European financial market integration: evidence on the emergence of a single Eurozone retail banking market

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Abstract

This study provides new evidence on the emergence of a single Eurozone retail banking market. Applying cointegration methodology, the empirical results indicate only limited evidence for integration before January 1, 1999. The introduction of the Euro manifests itself in structural breaks after which evidence for an emerging uniform Eurozone banking market is increasing. After investigating the interest pass-through we conclude that the single currency has the potential to "complete" the single market, however, not so much in the sense of cross-border arbitrage, but by means of a smooth and uniform pass-through process in the presence of a single monetary policy.

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1. INTRODUCTION

In 1988 the Commission of the European Communities commissioned a study, now widely known as the Cecchini report (Commission of the European Communities, 1988), which derived quantitative estimates of the benefits of financial market integration. The study predicted that post-integration prices will fall to a level equal to the prices of the country with the lowest pre-integration prices. In order to realize these predicted benefits, the Second Banking Directive (2nd BD) was implemented on January 1, 1993 for the member countries of the European Union (EU) with the intent to provide an appropriate regulatory environment for the single European banking market. However, as Kleimeier and Sander (2000) have shown, the degree of integration in the retail banking market before the introduction of the single currency January 1, 1999 was limited, leading to the question to what extent the single currency will contribute to the creation of a single retail banking market. For example, Tommaso Padoa-Schioppa (2000) from the European Central Bank (ECB) board argues that the "multiplicity of currencies in the single market was a fundamental factor behind the preservation of the segmentation of the banking industry" and that "it is indeed the existence of a single currency and a single central bank which very often unifies a banking system". Nonetheless, while most observers find at least some evidence for the emergence of a single banking industry in the area of wholesale banking and capital market activities, they remain more skeptical in the area of retail banking (Padoa-Schioppa 2000, Diez Guardia 2000).

The aim of our study is to provide further evidence on the emergence of a single Eurozone retail banking market. To do so, we develop a methodology that allows us to shed light onto the following: How effective has the single-market cum Second Banking Directive undertaking been so far in integrating credit markets? Are *nominal* and *real* cost of borrowing converging across

Europe and is convergence really a sign of integration? Is there evidence for differential effects in various credit products? How effective is the transmission of interest rate changes by monetary policy onto lending rates and are there differences in the "pass-through" among the countries of the Eurozone and among the various lending rates? What has so far been the contribution of the single currency and what is its likely future impact on this process?

The attempt to answer these questions today is ambitious for the very simple reason that the data available by now is still limited. However bearing in mind the Lucas critic, drawing conclusions from past data after almost revolutionary changes in the European monetary system might be even more risky than relying on an almost three-year experience with a single currency. Nonetheless, we fully bear in mind the limitations of the analysis resulting from the brief sample period but hope to develop an approach that allows us to answer these research questions in principal and with increasing confidence as the integration process unfolds. In particular, as this study follows up on an earlier consultancy report (Kleimeier and Sander, 2002) we find that using now an extended database our earlier results and conclusions are by and large validated thus pointing to the robustness of the approach.

2. TOWARDS AN INTEGRATED EUROPEAN RETAIL BANKING MARKET?

2.1. Recent developments in European banking

Bank lending plays a dominant role in providing funds to the corporate, private, and public sector in Europe. Based on data for 1999 provided by the European Central Bank (ECB) (2000a), in the Eurozone bank loans amounted to 100.4 per cent of the gross domestic product (GDP) which is clearly higher than for example 48.4 per cent in the United States (US). In contrast,

market based forms of funding which are an alternative for corporations are used to a lesser extend in the Eurozone. Outstanding domestic debt securities amount to 88.8 per cent in the Eurozone compared to 164.6 per cent in the US and stock market capitalization amounts to 71.1 per cent in the Eurozone compared to 163.3 per cent in the US.

The banking market in the European Union (EU) has been shaped to a large extend by the regulatory process aiming at liberalization and integration. At the beginning of the 1980s, the banking markets of Italy, France, and Belgium could be considered to be highly regulated, whereas banking markets in Germany, the United Kingdom (UK), and the Netherlands were only slightly regulated (De Bondt 1998). For example, capital controls were in place in many highly regulated countries. Furthermore, interest rate regulations existed as late as 1992 or 1993 in some EU member countries (Diez Guardia 2000). Specifically, interest rates were deregulated early in the UK (1979), Germany (1981) and the Netherlands (1981) compared to Denmark (1988), Belgium, France, Italy, and Luxembourg (all 1990), Spain and Portugal (both 1992), Ireland and Greece (both 1993). Even if the establishment of the common market has been an objective in the EU since the 1957 Treaty of Rome and has been reinforced by the 1985 White Paper and the 1986 Single European Act, very little had been achieved for the banking markets until the 2nd BD of 1989. Regarding key regulatory elements, the First Banking Directive (1st BD) of 1977 which allowed for cross border branching under the host country rule[1] was not very effective in reducing differences between national regulatory systems and was thus followed by a 2nd BD. This 2nd BD relied on three fundamental principles of harmonization, mutual recognition, and

[1] Under the host country rule a bank had to obtain permission to operate in a foreign country by the supervisory agencies of that country.

home country control and supervision[2] - the latter representing a complete turnaround in regulatory policy compared to the 1st BD. Since 1986, additional directives which are aimed at further harmonization of the different national EU banking markets have been passed concerning bank supervision, capital adequacy, solvency standards, money laundering, consumer credit, or publishing and consolidation of annual accounts to name but a few[3]. In the area of consumer credit, in 1986 the European Community introduced a consumer credit directive. The main two objectives of this directive were consumer protection and facilitation of cross-border credit by means of harmonization of the banks' information provision to its customers. This directive was amended and completed by two more consumer credit directives in 1990 and 1998, respectively[4]. In 1999, the Financial Services Action Plan (FSAP) has been launched which is widely considered the principal blueprint for financial integration in the EU by means of 42 measures to foster the progress towards an integrated market. By spring 2002, 26 of these 42 measures have been finalized, but the remaining measures are still considered to be crucial. Thus, the Barcelona European Council in March 2002 has called for a full implementation of all measures by 2005. On January 1, 1999, the Euro replaced the national currencies of Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain. Of the remaining EU countries, Greece initially failed to meet the required economic criteria but joined the European Monetary Union (EMU) on January 1, 2001, whereas Denmark, Sweden, and the United Kingdom decided not join the EMU as yet.

[2] Harmonisation should lead to a system where banks operating in several countries face a common set of EU regulations. Mutual recognition implies that the banking charter of the home country is sufficient to operate in all EU countries. Home country rule, finally, stipulates that foreign owned banks are regulated by their home country and not by the host country.
[3] For details see Kleimeier (2001), Kleimeier and Sander (2000), Diez Guardia (2000), Zimmerman (1995).
[4] For details and evaluation see Diez Guardia (2000).

Assessing the Eurozone banking markets, integration can be considered as far advanced from a purely legal perspective (Zimmerman 1995, Bredemeier 1995). However, non-regulatory barriers to integration such as cultural differences in consumer behaviors such as preferences for types of credit continue to exist. Whereas Eurozone interbank and wholesale markets are considered to be integrated, the extent of integration in the retail banking markets appears to be limited. For one thing, retail lending products are less exposed to international competitive pressure as proximity to customers is important even when one accounts for advances in modern distribution technology. Furthermore, this impression is enforced when looking at the limited extent of cross-border lending. The focus in bank lending and deposit taking is clearly domestic. In 1999, 79.8 per cent of all loans and 72.8 per cent of loans to the non-bank private sector were domestic. Similarly, 72.8 per cent of all deposits and 86.5 per cent of deposits to the non-bank private sector were domestic. Moreover, 66.7 per cent of all government securities and 39.5 per cent of all non-bank private securities are domestic. Only for this last business activity is the foreign business dominant and Euro area holdings amount to 19.1 per cent. However, the growth rates for all Eurozone activities - with the exception of deposits from the non-bank private sector - are positive and larger than the corresponding growth rates for domestic activities. Furthermore, the market shares of foreign banks in Europe are still very low in most countries in 1997. In Denmark, France, Italy, the Netherlands, Austria, Finland, Portugal, and Spain foreign banks have a market share of less than 12 per cent. In Belgium and Ireland, their market shares lie in the mid-range with 36.3 and 53.6 per cent, respectively. Only in Luxembourg foreign banks dominate the market with a share of 99.9 per cent (ECB 1999a, 1999b, 2000a, 2000b). Similar figures have been reported by Diez Guardia (2000).

One reason for these localized retail banking markets where banks are neither reaching out for all prospective Eurozone customers, nor are consumers shopping around for credits in the whole Eurozone is given by Padoa-Schioppa (2000). He refers to a survey conducted by the US Federal Reserve Bank that has found that in the United States 90% of the banks clientele is located within a distance of less than 20 miles of the bank's premises. He concludes that "proximity is an intrinsic characteristic of the retail market with or without the emergence of a currency embracing a wider area". One should, however, read such results with caution, as the localization of retail banking in the USA is also, and in particular the result of the US banking regulation[5].

Another reason for the lack in cross border lending could lie in the organizational strategies adopted by European banks with respect to type of bank they want to become in an integrated European banking market: In principle, a bank can either become a Europe-wide universal bank, a domestic universal bank, a Europe-wide specialized bank, or a domestic specialized bank. According to Marois (1997), the strategies adopted by European banks are diverse and a predominant strategy has yet to crystallize. However, the EU deregulatory process sparked two phases of bank mergers and acquisitions (M&As) in Europe: The first phase took place in the late 1980s and early 1990s in reaction to the 2nd BD and the second phase took place in the second half of the 1990s in anticipation of the EMU (Tourani Rad and van Beek, 1999). As Padoa-Schioppa (2000) argues, it is an error to believe that “a single banking industry will only emerge when cross-border mergers occur”. However, the pattern of M&As can give us an indication about the types of banks operating in the European market.

[5] Especially, the McFadden Act, which was in place from 1927 until 1994 explicitly prohibited interstate branching. In 1994, the basis for a truly US wide banking system was laid with the adoption of the Riegel-Neal Interstate Banking and Branching Efficiency Act.

From Table 1 note first that the total value of domestic M&As exceeds that of cross-border M&As, mainly driven by acquisitions of commercial banks and securities firms. Only for insurance companies the value of cross-border M&As exceed the value of domestic M&As. This implies that consolidation is still taking place on a national rather than international level. Furthermore, for commercial banks and securities firms M&As within Europe are as important as other foreign M&As, indicating a global rather than regional consolidation process. Second, consolidation within the sector is more common than consolidation across sectors – with domestic M&As and to a lesser extend Europe-Non-Europe M&As when the acquirer is a securities firm being the only exceptions. This would indicate that most banks in Europe are still specialized rather than universal banks. Taken together these findings show that the typical EU bank can still be characterized as a specialized domestic bank. Therefore, the result presented earlier that most bank activities are still domestic in nature is not surprising[6] (Kleimeier 2001).

TABLE 1 ABOUT HERE

2.2. What constitutes an integrated banking market?

2.2.1. The non-applicability of the "law of one price" in credit markets

Quantifying the degree of integration of the retail banking market is not an easy task. The Cecchini study advances the hypothesis of price equalization for financial assets within Europe as the characteristic of completely integrated markets. This "law of one price" manifests itself in financial markets as the interest rate parity. It is well established that under perfect capital

[6] It is interesting to note that the only strategy which can be characterised as clearly European is the acquisition strategy that insurance company follow within Europe when acquiring banks. This strategy amounts to 13.4% of all

mobility the covered interest parity typically holds, but it is more difficult to establish the empirical validity of the uncovered interest parity due to exchange rate volatility or exchange rate expectations. In the context of retail banking the case for the law of one price is, however, not so straightforward. First, the interest rate parity is suggested as parity for interest rates on such assets like government bonds, which are close if not perfect substitutes. This is clearly not the case for bank assets like consumer credits. Rather, credits are characterized by heterogeneity caused by risk differences, cultural influences in bank-client relationship, country-specific strategic bank behavior in order to cope with informational imperfections (moral hazard, incentive effects etc.), to name just a few. Consequently, one cannot expect the law of one price to hold in the strict sense in the consumer credit market. Secondly, there is clearly not (yet) a perfect "capital" mobility. As discussed in the previous section, banks are neither reaching out for all prospective Eurozone customers, nor are consumers shopping around for credits in the whole Eurozone, i.e. retail banking is still localized. Thus, retail interest rates may not as easily equalize as suggested by the Cecchini study. Rather, even when they are equalizing but the underlying characteristics of credits are different, this may not even be a sign of an integrated banking market. Looking simply at interest rate convergence or equalization can therefore be profoundly misleading.

2.2.2. Interest rate trends in the Eurozone – Some descriptive statistics

Despite the reservation we have about the use of the descriptive statistics we report them in Table A1 in the appendix and illustrate the (non-) convergence process in Figures 1 to 3. We report the following interest rates as obtained from ECB's National Retail Interest Rates

Intra-European M&As and is the only M&As type for which the intra-European percentage is higher than either the

Statistics: mortgage loans to households (N2), consumer loans to households (N3), and the lending rate charged to the corporate sector (N4). These rates are available on a monthly basis starting in the 1980s with most countries reporting regularly as off 1989 (a more detailed description of the data is provided in the appendix).

FIGURES 1, 2, 3, ABOUT HERE

Figure 1 and 2 show the convergence of interest rates for mortgage rates, consumer lending rates and corporate lending rates in both, nominal and real terms. In general, we divide our sample that ranges from April 1995 to April 2002 into a pre-EMU period until December 1998 and an EMU period thereafter. Clearly, all nominal rates are now closer together then they were in the mid-1990s. But this can largely be attributed to the effect of macroeconomic factors, in particular the single monetary policy. It is also clear that mortgage rates are closer together because the credit characteristics across countries are more similar throughout the Eurozone as compared to the lending rates charged for the other credit forms that differ more widely in their characteristics (as well as in their statistical definition). For example, while Italy had the highest average mortgage rate of 11.1 per cent in the pre-EMU phase and Belgium with 6.1 per cent the lowest rate, both countries have in the EMU phase the almost identical average rate of about 6 per cent. However, as argued before, interest rates need not equalize – and in most cases should not equalize even in the presence of an integrated banking market. From the "localized" borrower's point of view, however, the real, consumer price inflation-corrected costs of mortgage borrowing still differ widely throughout the Eurozone after January 1999, with the highest real cost in France (5.0 per

domestic or the non-Europe share. Thus, it appears that a European trend towards ALLFINANZ might be emerging.

cent) and the lowest in Ireland (1.2 per cent), mainly because of differences in consumer price inflation. As far as consumer and corporate lending rates are concerned, also here the cross-country differences have become smaller, but they still remain large.

In Figure 3 we show the development of the spreads between retail lending rates and the money market rate (as a proxy of the banks' cost of funding), which could be interpreted as a rough proxy for credit market imperfections. A recent study by Corvoisier and Gropp (2001) has shown that despite the pro-competitive move in European banking through deregulation, the increased concentration stemming from the recent wave of bank mergers may have resulted in less competitive loan pricing by banks. Our figure is consistent with this assessment and additionally shows that spreads differ significantly across countries but also across lending markets with spreads for consumer lending typically being the highest. Moreover, as far as convergence patterns are concerned, the only clear effect can be found in the mortgage market.

2.2.3. Cointegrated retail banking markets

Because of the different characteristics of the various (still) national credit instruments (as well as the differences in the reported statistics), we propose to base the judgment about the existence of a uniform Eurozone retail banking system on the existence of *cointegration* among national credit markets in Europe. This concept realizes that although full equalization cannot be expected, the concept of market integration requires that interest rates should exhibit a certain long-run equilibrium relationship. Thus, we do not require that the national interest rate of a country (L_{nat}) should equal the interest rate in the remaining Eurozone (L_{EU}) as it would be required by the law of one price shown in equation (1):

$$(1) \qquad L_{nat} = L_{EU}$$

Rather, we accept as a possible long run relationship that the rates may differ from each other such that:

$$(2) \qquad L_{nat} = a + b\, L_{EU}$$

In the long-run, equation (2) can be interpreted as a relationship reflecting the existence of a financial system with "structural trends and systematic disturbances in banking [that] cut across state borders"[7] while in the short-run deviations from the long-run equilibrium relationship are possible. This equation could in principle be estimated by means of regression analysis. However, since interest rates typically follow a random walk one may obtain spurious results from regression analysis. To establish that there exists a certain long-term relationship one therefore has to undertake a cointegration analysis. If cointegration is found, this reflects that national interest rates are connected in terms of a long-term relationship as shown in equation (2). This retail interest rate link must, however, not necessarily reflect banking market integration in the sense of arbitrage as suggested by Cecchini. Rather, in the short-run deviations from this long-run equilibrium can be corrected over time by one or more of the following three mechanisms:

- An international arbitrage (cross-border lending) process where banks increasingly shift their lending activities to countries where lending rates are the highest while consumers borrow in low interest rate countries.

[7] For this sentence we have used the words of Padoa-Schioppa (2000) with which he refers to the localized US financial system that is commonly viewed as integrated.

- When money market rates equalize by means of an international arbitrage process such changes will have an impact on lending rates via domestic competition that ties lending and borrowing rates together (interest rate pass-through).
- Increased (international) competition, or the threat of it as suggested by the theory of contestable markets will help to harmonies the pricing behavior of banks and thus lead to a harmonization of retail prices.

In the context of our study, we apply cointegration methodology closely based on the approach promoted by Engle and Granger (1987), which proceeds in three steps. First the time series must proven to be unit roots. Only then the cointegration vector can be estimated. Finally, once cointegration has been established, the corresponding error correction model will be estimated.

In order to establish whether the interest rates are unit roots, or I(1), two test statistics, a t-statistic and an F-statistic, will be employed based on regressions on levels as well as first differences of the underlying series. Both include next to lagged observations of the lending rate L in question also a trend variable T:

$$(3.1) \quad \Delta L_t = \eta_0 + \eta_1 L_{t-1} + \eta_2 \Delta L_{t-1} + \eta_3 T + \varepsilon_t$$

$$(3.2) \quad \Delta^2 L_t = \eta_0 + \eta_1 \Delta L_{t-1} + \eta_2 \Delta^2 L_{t-1} + \eta_3 T + \varepsilon_t$$

The null hypothesis states that the series follow random walks. For the t-statistic, this corresponds to a null hypothesis of H_0: $\eta_1 = 0$ and for the F-statistic to a null hypothesis of H_0: $\eta_1 = \eta_3 = 0$. We fail to reject the null hypothesis of a random walk if the calculated t or F values

are smaller in absolute terms than the critical values. Thus, as a precondition for cointegration, we have to accept the null hypotheses for equation (3.1.) but reject them for equation (3.2). As shown in Table A2 in the appendix the pre-condition that the time series are integrated of the order 1 is generally fulfilled. For nominal and real lending rates, there is evidence for I(0) or I(2) for only 10% of the series.

Once the I(1) characteristic has been established, cointegration testing can commence starting with estimating the cointegration regression using the national lending rate L_{nat} for the individual country as the dependent variable and the weighted average rate for the remaining EU countries L_{EU} as the independent variable:

$$(4) \qquad L_{nat,t} = a + b\, L_{EU,t} + u_t$$

A first cointegration testing procedure relies on the Durbin-Watson statistics (DW). The null hypothesis of no cointegration can be rejected when the calculated DW values resulting from the regression of equation (4) are larger than the critical values. As Engle and Granger point out, the Durbin-Watson test can be used as a good but only approximate indicator for cointegration and should be followed by a more specific testing procedure such as the Dickey-Fuller (DF) and augmented Dickey-Fuller (ADF) tests. The Dickey-Fuller test is based on the residuals of the cointegration regression

$$(5) \qquad \Delta\hat{u}_t = -\delta_0\, \hat{u}_{t-1} + \varepsilon_t$$

where the t-statistic for the estimated coefficient $-\delta_0$ provides an indication regarding the cointegration of the two series. In particular, the null hypothesis of no cointegration can be rejected when the t-statistic is larger in absolute value than the critical value.

The augmented Dickey-Fuller test is obtained in a two-step procedure from the regression

$$(6) \qquad \Delta\hat{u}_t = -\delta_0 \ \hat{u}_{t-1} + \sum_{i=1}^{4} \delta_i \ \Delta\hat{u}_{t-i} + \varepsilon_t$$

In the first step equation (6) is estimated including all 4 lags of $\Delta\hat{u}_{t-i}$. In the second step, equation (6) is re-estimated including only the significant lags of $\Delta\hat{u}_{t-i}$ from step 1. Now, the null hypothesis of no cointegration can be rejected when the t-statistic for the estimated coefficient $-\delta_0$ is larger in absolute value than the critical value.

Once the existence of a long-run relationship, i.e. cointegration is established, one can investigate the short-run dynamics of interest rates by estimating the corresponding error correction model (ECM). This model will provide an estimate of the speed of adjustment, with which the system returns back to the long-run equilibrium. To find the correct specification of the ECM, first, an unrestricted vector autoregression (UVAR) is estimated based on the regression

$$(7) \qquad \Delta L_{nat,t} = \lambda_0 + \lambda_1 L_{nat,t-1} + \lambda_2 L_{EU,t-1} + \sum_{i=1}^{4} \lambda_{nati} \Delta L_{nat,t-i} + \sum_{i=1}^{4} \lambda_{EUi} \Delta L_{EU,t-i} + \varepsilon_t$$

From this regression, the significant lagged first differences of the exogenous and endogenous variables are identified and included in the final ECM in combination with any error correction terms (ECT) obtained from the estimated errors $\hat{u}_{t-1}$ of the cointegration regression

$$(8) \qquad \Delta L_{nat,t} = \varphi_0 + \varphi_1 \hat{u}_{t-1} + \sum_{i=1}^{4} \varphi_{nati} \Delta L_{nat,t-i} + \sum_{i=1}^{4} \varphi_{EUi} \Delta L_{EU,t-i} + \varepsilon_t$$

The estimated coefficient φ_1 of the ECT measures the speed of adjustment. For example, an estimated φ_1 of -0.2 indicates that if there is a shock to the national lending rate $L_{nat,t}$, which raises its value relative to the equilibrium relationship to the cointegrated EU-wide lending rate $L_{EU,t}$, then one fifth of the divergence is eliminated in the following period.

