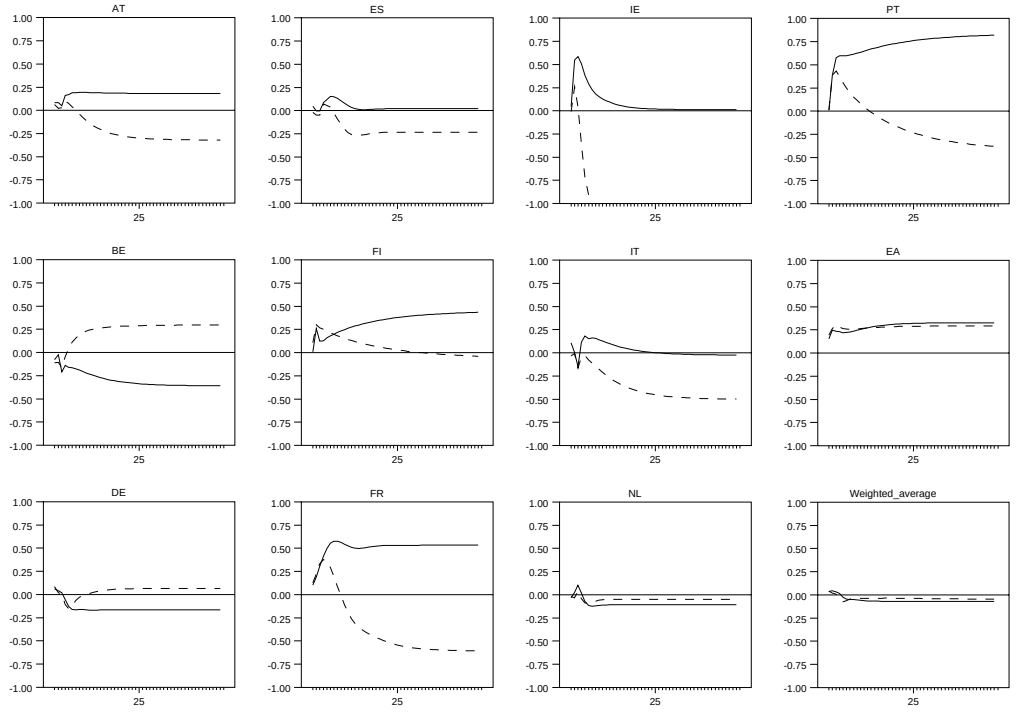
Change in the pass-through: Consumer credit

+1% MMR and both +1% MMR and +1% BR (dotted)



Change in the pass-through: Mortgages

+1% MMR and both +1% MMR and +1% BR (dotted)



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