In the remainder of the study, we will investigate the presence or non-presence of such a long-term relationship among Eurozone retail banking markets and inquire into the mechanisms that eventually bind national interest rates together. However, given the countries and time periods, which are the focus of our study, it is very well possible that the introduction of the single currency has brought about structural changes in the cointegration relationship. In order to detect whether any such structural changes are present and if so, at what time they occur, we conduct a structural break analysis of the cointegration regression. In particular, we estimate a rolling Chow test, which implies the following procedure: First, the cointegration regression of equation (4) is estimated for the full sample ranging from April 1995 to April 2002. However, in the presence of a structural break, the DW, DF, and ADF cointegration tests have low power, i.e. the rejection frequency of the ADF test is clearly reduced (e.g. Gregory et.al., 1996). Thus, in a

second step, the cointegration vector is tested for structural breaks such that H_0: $a_{t1} = a_{t2}$ and $b_{t1} = b_{t2}$ with sub-samples t1 = 1 to k and t2 = k+1 to T. If k, the time of the break is known, the two samples t1 and t2 are clearly identified and a standard Chow test can be conducted. In our case, we consider a break to be likely around January 1999, but the exact timing of the break -if indeed there is any- is not known. Thus, rather than using a standard Chow test, a supremum F (supF) test is calculated. This test was first proposed by Quandt (1960) and has more recently been the focus of various studies (e.g. Andrews 1993, Diebold and Chen 1996, Hansen 1992). In our single equation model, the supF test can be found by conducting a series of Chow tests. In particular, Chow tests are conducted for a series of different break points k, which move through the mid-80% of the sample. SupF equals the largest Chow F-statistic and is compared to critical values as reported by Hansen (1992). Depending on the model, the number of observations, etc, any estimated supF test statistic larger than approximately 15 will allow us to reject the null hypothesis of no structural break. Furthermore, the sequence of F-statistics can give an indication about the timing of the break.

Table 2 reports the test statistics and the timing of our structural break test that we have been conducting for the cointegration relationship for both nominal and real lending rates.[8] The first striking result is that for nominal interest rates almost all long-run relationships show evidence in favor of a structural break around the time of the introduction of the single currency. This evidence seems to be in line with the view that a single currency had a major impact on the unification of a banking system. For real interest rates we often find structural breaks occurring earlier. This may be interpreted as the result of the convergence process in terms of inflation

rates that happened in the mid 1990s[9]. Consequently, we generally divide the sample into a pre-EMU sub-period and an EMU sub-period. As can be seen the pre-EMU period is not always free of structural breaks but for the sake of comparability we have chosen the 1995 to 1998 period. For the EMU period, we estimate the cointegration vector over both, the whole EMU period and over a shorter post-break period when appropriate.

TABLE 2 ABOUT HERE

3. IS A UNIFIED EUROPEAN RETAIL BANKING MARKET EMERGING? NO, (MAYBE) NO, AND MAYBE (YES)!

Our judgment on the emergence of a uniform European banking system will in the following be based on the result of the proposed cointegration analysis that we performed for all retail lending rates for the Eurozone countries in both, nominal and real terms. While we are confident that the methodology we propose is helpful in monitoring the progress towards an integrated European banking market, the existing database is still the major obstacle for making to strict judgments at the moment, for three reasons: First, there is no sufficiently harmonized data on credit and in particular consumer credit (Diez Guardia 2000). This problem can and should be addressed in the future, but in the meantime the data provided by the ECB can be used as a first proxy. Secondly, the time period for which data for all countries are available simultaneously is very

[8] Figure A1 and A2 in the appendix visualize the results. Typically the peaks in the figures represent the presence and timing of the structural break, provided the F-statistics value exceeds the critical value.

[9] To illustrate this point consider fully integrated real interest rates with the real interest rates in two countries both being 5 percent (and thereafter varying driven by the same structural trends). With an expected inflation rate of 2 percent in both countries, the nominal rate would be 7 percent. Now consider one country starting from an inflation rate expectation of 6 percent, which would imply a nominal interest rate of 11 percent. If now inflation and subsequently inflation expectations would converge to 2 percent, the nominal interest rate in the high-inflation

limited. And third, the introduction of the single currency has brought about structural changes that limit the available database further. In particular, we find that the introduction of the single currency in 1999 has sufficiently shaken up the structural relationship to base judgment on the current state of integration only on data relating to the EMU phase. This reduces the database from which to derive judgments to three and a half years, which obviously limits the power of the statistical work. The only way to avoid this reduction would be to include past data that may not reflect to current state of integration. Given the data limitation, the results of the study will have to be interpreted with caution, but are, however, in our view still very valuable. An earlier study conducted by the authors (Kleimeier and Sander 2002) using a two years estimation horizon is thus extended here. As we will show, most of our earlier results are remaining valid, thus suggesting a certain robustness of the estimates. Where important differences between the current and the earlier estimates appear we will comment on them explicitly.

Figure 4 illustrates the results of the cointegration analysis for nominal interest rates, Figure 5 for real interest rates. The figures are summarizing the empirical testing for which the details are made available in Table 3 and A3 in the appendix. Only for countries and sample or sub-sample periods where bars are shown, a cointegration relationship could be established. The absence of a bar therefore indicates that we do not find any evidence of cointegration of these countries' lending markets with the corresponding Eurozone lending market (countries for which data are not available are clearly indicated with an N.A.). The height of the bars then simply indicates how fast the national rates are returning to the long-term equilibrium. It should be noted, however, that in some cases despite the fact that cointegration has been accepted in the test

country would decrease and, consequently, nominal interest rates would not be cointegrated during the inflation

procedures the error-correction mechanism was not found to be statistically significant at an at least 10 per cent confidence level. In such cases striped bars are being used. Moreover, for the EMU period in a number of countries structural breaks occur after January 1999 – in some cases as late as June 2001, thus limiting the reliability of the estimates. Whenever we report the results for a post-break EMU period, the break point is indicated above the bar as a reminder to the above-mentioned limitations. Do we then find evidence for a uniform European retail banking market? The brief answers are: No for mortgages, maybe no for consumer lending, and maybe yes for corporate lending. Or to go into more detail:

1. As argued earlier, judgments about market integration based on interest rate convergence can be misleading. For example, nominal European mortgage rates are converging because they are by and large following the money market rate developments. But as shown in our results here they do not (yet) exhibit a long-term equilibrium relationship in many cases.
2. Regarding nominal mortgage lending rates, we find only very limited evidence in favor of cointegration. The only EMU-member country that exhibits cointegration over the whole estimation horizon is France[10] whereas for Belgium cointegration is only present in a post-break period starting in May 1999. The latter result emerged only when using the extended sample until April 2002. For Germany and the Netherlands cointegration is only present in the pre-EMU period and – surprisingly – not in the EMU period. Interestingly, for non-EMU countries Sweden[11] and the UK cointegration can be found. Again, particularly the post-break period for these countries suffers from a very short estimation horizon so that the results should be interpreted with care.

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convergence process.

[10] Recall, however, that French data were only available with a quarterly frequency thus limiting the reliability of this result.

3. While there is very little to almost no evidence for cointegration in mortgage markets in nominal terms, there is somewhat more evidence for cointegration for nominal consumer rates. For the EMU-members France, Germany, Greece, Portugal, and Spain we find a statistically significant adjustment process towards a long-term equilibrium relationship, which is generally stronger or just only becoming statistically significant in the EMU-period and in particular in the shorter post-break periods. A similar observation holds true for the non-EMU member Sweden and UK, possibly suggesting that the observed tendencies reflect probably the impact of the generally declining level of interest rates over the sample period which may or may be not followed smoothly by consumer lending rates. This suggests that the pass-through mechanism in the various countries may play an important role in producing these statistical artifacts. While we find that our earlier conclusion of "no" evidence for cointegration in consumer lending must be slightly modified into a weaker "maybe no", the fact that with the exemption of Portugal and Spain the error correction mechanism exhibits only a slow speed of adjustment which points to still weakly linked lending markets. Nevertheless, the introduction of the single currency may already show its first effect here.
4. For the corporate sector the evidence is pointing to a number of cases where nominal cointegration could be established in particular in the EMU phase. It can also be observed that the ECT-coefficients are often higher than in the other markets, eventually pointing to the more important role of competition (direct vs. indirect finance etc.) in this sector. It is interesting to note that in particular those EMU countries who have often been dubbed as "non-core EMU" such as Ireland, Italy, Portugal, and Spain may have been most effected by integration efforts as we find here a significant and high speed of adjustment toward the

[11] Note that for Sweden also only quarterly data are available.

long-run equilibrium relationship in the EMU period. However, it is also striking that for core-EMU countries such as Austria, Belgium, Germany and the Netherlands we were not (anymore) able to detect evidence for cointegration in the EMU period. Again, the particularities of the pass-through process in the latter four countries could be potential suspects for explaining this result, such as a close bank-firm relationship, which eventually limits the flexibility of lending rates.

5. In real (inflation-corrected) terms there is some more evidence in favor of cointegration in mortgage rates despite the fact that real mortgage rate diverge more than nominal ones. For the first two years of the EMU our earlier study has found cointegration for Austria, Finland, Germany, Netherlands, Portugal, and in Spain. This already more pronounced trend towards cointegration in the EMU is reinforced in the extended sample (also by using an explicit post-break period), with Austria and the Netherlands exhibiting now a more forceful error-correction mechanism, while cointegration and a significant ECT could be found now for Belgium, France, Greece, and Italy. Note however, that some EMU members are either not exhibiting an ECM anymore (Finland, Germany, Portugal) or that the ECT is showing lower values (Spain). Given the role of inflation expectations for the determination for real mortgage rates, the evidence for or against cointegration of real mortgage rates may thus reflect the convergence or non-convergence of inflation expectations in the Eurozone. From the point of view of the individual borrower the almost non-existence of nominal co-integration suggests unexploited arbitrage possibilities and as such a lack of integration.
6. For real consumer lending rates, however, we have found in our earlier study that evidence for cointegration was less pronounced than for real mortgage rates. The mortgage rate results may have reflected the fact that borrowers extensively compare prices nationally, that the

national markets are more competitive and that inflation expectations play an important role in the long-term oriented mortgage market. In consumer lending, the sketchier evidence for cointegration may have pointed to a less competitive environment often characterized by high switching costs. However, after extending the sample period, the evidence for cointegration has improved, suggesting the potentially unifying role of a common monetary policy. Note, however, that a statistically significant structural break occurred for a number of countries relatively late after the introduction of the single currency thus limiting the reliability of this finding.

7. The strongest results for cointegration in real borrowing costs can be found for corporate rates. For 10 out of 12 countries we find a significant error correction mechanism for the EMU period.

In sum, we find (almost) *no* evidence for a uniform banking market for mortgages. The picture differs, however, if one turns from nominal to real lending rates. Here mortgage rates appear to be more cointegrated, i.e. households' real cost of mortgage borrowing are more likely to follow similar structural trends in the Eurozone. The evidence for cointegration in consumer credits is only somewhat better, again slightly more so for real than for nominal rates. Our conclusion is therefore also a "*maybe no*". But we do find quite some evidence for more unified corporate lending in the EMU phase from nominal as well as real rate analysis. A "*maybe yes*" might therefore be justified, in particular in the EMU phase. Our "no, (maybe) no, and maybe (yes)" conclusion is, however, subject to three reservations. First, and as mentioned before, our sample size is for obvious reasons quite short for the EMU period thus limiting the validity of conclusions. It is, however, reassuring, that our result presented here, are very much validating

the results of our earlier study. Second, by extending the sample we are also able to confirm our earlier observation that as the effects of the single currency unfold, the so far rather sketchy evidence for integration increases. Finally and most importantly, equating evidence in favor of cointegration with integrated markets can be misleading. Cointegration in banking may not be brought about by cross-border lending, mergers and acquisitions, or international arbitrage. Rather, the statistical evidence of cointegration under the condition of a single monetary policy may simply reflect a smooth and homogeneous pass-through of monetary policy rate changes onto lending rates in all EMU member. The latter phenomenon will be investigated in the following section.

TABLE 3 AND FIGURE 4 AND 5 ABOUT HERE

4. Pass-Through of Interest Rates Changes to Lending Rates: A Still Segmented Eurozone Banking Market?

Evidence for cointegration in lending markets can be produced by three mechanisms: arbitrage, (threat of) international competition, and a uniform monetary policy impact on lending rates. Based on the few cases in which we found cointegration one cannot directly identify that arbitrage and competition are the driving mechanisms. In this case, retail interest rates could in principle follow the same time pattern if banks in the different Eurozone countries would pass changes in policy-related interest rates smoothly and with the same speed onto lending rates. On the other hand, the cases in which we did not find cointegration indicate not only a lack of arbitrage and international competition but also an ineffective and/or heterogeneous monetary policy impact on lending rates. An ineffective pass-through of interest rates could be interpreted

as pointing to a high degree of imperfect competition in retail banking (Cottarelli and Kourelis, 1994). A heterogeneous pass-through could be interpreted as limited institutional convergence in Eurozone banking (Kleimeier and Sander 2000, Sander and Kleimeier 2002). Thus, the investigation of the limitations and differences in the pass-through of interest rates in the Eurozone can provide indirect evidence about forces driving or limiting the emergence of a unified Eurozone retail banking market.

4.1. Pass-Through Methodology

Following Cottarelli and Kourelis (1994), a growing literature is discussing the response of lending rates to monetary policy impulses as an important part of the monetary transmission process. These approaches typically model the transmission process in a dynamic model for the lending rate such as

$$(9) \qquad L_t = \beta_1 + \beta_L L_{t-1} + \beta_M M_t + \varepsilon_t$$

where L_t and M_t are the national lending and money market rates, respectively (where we omit the subscript 'nat' because only national lending rates are part of the pass-through analysis and a distinction between national and EU-wide lending rates is not required in this context). The estimated coefficient $ß_M$ is the impact multiplier. A value of less than 1 indicates sluggish adjustment of lending rates to money market rates, also known as lending rate stickiness[12]. This leads to a partial adjustment process over time towards a long-run equilibrium. In the long run

[12] The study by Corvoisier and Gropp (2001) confirms that increases in concentration in the Eurozone banking sector can make the transmission of monetary policy to lending rates more sluggish.

when the lending rate reaches its steady state value for any given value of the money market rate, i.e. L_{t-1} equals L_t, equation (9) takes the form of:

$$(10) \qquad L_t = \theta_0 + \theta M_t + u_t$$

Cottarelli and Kouralis (1994) argue that this formulation is consistent with the monopolistic competition model relating the lending rate to the money market rate. If θ is equal to one, we speak of a full pass-through in the long-run, while the parameter θ_0 reflects then the mark-up over costs in the pricing policies of the banks.

We estimate a slightly revised version of Cottarelli and Kouralis (1994) given by

$$(11) \qquad L_t = \beta_1 + \sum_{i=1}^{k^*} \beta_{L,i} L_{t-i} + \beta_2 M_t + \sum_{i=1}^{n^*} \beta_{M,i} M_{t-i} + \varepsilon_t$$

k* and n* are defined as the model's optimal lag-length which is determined by the minimum AIC criteria for models with up to 4 lags. Note that for k=1 and n=0 this model is equivalent to the model of equation (9). Similar to the model of equation (9), the estimated coefficient $\hat{\beta}_2$ is the impact multiplier. The long-term multiplier can be calculated from (11) as

$$(12) \qquad \theta = \frac{\hat{\beta}_2 + \sum_{i=1}^{n^*} \hat{\beta}_{M,i}}{1 - \sum_{i=1}^{k^*} \hat{\beta}_{L,i}}$$

and the long run equation therefore has again the form of

$$(13) \qquad L_t = \theta_0 + \theta M_t + u_t$$

It is widely accepted that the time series for interest rates typically exhibit an I(1) property, that is unit root tests can not reject the null hypothesis of a random walk. Consequently, pass-through models like equation (11) are regularly estimated in first differences to avoid spurious regression problems.

Next to the standard pass-through specification, we propose to base pass-through measurement on a well specified error correction model that explicitly incorporates the long-run relationship between lending and money market rates provided the series are cointegrated[13].

$$(14) \qquad \Delta L_t = \beta_1 + \sum_{i=1}^{k^*} \beta_{L,i} \Delta L_{t-i} + \beta_2 \Delta M_t + \sum_{i=1}^{n^*} \beta_{M,i} \Delta M_{t-i} + \beta_{ECT} ECT_{t-1} + \varepsilon_t$$

where ECT contains the estimated residuals $\hat{u}_{t-1}$ from the long-run equilibrium relationship defined by equation (13), provided such a relationship can be established by cointegration testing procedures corresponding to those described in section 2.2.3.

This formulation has a number of advantages over the standard pass-through model of equation (11). First, as the long-run multiplier can directly be obtained from the co-integrating regression (13). Second, we can directly obtain the speed of adjustment towards the long-run equilibrium

[13] For details on the methodology see Sander and Kleimeier (2002).

via the estimated coefficient of the ECT in equation (14). Third, this error correction specification allows us to analyze a variety of adjustment mechanisms – including the symmetric adjustment of the Engle-Granger cointegration methodology but also alternative asymmetric adjustment – thus showing more openly the differences in the financial part of the monetary transmission mechanism. Moreover, using models with asymmetries allows us to detect cointegration in cases where there are asymmetries and where the Engle-Granger methodology would thus fail to detect cointegration. Finally, only in cases where no cointegration is present in the data the standard pass-through model is appropriate.

In particular, we are considering here five different specifications for asymmetric adjustment of interest rates. The first model we consider is the threshold autoregressive model (TAR^0) developed by Tong (1983). The model makes a distinction whether the explained interest rate (lending rate in our case) is above or below its equilibrium level. Thus, the TAR^0 allows for asymmetric adjustment depending on the state of equilibrium-deviation. For example, if the money market rate decreases without an immediate adjustment in the lending rate, we obtain a positive realization of the error term u_t. When in this case the autoregressive decay is faster than in the case of money market rate increases, then the lending rate adjustment is faster downward than upward. An appropriate test procedure is to set a Heaviside indicator I_t for different states of $\hat{u}_{t-1}$.

$$(15) \qquad I_t = \begin{cases} 1 & if \quad \hat{u}_{t-1} \geq 0 \\ 0 & if \quad \hat{u}_{t-1} < 0 \end{cases}$$

Using this definition, we test for cointegration by estimating equation (16), which represents a modification of the ADF test. The null of no cointegration is rejected if the estimated F-statistic for H_0: $\rho_1 = \rho_2 = 0$ based on critical values provided by Enders and Siklos (2000).

$$(16) \qquad \Delta\hat{u}_t = I_t \rho_1 \hat{u}_{t-1} + (1 - I_t)\rho_2 \hat{u}_{t-1} + \sum_{i=1}^{m^*} \rho_{2+i} \Delta\hat{u}_{t-i} + \varepsilon_t$$

The optimal lag length m* is determined via the minimum AIC criteria for models with up to 4 lags. When cointegration is established, an F-test for equality of ρ_1 and ρ_2 indicates the presence of asymmetry.

The next model (TAR*) is a modification of the TAR^0 in the sense that the threshold that was formerly implicitly set at zero is now allowed to deviate from that value. The rational behind such a non-zero threshold is that one or both variables may only adjust to a dis-equilibrium once it exceeds a certain minimum deviation in one direction. For example, the lending rate will adjust fast only when out of an equilibrium situation the money market rate drops in a way that the deviation from equilibrium exceeds an optimal threshold of, say, 0.5 percentage points. For lower deviations or increases in the money market rate, adjustment takes place at a significantly slower pace. Now the Heaviside indicator in conjunction with equation (16)[14] is defined as

$$(17) \qquad I_t = \begin{cases} 1 & if \quad \hat{u}_{t-1} \geq a_0^* \\ 0 & if \quad \hat{u}_{t-1} < a_0^* \end{cases}$$

[14] For both, the TAR* and the following B-TAR* model, the optimal lag length m* of the TAR^0 specification is used.

In accordance with Chan's (1993), the optimal threshold a_0* is found by searching over the mid-80% of the distribution of $\hat{u}_t$ and selecting the model for which the residual sum of squares is minimized. Cointegration and asymmetry testing proceeds with the above described F-tests.

The third variation is a Band-TAR model (B-TAR*), which defines the Heaviside indicator as

$$(18) \qquad I_1 = \begin{cases} I_1 = 1 & if \quad \hat{u}_{t-1} \geq a_0^* \quad and \quad 0 \quad otherwise \\ I_2 = 1 & if \quad |\hat{u}_{t-1}| < a_0^* \quad and \quad 0 \quad otherwise \\ I_3 = 1 & if \quad \hat{u}_{t-1} < -a_0^* \quad and \quad 0 \quad otherwise \end{cases}$$

while equation (16) has to be modified to

$$(19) \qquad \Delta\hat{u}_t = \sum_{j=1}^{3} \rho_j I_j \hat{u}_{t-1} + \sum_{i=1}^{m^*} \rho_{3+i} \Delta\hat{u}_{t-i} + \varepsilon_t$$

Procedures for optimal lag length m* and optimal threshold a_0* are corresponding to those of the TAR* and the F-tests for cointegration and asymmetry are applied to all three coefficient ρ_j. Such a model has often been applied in particular to model interest rate cointegration where infrequent and discrete adjustments in the rates occur (Balke and Fomby 1997, Baum and Karasulu 1998). For example, if deviations from equilibrium are small and will therefore not lead to an adjustment of the dependent interest rate, one may find no cointegration within a narrow band bordered by a_0* and $-a_0$* while outside this band cointegration and thus an error correction mechanism may be present. In the context of our study, such behavior could be related to the

”menu-cost” argument of lending rate stickiness such that banks only adjust lending rates when deviations are sufficiently large. However, if it would happen that inside the band cointegration is found but not outside, this could indicate that banks implicitly insure their customers against excessive deviations from equilibrium by smoothing the response of the lending rate.

In the TAR models the autoregressive decay always depends on the degree of deviation from equilibrium. One could also image situations where the adjustment speed depends on how fast the rates move away from or towards equilibrium. Enders and Granger (1998) therefore propose a momentum threshold autoregressive model (M-TAR) where the Heaviside indicator depends as follows on the change in error correction term, $\Delta\hat{u}_t$:

$$(20) \qquad I_t = \begin{cases} 1 & if \quad \Delta\hat{u}_{t-1} \geq a_0 \\ 0 & if \quad \Delta\hat{u}_{t-1} < a_0 \end{cases}$$

Similar to the TAR^0 and TAR* specifications, the threshold in the M-TAR can either be set at zero leading to the M-TAR^0 specification or be optimized at a_0* leading to the M-TAR* specification. Cointegration and asymmetry testing proceed based on equation (16) above. The M-TAR models have successfully been applied to the term structure of interest rates by Enders and Granger (1998) and Enders and Siklos (2000). According to the latter authors, M-TAR adjustment can be especially useful when decision makers (in our case banks) are viewed as attempting to smooth out large changes in a series.

Based on the cointegration testing we selected the appropriate model for analyzing the pass-through of interest rates. In the case where no cointegration was found, we use the standard pass-through model (STD). This can be done by estimating the error correction model of equation (14) with β_{ECT} set to zero. For this as well as for all other specifications of equation (14), we have chosen an optimal lag length k* and n* for lending and money market rates, respectively, by applying the minimum AIC criteria for all models with up to 4 lags in either rate. Consequently, in the STD model the impact multiplier is given by the estimated coefficient $\hat{\beta}_2$ and the long-run multiplier θ is calculated according to equation (12).

When cointegration was found, the long-run multiplier θ is directly obtained from the co-integrating regression (13) while again the impact multiplier is $\hat{\beta}_2$ obtained from the appropriate specification of equation (14). The error correction mechanism itself depends on the optimal model. In the case of the symmetric cointegration model (SYM), the ECT is equal to the estimated residuals of the co-integrating regression. β_{ECT} is therefore estimating the speed of a symmetric adjustment process towards a long-run equilibrium. In the models with asymmetric adjustment, β_{ECT} and the ECTs are 2-dimensional or, in the case of the B-TAR*, 3-dimentional vectors which give the speed of adjustment depending on the definition of the ECTs of equations (15), (17), (18), or (20), respectively. Furthermore, where appropriate, the value of the optimal threshold a_0* is reported.

4.2. Evidence on Pass-Through in the Eurozone

In investigating the pass-through in the Eurozone we estimate both the standard pass-through model of equation (11) as well as the well-specified error correction model for cases when lending and money market rates are cointegrated. Table 4 gives the details of the pass-through model selection. In case that neither symmetric nor asymmetric cointegration could be established, the standard pass-through model will be selected. If we find evidence for asymmetric cointegration, the TAR-type model that best fits the data based on the AIC criteria is chosen. These models are able to detect cointegration under condition of asymmetry and threshold behavior - cointegration that would otherwise remain undetected and could lead to a premature conclusion of limited competition in the banking sector. However, if the test statistics lead to a rejection of the asymmetry cointegration hypothesis, the symmetric error correction pass-through model is considered, cointegration provided. Based on this selection, the estimates of the pass-through models are given in Table 5 and visualized in Figures 6 and 7.

TABLE 4 AND 5 ABOUT HERE

Among the most important results are:

1. The impact multipliers are in most cases far below 1 indicating a limited pass-through of interest rate changes typically averaging between 0.3 for mortgage rates and slightly above 0.4 for consumer and corporate lending rates.
2. Even in the long run, the pass-through is far from perfect – that is, we do not always find a full pass-through. However, the long-run pass-through works best in corporate lending rates. This result corresponds to our findings in the cointegration analysis and points to the fact that

next to a lack of cross-border lending a limited interest rate pass-through is the second cause for the lack of integration.

3. Comparing the size of the impact multipliers over time shows evidence for an increase in 5 out of 12 countries for mortgage rates. In the EMU period therefore, the average impact multiplier increased on average from 0.24 to 0.35. Regarding consumer lending rates, it appears that the average value of the impact multipliers has decreased, however, this is compensated by an increased in the speed of adjustment as measured by the ECT coefficients. Regarding corporate lending rates, there is a slight increase of the average impact multiplier from 0.41 to 0.42, but again supported by an additional increase in the average speed of adjustment, which among all rates shows the highest values. Again, this result which was already documented in our earlier study indicates that the pass-through mechanism has become faster after January 1999, a result also recently confirmed by an ECB study (de Bondt, 2002).
4. For all three rates, it is also evident from Figures 6 and 7 that the pass-through mechanism differs widely across countries in both, the short-run and the long-run, thus explaining not only the lack of integration but also the increasing evidence for cointegration in the presence of a single monetary policy. For example, during the pre-EMU period the heterogeneity as measured by the standard deviation of the long-term multipliers is the highest in consumer lending (0.56) followed by mortgage (0.44) and corporate lending (0.28). When moving into the EMU period, however, we find some evidence for a more homogeneous pass-through for mortgages and consumer lending as standard deviations fall to 0.33 and 0.28, respectively. Again, this confirms our interpretation that an efficient and uniform pass-through process is the main force behind the cointegration evidence.

5. The important novelty of our extended model is the analysis of the different nature of the adjustment process. The results show that there is no predominant model that fits all lending markets and countries. Rather, we find that in some cases lending rates are adjusting only when rates are sufficiently far from the equilibrium – that is, surpassing a certain threshold. In other cases, adjustment is differing when rates are moving upward or downward, or away or towards the equilibrium. In yet another case, adjustment takes place only when there is a fast and large movement away from equilibrium. For example looking to the EMU period, in corporate lending we find in 8 out of 12 cases either a symmetric adjustment or standard process. Only in Belgium, France, Portugal, and non-EMU member Sweden an asymmetric threshold adjustment model seems to be more adequate. For Sweden, however, the speed of adjustment could not be found significant. The results point to the fact that banks shields at least partially their corporate customers from rapid changes in interest rates. Turning now to EMU-period consumer lending rates we find no error correction mechanism in Belgium, Germany, Greece, a symmetric one in Austria, France, Portugal, Sweden, an asymmetric band adjustment in Spain, and a momentum asymmetric threshold adjustment in Denmark, Finland, and the UK. Again for EMU period, mortgage rates in most countries exhibit a standard pass-through (7 of 13) or a symmetric one (5 of 13). The only exception is France where a momentum threshold adjustment model seems to provide the best fit, indicating that banks only adjust lending rates when changes are fast and sufficiently large. This finding is consistent with the lack of cointegration in the mortgage market as such sluggish and differential adjustments can explain the lack of a common mortgage rate behavior in Europe.

FIGURE 6 AND 7 ABOUT HERE

Summing up, the transmission process from money market interest rates to lending rates in the Eurozone exhibits strong national characteristics, which are rooted in the specific features of the national finance and banking systems. While there is some evidence for the emergence of a smoother pass-through process in the recent EMU years, it is still a far way from calling it a uniform banking system. These results are in line with the findings of a recent ECB study that suggests "that current 'country asymmetries' in response of bank rates to monetary policy should decrease over time by virtue of the implementation of the single monetary policy" (Mojon 2000).[15] Overall, it appears that three factors are simultaneously important for creating a uniform retail banking market in the Eurozone: The first factor is the potential impact of the single currency as suggested above. Secondly, further harmonization of national legislation in particular in the area of consumer credit where harmonization accomplished so far is limited (Diez Guardia 2000). Along similar lines, national differences in taxation also go some way in explaining the lack of arbitrage, in particular for mortgage lending. Thirdly, additional regulatory efforts and pro-competition measures are needed to promote a smooth and more uniform pass-through of monetary policy changes.

V. Conclusions

Our study provides new evidence on the emergence of unified European retail banking market. The *first* point we stress is that the empirical artifact of converging nominal and real lending rates cannot simply be read as a sign for an integrating retail banking market. Such rates follow - often with considerable delay - the changes in central bank-determined interest rates, that is, convergence of lending rates could be the consequence of convergence of monetary policy and

[15] See also de Bondt (2002) who reports a smoother pass-through mechanism in the Eurozone after January 1999.

not of market integration. *Secondly*, we therefore suggest to base judgment on the existence of a uniform banking market on a cointegration analysis. Doing so, we find very limited evidence for cointegration in particular before January 1, 1999, that is the introduction of the single currency. The 2nd BD and other regulation efforts in order to create a single lending market appear to have been of a limited effect in this respect. *Third,* we find that the relationship of national lending markets with the remaining Eurozone lending markets exhibits strong signs of structural changes that have come along with the introduction of the single currency on January 1, 1999. This result should not be underestimated as it indicates that Eurozone credit markets are changing dramatically. *Forth*, we provide a first picture of the emerging (uniform) Eurozone banking market based on the data available so far. However, our results based now on more than three years experience with the single currency are confirming the findings of our earlier study, thus pointing to a certain level of robustness of the proposition that the Euro has the potential to unify financial markets. We found, *fifth*, that there are some tendencies for a more uniform corporate lending market, while consumer and mortgage lending markets are still more fragmented. *Sixth*, we identify three driving forces towards a uniform banking market: Cross border borrowing and lending (arbitrage), a national and international retail banking environment, and a smooth and uniform pass-through of interest rate changes onto lending rates. Regarding the first point, lending is still a very much localized activity and may eventually remain so. For an effective arbitrage process a much higher level of harmonization is needed, in particular in the field of consumer credit. If, however, cross-border lending is limited this lack of internationalization of lending could have been healed by a competitive behavior of loan pricing. On the one hand, increased competition would decrease lending spreads. Our descriptive analysis of interest rate spreads has delivered no clear evidence in favor of the increased competition hypothesis and is in

line with the more sophisticated empirical work by Corvoisier and Gropp (2001). On the other hand, more competition should lead to a smoother pass-through of monetary policy changes onto borrowers in particular with respect to lending to the corporate sector. Consequently, improving the competitive environment in retail banking could not only benefit the borrowers a lot but also help to unify the Eurozone retail banking market.

Integrating financial markets legally is in itself not a guarantee that a competitive and more uniform retail lending markets will be established throughout the Eurozone. It is in this context that a recent "report by the Economic and Financial Committee on EU Financial Integration" states that "[o]nly if integration results in a genuine increase in the level of competition will efficiency gains translate into lower capital cost for borrowers ..." (Economic and Financial Committee 2002:3). The committee therefore also remarks that "to accompany the transition to an integrated financial market, the competent competition authorities must be fully prepared to respond to the evolving structure of the EU's financial markets, including by addressing uncompetitive structures and arrangements resulting from the inheritance of national markets in financial services." (Economic and Financial Committee 2002:22).

However, our results also suggest that the introduction of the single currency already had and will most likely continue to have an important impact on the emergence of a single Eurozone retail banking market. In what direction these developments will go, needs to be monitored closely for all different retail lending products in order to obtain the benefits promised earlier with the single market initiative as well as to promote the smooth functioning of the single monetary policy.

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APPENDIX – DATA SOURCES

Our study mainly relies on monthly national retail interest rates that have been obtained from ECB. The ECB collects three consumer lending rates: overdrafts on cash accounts (series N1), mortgage loans to households (series N2), and consumer loans to households (series N3). As the series N1 is only available for France and Ireland, we are forced to focus on the remaining series N2 and N3. With regards to corporate lending rates we use the series N4 'short-term loans to enterprises'. These series are available for the EMU member countries Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain and for Denmark, Sweden, and the United Kingdom as non-EMU EU countries. The series N4 for Denmark and N3 for Sweden and Denmark are available from the ECB's publication "Selected retail interest rates from the non-Euro area EU countries. Note, however, that the following series are missing: N2 for Denmark, N3 for Ireland, Italy, and the Netherlands, N4 for Finland and the UK. Furthermore, the following series are only available as quarterly data: N2 for France and Sweden, N3 for Denmark, France and Sweden, N4 for Denmark and Sweden. In these cases, we assume that interest rates are constant during the given quarter and thus convert the quarterly to a monthly frequency by filling in the missing values. For the UK and Sweden several different N2 series are available and the series 2.3 and 2.1 have been chosen, respectively, as the relevant mortgage rate. For the UK several different N3 series are available and the series 3.1 has been chosen as the relevant consumer lending rate. For Belgium, Italy, and Portugal several different N4 series are available and the series 4.1, 4.1, and 4.2 have been chosen, respectively, as the relevant corporate lending rate. Finally, whereas some national series start as early as 1980, data for all EMU member countries is available only as of April 1995. Thus we decided to focus on the period from April 1995 until April 2002.

Based on these nominal interest rate series, real interest rates are calculated by deducting inflation rates. Inflation rates are calculated as the percentage change in the consumer price index (CPI) which is obtained from the CD-ROM version of the International Financial Statistics (IFS) published by the International Monetary Fund (IMF). From January 1996 until April 2002, a harmonized consumer price index (HCPI) as given in the IFS's line 64H is available for all EU countries and has been used. Before January 1996, the national CPI of line 64 is used. Exceptions to this rule are the following: For Portugal, national CPI data are used until December 1998 and HCPI is used starting January 1999. For Ireland, no CPI data are available. Thus, inflation rates are calculated based on wholesale prices until December 1998 and HCPI is used starting January 1999.

In order to calculate European weighted averages for the nominal and real interest rate series N2, N3, and N4, weights for each country have to be found. These weights should appropriately reflect the relative economics importance of the Eurozone countries. We therefore work with the OECD (2000) weighting scheme for aggregate measures, which is based on 1995 GDP and purchasing power parities. The weights are 0.82 for Austria, 1.05 for Belgium, 0.46 for Finland, 5.72 for France, 8.33 for Germany, 0.31 for Ireland, 5.49 for Italy, 1.57 for the Netherlands, 0.65 for Portugal, and 2.84 for Spain. Note that when estimating equation (4), the country under investigation is excluded from the European average and the weights are re-scaled to sum up to 100 per cent. Note that as Greece did not join EMU until January 2001, it has not been included in the weighted averages.

Finally, money market rates are obtained from line 60b of the CD-ROM version of the IMF's IFS. National rates for EMU member countries are used until December 1998 but due to the convergence of money market rates under the single currency, Euro area rates have been used as of January 1999. For Greece, national rates are available only from January 1998 to October 1999. After October 1999, Euro area rates have been used instead. For non-EMU member countries, the national rates have been used for the full time period.

This sample selection leads to series without any missing values for all EMU member countries. However, the series for the non-EMU member countries show some missing values. In particular the following series are not available for the full time period of 4/95 to 4/02: Mortgage lending rates (N2): Nominal rates, real rates and spreads for Greece (1/99-4/02), Sweden (1/96-9/01), UK (4/95-3/02). Consumer lending rates (N3): Nominal rates, real rates and spreads for Denmark (10/95-12/01), Greece (1/99-4/02), Sweden (10/95-9/01). Corporate lending rates (N4): Nominal rates, real rates and spreads for Denmark (4/95-12/01), Sweden (4/95-9/01), nominal rates for Greece (4/95-4/04) and real rates and spreads for Greece (1/98-4/02).

APPENDIX – TABLES AND FIGURES

TABLE A1, A2, A3 ABOUT HERE

FIGURE A1, A2 ABOUT HERE

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Table 1: Value of M&As in the financial sector between 1985 and 1997

	acquirer					
	commercial bank		securities firm		insurance company	
target	value	% of total	value	% of total	value	% of total
Panel A: Domestic M&As						
commercial bank	89.0	36.0	23.0	9.3	11.0	4.4
securities firm	9.0	3.6	19.0	7.7	6.0	2.4
insurance company	20.0	8.1	24.0	9.7	46.0	18.6
Panel B: Intra-European M&As						
commercial bank	15.0	17.9	4.3	5.1	11.2	13.4
securities firm	8.7	10.4	5.8	6.9	0.3	0.4
insurance company	0.4	0.5	1.1	1.3	37.0	44.2
Panel C: Europe-Non-Europe M&As						
commercial bank	14.5	14.5	15.6	15.6	1.0	1.0
securities firm	4.3	4.3	15.9	15.9	3.1	3.1
insurance company	0.3	0.3	12.9	12.9	32.7	32.7

Source: Berger, Demsetz, and Strahan (1999). Values are given in billion of US dollar. For each panel, the per cent figures sum to 100.

Table 2: Structural Breaks in the Cointegration Relationship

Country	Mortgage Lending Rates		Consumer Lending Rates		Corporate Lending Rates	
	Rolling Chow F-test	Break point (mm/yy)	Rolling Chow F-test	Break point (mm/yy)	Rolling Chow F-test	Break point (mm/yy)
Panel A: Nominal Lending Rates						
Austria	27.76	01/98	34.91	02/98	24.96	11/96
Belgium	112.74	05/99	121.05	12/95	54.52	06/97
Denmark			43.87	03/98	89.54	04/98
Finland	45.31	09/97	19.37	05/00		
France	14.29	(06/99)	55.81	06/98	23.60	03.97
Germany	62.56	06/99	38.75	08/00	253.28	03/00
Greece	118.96	11/00	168.55	02/01	340.32	03/00
Ireland	62.55	01/98			98.56	09/98
Italy	153.35	05/98			367.97	11/98
Netherlands	48.97	07/99			122.89	11/98
Portugal	63.81	01/97	733.21	04/98	375.26	05/99
Spain	82.20	03/97	623.64	01/00	57.68	02/97
Sweden	32.86	06/99	25.58	09/96	62.76	05/99
United Kingdom	48.28	11/00	124.75	12/98		
Panel B: Real Lending Rates						
Austria	44.24	07/99	25.77	12/96	39.52	11/99
Belgium	50.67	07/97	145.02	12/95	51.65	06/97
Denmark			13.65	(06/00)	28.40	06/00
Finland	81.35	02/96	32.47	07/96		
France	11.16	-	22.90	06/01	34.45	11/98
Germany	17.39	01/00	14.94	(11/99)	23.53	12/97
Greece	15.78	(09/00)	93.72	06/00	120.96	09/00
Ireland	31.50	12/98			98.56	09/98
Italy	106.67	03/98			144.83	02/98
Netherlands	90.74	12/00			77.13	12/00
Portugal	48.58	11/97	114.51	03/98	50.19	05/98
Spain	30.72	12/00	46.60	11.97	17.34	03/96
Sweden	32.11	03/98	25.60	02/97	27.94	03/98
United Kingdom	28.13	09/99	33.75	12/98		

Note: Parentheses indicate that a breakpoint is only marginally significant.

Table 3: Cointegration of Lending Rates

		Mortgage Lending Rates				Consumer Lending Rates				Corporate Lending Rates			
		nom		real		nom		real		nom		real	
Country	Period	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)
Austria	full	no	-0.113	yes	-0.237	no	-1.778	yes	-0.197	no	0.017	yes	-0.201
			(-3.950)		(-3.154)		(-3.842)		(-2.501)		(0.241)		(-2.497)
	pre-EMU	no	-0.091	yes	-0.375	no	-0.141	yes	-0.292	no	-0.133	yes	-0.422
			(-1.701)		(-2.776)		(-1.591)		(-2.369)		(-1.709)		(-3.264)
	EMU	no	-0.417	yes	-0.385	no	0.057	yes	-0.428	no	0.159	yes	-0.245
			(-8.797)		(-2.932)		-0.496		(-3.362)		(1.096)		(-1.944)
	postbreak			yes	-0.600							yes	-0.543
					(-3.000)								(-2.150)
Belgium	full	no	-0.143	yes	-0.152	no	-0.177	no	-0.119	no	-0.140	no	-0.136
			(-4.141)		(-2.547)		(-3.094)		(-2.144)		(-3.578)		(-2.415)
	pre-EMU	no	-0.178	no	-0.111	no	-0.224	no	-0.085	yes	-0.168	no	-0.085
			(-2.748)		(-1.573)		(-2.537)		(-1.075)		(-3.381)		(-1.419)
	EMU	no	-0.093	yes	-0.268	no	-0.084	yes	-0.205	no	0.167	yes	-0.626
			(-1.065)		(-2.099)		(-1.059)		(-1.495)		(1.839)		(-3.892)
	postbreak	yes	-0.437										
			(-3.684)										
Denmark	full					no	-0.214	no	-0.109	no	-0.135	no	-0.128
							(-3.565)		(-1.817)		(-2.360)		(-2.290)
	pre-EMU					no	-0.067	no	-0.05	no	-0.047	no	-0.065
							(-0.897)		(-0.642)		(-0.457)		(-0.788)
	EMU					yes	-0.119	no	-0.177	yes	-0.786	no	-0.069
							(-0.838)		(-1.935)		(-4.526)		(-0.827)
	postbreak							yes	-0.488			yes	-0.914
									(-2.111)				(-5.194)
Finland	full	no	-0.081	no	0.067	yes	-0.132	yes	-0.129				
			(-2.754)		(-1.525)		(-1.913)		(-1.798)				
	pre-EMU	no	-0.052	no	-0.027	yes	-0.312	yes	-0.531				
			(-1.553)		(-0.488)		(-2.587)		(-2.647)				
	EMU	no	-0.222	no	-0.262	no	0.146	no	-0.145				
			(-2.365)		(-2.378)		(1.822)		(-1.372)				
	postbreak					no	0.227						
							(2.168)						
France	full	yes	-0.368	yes	-0.206	yes	-0.198	yes	-0.175	yes	-0.117	yes	-0.164
			(-5.713)		(-2.723)		(-4.087)		(-1.862)		(-1.924)		(-2.623)
	pre-EMU	yes	-0.296	yes	-0.227	yes	-0.32	yes	-0.306	yes	-0.212	yes	-0.186
			(-3.182)		(-2.349)		(-3.816)		(-2.377)		(-0.268)		(-1.991)
	EMU	yes	-0.405	yes	-0.363	yes	-0.196	yes	-0.114	yes	-0.172	yes	-0.402
			(-4.223)		(-3.085)		(-1.994)		(-0.954)		(-1.041)		(-2.298)
	postbreak	yes	-0.561					yes	-0.554				
			(-4.074)						(-1.604)				

Table 3 continued: Cointegration of Lending Rates

		Mortgage Lending Rates				Consumer Lending Rates				Corporate Lending Rates			
		nom		real		nom		real		nom		real	
Country	Period	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)
Germany	full	no	-0.136	no	-0.107	no	-0.009	no	-0.182	no	-0.032	yes	-0.241
			(-3.044)		(-1.904)		(-2.089)		(-2.778)		(-1.637)		(-3.277)
	pre-EMU	yes	-0.197	no	-0.127	yes	-0.068	no	-0.107	no	-0.147	no	-0.19
			(-2.909)		(-1.801)		(-0.877)		(-1.239)		(-2.166)		(-2.131)
	EMU	no	0.056	no	-0.073	no	-0.057	no	-0.161	no	-0.042	yes	-0.334
			(0.740)		(-0.766)		(-1.230)		(-1.360)		(-0.776)		(-2.663)
	postbreak	no	-0.058	no	-0.147	yes	-0.411	yes	-0.352	no	-0.378		
			(-0.648)		(-1.087)		(-4.322)		(-2.233)		(-4.553)		
Greece	EMU	no	0.017	yes	-0.13	no	-0.079	no	-0.068	no	-0.062	no	-0.005
			(0.874)		(-1.415)		(-2.383)		(-2.082)		(-2.493)		(-0.191)
	postbreak	yes	-0.088	yes	-0.4	yes	-0.256	yes	-0.271	no	-0.055	yes	-0.274
			(-0.637)		(-2.439)		(-1.806)		(-4.504)		(-2.201)		(-2.507)
Ireland	full	no	-0.067	no	-0.115					no	-0.077	no	-0.123
			(-2.405)		(-2.509)						(-2.152)		(-2.461)
	pre-EMU	no	-0.132	yes	-0.182					no	-0.128	no	-0.199
			(-2.069)		(-2.070)						(-1.622)		(-2.317)
	EMU	no	-0.150	no	-0.084					yes	-0.712	yes	-0.165
			(-2.258)		(-1.445)						(-4.220)		(-2.242)
Italy	full	no	-0.108	no	-0.048					no	-0.021	no	-0.04
			(-5.732)		(-1.743)						(-2.718)		(-1.744)
	pre-EMU	no	-0.054	no	0.014					no	-0.016	no	0.018
			(-0.964)		-0.37						(-0.628)		-0.536
	EMU	no	-0.263	yes	-0.274					yes	-0.321	yes	-0.29
			(-3.832)		(-2.483)						(-4.367)		(-2.821)
Netherlands	full	no	-0.175	no	-0.075					no	-0.059	no	-0.053
			(-4.229)		(-1.829)						(-2.359)		(-1.143)
	pre-EMU	yes	-0.198	yes	-0.216					no	-0.070	yes	-0.181
			(-2.759)		(-1.392)						(-1.959)		(-1.696)
	EMU	no	-0.036	no	-0.061					yes	-0.265	no	-0.024
			(-0.352)		(-1.187)						(-1.484)		(-0.427)
	postbreak	no	-0.266	yes	-0.586							yes	-0.445
			(-1.945)		(-3.685)								(-3.275)
Portugal	full	no	-0.071	yes	-0.052	yes	-0.384	no	-0.134	yes	-0.138	yes	-0.043
			(-2.838)		(-1.087)		(-4.792)		(-2.434)		(-3.739)		(-0.885)
	pre-EMU	no	-0.074	no	-0.063	yes	-0.309	no	-0.08	yes	-0.717	yes	-0.178
			(-2.272)		(-0.991)		(-2.948)		(-1.072)		(-5.032)		(-1.893)
	EMU	no	-0.273	yes	-0.033	yes	-0.767	yes	-0.443	yes	-0.434	no	-0.066
			(-4.391)		(-0.398)		(-4.992)		(-2.781)		(-3.530)		(-0.872)
	postbreak									yes	-0.660		
											(-3.443)		

Table 3 continued: Cointegration of Lending Rates

		Mortgage Lending Rates				Consumer Lending Rates				Corporate Lending Rates			
		nom		real		nom		real		nom		real	
Country	Period	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)	coint?	β_{ECT} (t-stat)
Spain	full	no	-0.035	no	-0.12	yes	-0.285	yes	-0.111	no	-0.058	yes	-0.229
			(-1.940)		(-2.545)		(-4.226)		(-2.096)		(-0.920)		(-3.269)
	pre-EMU	no	-0.065	no	-0.141	no	-0.338	no	-0.173	no	-0.201	yes	-0.241
			(-2.439)		(-1.967)		(-5.702)		(-2.462)		(-2.317)		(-3.064)
	EMU	no	-0.21	yes	-0.296	yes	-0.517	yes	-0.434	yes	-0.531	yes	-0.393
			(-5.106)		(-3.016)		(-3.226)		(-3.817)		(-2.559)		(-2.753)
	postbreak			yes	-0.321	yes	-0.803						
					(-1.488)		(-4.528)						
Sweden	full	no	-0.162	no	-0.073	no	-0.086	no	-0.153	no	-0.046	no	-0.059
			(-2.297)		(-1.558)		(-2.119)		(-2.728)		(-1.981)		(-1.200)
	pre-EMU	yes	-0.322	no	-0.078	no	-0.152	no	-0.2	no	-0.131	no	-0.098
			(-1.961)		(-1.340)		(-2.310)		(-2.157)		(-3.138)		(-1.416)
	EMU	no	-0.313	yes	0.045	yes	-0.267	no	0.06	yes	-0.185	no	0.314
			(-2.632)		(0.299)		(-2.740)		-0.622		(-1.257)		(2.439)
	postbreak	yes	-0.228							yes	-0.162		
			(-1.701)								(-1.003)		
UK	full	no	-0.074	no	-0.082	no	-0.143	yes	-0.241				
			(-1.925)		(-1.585)		(-3.468)		(-3.404)				
	pre-EMU	no	-0.21	no	-0.159	yes	-0.203	yes	-0.396				
			(-2.871)		(-1.835)		(-2.387)		(-3.611)				
	EMU	no	-0.048	no	-0.106	yes	-0.356	yes	-0.465				
			(-0.600)		(-1.557)		(-3.086)		(-3.423)				
	postbreak	yes	-0.490	yes	-0.091								
			(-3.284)		(-0.671)								

Note: Cointegration is considered to exist if at least 2 test statistics of Table A3 are significant at the 10% level or if at least 1 test statistic is significant at 5% level or higher.

Table 4: Pass-Through Model Selection

		AIC values at optimal lag length					cointegration based on best TAR					Engle-Granger cointegration				selected pass-through model
								asymmetry tests								
country	period	TAR^0	TAR*	BTAR*	MTAR0	MTAR*	coint. test: H_0: $\Sigma_i \rho_i=0$	H_0: $\rho_1=\rho_2$	H_0: $\rho_1=\rho_3$	H_0: $\rho_2=\rho_2$	cointe-gration?	DW	DF	ADF	cointe-gration?	
Panel A: Mortgage Lending Rates																
Austria	full	-18.712	-19.210	**-20.205**	-15.426	-19.260	4.262	3.431	3.682	4.055	no	0.023	-2.260		no	STD
Austria	pre-EMU	18.091	14.324	**11.666**	19.284	15.406	4.183	9.324	3.000	4.966	no	0.195	-1.276		no	STD
Austria	EMU	-41.364	-42.298	-41.449	-42.161	**-43.745**	3.144	1.545			no	0.471	-2.573		yes	SYM
Belgium	full	92.202	90.875	**82.901**	90.789	85.735	5.492	11.358	0.008	11.380	no	0.143	-2.018		no	STD
Belgium	pre-EMU	38.830	36.056	33.647	38.097	**32.660**	3.429	5.579			no	0.156	-1.074		no	STD
Belgium	EMU	-6.780	-8.664	**-10.337**	-8.065	-9.311	4.686	4.645	0.522	5.344	no	0.219	-1.982	-2.736	no	STD
Finland	full	28.723	26.298	26.116	28.415	**22.683**	3.403	5.813			no	0.044	-0.895		no	STD
Finland	pre-EMU	-15.419	-15.880	**-35.379**	-14.563	-18.739	9.707	26.536	2.588	26.420	yes	0.098	-0.196		no	BTAR*
Finland	EMU	-23.571	-26.107	-24.719	-21.695	**-24.720**	5.915	4.013			no	0.598	-2.691		yes	SYM
France	full	67.725	66.596	62.406	67.622	**48.170**	10.792	20.781			yes, asym	0.037	-0.607	-0.965	no	MTAR*
France	pre-EMU	15.998	15.389	14.995	16.838	**4.885**	6.184	12.064			yes, asym	0.073	-0.254	-0.765	no	MTAR*
France	EMU	-24.463	-26.761	-26.292	-25.912	**-26.939**	10.090	2.365			yes, asym	1.136	-3.866	-4.432	yes	MTAR*
Germany	full	31.653	31.142	30.166	32.298	**26.782**	5.196	5.376			no	0.067	-2.271	-2.172	no	STD
Germany	pre-EMU	4.736	3.519	3.372	5.604	**-4.700**	5.693	10.859			no	0.107	-0.335		no	STD
Germany	EMU	-14.335	-17.113	-17.086	-14.551	**-17.561**	5.168	3.331			no	0.134	-1.661	-2.565	no	STD
Greece	EMU	67.819	**66.050**	66.419	67.555	66.716	1.697	1.894			no	0.207	-1.498		no	STD
Ireland	full	126.441	**124.099**	124.119	125.856	124.344	4.348	2.285			no	0.215	-2.162		no	STD
Ireland	pre-EMU	4.796	0.401	**-7.876**	5.574	-4.633	8.474	13.848	0.057	9.667	yes, asym	0.321	-2.293		no	BTAR*
Ireland	EMU	25.097	24.007	25.222	**20.236**	20.236	5.299	5.915			no	0.209	-1.790	-2.197	no	STD
Italy	full	151.658	150.551	149.721	151.593	**149.349**	2.581	2.166			no	0.230	-3.010		no	STD
Italy	pre-EMU	60.029	55.139	**52.176**	59.219	58.592	3.628	6.553	0.799	8.862	no	0.324	-2.706		no	STD
Italy	EMU	0.142	-1.241	**-3.613**	0.302	-3.439	3.957	4.649	0.134	5.716	no	0.411	-2.346		yes	SYM
Netherlands	full	51.182	50.242	51.009	50.374	**47.957**	4.585	3.398			no	0.075	-2.825	-2.368	no	STD
Netherlands	pre-EMU	31.289	30.688	30.772	29.516	**24.529**	3.716	5.580			no	0.196	-1.519		no	STD
Netherlands	EMU	-12.316	-13.140	**-19.967**	-12.641	-16.279	5.055	10.102	0.281	9.767	no	0.179	-1.271	-2.019	no	STD
Portugal	full	127.514	126.374	126.521	125.083	**122.139**	4.809	5.162			no	0.153	-2.135	-2.171	no	STD
Portugal	pre-EMU	29.632	27.846	27.266	29.520	**24.414**	5.031	4.743			no	0.166	-1.866	-2.042	no	STD
Portugal	EMU	-0.674	-0.916	0.225	-0.542	**-2.885**	4.973	2.639			no	0.490	-2.852		yes	SYM
Spain	full	107.891	106.126	105.209	107.788	**102.890**	7.853	4.931			yes, asym	0.487	-3.931		yes	MTAR*
Spain	pre-EMU	45.312	43.086	**40.946**	45.256	43.206	5.152	5.458	0.574	6.158	no	0.785	-3.209		yes	SYM
Spain	EMU	-22.087	-22.242	**-25.697**	-22.905	-23.730	4.563	5.009	0.040	5.160	no	0.592	-2.701	-3.541	yes	SYM
Sweden	full	79.638	76.305	**72.303**	79.886	77.787	5.421	8.952	0.558	9.110	yes, asym	0.157	-1.877	-2.404	no	BTAR*
Sweden	pre-EMU	29.257	26.531	**23.244**	29.047	26.067	3.520	7.399	0.401	7.404	no	0.148	-1.421	-1.610	no	STD
Sweden	EMU	-1.257	**-3.321**	-2.033	1.186	-0.542	6.709	4.285			no	0.188	-1.855	-2.578	no	STD

Table 4 continued: Pass-Through Model Selection

		AIC values at optimal lag length					cointegration based on best TAR					Engle-Granger cointegration				selected pass-through model
								asymmetry tests								
country	period	TAR^0	TAR*	BTAR*	$MTAR^0$	MTAR*	coint. test: H_0: $\Sigma_i \rho_i=0$	H_0: $\rho_1=\rho_2$	H_0: $\rho_1=\rho_3$	H_0: $\rho_2=\rho_2$	cointe-gration?	DW	DF	ADF	cointe-gration?	
UK	full	141.913	135.889	**129.941**	141.772	131.902	6.410	6.660	1.157	12.758	yes,asym	0.136	-3.138	-2.124	no	BTAR*
UK	pre-EMU	45.663	44.675	44.875	45.904	**43.850**	3.731	6.989			no	0.251	-0.553	-0.553	no	STD
UK	EMU	23.008	**17.566**	18.252	21.929	19.927	4.996	5.618			no	0.328	-2.148	-2.328	no	STD
Panel B: Consumer Lending Rates																
Austria	full	18.355	17.562	**15.181**	23.000	19.828	5.908	5.705	5.458	4.758	no	0.022	-2.501		no	STD
Austria	pre-EMU	41.087	39.837	39.437	41.817	**38.164**	1.995	3.637			no	0.253	-1.435	-1.015	no	STD
Austria	EMU	-47.224	**-47.909**	-46.467	-45.636	-47.292	6.808	1.012			yes, sym.	0.623	-3.550	-3.241	yes	SYM
Belgium	full	181.190	180.592	180.262	177.819	**148.008**	28.493	43.942			yes, asym	0.098	-2.533		no	MTAR*
Belgium	pre-EMU	89.256	87.285	86.167	89.959	**82.737**	3.931	6.999			no	0.248	-1.629		no	STD
Belgium	EMU	1.030	-0.588	**-3.609**	0.059	-3.147	4.051	6.681	0.049	6.675	no	0.322	-2.197		no	STD
Denmark	full	77.845	77.641	**71.542**	78.164	76.877	4.417	0.686	5.326	9.038	no	0.214	-2.184	-1.955	no	STD
Denmark	pre-EMU	0.520	-1.276	**-4.726**	0.597	-0.550	3.185	6.833	0.201	6.912	no	0.379	-1.918		no	STD
Denmark	EMU	12.653	11.270	10.230	10.082	**7.516**	8.609	5.330			yes, asym	0.933	-3.375	-3.327	yes	MTAR*
Finland	full	129.889	128.861	128.399	127.865	**119.506**	6.033	11.433			yes, asym	0.192	-2.075	-0.741	no	MTAR*
Finland	pre-EMU	59.790	54.981	55.216	58.911	**49.056**	6.008	12.008			yes, asym	0.617	-2.438	-0.659	yes	MTAR*
Finland	EMU	-11.992	-13.650	-11.693	-12.367	**-19.790**	8.817	8.729			yes, asym	0.691	-2.932		yes	MTAR*
France	full	95.562	93.824	94.703	93.159	**77.991**	9.990	18.785			yes, asym	0.040	-0.692	-0.974	no	MTAR*
France	pre-EMU	40.386	39.082	38.453	42.472	**31.068**	5.775	11.461			no	0.110	-0.522		no	STD
France	EMU	-40.027	-40.775	-40.317	-41.478	**-42.064**	4.734	3.108			no	0.588	-2.432		yes	SYM
Germany	full	-62.051	-62.442	**-65.429**	-56.973	-61.289	6.727	6.122	5.683	4.815	yes, asym	0.012	-3.398	-2.597	yes	BTAR*
Germany	pre-EMU	6.206	3.030	1.929	3.259	**1.225**	2.737	4.935			no	0.095	-0.736		no	STD
Germany	EMU	-83.435	-85.331	**-93.187**	-83.207	-83.471	4.365	6.415	0.643	10.550	no	0.072	-0.196	-1.449	no	STD
Greece	EMU	143.923	142.346	**136.516**	144.682	143.855	4.191	8.633	1.748	7.020	no	0.151	-1.088		no	STD
Portugal	full	314.500	311.923	314.725	314.472	**311.146**	4.886	3.235			no	0.671	-4.119	-4.119	yes	SYM
Portugal	pre-EMU	139.137	137.954	**136.794**	139.043	138.572	3.047	3.697	0.001	3.774	no	0.966	-3.933		yes	SYM
Portugal	EMU	93.467	92.779	**89.893**	92.907	91.914	2.615	4.488	0.137	4.829	no	1.187	-4.017	-2.229	yes	SYM
Spain	full	176.654	174.535	**169.552**	177.281	174.567	5.017	8.797	0.857	8.754	no	0.473	-3.342		yes	SYM
Spain	pre-EMU	53.491	50.555	**47.809**	53.359	49.841	3.462	4.158	0.701	6.717	no	0.583	-2.722		yes	SYM
Spain	EMU	37.273	32.493	**28.699**	36.340	29.755	9.674	10.288	1.985	10.194	yes, asym	1.211	-4.447	-4.306	yes	BTAR*
Sweden	full	28.713	26.861	**21.840**	29.446	26.492	3.110	6.629	1.326	9.075	no	0.236	-1.750	-1.669	no	STD
Sweden	pre-EMU	-3.373	-4.422	**-5.973**	-5.217	-5.445	1.352	3.840	0.174	3.992	no	0.735	-2.821	-2.438	yes	SYM
Sweden	EMU	-44.830	-46.750	**-47.121**	-45.355	-47.110	2.496	3.677	0.007	3.668	no	0.604	-2.266	-2.331	yes	SYM
UK	full	263.209	262.471	252.506	262.793	**252.449**	7.298	10.789			yes, asym	0.221	-2.640	-2.087	no	MTAR*
UK	pre-EMU	64.861	64.549	62.909	64.998	**59.107**	4.949	5.575			no	0.135	-0.960		no	STD
UK	EMU	36.254	28.249	33.296	36.184	**26.370**	7.403	9.472			yes, asym	0.700	-3.333		yes	MTAR*

Table 4 continued: Pass-Through Model Selection

		AIC values at optimal lag length					cointegration based on best TAR					Engle-Granger cointegration				
								asymmetry tests								
country	period	TAR^0	TAR*	**BTAR**	MTAR0	MTAR*	coint. test: H_0: $\Sigma_i \rho_i=0$	H_0: $\rho_1=\rho_2$	H_0: $\rho_1=\rho_3$	H_0: $\rho_2=\rho_2$	cointe-gration?	DW	DF	ADF	cointe-gration?	selected pass-through model
Panel C: Corporate Lending Rates																
Austria	full	-43.629	**-43.815**	-43.668	-38.839	-40.806	5.381	7.297			no	0.016	-2.109	-1.811	no	STD
Austria	pre-EMU	16.502	11.820	**9.505**	17.367	12.852	4.173	10.043	3.628	4.225	no	0.156	-1.017		no	STD
Austria	EMU	-55.898	-56.726	**-60.344**	-57.053	-57.116	5.327	6.911	0.198	6.284	no	0.451	-2.832		yes	SYM
Belgium	full	10.386	9.210	8.752	8.745	**4.573**	9.281	6.161			yes, asym	0.688	-4.368		yes	MTAR*
Belgium	pre-EMU	-31.691	-33.068	-33.352	-35.647	**-36.521**	4.024	5.435			no	1.255	-4.621		yes	SYM
Belgium	EMU	-14.187	-16.008	-16.872	-13.939	**-20.421**	6.881	6.941			yes, asym	0.486	-2.495		yes	MTAR*
Denmark	full	75.773	71.279	61.092	74.096	**70.924**	8.158	9.208	3.455	16.700	yes, asym	0.190	-2.227	-2.382	no	MTAR*
Denmark	pre-EMU	27.854	26.667	23.532	25.305	**22.525**	4.027	5.627			no	0.197	-1.378		no	STD
Denmark	EMU	10.677	3.047	**0.780**	11.818	9.250	4.714	3.865	3.558	14.109	no	0.458	-1.825	-2.017	yes	SYM
France	full	109.413	106.616	103.113	109.322	**99.124**	6.189	10.159			yes, asym	0.062	-1.006	-1.564	no	MTAR*
France	pre-EMU	29.103	26.211	28.152	29.561	**22.722**	4.215	6.538			no	0.070	-0.434	-1.330	no	STD
France	EMU	9.182	7.837	7.814	9.209	**6.966**	7.758	2.119			yes, asym	1.058	-3.660	-3.896	yes	MTAR*
Germany	full	-3.503	-7.066	-5.090	-4.249	**-6.387**	2.954	4.580			no	0.189	-1.420		no	STD
Germany	pre-EMU	-41.853	-42.221	-43.540	-40.799	**-45.274**	2.868	4.404			no	0.308	-2.004		no	STD
Germany	EMU	-25.039	-27.459	**-30.691**	-22.690	-23.851	3.520	5.531	2.496	9.168	no	0.144	-0.709		no	STD
Greece	EMU	127.066	126.389	**116.923**	128.460	127.107	4.979	11.615	1.938	10.853	no	0.166	-1.067		no	STD
Ireland	full	50.256	46.498	**40.883**	50.066	45.023	6.163	7.946	1.289	11.089	no	0.389	-2.981	-2.024	yes	SYM
Ireland	pre-EMU	10.077	9.489	**1.463**	10.273	7.986	6.635	10.080	0.003	9.401	no	0.649	-2.903	-1.949	yes	SYM
Ireland	EMU	-13.299	-17.056	**-18.059**	-12.070	-14.573	4.054	6.624	1.276	6.810	no	0.358	-1.892		no	STD
Italy	full	98.323	97.699	**87.826**	94.209	91.515	5.107	12.339	0.001	12.353	no	0.176	-2.770		no	STD
Italy	pre-EMU	25.615	21.013	21.372	22.912	**19.594**	4.654	7.192			no	0.282	-2.814		no	STD
Italy	EMU	-31.809	-33.647	**-37.445**	-30.788	-36.023	5.623	8.890	0.840	5.771	no	0.202	-2.584		no	STD
Netherlands	full	88.105	87.430	87.422	88.399	**85.417**	4.663	2.893			no	0.821	-4.339		yes	SYM
Netherlands	pre-EMU	-1.091	-3.667	**-4.690**	0.071	-1.603	2.262	4.233	1.698	5.967	no	0.862	-2.657	-0.716	yes	SYM
Netherlands	EMU	25.902	24.803	**24.342**	25.282	24.536	3.596	3.442	0.158	3.440	no	0.807	-2.626		yes	SYM
Portugal	full	196.386	192.398	191.121	196.795	**190.441**	5.042	6.744			no	0.377	-2.928	-2.387	no	STD
Portugal	pre-EMU	73.258	69.654	**65.301**	73.607	73.152	8.890	9.303	0.861	9.327	yes, asym	1.556	-5.232	-5.331	yes	BTAR*
Portugal	EMU	13.385	12.177	11.384	14.338	**9.858**	8.404	4.707			yes, asym	0.616	-3.395		yes	MTAR*

Table 4 continued: Pass-Through Model Selection

		AIC values at optimal lag length					cointegration based on best TAR					Engle-Granger cointegration				selected pass-through model
								asymmetry tests								
country	period	TAR^0	TAR*	BTAR*	$MTAR^0$	MTAR*	coint. test: H_0: $\Sigma_i \rho_i=0$	H_0: $\rho_1=\rho_2$	H_0: $\rho_1=\rho_3$	H_0: $\rho_2=\rho_2$	cointe-gration?	DW	DF	ADF	cointe-gration?	
Spain	full	116.671	**114.864**	116.380	116.906	116.403	4.047	2.994			no	0.965	-5.371	-3.348	yes	SYM
Spain	pre-EMU	33.687	31.000	30.419	34.317	**29.487**	2.444	4.424			no	0.800	-2.799		yes	SYM
Spain	EMU	12.731	12.443	**10.750**	12.718	11.268	5.104	3.307	0.075	3.426	no	1.499	-4.771		yes	SYM
Sweden	full	57.601	**52.644**	54.189	57.477	52.872	3.219	4.716			no	0.332	-2.644	-2.313	no	STD
Sweden	pre-EMU	14.202	8.051	**7.167**	10.970	9.506	4.165	3.447	0.703	8.686	no	0.551	-2.914	-2.451	yes	SYM
Sweden	EMU	-42.618	-42.944	-43.385	-41.800	**-43.486**	6.207	2.180			yes, asym	0.870	-3.233		yes	MTAR*

Note: For the critical values of the Engle-Granger cointegration tests see notes to table 4. The critical values for the cointegration and asymmetry tests of the best TAR model are listed in Enders and Siklos (2000). The critical values vary depending on the type of TAR model, the sample size, and the lag length of the model. As approximate benchmarks, one can consider test statistics of 6.0 or higher for the cointegration test and test statistics of -2.5 and lower for the asymmetry tests to allow the rejection of the null hypothesis. – The minimum AIC value of the optimal TAR model is represented in bold. Engle-Granger cointegration is considered to exist if either 2 test statistics are significant at 10% level or 1 test statistic is significant at the 5% level or higher.

Table 5: Extended Pass-Through of Money Market Rate Innovations onto Lending Rates in Europe

Country	Period	Model	Impact Multiplier β_2	Long-run Multiplier θ	Error Correction Speed of Adjustment $\beta_{ECT,1}$	$\beta_{ECT,2}$	$\beta_{ECT,3}$	Optimal Threshold a_0*	Lags k*	n*
Panel A: Mortgage Lending Rates										
Austria	full	STD	0.136 (2.597)	0.653					4	1
	pre	STD	0.064 (0.752)	0.563					4	1
	EMU	SYM	0.158 (3.256)	0.590	-0.423 (-5.550)				3	0
Belgium	full	STD	0.282 (3.053)	0.641					2	1
	pre	STD	0.240 (1.721)	0.712					2	1
	EMU	STD	0.356 (2.919)	0.413					0	1
Finland	full	STD	0.374 (5.826)	0.749					1	1
	pre	BTAR*	0.304 (3.510)	1.032	-0.082 (-0.960)	-10.617 (-0.858)	0.057 (0.908)	0.009	1	1
	EMU	SYM	0.475 (4.607)	0.832	-0.216 (-1.869)				1	1
France	full	MTAR*	0.134 (2.221)	0.611	0.003 (0.041)	-0.028 (-1.741)		0.275	3	0
	pre	MTAR*	-0.080 (-1.044)	0.545	0.104 (0.748)	-0.024 (-0.954)		0.246	4	0
	EMU	MTAR*	0.391 (4.039)	0.515	-0.530 (-1.963)	-0.812 (-4.171)		0.053	3	0
Germany	full	STD	0.483 (4.348)	0.185					4	2
	pre	STD	0.325 (1.824)	0.405					0	2
	EMU	STD	0.584 (4.229)	0.145					4	2
Greece	EMU	STD	-0.001 (-0.044)	-0.001					0	4
Ireland	full	STD	0.239 (3.549)	0.589					1	1
	pre	BTAR*	0.205 (3.809)	0.492	-0.081 (-0.781)	-0.228 (-1.797)	-0.251 (-1.555)	0.359	3	1
	EMU	STD	0.235 (1.120)	0.870					1	1
Italy	full	STD	0.286 (2.695)	0.694					2	3
	pre	STD	0.257 (1.632)	0.783					2	3
	EMU	SYM	0.179 (1.258)	0.552	-0.596 (-4.037)				1	2
Netherlands	full	STD	0.142 (1.767)	0.459					1	1
	pre	STD	0.071 (0.577)	0.092					0	1
	EMU	STD	0.152 (1.431)	0.315					0	1
Portugal	full	STD	0.212 (2.764)	0.926					2	4
	pre	STD	0.174 (1.500)	0.468					0	4
	EMU	SYM	0.017 (0.190)	0.813	-0.180 (-2.339)				1	1

Table 5 continued: Extented Pass-Through of Money Market Rate Innovations onto Lending Rates in Europe

Country	Period	Model	Impact Multiplier	Long-run Multiplier	Error Correction Speed of Adjustment			Optimal Threshold	Lags	
			β_2	θ	$\beta_{ECT,1}$	$\beta_{ECT,2}$	$\beta_{ECT,3}$	a_0*	k*	n*
Spain	full	MTAR*	0.180	1.077	-0.043	0.017		-0.323	1	2
			(4.688)		(-1.316)	(0.159)				
	pre	SYM	0.144	1.139	-0.047				1	2
			(2.901)		(-0.879)					
	EMU	SYM	0.106	0.742	-0.345				1	0
			(2.352)		(-6.768)					
Sweden	full	BTAR*	0.074	0.711	-0.187	-1.286	0.026	0.089	3	0
			(0.376)		(-1.760)	(-0.472)	(0.222)			
	pre	STD	0.048	0.046					0	3
			(0.176)							
	EMU	STD	-0.024	-0.038					0	3
			(-0.075)							
UK	full	BTAR*	0.054	0.441	-0.090	0.030	-0.135	0.863	4	1
			(1.511)		(-2.683)	(0.796)	(-2.538)			
	pre	STD	0.037	-0.443					4	4
			(0.526)							
	EMU	STD	0.002	0.003					0	1
			(0.053)							
Panel B: Consumer Lending Rates										
Austria	full	STD	0.143	0.750					3	4
			(2.055)							
	pre	STD	0.049	0.908					3	3
			(0.415)							
	EMU	SYM	0.219	0.589	-0.431				3	4
			(3.872)		(-4.432)					
Belgium	full	MTAR*	0.915	1.095	-0.022	-0.170		0.097	2	3
			(3.900)		(-0.290)	(-4.203)				
	pre	STD	0.980	1.321					1	1
			(2.795)							
	EMU	STD	0.488	0.369					33	1
			(3.013)							
Denmark	full	STD	0.320	0.582					3	2
			(3.275)							
	pre	STD	0.167	0.174					0	3
			(1.523)							
	EMU	MTAR*	0.047	0.574	-0.472	-0.417		-0.252	3	1
			(0.392)		(-2.760)	(-1.420)				
Finland	full	MTAR*	0.640	1.027	0.381	-0.061		0.458	2	1
			(3.610)		(1.413)	(1.507)				
	pre	MTAR*	0.284	1.089	1.349	0.039		0.501	2	1
			(0.762)		(1.852)	(0.358)				
	EMU	MTAR*	0.547	0.833	-0.482	0.043		-0.166	1	1
			(4.089)		(-2.601)	(0.146)				
France	full	MTAR*	-0.063	0.629	0.043	-0.035		0.293	3	4
			(-0.934)		(0.653)	(-2.002)				
	pre	STD	-0.150	-0.144					0	3
			(-1.582)							
	EMU	SYM	0.033	0.285	-0.609				3	2
			(0.483)		(-4.257)					
Germany	full	BTAR*	0.087	0.335	-0.038	0.143	-0.102	0.153	3	3
			(1.700)		(-2.144)	(0.630)	(-3.247)			
	pre	STD	0.140	0.412					3	3
			(1.376)							
	EMU	STD	0.116	0.282					2	1
			(2.575)							
Greece	EMU	STD	-0.048	-0.084					0	4
			(-0.615)							

Table 5 continued: Extented Pass-Through of Money Market Rate Innovations onto Lending Rates in Europe

Country	Period	Model	Impact Multiplier β_2	Long-run Multiplier θ	Error Correction Speed of Adjustment $\beta_{ECT,1}$	$\beta_{ECT,2}$	$\beta_{ECT,3}$	Optimal Threshold a_0*	Lags k*	n*
Portugal	full	SYM	0.210 (0.489)	1.566	-0.318 (-3.859)				1	0
	pre	SYM	0.251 (0.303)	1.692	-0.542 (-3.845)				1	0
	EMU	SYM	-0.696 (-1.583)	0.477	-0.510 (-3.297)				1	0
Spain	full	SYM	0.743 (5.571)	1.215	-0.225 (-3.514)				4	0
	pre	SYM	0.705 (4.731)	1.246	-0.264 (-2.766)				4	0
	EMU	BTAR*	0.361 (1.435)	0.591	-0.613 (-1.647)	3.026 (0.093)	-1.175 (-3.704)	0.007	3	0
Sweden	full	STD	0.587 (4.713)	0.662					2	4
	pre	SYM	0.819 (4.182)	0.862	0.274 (2.336)				4	4
	EMU	SYM	0.064 (0.410)	0.292	-0.289 (-2.391)				3	0
UK	full	MTAR*	0.098 (1.258)	0.969	-0.407 (-0.388)	-0.047 (-1.605)		1.823	1	3
	pre	STD	0.210 (1.804)	0.630					1	1
	EMU	MTAR*	-0.073 (-1.419)	-0.041	-0.416 (-3.014)	-1.286 (-3.035)		-0.462	1	0
Panel C: Corporate Lending Rates										
Austria	full	STD	0.251 (5.449)	0.691					4	1
	pre	STD	0.129 (1.978)	0.513					4	1
	EMU	SYM	0.196 (3.571)	0.609	-0.312 (-3.362)				1	4
Belgium	full	MTAR*	1.072 (10.213)	0.921	-0.325 (-2.149)	-0.413 (-2.852)		-0.014	1	2
	pre	SYM	1.009 (7.066)	0.934	-0.481 (-2.449)				1	4
	EMU	MTAR*	1.234 (7.528)	0.925	-0.934 (-3.207)	0.403 (0.124)		-0.238	3	1
Denmark	full	MTAR*	0.270 (3.508)	0.714	-1.383 (-2.711)	-0.144 (-3.080)		0.444	2	3
	pre	STD	0.119 (0.923)	0.664					1	3
	EMU	SYM	0.274 (2.810)	0.718	-0.312 (-3.515)				3	0
France	full	MTAR*	0.451 (3.895)	0.885	0.100 (0.720)	-0.056 (-2.309)		0.369	4	4
	pre	STD	0.273 (1.445)	0.876					4	4
	EMU	MTAR*	0.692 (4.389)	0.829	-0.753 (-4.224)	0.115 (0.239)		-0.232	3	1
Germany	full	STD	0.130 (2.304)	0.540					1	3
	pre	STD	0.167 (1.611)	0.373					1	1
	EMU	STD	0.104 (1.903)	0.558					2	2
Greece	EMU	STD	-0.049 (-0.856)	-0.077					0	1

Table 5 continued: Extented Pass-Through of Money Market Rate Innovations onto Lending Rates in Europe

Country	Period	Model	Impact Multiplier	Long-run Multiplier	Error Correction Speed of Adjustment			Optimal Threshold	Lags	
			β_2	θ	$\beta_{ECT,1}$	$\beta_{ECT,2}$	$\beta_{ECT,3}$	a_0*	k*	n*
Ireland	full	SYM	0.250	0.564	-0.104				3	1
			(5.055)		(-1.874)					
	pre	SYM	0.269	0.582	-0.175				3	1
			(4.244)		(-1.749)					
	EMU	STD	0.192	0.624					1	1
			(2.067)							
Italy	full	STD	0.154	0.845					3	3
			(4.891)							
	pre	STD	0.126	0.843					3	3
			(2.760)							
	EMU	STD	0.134	0.840					2	4
			(2.630)							
Netherlands	full	SYM	0.435	1.075	-0.248				4	1
			(4.637)		(-2.974)					
	pre	SYM	0.195	1.040	-0.212				3	0
			(1.847)		(-1.983)					
	EMU	SYM	0.406	1.028	-0.539				4	0
			(2.304)		(-3.370)					
Portugal	full	STD	0.392	0.900					4	2
			(2.012)							
	pre	BTAR*	0.344	1.442	-1.335	136.245	-0.084	0.006	2	0
			(0.929)		(-4.681)	(1.934)	(-0.314)			
		TAR*	0.331	1.442	-1.351	-0.524		0.351	2	1
			(0.901)		(-4.836)	(-2.525)				
	EMU	MTAR*	0.345	0.602	-0.927	-0.495		-0.011	3	0
			(1.999)		(-3.499)	(2.861)				
Spain	full	SYM	0.433	0.966	-0.021				3	0
			(2.774)		(-0.451)					
	pre	SYM	0.620	1.036	-0.147				1	1
			(5.792)		(1.078)					
	EMU	SYM	0.641	0.887	-1.018				1	1
			(3.422)		(-5.398)					
Sweden	full	STD	0.424	0.515					0	3
			(2.945)							
	pre	SYM	0.661	0.889	0.055				3	2
			(2.930)		(0.647)					
	EMU	MTAR*	0.004	0.534	-0.429	-0.439		-0.101	3	0
			(0.018)		(-1.560)	(-0.661)				

Note: t-statistics are given in parentheses.

Table A1: Nominal and Real Cost of Borrowing and Interest Rate Spreads – Descriptive Statistics

country	mortgage lending rates						consumer lending rates						corporate lending rates					
	full		pre-EMU		EMU		full		pre-EMU		EMU		full		pre-EMU		EMU	
	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.
Panel A: Nominal cost of borrowing																		
Austria	6.22	0.73	6.64	0.65	5.74	0.49	7.71	0.90	8.29	0.79	7.05	0.48	6.62	0.76	7.05	0.69	6.14	0.50
Belgium	6.08	0.77	6.07	0.85	6.10	0.68	7.71	1.33	8.16	1.65	7.20	0.52	4.63	0.63	4.58	0.51	4.68	0.76
Denmark							10.16	0.60	10.45	0.45	9.84	0.58	5.99	0.75	6.12	0.73	5.85	0.74
Finland	5.83	1.07	6.36	1.07	5.23	0.68	7.02	1.13	7.58	1.16	6.40	0.68						
France	7.30	1.14	8.07	1.01	6.43	0.43	9.46	1.23	10.31	1.12	8.51	0.26	5.85	1.40	6.56	1.50	5.05	0.69
Germany	5.96	0.69	6.17	0.70	5.73	0.60	11.00	0.79	11.47	0.80	10.48	0.28	8.09	0.52	7.95	0.39	8.25	0.61
Greece	7.22	1.27			7.22	1.27	16.13	3.83			16.13	3.83	16.03	4.85	20.03	1.61	11.54	2.93
Ireland	6.23	1.14	7.17	0.46	5.17	0.63							9.56	0.75	10.03	0.49	9.04	0.65
Italy	8.78	3.03	11.09	2.38	6.17	0.50							8.41	2.66	10.48	2.01	6.09	0.53
Netherlands	6.11	0.63	6.31	0.63	5.88	0.54							3.94	0.78	3.59	0.50	4.33	0.85
Portugal	7.88	2.75	9.88	2.32	5.63	0.69	12.04	3.10	14.05	3.01	9.77	0.73	8.06	2.95	10.22	2.49	5.63	0.56
Spain	6.92	2.20	8.27	2.23	5.41	0.61	9.93	2.50	11.54	2.45	8.11	0.55	6.14	2.02	7.35	2.03	4.77	0.74
Sweden	7.23	1.05	7.73	1.18	6.67	0.45	7.67	1.49	8.62	1.45	6.55	0.18	6.43	1.79	7.43	1.77	5.07	0.26
UK	7.20	0.97	7.91	0.70	6.41	0.49	17.43	1.79	18.93	1.04	15.74	0.37						
Panel B: Real cost of borrowing																		
Austria	4.70	0.67	5.20	0.29	4.13	0.51	6.19	0.85	6.85	0.41	5.45	0.54	5.11	0.71	5.61	0.31	4.53	0.57
Belgium	4.32	0.82	4.68	0.89	3.91	0.48	5.94	1.53	6.77	1.67	5.02	0.50	2.87	0.68	3.20	0.74	2.50	0.35
Denmark							8.10	0.86	8.67	0.64	7.49	0.62	3.93	0.88	4.34	0.76	3.50	0.81
Finland	4.14	1.58	5.25	1.36	2.89	0.52	5.33	1.62	6.47	1.41	4.06	0.53						
France	5.84	1.02	6.63	0.61	4.96	0.52	8.01	1.14	8.88	0.73	7.03	0.59	4.40	1.15	5.13	1.06	3.58	0.52
Germany	4.51	0.75	4.96	0.51	4.01	0.65	9.55	0.99	10.25	0.63	8.75	0.67	6.64	0.43	6.73	0.38	6.52	0.45
Greece	4.19	1.98			4.19	1.98	13.10	4.62			13.10	4.62	9.78	4.03	14.03	0.81	8.50	3.71
Ireland	3.88	2.94	6.30	1.48	1.16	1.35							7.21	2.43	9.15	1.51	5.02	0.99
Italy	6.03	2.25	7.88	1.40	3.95	0.50							5.67	1.88	7.27	0.96	3.87	0.51
Netherlands	3.66	1.54	4.61	0.73	2.59	1.51							1.49	1.03	1.89	0.53	1.04	1.26
Portugal	4.84	2.76	7.94	2.10	2.48	0.77	8.99	3.05	11.11	2.76	6.62	0.70	5.01	2.93	7.28	2.14	2.47	0.86
Spain	4.05	1.73	5.42	1.16	2.52	0.58	7.06	2.06	8.70	1.37	5.22	0.64	3.27	1.54	4.50	0.96	1.88	0.60
Sweden	5.93	1.38	6.52	1.48	5.29	0.93	6.34	1.65	7.32	1.51	5.18	0.87	5.00	1.70	5.96	1.56	3.69	0.75
UK	5.48	0.65	5.67	0.48	5.26	0.76	15.71	1.16	16.69	0.55	14.58	0.39						

Table A1 continued: Nominal and Real Cost of Borrowing and Interest Rate Spreads – Descriptive Statistics

country	mortgage lending rates						consumer lending rates						corporate lending rates					
	full		pre-EMU		EMU		full		pre-EMU		EMU		full		pre-EMU		EMU	
	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.	mean	stand. dev.
Panel C: Spreads over Money Market Rate																		
Austria	2.59	0.75	3.18	0.42	1.92	0.35	4.08	0.92	4.83	0.53	3.23	0.35	2.99	0.76	3.59	0.47	2.31	0.33
Belgium	2.36	0.51	2.43	0.58	2.27	0.39	3.99	1.12	4.52	1.26	3.38	0.46	0.90	0.7	0.94	0.13	0.86	0.20
Denmark							5.95	0.58	6.36	0.32	5.50	0.46	1.78	0.56	2.03	0.56	1.51	0.42
Finland	1.96	0.61	2.45	0.39	1.41	0.21	3.15	0.66	3.66	0.48	2.57	0.22						
France	3.35	1.01	4.01	0.93	2.61	0.40	5.51	1.09	6.26	0.89	4.68	0.58	1.916	1.02	2.51	1.07	1.23	0.25
Germany	2.31	0.64	2.67	0.49	1.91	0.55	7.35	0.87	7.96	0.53	6.65	0.63	4.43	0.31	4.44	0.22	4.42	0.39
Greece	1.54	2.09			1.54	2.09	10.45	2.95			10.45	2.95	5.56	2.19	4.57	1.60	5.85	2.26
Ireland	1.37	0.56	1.38	0.47	1.35	0.65							4.70	0.60	4.24	0.40	5.22	0.29
Italy	2.92	0.78	3.43	0.65	2.35	0.44							2.56	0.52	2.82	0.48	2.26	0.41
Netherlands	2.60	0.70	3.07	0.48	2.06	0.50							0.43	0.24	0.35	0.19	0.51	0.26
Portugal	2.68	1.02	3.45	0.78	1.81	0.28	6.83	1.45	7.62	1.47	5.95	0.75	2.86	1.21	3.79	0.86	1.81	0.42
Spain	1.68	0.36	1.76	0.42	1.61	0.27	4.69	0.67	5.04	0.64	4.29	0.44	0.89	0.27	0.84	0.28	0.95	0.24
Sweden	2.92	0.72	2.83	0.84	3.01	0.57	3.17	0.43	3.40	0.37	2.90	0.34	1.60	0.37	1.74	0.39	1.41	0.23
UK	1.40	1.02	1.47	1.22	1.32	0.74	11.62	1.51	12.48	1.40	10.63	0.93						

Note: “stand. dev.” indicates standard deviation. All rates are given in percentage points per annum. Blank cells indicate that the interest rate series is not available.

Table A2: Unit Root Tests

Panel A: Nominal Lending Rates

		mortgage rates				consumer rates				corporate rates			
country	period	t(level)	F(level)	t(diff)	F(diff)	t(level)	F(level)	t(diff)	F(diff)	t(level)	F(level)	t(diff)	F(diff)
Austria	full	-2.177	3.175	-3.138	4.966	-2.075	3.076	-4.403	9.698	-2.198	3.362	-3.321	5.514
	pre-EMU	-2.302	5.073	-3.387	5.750	-2.034	2.723	-4.216	8.898	-2.094	5.882	-3.657	6.723
	EMU	-1.116	0.768	-1.824	1.739	-1.545	1.210	-2.103	2.218	-1.235	0.973	-2.219	2.473
Belgium	full		5.755	-5.194	13.488	-2.921	6.503	-7.208	26.003	-3.170	5.738	-5.151	13.266
	pre-EMU	-2.369	4.000	-4.184	8.762	-2.050	3.235	-5.603	15.714	-3.472	7.513	-4.466	9.995
	EMU	-0.935	1.337	-3.610	6.524	-1.169	1.014	-3.714	6.941	-0.977	1.025	-3.384	5.807
Denmark	full					-2.345	2.984	-6.061	18.372	-2.596	4.938	-6.358	20.217
	pre-EMU					-1.854	6.518	-6.553	21.491	-1.126	5.932	-7.294	26.630
	EMU					-2.114	2.254	-4.079	8.321	-2.005	2.067	-4.022	8.089
Finland	full	-2.127	2.880	-4.000	8.006	-2.025	2.907	-6.671	22.267				
	pre-EMU	-1.569	1.702	-3.038	4.620	-1.843	1.997	-5.730	16.422				
	EMU	-1.265	1.084	-2.812	3.991	-0.911	1.065	-3.252	5.418				
France	full	-0.951	0.927	-7.217	26.050	-0.950	1.770	-7.717	29.794	-1.329	0.887	-6.436	20.716
	pre-EMU	-4.606	11.670	-7.396	27.433	-2.704	3.951	-6.637	22.089	-5.805	17.901	-4.905	12.044
	EMU	-0.751	0.491	-4.344	9.434	-0.299	0.772	-4.530	10.260	-0.513	0.833	-4.552	10.359
Germany	full		5.087	-5.105	13.033	-2.030	9.368	-6.535	21.355	-2.779	6.638	-4.157	8.648
	pre-EMU	-3.781	7.406	-4.203	8.882	-1.840	4.097	-6.060	18.413	-3.972	15.969	-6.184	19.136
	EMU	-1.816	1.971	-3.401	5.807	-2.204	2.480	-2.669	3.662	-1.533	1.277	-2.057	2.118
Greece	full	-1.422	1.124	-4.324	9.716	-1.518	1.155	-3.155	5.075	-2.128	2.298	-5.660	16.025
	pre-EMU									-3.917	9.857	-4.594	10.556
	EMU	-1.422	1.124	-4.324	9.716	-1.518	1.155	-3.155	5.075	-2.942	4.824	-4.318	9.331
Ireland	full	-1.977	2.016	-6.292	20.272					-2.005	2.093	-4.923	12.227
	pre-EMU	-1.913	1.836	-5.067	13.268					-1.630	1.486	-3.780	7.155
	EMU	-1.768	1.569	-3.737	7.021					-0.976	0.673	-3.072	4.881
Italy	full	-0.329	0.717	-5.760	16.953					-1.210	1.517	-3.589	7.322
	pre-EMU	-2.389	10.881	-6.237	19.689					-3.887	9.707	-3.097	5.001
	EMU	-1.112	0.692	-4.286	9.575					-1.640	1.656	-2.597	4.646
Netherlands	full	-2.920	6.102	-5.066	12.942					-1.528	1.169	-4.433	10.035
	pre-EMU	-3.484	7.121	-4.610	10.678					-1.702	4.750	-3.571	6.460
	EMU	-1.898	1.807	-2.776	3.953					0.392	1.585	-3.472	6.145
Portugal	full	-0.859	1.571	-3.528	6.289	-1.315	1.355	-8.180	33.459	-0.973	1.777	-10.299	53.101
	pre-EMU	-1.549	3.338	-4.213	8.953	-3.918	8.006	-6.243	19.502	-4.319	9.453	-8.997	40.694
	EMU	-1.223	0.933	-2.231	2.603	-2.247	2.734	-6.860	23.596	-1.221	0.806	-4.774	11.636
Spain	full	-1.513	3.310	-3.731	7.765	-0.838	1.112	-7.431	27.630	-0.869	1.504	-5.722	16.498
	pre-EMU	-1.709	1.474	-3.289	6.229	-3.215	6.092	-4.024	8.425	-1.736	1.545	-4.325	9.467
	EMU	-1.978	2.484	-2.560	3.423	-1.667	1.586	-7.595	29.174	-0.834	0.483	-3.955	7.871
Sweden	full	-1.511	2.677	-6.364	20.256	-2.853	11.301	-9.292	43.197	-0.447	2.738	-7.584	28.769
	pre-EMU	-2.041	2.280	-5.125	13.199	-1.884	4.453	-7.827	30.743	-1.021	0.596	-5.857	17.194
	EMU	-1.238	0.978	-3.899	7.603	-3.356	6.455	-4.110	8.451	-4.747	12.403	-4.065	8.262
UK	full	-2.568	3.667	-5.783	16.735	-1.658	1.473	-6.443	20.822				
	pre-EMU	-2.049	2.098	-4.904	12.040	-1.956	1.927	-4.430	9.818				
	EMU	-1.934	1.921	-3.341	5.583	-5.662	21.362	-5.432	14.763				

Table A2 continued: Unit Root Tests

Panel B: Real Lending Rates

		mortgage rates				consumer rates				corporate rates			
country	period	t(level)	F(level)	t(diff)	F(diff)	t(level)	F(level)	t(diff)	F(diff)	t(level)	F(level)	t(diff)	F(diff)
Austria	full	-2.884	4.163	-8.808	38.803	-2.813	3.997	-7.939	31.519	-2.829	4.001	-8.802	38.740
	pre-EMU	-2.815	4.290	-6.580	21.684	-2.422	3.150	-5.803	16.882	-2.541	3.562	-6.583	21.708
	EMU	-2.225	3.041	-6.062	18.390	-2.239	3.083	-5.505	15.174	-2.174	2.680	-5.925	17.582
Belgium	full	-3.137	5.731	-5.864	17.319	-2.685	5.123	-6.317	20.114	-3.225	5.791	-6.632	22.175
	pre-EMU	-2.066	2.662	-4.567	10.434	-1.714	2.495	-4.841	11.729	-2.402	3.580	-4.720	11.152
	EMU	-2.878	4.450	-3.557	6.568	-2.608	4.069	-3.730	7.102	-4.319	9.931	-4.946	12.359
Denmark	full					-2.100	2.400	-6.055	18.335	-2.332	3.686	-6.408	20.540
	pre-EMU					-1.850	4.179	-5.138	13.203	-1.279	6.515	-6.437	20.720
	EMU					-3.641	8.188	-4.686	10.981	-3.112	6.225	-4.836	11.699
Finland	full	-2.113	2.342	-5.959	17.790	-2.238	2.624	-7.103	25.270				
	pre-EMU	-1.526	1.276	-3.736	7.037	-1.833	1.742	-5.078	12.911				
	EMU	-2.541	3.452	-4.927	12.146	-2.291	2.693	-4.711	11.095				
France	full	-4.272	9.148	-8.332	34.711	-4.005	8.022	-7.714	29.757	-3.177	5.162	-7.981	31.853
	pre-EMU	-2.913	4.293	-5.539	15.339	-2.693	3.690	-5.649	15.956	-4.321	9.418	-5.101	13.013
	EMU	-3.119	4.875	-5.990	17.977	-2.914	4.252	-5.053	12.798	-1.839	1.821	-6.641	22.077
Germany	full	-2.893	4.844	-6.809	23.232	-2.228	2.924	-7.170	25.742	-3.242	5.498	-7.571	28.705
	pre-EMU	-2.482	3.693	-4.913	12.074	-1.173	1.492	-5.262	13.924	-1.529	2.400	-6.075	18.509
	EMU	-1.560	1.537	-4.596	10.622	-1.560	2.418	-5.148	13.310	-2.461	3.594	-5.086	13.024
Greece	full	-3.306	5.764	-4.755	11.333	-1.972	2.010	-3.056	4.750	-1.792	1.606	-4.656	10.843
	pre-EMU									-2.513	7.096	-5.347	14.737
	EMU	-3.306	5.764	-4.755	11.333	-1.972	2.010	-3.056	4.750	-1.751	1.540	-3.885	7.626
Ireland	full	-2.040	2.329	-6.024	18.143					-2.087	2.399	-6.200	19.233
	pre-EMU	-1.575	1.247	-4.787	11.535					-1.521	1.179	-4.881	12.058
	EMU	-3.392	6.816	-4.035	8.147					-3.761	8.036	-3.897	7.603
Italy	full	-1.414	1.010	-6.918	24.022					-1.582	1.288	-6.488	21.140
	pre-EMU	0.094	2.239	-4.747	11.313					0.000	2.749	-4.332	9.383
	EMU	-2.641	3.486	-5.686	16.201					-2.472	3.115	-4.894	12.021
Netherlands	full	-2.313	2.705	-6.405	20.578					-1.563	1.587	-7.242	26.226
	pre-EMU	-3.477	6.171	-5.396	14.576					-1.908	2.160	-5.782	16.720
	EMU	-1.464	1.115	-4.014	8.126					-1.246	0.963	-4.641	10.769
Portugal	full	-2.223	2.473	-5.717	16.351	-2.363	2.824	-7.843	30.754	-2.590	3.369	-7.994	32.055
	pre-EMU	-1.778	3.383	-4.294	9.230	-3.156	5.668	-6.131	18.794	-3.140	5.946	-6.170	19.225
	EMU	-2.491	3.428	-4.901	12.107	-3.208	5.452	-7.071	25.080	-2.623	3.566	-5.268	14.062
Spain	full	-2.916	4.338	-6.253	19.572	-3.052	4.707	-7.603	28.943	-2.696	3.753	-6.945	24.127
	pre-EMU	-3.222	5.524	-3.855	7.436	-4.014	9.527	-4.870	12.431	-2.720	4.093	-4.445	9.888
	EMU	-2.850	4.074	-4.512	10.249	-2.982	4.449	-5.547	15.583	-2.865	4.112	-4.916	12.129
Sweden	full	-1.576	1.243	-6.310	19.918	-1.915	1.837	-7.124	25.373	-1.860	1.827	-7.387	27.294
	pre-EMU	-0.444	1.022	-3.915	7.674	-0.648	1.067	-5.357	14.399	-1.015	0.646	-5.271	13.898
	EMU	-1.188	1.282	-5.943	17.660	-1.963	1.963	-5.242	13.737	-1.986	1.991	-5.275	13.916
UK	full	-2.114	2.340	-6.196	19.195	-3.414	5.900	-6.260	19.628				
	pre-EMU	-1.894	1.911	-4.910	12.188	-2.839	4.200	-5.094	13.069				
	EMU	-1.250	1.386	-3.772	7.148	-4.782	12.519	-4.066	8.268				

Table A2 continued: Unit Root Tests

Panel C: Nominal EU Average Lending Rates

		mortgage rates				consumer rates				corporate rates			
Average series	period	t(level)	F(level)	t(diff)	F(diff)	t(level)	F(level)	t(diff)	F(diff)	t(level)	F(level)	t(diff)	F(diff)
EU	full	-1.152	3.191	-4.218	9.191	-1.142	5.567	-5.932	17.633	-1.297	1.594	-3.483	6.163
	pre-EMU	-1.58	1.987	-5.419	14.871	-1.79	1.687	-5.331	14.21	-3.351	5.893	-3.8	7.295
	EMU	-1.397	1.399	-2.756	3.885	-0.711	0.557	-3.772	7.388	-1.062	0.884	-2.121	2.402
EUaus	full	-1.089	2.954	-4.087	8.65	-0.922	4.823	-5.655	16.026	-1.267	1.52	-3.513	6.259
	pre-EMU	-1.611	2.352	-5.048	12.922	-1.858	1.728	-4.854	11.783	-3.57	6.741	-3.794	7.262
	EMU	-1.364	1.366	-2.763	3.905	-0.699	0.559	-3.893	7.87	-1.061	0.892	-2.144	2.464
EUbel	full	-1.07	3.158	-4.25	9.355	-0.975	4.548	-6.071	18.451	-1.24	1.484	-3.528	6.312
	pre-EMU	-1.432	2.124	-5.589	15.848	-2.173	2.364	-5.358	14.361	-3.621	6.947	-3.769	7.178
	EMU	-1.349	1.302	-2.758	3.886	-0.787	0.543	-3.887	7.79	-1.048	0.863	-2.136	2.443
EUfin	full	-1.12	3.291	-4.289	9.506	-1.127	5.754	-6.034	18.239				
	pre-EMU	-1.478	1.919	-5.546	15.606	-1.807	1.721	-5.388	14.518				
	EMU	-1.356	1.316	-2.776	3.928	-0.712	0.546	-3.825	7.611				
EUfra	full	-1.248	3.568	-4.722	11.409	-1.402	5.855	-6.368	20.296	-1.568	2.527	-3.55	6.439
	pre-EMU	-1.792	1.904	-5.482	15.138	-2.085	2.42	-4.947	12.267	-1.678	1.415	-4.667	10.96
	EMU	-1.569	1.72	-3.071	4.856	-1.048	0.659	-4.453	10.23	-1.228	1.052	-2.146	2.59
EUger	full	-0.737	2.648	-4.212	9.515	-0.908	3.617	-6.503	21.192	-1.192	1.061	-3.829	7.419
	pre-EMU	-2.78	8.049	-5.926	18.318	-2.302	2.731	-5.45	14.864	-5.075	13.873	-3.741	7.055
	EMU	-1.122	0.923	-2.313	2.78	-0.392	0.913	-4.927	12.393	-0.871	0.771	-2.319	2.931
EUire	full	-1.141	3.262	-4.224	9.208					-1.274	1.568	-3.495	6.194
	pre-EMU	-1.585	1.966	-5.432	14.976					-3.32	5.792	-3.806	7.311
	EMU	-1.328	1.305	-2.739	3.828					-1.038	0.866	-2.129	2.426
EUita	full	-1.847	4.008	-4.32	9.421					-1.437	1.904	-3.906	7.637
	pre-EMU	-2.694	4.104	-5.403	14.634					-1.35	1.038	-4.677	10.97
	EMU	-1.378	1.295	-2.659	3.542					-0.616	0.719	-2.265	2.612
EUnet	full	-0.992	3.012	-4.203	9.126					-1.094	1.569	-3.771	7.283
	pre-EMU	-1.548	2.836	-5.455	15.091					-4.028	8.802	-3.855	7.538
	EMU	-1.192	1.224	-2.891	4.327					-1.079	0.829	-2.324	2.817
EUpor	full	-1.159	3.246	-4.294	9.509	-1.26	6.081	-5.946	17.71	-1.325	1.632	-3.54	6.386
	pre-EMU	-1.626	1.914	-5.358	14.557	-1.502	1.349	-5.428	14.733	-3.277	5.579	-3.79	7.305
	EMU	-1.319	1.266	-2.744	3.833	-0.811	0.661	-3.585	6.741	-1.032	0.846	-2.143	2.43
EUspa	full	-1.18	3.106	-4.291	9.421	-1.813	8.905	-6.529	21.338	-1.303	1.403	-3.499	6.169
	pre-EMU	-1.077	1.24	-5.036	12.805	-1.727	2.71	-6.947	24.286	-4.345	9.975	-3.882	7.565
	EMU	-1.314	1.249	-2.872	4.196	-0.781	0.437	-2.653	3.606	-1.221	1.096	-2.176	2.512

Table A2 continued: Unit Root Tests

Panel D: Real EU Average Lending Rates

country	period	mortgage rates				consumer rates				corporate rates			
		t(level)	F(level)	t(diff)	F(diff)	t(level)	F(level)	t(diff)	F(diff)	t(level)	F(level)	t(diff)	F(diff)
EU	full	-3.74	7.17	-7.211	26.08	-3.149	5.211	-7.053	24.884	-3.722	6.945	-7.212	26.041
	pre-EMU	-3.033	4.622	-4.777	11.422	-2.593	3.447	-5.061	12.81	-4.248	9.042	-5.143	13.229
	EMU	-4.219	9.1	-5.188	13.476	-2.645	3.916	-4.829	11.667	-2.936	4.41	-4.852	11.78
EUaus	full	-3.647	6.81	-7.183	25.877	-3.121	5.061	-6.996	24.482	-3.676	6.775	-7.228	26.152
	pre-EMU	-2.969	4.451	-4.797	11.516	-2.741	3.787	-5.018	12.595	-4.328	9.395	-5.269	13.882
	EMU	-4.166	8.876	-5.133	13.195	-2.62	3.84	-4.801	11.533	-2.92	4.357	-4.804	11.548
EUbel	full	-3.547	6.423	-7.295	26.676	-3.399	5.926	-7.178	25.769	-3.647	6.688	-7.182	25.811
	pre-EMU	-2.705	3.711	-4.838	11.716	-3.008	4.553	-5.139	13.214	-4.156	8.689	-5.205	13.547
	EMU	-4.062	8.436	-5.25	13.796	-2.661	3.911	-4.9	12.008	-2.873	4.215	-4.79	11.477
EUfin	full	-3.719	7.087	-7.219	26.135	-3.212	5.411	-7.032	24.738				
	pre-EMU	-2.929	4.314	-4.795	11.509	-2.687	3.696	-5.111	13.066				
	EMU	-4.187	8.964	-5.187	13.47	-2.624	3.872	-4.782	11.444				
EUfra	full	-2.664	3.976	-6.727	22.726	-2.617	3.842	-7.111	25.301	-3.485	6.073	-6.854	23.53
	pre-EMU	-2.296	2.711	-4.674	10.937	-2.361	2.881	-4.875	11.891	-4.013	8.052	-5.153	13.279
	EMU	-4.392	9.835	-5.12	13.111	-2.391	3.514	-5.056	12.786	-3.355	5.894	-4.656	10.844
EUger	full	-2.548	3.256	-6.734	22.741	-3.308	5.542	-6.734	22.672	-2.964	4.595	-6.951	24.172
	pre-EMU	-1.666	1.775	-4.432	9.838	-3.214	5.187	-4.73	11.269	-3.966	8.525	-5.003	12.522
	EMU	-3.714	6.935	-5.177	13.402	-3.241	5.262	-4.543	10.332	-2.145	2.301	-4.67	10.908
EUire	full	-3.749	7.221	-7.239	26.275					-3.763	7.097	-7.279	26.523
	pre-EMU	-3.121	4.894	-4.802	11.541					-4.413	9.756	-5.272	13.9
	EMU	-4.029	8.283	-5.2	13.538					-2.889	4.26	-4.852	11.784
EUita	full	-4.355	9.682	-7.503	28.186					-3.701	6.859	-7.591	28.818
	pre-EMU	-3.039	4.846	-5.225	13.652					-2.256	2.632	-5.267	13.87
	EMU	-3.009	4.781	-5.141	13.273					-3.003	4.583	-5.286	13.999
EUnet	full	-3.311	5.641	-7.39	27.358					-3.27	5.347	-7.466	27.908
	pre-EMU	-2.719	3.75	-4.765	11.363					-4.461	10.042	-5.322	14.163
	EMU	-4.634	10.914	-5.274	13.912					-3.047	4.801	-5.047	12.745
EUpor	full	-4.001	8.187	-7.285	26.616	-3.111	5.095	-7.063	24.954	-3.724	6.955	-7.197	25.938
	pre-EMU	-3.297	5.438	-4.742	11.257	-2.194	2.601	-5.129	13.159	-3.978	7.914	-5.116	13.092
	EMU	-4.354	9.71	-5.278	13.948	-2.629	3.912	-4.812	11.589	-2.929	4.399	-4.855	11.799
EUspa	full	-3.771	7.395	-7.329	26.967	-2.992	4.952	-7.184	25.84	-3.92	7.692	-7.266	26.443
	pre-EMU	-3.015	4.547	-4.847	11.765	-1.983	2.522	-5.207	13.596	-4.088	8.357	-5.205	13.548
	EMU	-3.433	6.15	-5.248	13.811	-2.282	3.208	-5.015	12.632	-2.813	4.076	-4.893	11.994

Note: t(level) and F(level) give unit-root test-statistics for the level regression of equation (2.1) whereas t(diff) and F(diff) give the unit-root test-statistics for the regression in first differences of equation (2.2). The critical values for 100 observations are as follows: -3.46 (1%), -2.88 (5%), -2.57 (10%) for the t test and 8.73 (1%), 6.49 (5%), 5.47 (10%) for the F test. Blank cells indicate that the interest rate series is not available.

Table A3: Cointegration of Lending Rates

Panel A: Mortgage Lending Rates

Country	period	nominal lending rates							real lending rates						
		cointegrating vector (t-statistics)	DW	DF	ADF (k)	ECM ECT (t-stat.)	ECM AIC	ECM no. of lags	cointegrating vector (t-statistics)	DW	DF	ADF (k)	ECM ECT (t-stat.)	ECM AIC	ECM no. of lags
Austria	full	L_{AUS} = 2.74 + 0.50 L_{EU} (17.00) (21.93)	0.110	-2.066	-2.758 (2)	-0.113 (-3.950)	-68.18	2	L_{AUS} = 2.47 + 0.45 L_{EU} (13.81) (12.88)	0.434	-3.167	-2.375 (1)	-0.237 (-3.154)	165.71	0
	pre-EMU	L_{AUS} = 2.90 + 0.48 L_{EU} (10.99) (14.32)	0.127	-2.210	-2.481 (2)	-0.091 (-1.701)	-51.62	1	L_{AUS} = 4.73 + 0.08 L_{EU} (11.98) (1.19)	0.748	-3.249		-0.375 (-2.776)	51.68	1
	EMU	L_{AUS} = 0.21 + 0.93 L_{EU} (0.49) (13.00)	0.205	-1.723		-0.417 (-8.797)	-59.66	0	L_{AUS} = 0.76 + 0.89 L_{EU} (1.45) (6.44)	0.485	-2.611	-0.426 (1-4)	-0.385 (-2.932)	54.89	4
	postbreak EMU								L_{AUS} = 1.62 + 0.63 L_{EU} (3.82) (5.60)	0.973	-3.607	-0.724 (3,4)	-0.600 (-3.000)	40.58	5
Belgium	full	L_{BEL} = 3.85 + 0.32 L_{EU} (10.77) (6.38)	0.073	-1.960	-1.671 (3)	-0.143 (-4.141)	74.96	4	L_{BEL} = 2.33 + 0.40 L_{EU} (7.80) (6.85)	0.253	-2.795	-3.470 (1)	-0.152 (-2.547)	218.13	0
	pre-EMU	L_{BEL} = 1.42 + 0.58 L_{EU} (3.42) (11.34)	0.190	-2.599		-0.178 (-2.748)	32.80	1	L_{BEL} = 0.59 + 0.69 L_{EU} (0.56) (3.89)	0.171	-1.872		-0.111 (-1.573)	94.77	0
	EMU	L_{BEL} = -1.94 + 1.36 L_{EU} (-3.85) (15.97)	0.323	-2.271	-2.861 (3)	-0.093 (-1.065)	0.78	1	L_{BEL} = 2.86 + 0.28 L_{EU} (4.17) (1.55)	0.532	-2.180		-0.268 (-2.099)	82.40	0
	postbreak EMU	L_{BEL} = -0.67 + 1.15 L_{EU} (-1.77) (18.29)	0.664	-3.800		-0.437 (-3.684)	-16.95	2							
Finland	full	L_{FIN} = 0.84 + 0.72 L_{EU} (3.16) (19.11)	0.070	-1.593	-2.971 (1,3)	-0.081 (-2.754)	25.48	1	L_{FIN} = -1.69 + 1.18 L_{EU} (-5.09) (18.02)	0.177	-2.103	-2.611 (3)	0.067 (-1.525)	179.06	2
	pre-EMU	L_{FIN} = 0.27 + 0.78 L_{EU} (0.56) (12.67)	0.050	-1.097	-2.680 (2,3)	-0.052 (-1.553)	-17.81	2	L_{FIN} = -4.45 + 1.64 L_{EU} (-3.70) (8.11)	0.218	-1.403		-0.027 (-0.488)	83.50	0
	EMU	L_{FIN} = -2.85 + 1.36 L_{EU} (-5.93) (16.87)	0.346	-1.975		-0.222 (-2.365)	0.95	1	L_{FIN} = -0.34 + 0.84 L_{EU} (-0.59) (5.65)	0.293	-2.608	-0.172 (3)	-0.262 (-2.378)	56.24	0
France	full	L_{FRA} = 1.77 + 0.81 L_{EU} (17.53) (55.81)	0.725	-4.086	-5.615 (1,3)	-0.368 (-5.713)	8.09	1	L_{FRA} = 1.97 + 0.81 L_{EU} (9.71) (19.56)	0.408	-2.904	-2.702 (3,4)	-0.206 (-2.723)	174.62	1
	pre-EMU	L_{FRA} = 2.04 + 0.78 L_{EU} (13.08) (39.20)	0.947	-3.522	-5.023 (1,3)	-0.296 (-3.182)	-21.41	1	L_{FRA} = 2.94 + 0.64 L_{EU} (5.54) (7.01)	0.391	-2.513	-3.212 (3)	-0.227 (-2.349)	68.87	0
	EMU	L_{FRA} = 1.94 + 0.77 L_{EU} (5.23) (12.21)	0.569	-2.391	-2.663 (3)	-0.405 (-4.223)	-13.85	1	L_{FRA} = 1.03 + 1.05 L_{EU} (1.21) (4.63)	0.472	-1.862	-1.578 (4)	-0.363 (-3.085)	53.25	2
	postbreak EMU	L_{FRA} = 0.90 + 0.47 L_{EU} (2.18) (13.52)	0.890	-3.440	-3.565 (3)	-0.561 (-4.074)	-12.55	1							
Germany	full	L_{GER} = 3.69 + 0.31 L_{EU} (16.36) (10.31)	0.109	-2.027	-2.391 (1)	-0.136 (-3.044)	53.13	2	L_{GER} = 2.62 + 0.37 L_{EU} (12.63) (9.49)	0.250	-2.358	-2.757 (3)	-0.107 (-1.904)	165.15	2
	pre-EMU	L_{GER} = 2.40 + 0.44 L_{EU} (10.10) (16.06)	0.259	-3.286	-2.864 (1)	-0.197 (-2.909)	-10.73	3	L_{GER} = 2.93 + 0.32 L_{EU} (5.47) (3.79)	0.217	-1.964		-0.127 (-1.801)	45.06	1
	EMU	L_{GER} = 0.70 + 0.83 L_{EU} (0.75) (5.40)	0.128	-1.832	-2.311 (1)	0.056 (0.740)	24.25	0	L_{GER} = 1.54 + 0.66 L_{EU} (1.81) (2.91)	0.258	-1.292	-1.866 (3)	-0.073 (-0.766)	76.09	1
	postbreak EMU	L_{GER} = 2.58 + 0.54 L_{EU} (3.22) (4.16)	0.226	-2.227		-0.058 (-0.648)	20.79	0	L_{GER} = 2.10 + 0.47 L_{EU} (2.05) (1.66)	0.320	-1.243	-1.485 (3)	-0.147 (-1.087)	55.98	1
Greece	EMU	L_{GRE} = 11.39 - 0.70 L_{EU} (4.55) (-1.67)	0.064	-1.736	0.037 (1-4)	0.017 (0.874)	-8.48	0	L_{GRE} = -11.95 + 4.24 L_{EU} (-8.50) (11.55)	0.891	-3.159		-0.130 (-1.415)	105.27	0
	postbreak EMU	L_{GRE} = -8.34 + 2.37 L_{EU} (-6.96) (12.08)	0.573	-1.324	-3.133 (1)	-0.088 (-0.637)	-2.11	0	L_{GRE} = -6.48 + 2.56 L_{EU} (-3.17) (4.41)	0.692	-2.172		-0.400 (-2.439)	52.95	0
Ireland	full	L_{IRE} = 1.99 + 0.61 L_{EU} (4.35) (9.44)	0.071	-0.938	-1.608 (1)	-0.067 (-2.405)	119.62	1	L_{IRE} = -5.69 + 1.94 L_{EU} (-6.57) (11.35)	0.216	-2.196		-0.115 (-2.509)	344.86	2
	pre-EMU	L_{IRE} = 6.26 + 0.12 L_{EU} (14.55) (2.13)	0.186	-0.965	-2.264 (1)	-0.132 (-2.069)	26.36	0	L_{IRE} = 7.80 - 0.25 L_{EU} (3.86) (-0.75)	0.354	-2.047	-2.327 (3)	-0.182 (-2.070)	174.61	0
	EMU	L_{IRE} = 1.77 + 0.57 L_{EU} (1.53) (2.96)	0.176	-1.526	-2.048 (1)	-0.150 (-2.258)	47.82	0	L_{IRE} = -2.56 + 0.97 L_{EU} (-1.31) (1.91)	0.128	-1.365	-3.158 (1-3)	-0.084 (-1.445)	102.83	0

Table A3 continued: Cointegration of Lending Rates

Country	period	nominal lending rates							real lending rates						
		cointegrating vector (t-statistics)	DW	DF	ADF (k)	ECM ECT (t-stat.)	ECM AIC	ECM no. of lags	cointegrating vector (t-statistics)	DW	DF	ADF (k)	ECM ECT (t-stat.)	ECM AIC	ECM no. of lags
Italy	full	L_{ITA} = -9.43 + 2.80 L_{EU} (-9.81) (19.14)	0.060	-1.753	-1.719 (1,3)	-0.108 (-5.732)	117.14	1	L_{ITA} = -2.48 + 1.82 L_{EU} (-3.73) (13.07)	0.126	-1.812	-2.174 (3)	-0.048 (-1.743)	198.81	1
	pre-EMU	L_{ITA} = -5.14 + 2.30 L_{EU} (-5.79) (18.46)	0.143	-2.572		-0.054 (-0.964)	62.63	1	L_{ITA} = 2.08 + 1.06 L_{EU} (1.19) (3.34)	0.067	0.230	-0.494 (3)	0.014 (0.370)	76.90	1
	EMU	L_{ITA} = 2.02 + 0.71 L_{EU} (2.85) (5.89)	0.220	-1.704	-1.837 (3)	-0.263 (-3.832)	14.57	1	L_{ITA} = 4.20 - 0.07 L_{EU} (6.81) (-0.41)	0.523	-2.600		-0.274 (-2.483)	78.39	0
Netherlands	full	L_{NET} = 3.68 + 0.35 L_{EU} (17.50) (11.80)	0.126	-2.348	-2.320 (1)	-0.175 (-4.229)	41.84	1	L_{NET} = -1.39 + 1.00 L_{EU} (-2.97) (11.07)	0.173	-1.934	-2.264 (3)	-0.075 (-1.829)	217.25	2
	pre-EMU	L_{NET} = 2.84 + 0.43 L_{EU} (10.57) (13.06)	0.240	-3.376	-2.852 (1,4)	-0.198 (-2.759)	7.86	0	L_{NET} = -1.37 + 0.98 L_{EU} (-2.83) (12.40)	0.591	-2.656		-0.216 (-1.392)	86.40	1
	EMU	L_{NET} = -0.07 + 1.00 L_{EU} (-0.12) (10.78)	0.182	-1.149	-2.411 (1,3)	-0.036 (-0.352)	0.081	1	L_{NET} = -5.06 + 1.94 L_{EU} (-2.07) (3.14)	0.245	-1.651		-0.061 (-1.187)	92.53	2
	postbreak EMU	L_{NET} = 1.60 + 0.73 L_{EU} (2.45) (6.83)	0.224	-1.422	-1.861 (3)	-0.266 (-1.945)	-10.00	3	L_{NET} = -0.59 + 0.45 L_{EU} (-0.28) (0.78)	0.653	-4.643		-0.586 (-3.685)	35.46	1
Portugal	full	L_{POR} = -6.34 + 2.06 L_{EU} (-17.75) (40.50)	0.113	-1.694	-1.979 (3)	-0.071 (-2.838)	29.62	3	L_{POR} = -6.24 + 2.25 L_{EU} (-14.92) (27.21)	0.370	-3.005	-3.482 (1)	-0.052 (-1.087)	200.40	4
	pre-EMU	L_{POR} = -4.70 + 1.88 L_{EU} (-8.61) (27.02)	0.123	-1.542		-0.074 (-2.272)	-8.22	2	L_{POR} = -10.95 + 3.03 L_{EU} (-8.36) (13.73)	0.338	-2.213	-2.299 (2)	-0.063 (-0.991)	91.87	3
	EMU	L_{POR} = -1.79 + 1.25 L_{EU} (-2.42) (10.09)	0.188	-1.739	-1.955 (3)	-0.273 (-4.391)	4.94	0	L_{POR} = -2.62 + 1.33 L_{EU} (-3.11) (6.07)	0.615	-2.632		-0.033 (-0.398)	63.02	1
Spain	full	L_{SPA} = -4.95 + 1.71 L_{EU} (-15.60) (38.00)	0.116	-1.550	-2.323 (2)	-0.035 (-1.940)	-39.34	2	L_{SPA} = -2.87 + 1.38 L_{EU} (-8.60) (21.29)	0.243	-2.206		-0.120 (-2.545)	179.26	3
	pre-EMU	L_{SPA} = -6.71 + 1.93 L_{EU} (11.59) (26.14)	0.138	-0.473	-1.349 (2)	-0.065 (-2.439)	-32.93	1	L_{SPA} = -4.75 + 1.70 L_{EU} (-6.00) (12.89)	0.348	-2.319		-0.141 (-1.967)	59.36	2
	EMU	L_{SPA} = -1.56 + 1.16 L_{EU} (-2.57) (11.52)	0.182	-1.388	-2.047 (1)	-0.210 (-5.106)	-64.59	1	L_{SPA} = 1.93 + 0.15 L_{EU} (2.33) (0.70)	0.430	-2.099	-2.565 (1)	-0.296 (-3.016)	68.15	3
	postbreak EMU								L_{SPA} = -1.39 + 1.14 L_{EU} (-0.72) (2.09)	0.569	-1.204		-0.321 (-1.488)	39.35	1
Sweden	full	L_{SWE} = 1.26 + 0.89 L_{EU} (3.93) (18.78)	0.243	-2.163	-2.679 (3)	-0.162 (-2.297)	84.69	2	L_{SWE} = 1.30 + 0.95 L_{EU} (2.29) (8.27)	0.135	-1.282	-1.961 (3)	-0.073 (-1.558)	159.36	2
	pre-EMU	L_{SWE} = -0.66 + 1.13 L_{EU} (-1.90) (24.42)	0.677	-2.082	-2.191 (3)	-0.322 (-1.961)	38.04	0	L_{SWE} = -4.00 + 1.83 L_{EU} (-2.36) (6.24)	0.154	-0.640	-1.395 (3)	-0.078 (-1.340)	54.18	2
	EMU	L_{SWE} = 4.00 + 0.45 L_{EU} (4.90) (3.28)	0.218	-1.686	-2.292 (3)	-0.313 (-2.632)	10.07	3	L_{SWE} = -3.23 + 2.17 L_{EU} (-3.03) (8.03)	0.746	-2.266		0.045 (0.299)	63.76	2
	postbreak EMU	L_{SWE} = 6.46 + 0.06 L_{EU} (7.06) (0.39)	0.392	-3.010		-0.228 (-1.701)	3.28	2							
UK	full	L_{UKD} = 2.76 + 0.64 L_{EU} (10.52) (17.20)	0.116	-1.664	-2.335 (1,4)	-0.074 (-1.925)	71.84	2	L_{UKD} = 4.43 + 0.21 L_{EU} (15.65) (3.81)	0.184	-1.860		-0.082 (-1.585)	162.84	3
	pre-EMU	L_{UKD} = 4.00 + 0.50 L_{EU} (12.17) (12.02)	0.255	-2.361	-2.035 (4)	-0.210 (-2.871)	15.51	1	L_{UKD} = 5.35 + 0.05 L_{EU} (8.08) (0.49)	0.340	-1.930		-0.159 (-1.835)	66.36	1
	EMU	L_{UKD} = 4.39 + 0.34 L_{EU} (4.61) (2.13)	0.075	0.721	-1.299 (1)	-0.048 (-0.600)	3.46	2	L_{UKD} = 1.76 + 0.92 L_{EU} (1.75) (3.50)	0.107	-2.175	-2.080 (3)	-0.106 (-1.557)	50.98	2
	postbreak EMU	L_{UKD} = 2.56 + 0.57 L_{EU} (3.26) (4.48)	0.546	-2.906	-3.386 (1,4)	-0.490 (-3.284)	-17.43	2	L_{UKD} = - 0.81 + 1.67 L_{EU} (-1.24) (9.56)	0.642	-2.682	-1.956 (4)	-0.091 (-0.671)	42.36	1

Table A3 continued: Cointegration of Lending Rates

Panel B: Consumer Lending Rates

Country	period	nominal lending rates						real lending rates					
		cointegrating vector (t-statistics)	DW	DF	ADF (k)	ECM ECT (t-stat.)	ECM AIC	ECM no. of lags	cointegrating vector (t-statistics)	DW	DF	ADF (k)	ECM ECT (t-stat.)	ECM AIC	ECM no. of lags
Austria	full	L_{AUS} = 0.80 + 0.60 L_{EU} (3.12) (27.26)	0.155	-2.140	-2.581 (2,3)	-1.778 (-3.842)	-4.29	5	L_{AUS} = 1.00 + 0.62 L_{EU} (3.50) (18.34)	0.504	-3.436	-2.608 (1)	-0.197 (-2.501)	166.46	0
	pre-EMU	L_{AUS} = 1.70 + 0.60 L_{EU} (4.79) (18.74)	0.231	-2.793		-0.141 (-1.591)	-12.38	3	L_{AUS} = 3.82 + 0.32 L_{EU} (6.99) (5.57)	0.678	-3.115		-0.292 (-2.369)	57.78	0
	EMU	L_{AUS} = -6.52 + 1.47 L_{EU} (-7.79) (16.22)	0.295	-1.372		0.057 (0.496)	-27.32	1	L_{AUS} = -0.86 + 0.86 L_{EU} (-1.10) (8.11)	0.737	-2.964	-3.593 (1,3,4)	-0.428 (-3.362)	43.37	5
Belgium	full	L_{BEL} = -1.05 + 0.86 L_{EU} (-1.48) (12.43)	0.240	-3.218		-0.177 (-3.094)	221.03	1	L_{BEL} = -2.71 + 1.03 L_{EU} (-3.88) (12.49)	0.278	-3.282		-0.119 (-2.144)	260.70	0
	pre-EMU	L_{BEL} = -4.58 + 0.16 L_{EU} (-3.71) (10.41)	0.331	-2.547		-0.224 (-2.537)	117.84	1	L_{BEL} = -9.21 + 1.70 L_{EU} (-4.63) (8.07)	0.380	-2.575		-0.085 (-1.075)	134.17	0
	EMU	L_{BEL} = -2.37 + 1.03 L_{EU} (-1.20) (4.86)	0.231	-2.130		-0.084 (-1.059)	27.46	1	L_{BEL} = -0.13 + 0.70 L_{EU} (-0.16) (6.22)	0.641	-2.640		-0.205 (-1.495)	60.53	1
Denmark	full	L_{DEN} = 5.80 + 0.44 L_{EU} (13.13) (9.88)	0.314	-2.423		-0.214 (-3.565)	84.84	2	L_{DEN} = 3.78 + 0.53 L_{EU} (6.25) (7.22)	0.227	-2.094		-0.109 (-1.817)	164.55	2
	pre-EMU	L_{DEN} = 7.01 + 0.33 L_{EU} (13.07) (6.44)	0.210	-1.292		-0.067 (-0.897)	-18.17	2	L_{DEN} = 5.67 + 0.33 L_{EU} (3.96) (2.10)	0.167	-0.916		-0.050 (-0.642)	50.99	0
	EMU	L_{DEN} = -4.88 + 1.61 L_{EU} (-4.21) (12.69)	0.664	-2.637	-2.545 (3)	-0.119 (-0.838)	27.03	1	L_{DEN} = 7.85 - 0.05 L_{EU} (5.11) (-0.23)	0.322	-1.925	-2.030 (3)	-0.177 (-1.935)	66.94	0
	postbreak EMU								L_{DEN} = 6.67 + 0.17 L_{EU} (3.09) (0.55)	0.829	-2.781		-0.488 (-2.111)	32.34	2
Finland	full	L_{FIN} = 1.22 + 0.82 L_{EU} (2.82) (19.17)	0.388	-3.092		-0.132 (-1.913)	191.93	0	L_{FIN} = -5.30 + 1.27 L_{EU} (-12.31) (24.96)	0.466	-3.344		-0.129 (-1.798)	221.58	1
	pre-EMU	L_{FIN} = -1.95 + 0.87 L_{EU} (-3.14) (15.42)	0.737	-3.325		-0.312 (-2.587)	96.89	0	L_{FIN} = -9.46 + 1.71 L_{EU} (-11.12) (18.79)	1.091	-4.005	-4.163 (1)	-0.531 (-2.647)	105.32	5
	EMU	L_{FIN} = -10.79 + 1.87 L_{EU} (-5.92) (9.44)	0.182	-1.034	-1.527 (4)	0.146 (1.822)	28.24	0	L_{FIN} = -0.60 + 0.64 L_{EU} (-0.59) (4.62)	0.275	-1.902	-1.847 (3)	-0.145 (-1.372)	60.68	0
	postbreak EMU	L_{FIN} = -22.63 + 4.57 L_{EU} (-4.95) (6.42)	0.257	-2.018		0.227 (2.168)	15.14	0							
France	full	L_{FRA} = -0.33 + 0.95 L_{EU} (-1.33) (39.54)	0.388	-2.904	-3.359 (3)	-0.198 (-4.087)	31.07	1	L_{FRA} = 0.80 + 0.86 L_{EU} (2.81) (25.62)	0.470	-2.998	-3.731 (3)	-0.175 (-1.862)	184.42	1
	pre-EMU	L_{FRA} = 0.79 + 0.86 L_{EU} (2.18) (26.40)	0.541	-2.686	-3.176 (3)	-0.320 (-3.816)	7.39	2	L_{FRA} = 1.72 + 0.76 L_{EU} (2.83) (11.82)	0.586	-2.997	-3.461 (3)	-0.306 (-2.377)	78.50	1
	EMU	L_{FRA} = 2.82 + 0.60 L_{EU} (4.26) (8.59)	0.500	-1.713		-0.196 (-1.994)	-34.18	1	L_{FRA} = 0.65 + 0.87 L_{EU} (0.68) (6.68)	0.837	-1.399	-1.343 (3,4)	-0.114 (-0.954)	59.67	1
real	postbreak EMU								L_{FRA} = 3.34 + 0.44 L_{EU} (0.97) (0.92)	0.924	-1.910		-0.554 (-1.604)	25.79	0
Germany	full	L_{GER} = 6.49 + 0.48 L_{EU} (53.56) (37.70)	0.216	-2.880		-0.009 (-2.089)	-55.68	2	L_{GER} = 4.95 + 0.62 L_{EU} (18.61) (17.57)	0.275	-2.207		-0.182 (-2.778)	168.49	2
	pre-EMU	L_{GER} = 6.16 + 0.51 L_{EU} (35.01) (30.38)	0.358	-3.204		-0.068 (-0.877)	-37.38	2	L_{GER} = 5.84 + 0. 52 L_{EU} (11.42) (8.68)	0.301	-1.447		-0.107 (-1.239)	44.37	2
	EMU	L_{GER} = 5.67 + 0.59 L_{EU} (8.30) (7.05)	0.152	-0.632		-0.057 (-1.230)	-81.12	2	L_{GER} = 2.76 + 0.97 L_{EU} (2.52) (5.58)	0.256	-1.071		-0.161 (-1.360)	79.67	0
	postbreak EMU	L_{GER} = 9.86 + 0.10 L_{EU} (25.77) (2.25)	0.581	-2.870		-0.411 (-4.322)	-80.58	3	L_{GER} = 7.29 + 0.20 L_{EU} (4.99) (0.80)	0.600	-2.209		-0.352 (-2.233)	57.86	0
Greece	EMU	L_{GRE} = 101.93 - 9.39 L_{EU} (8.67) (-7.30)	0.109	-0.446		-0.079 (-2.383)	97.06	0	L_{GRE} = -29.22 + 5.85 L_{EU} (-3.44) (5.00)	0.178	-1.221	-0.455 (4)	-0.068 (-2.082)	127.57	1
	postbreak EMU	L_{GRE} = -17.31 + 3.16 L_{EU} (-2.80) (4.76)	0.609	-2.480		-0.256 (-1.806)	11.02	1	L_{GRE} = 5.97 + 0.50 L_{EU} (0.57) (0.34)	0.157	-4.116		-0.271 (-4.504)	64.96	0

Table A3 continued: Cointegration of Lending Rates

Country	period	nominal lending rates							real lending rates						
		cointegrating vector (t-statistics)	DW	DF	ADF (k)	ECM ECT (t-stat.)	ECM AIC	ECM no. of lags	cointegrating vector (t-statistics)	DW	DF	ADF (k)	ECM ECT (t-stat.)	ECM AIC	ECM no. of lags
Portugal	full	L_{POR} = -12.86 + 2.50 L_{EU} (-14.72) (28.70)	0.701	-4.380		-0.384 (-4.792)	331.33	0	L_{POR} = -9.43 + 2.22 L_{EU} (-7.34) (14.48)	0.377	-2.956		-0.134 (-2.434)	360.87	0
	pre-EMU	L_{POR} = -11.75 + 2.41 L_{EU} (-7.31) (16.15)	0.604	-2.898		-0.309 (-2.948)	166.42	0	L_{POR} = -13.52 + 2.68 L_{EU} (-3.79) (6.93)	0.273	-1.430		-0.080 (-1.072)	177.57	1
	EMU	L_{POR} = -4.31 + 1.54 L_{EU} (-1.59) (5.21)	1.417	-4.648		-0.767 (-4.992)	114.24	0	L_{POR} = 4.75 + 0.26 L_{EU} (2.99) (1.17)	1.193	-4.050	-2.387 (1)	-0.443 (-2.781)	114.89	2
Spain	full	L_{SPA} = -13.72 + 2.35 L_{EU} (-23.79) (41.23)	0.456	-4.073	-3.786 (3)	-0.285 (-4.226)	208.17	0	L_{SPA} = -7.18 + 1.67 L_{EU} (-8.98) (17.97)	0.365	-3.084		-0.111 (-2.096)	246.93	2
	pre-EMU	L_{SPA} = -13.26 + 2.32 L_{EU} (-12.54) (23.55)	0.292	-2.570	-2.253 (3)	-0.338 (-5.702)	56.09	3	L_{SPA} = -5.23 + 1.49 L_{EU} (-3.19) (8.52)	0.255	-1.538		-0.173 (-2.462)	95.63	2
	EMU	L_{SPA} = -7.24 + 1.65 L_{EU} (-4.50) (9.55)	1.221	-4.323		-0.517 (-3.226)	68.38	0	L_{SPA} = 2.73 + 0.32 L_{EU} (1.96) (1.79)	0.736	-3.287		-0.434 (-3.817)	93.02	2
	postbreak EMU	L_{SPA} = -2.58 + 1.16 L_{EU} (-0.94) (4.00)	1.503	-3.961	-2.289 (2,4)	-0.803 (-4.528)	34.56	1							
Sweden	full	L_{SWE} = -5.89 + 1.37 L_{EU} (-12.16) (28.16)	0.204	-1.988	-3.040 (3)	-0.086 (-2.119)	28.83	1	L_{SPA} = -4.94 + 1.39 L_{EU} (-6.74) (15.50)	0.231	-1.396	-2.029 (3)	-0.153 (-2.728)	165.04	2
	pre-EMU	L_{SWE} = -5.83 + 1.37 L_{EU} (-7.39) (18.39)	0.250	-1.471	-2.423 (3)	-0.152 (-2.310)	9.59	1	L_{SWE} = -11.64 + 2.10 L_{EU} (-6.79) (11.08)	0.293	-1.705		-0.200 (-2.157)	79.96	1
	EMU	L_{SWE} = 3.36 + 0.35 L_{EU} (5.45) (5.18)	0.418	-1.896	-3.102 (3,4)	-0.267 (-2.740)	-55.62	2	L_{SWE} = -2.85 + 1.10 L_{EU} (-1.77) (4.98)	0.319	-0.147		0.060 (0.622)	48.38	2
UK	full	L_{UKD} = 4.75 + 1.26 L_{EU} (6.18) (16.60)	0.166	-2.102		-0.143 (-3.468)	200.69	0	L_{UKD} = 8.68 + 0.84 L_{EU} (20.10) (16.44)	0.472	-3.581		-0.241 (-3.404)	213.68	1
	pre-EMU	L_{UKD} = 10.65 + 0.76 L_{EU} (16.41) (12.83)	0.336	-2.056		-0.203 (-2.387)	64.32	1	L_{UKD} = 13.19 + 0.38 L_{EU} (15.87) (4.23)	0.503	-2.697		-0.396 (-3.611)	77.37	2
	EMU	L_{UKD} = 17.00 - 0.14 L_{EU} (9.63) (-0.72)	0.741	-3.384		-0.356 (-3.086)	56.79	1	L_{UKD} = 12.03 + 0.35 L_{EU} (14.35) (3.04)	0.877	-3.236		-0.465 (-3.423)	63.32	1

Table A3 continued: Cointegration of Lending Rates

Panel C: Corporate Lending Rates

Country	Period	nominal lending rates							real lending rates						
		cointegrating vector (t-statistics)	DW	DF	ADF(k)	ECM			cointegrating vector (t-statistics)	DW	DF	ADF(k)	ECM		
						ECT (t-stat.)	AIC	no. of lags					ECT (t-stat.)	AIC	no. of lags
Austria	full	L_{AUS} = 2.14 + 0.65 L_{EU} (18.25) (38.71)	0.168	-2.243	-2.266 (2)	0.017 (0.241)	-1.83	0	L_{AUS} = 1.94 + 0.65 L_{EU} (8.86) (14.67)	0.509	-3.480	-2.466 (1)	-0.201 (-2.497)	161.04	1
	pre-EMU	L_{AUS} = 2.43 + 0.61 L_{EU} (12.08) (23.28)	0.142	-2.320		-0.133 (-1.709)	-56.84	1	L_{AUS} = 4.03 + 0.28 L_{EU} (8.49) (3.36)	0.894	-3.533	-3.163 (2)	-0.422 (-3.264)	51.95	0
	EMU	L_{AUS} = 1.41 + 0.77 L_{EU} (6.47) (21.90)	0.281	-1.823		0.159 (1.096)	-6.81	0	L_{AUS} = -0.21 + 1.18 L_{EU} (-0.32) (7.35)	0.541	-2.468		-0.245 (-1.944)	63.29	1
	postbreak EMU								L_{AUS} = 0.93 + 0.85 L_{EU} (1.74) (6.29)	1.111	-3.592	-3.716 (3,4)	-0.543 (-2.150)	45.84	3
Belgium	full	L_{BEL} = 3.23 + 0.20 L_{EU} (8.21) (3.61)	0.098	-2.246	-2.452 (1,3)	-0.140 (-3.578)	87.15	3	L_{BEL} = 1.08 + 0.36 L_{EU} (3.11) (5.23)	0.230	-2.764	-2.958 (1)	-0.136 (-2.415)	189.95	1
	pre-EMU	L_{BEL} = 3.18 + 0.18 L_{EU} (6.48) (2.88)	0.142	-3.568		-0.168 (-3.381)	18.82	0	L_{BEL} = 3.31 - 0.02 L_{EU} (2.60) (-0.09)	0.168	-2.156	-2.346 (1)	-0.085 (-1.419)	71.57	1
	EMU	L_{BEL} = -2.04 + 1.08 L_{EU} (-3.45) (11.45)	0.245	-1.801		0.167 (1.839)	37.01	0	L_{BEL} = 0.42 + 0.51 L_{EU} (0.84) (4.16)	0.813	-2.857	-3.123 (3)	-0.626 (-3.892)	56.79	2
Denmark	full	L_{DEN} = 1.74 + 0.63 L_{EU} (4.95) (12.19)	0.220	-2.167	-2.182 (3)	-0.135 (-2.360)	93.53	1	L_{DEN} = 0.84 + 0.64 L_{EU} (1.61) (6.05)	0.162	-2.043	-2.623 (3,4)	-0.128 (-2.290)	162.67	1
	pre-EMU	L_{DEN} = 1.21 + 0.67 L_{EU} (2.39) (9.76)	0.244	-1.092	-0.428 (3)	-0.047 (-0.457)	21.29	1	L_{DEN} = 0.16 + 0.75 L_{EU} (0.11) (2.84)	0.151	-1.221		-0.065 (-0.788)	52.46	1
	EMU	L_{DEN} = -1.13 + 1.13 L_{EU} (-4.46) (27.82)	1.175	-3.664	-3.508 (3)	-0.786 (-4.526)	1.57	1	L_{DEN} = -0.31 + 0.92 L_{EU} (-0.18) (2.16)	0.138	-0.983		-0.069 (-0.827)	74.50	0
	postbreak EMU								L_{DEN} = 2.11 + 0.48 L_{EU} (1.74) (1.63)	0.998	-5.887		-0.914 (-5.194)	22.06	0
France	full	L_{FRA} = -3.20 + 1.26 L_{EU} (-11.38) (32.52)	0.355	-2.890	-3.332 (3)	-0.117 (-1.924)	127.96	1	L_{FRA} = -1.15 + 1.11 L_{EU} (-3.08) (15.07)	0.252	-3.273	-3.253 (3)	-0.164 (-2.623)	211.13	0
	pre-EMU	L_{FRA} = -4.95 + 1.47 L_{EU} (-10.68) (25.02)	0.389	-2.079	-2.844 (3)	-0.212 (-0.268)	36.10	2	L_{FRA} = -9.69 + 2.56 L_{EU} (-7.92) (12.14)	0.574	-3.457		-0.186 (-1.991)	82.84	0
	EMU	L_{FRA} = -1.73 + 1.05 L_{EU} (-4.18) (16.47)	0.825	-3.107		-0.172 (-1.041)	51.66	0	L_{FRA} = -0.79 + 1.05 L_{EU} (-1.20) (6.67)	0.713	-2.787	-2.933 (3)	-0.402 (-2.298)	85.11	0
Germany	full	L_{GER} = 7.40 + 0.11 L_{EU} (31.35) (2.96)	0.027	-0.742	-2.082 (2,3,4)	-0.032 (-1.637)	-27.92	1	L_{GER} = 6.25 + 0.09 L_{EU} (39.77) (2.58)	0.462	-3.220	-2.701 (4)	-0.241 (-3.277)	174.18	0
	pre-EMU	L_{GER} = 6.17 + 0.24 L_{EU} (38.73) (11.30)	0.158	-2.890	-2.891 (1,3,4)	-0.147 (-2.166)	-50.12	2	L_{GER} = 6.68 + 0. 01 L_{EU} (14.91) (0.12)	0.331	-1.705		-0.190 (-2.131)	46.93	1
	EMU	L_{GER} = 3.71 + 0.86 L_{EU} (10.18) (12.53)	0.113	-0.119		-0.042 (-0.776)	-44.79	1	L_{GER} = 5.73 + 0.26 L_{EU} (12.06) (1.68)	0.544	-2.501		-0.334 (-2.663)	75.90	0
	postbreak EMU	L_{GER} = 5.82 + 0.50 L_{EU} (12.22) (5.96)	0.122	-2.653		-0.378 (-4.553)	-28.80	0							
Greece	EMU	L_{GRE} = 29.80 - 2.96 L_{EU} (8.05) (-4.96)	0.043	0.510	0.133 (1)	-0.062 (-2.493)	57.05	3	L_{GRE} = -9.44 + 4.44 L_{EU} (-1.62) (3.10)	0.107	-0.920		-0.005 (-0.191)	112.06	1
	postbreak EMU	L_{GRE} = 3.56 + 0.95 L_{EU} (0.59) (1.04)	0.038	-3.227	-1.805 (2,3,4)	-0.055 (-2.201)	26.71	0	L_{GRE} = -4.65 + 2.50 L_{EU} (-1.92) (4.07)	0.529	-4.469		-0.274 (-2.507)	49.50	0
Ireland	full	L_{IRE} = 6.44 + 0.45 L_{EU} (17.52) (8.62)	0.101	-1.445	-1.935 (1)	-0.077 (-2.152)	98.75	1	L_{IRE} = -2.58 + 2.01 L_{EU} (-2.67) (10.29)	0.255	-2.494		-0.123 (-2.461)	343.71	0
	pre-EMU	L_{IRE} = 9.32 + 0.09 L_{EU} (18.16) (1.40)	0.212	-0.693	-1.907 (1)	-0.128 (-1.622)	47.31	1	L_{IRE} = 11.75 - 0.46 L_{EU} (4.56) (-1.01)	0.333	-1.982	-2.251 (3)	-0.199 (-2.317)	170.60	1
	EMU	L_{IRE} = 2.74 + 1.03 L_{EU} (14.74) (34.07)	0.756	-3.079		-0.712 (-4.220)	-6.15	0	L_{IRE} = 0.42 + 1.14 L_{EU} (0.27) (2.97)	0.199	-1.412	-3.207 (3,4)	-0.165 (-2.242)	87.03	2

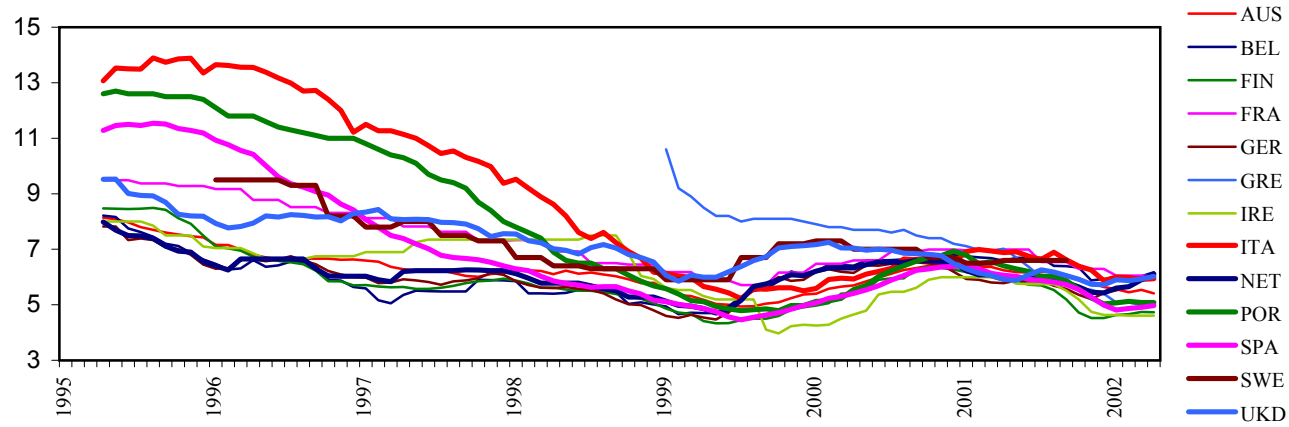
Table A3 continued: Cointegration of Lending Rates

Country	period	nominal lending rates							real lending rates						
		cointegrating vector (t-statistics)	DW	DF	ADF (k)	ECM ECT (t-stat.)	ECM AIC	ECM no. of lags	cointegrating vector (t-statistics)	DW	DF	ADF (k)	ECM ECT (t-stat.)	ECM AIC	ECM no. of lags
Italy	full	L_{ITA} = -7.73 + 2.47 L_{EU} (-5.41) (11.39)	0.022	-0.640	-1.281 (2,3)	-0.021 (-2.718)	-7.02	1	L_{ITA} = -3.50 + 1.95 L_{EU} (-4.27) (11.32)	0.158	-1.996		-0.040 (-1.744)	152.87	2
	pre-EMU	L_{ITA} = -4.23 + 2.14 L_{EU} (-4.93) (17.29)	0.086	-1.812	-1.040 (3)	-0.016 (-0.628)	-16.87	0	L_{ITA} = 5.72 + 0.29L_{EU} (3.96) (1.07)	0.049	1.041	-0.063 (3)	0.018 (0.536)	37.45	2
	EMU	L_{ITA} = 1.36 + 0.76 L_{EU} (4.61) (16.15)	0.272	-4.019		-0.321 (-4.367)	-47.13	1	L_{ITA} = 1.03 + 0.69 L_{EU} (1.38) (3.82)	0.500	-2.456		-0.290 (-2.821)	62.48	0
Netherlands	full	L_{NET} = 4.02 - 0.01 L_{EU} (8.08) (-0.16)	0.062	-1.220	-2.537 (3,4)	-0.059 (-2.359)	94.74	1	L_{NET} = -1.18 + 0.50 L_{EU} (-2.12) (4.87)	0.180	-1.504		-0.053 (-1.143)	212.84	4
	pre-EMU	L_{NET} = 2.89 + 0.09 L_{EU} (5.77) (1.41)	0.060	-2.064		-0.070 (-1.959)	-6.75	0	L_{NET} = -0.63 + 0.41 L_{EU} (-0.74) (2.95)	0.416	-2.036		-0.181 (-1.696)	89.03	0
	EMU	L_{NET} = -4.42 + 1.37 L_{EU} (-10.32) (20.54)	0.942	-2.663		-0.265 (-1.484)	44.82	1	L_{NET} = -2.37 + 0.78 L_{EU} (-0.98) (1.41)	0.160	-0.899		-0.024 (-0.427)	89.18	2
	postbreak EMU								L_{NET} = -5.41 + 1.22 L_{EU} (-2.54) (2.49)	0.888	-4.456		-0.445 (-3.275)	35.39	0
Portugal	full	L_{POR} = -9.30 + 2.52 L_{EU} (-12.73) (24.07)	0.583	-1.824	-1.575 (1,3)	-0.138 (-3.739)	212.86	2	L_{POR} = -9.97 + 3.06 L_{EU} (-13.65) (20.83)	0.418	-3.096		-0.043 (-0.885)	284.77	0
	pre-EMU	L_{POR} = -7.33 + 2.34 L_{EU} (-16.14) (39.03)	1.401	-4.788		-0.717 (-5.032)	102.33	0	L_{POR} = -15.82 + 4.12 L_{EU} (-8.22) (12.04)	0.504	-2.018	-2.396 (3)	-0.178 (-1.893)	140.06	1
	EMU	L_{POR} = 0.81 + 0.78 L_{EU} (1.85) (11.10)	0.702	-3.543		-0.434 (-3.530)	31.81	3	L_{POR} = -0.17 + 0.65 L_{EU} (-0.12) (1.84)	0.269	-1.623		-0.066 (-0.872)	88.67	0
	postbreak EMU	L_{POR} = 0.16 + 0.87 L_{EU} (0.46) (15.68)	1.257	-4.104		-0.660 (-3.443)	30.62	2							
Spain	full	L_{SPA} = -7.10 + 1.89 L_{EU} (-20.23) (38.13)	0.303	-2.730	-2.176 (1)	-0.058 (-0.920)	157.78	3	L_{SPA} = -5.08 + 1.64 L_{EU} (-12.57) (20.94)	0.494	-3.687		-0.229 (-3.269)	233.74	1
	pre-EMU	L_{SPA} = -8.02 + 2.03 L_{EU} (-16.63) (32.12)	0.354	-2.511		-0.201 (-2.317)	53.03	1	L_{SPA} = -5.28 + 1.69 L_{EU} (-4.76) (8.84)	0.406	-2.768		-0.241 (-3.064)	76.31	1
	EMU	L_{SPA} = -2.53 + 1.15 L_{EU} (-6.87) (19.93)	1.500	-4.793		-0.531 (-2.559)	63.15	0	L_{SPA} = -1.06 + 0.69 L_{EU} (-1.07) (2.98)	0.752	-2.858		-0.393 (-2.753)	104.28	0
Sweden	full	L_{SWE} = -3.70 + 1.45 L_{EU} (-8.03) (22.26)	0.101	-1.436	-3.092 (3)	-0.046 (-1.981)	39.70	0	L_{SWE} = -2.38 + 1.14 L_{EU} (-6.61) (15.74)	0.173	-1.433	-1.790 (3)	-0.059 (-1.200)	189.83	1
	pre-EMU	L_{SWE} = -4.39 + 1.56 L_{EU} (-7.98) (21.71)	0.224	-1.442	-2.507 (3)	-0.131 (-3.138)	8.69	1	L_{SWE} = -9.52 + 2.74 L_{EU} (-6.90) (11.26)	0.284	-1.616		-0.098 (-1.416)	92.25	1
	EMU	L_{SWE} = 2.82 + 0.36 L_{EU} (17.94) (14.34)	0.501	-2.116		-0.185 (-1.257)	-39.17	1	L_{SWE} = -2.16 + 1.41 L_{EU} (-1.44) (3.90)	0.244	-0.075		0.314 (2.439)	46.79	3
	postbreak EMU	L_{SWE} = 2.94 + 0.35 L_{EU} (17.17) (12.75)	0.515	-2.426	-2.622 (3)	-0.162 (-1.003)	-31.57	0							

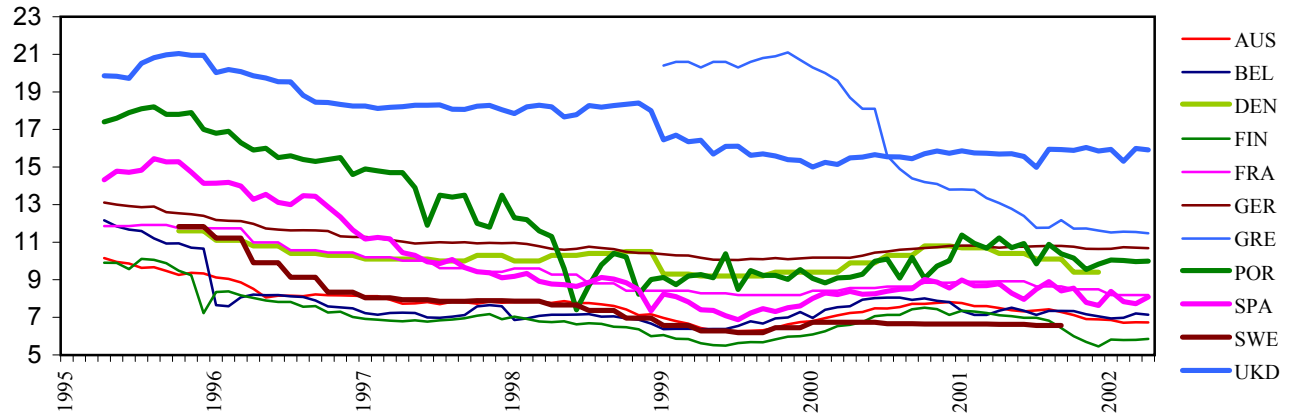
For the cointegrating vector, L indicates lending rates and the subscripts indicate the country. EU indicates the average of all countries except the country under investigation. Furthermore, t-statistics are given in parentheses and the following test statistics are reported: Durbin Watson (DW), Dickey Fuller (DF), Augmented Dickey Fuller with optimal lag length selected by AIC criteria based on all models up to 4 lags (ADF(k_4)) or 12 lags (ADF(k_{12})). The critical values at the 1%, 5%, and 10% level for 100 observations are as follows: 0.511, 0.386, and 0.322 for DW, 4.07, 3.37, and 3.03 for DF, 3.77, 3.17, and 2.84 for ADF(k).

Figure 1: Nominal Interest Rates

Panel A: Mortgage Rates



Panel B: Consumer Rates



Panel C: Corporate Rates

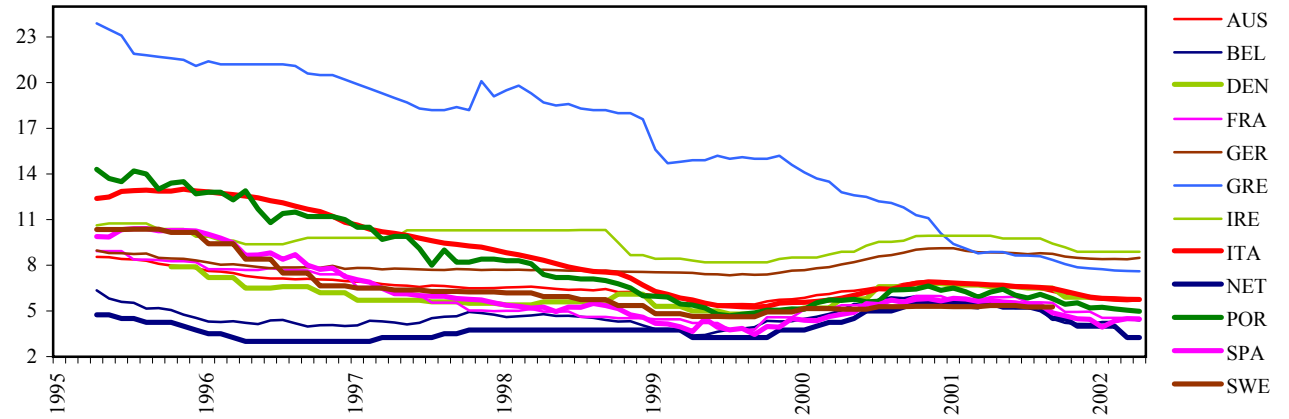
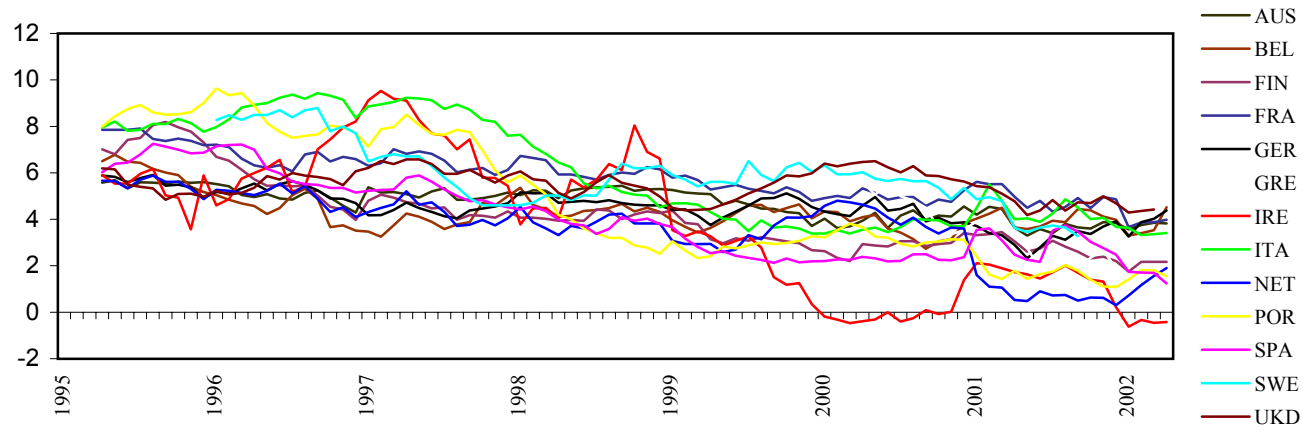
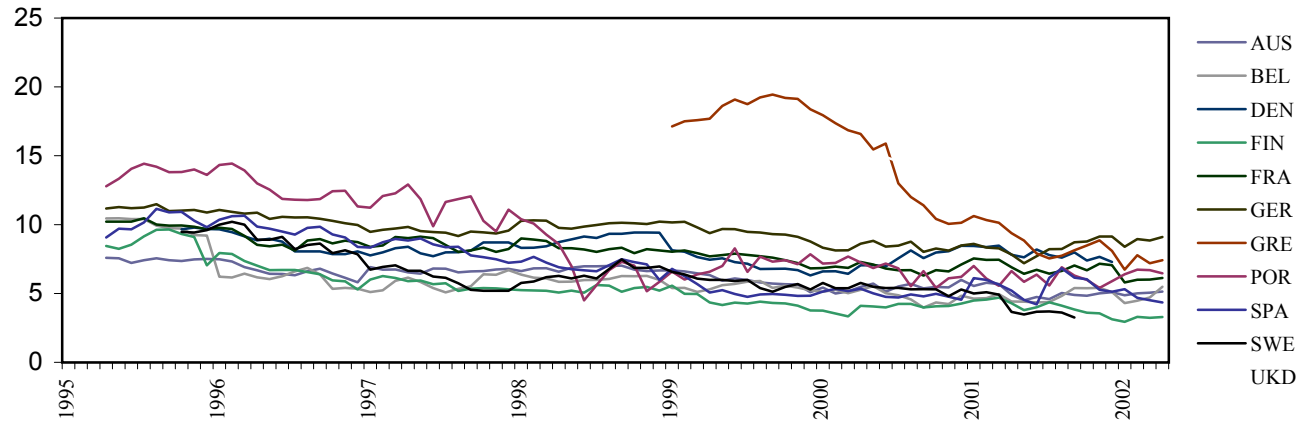


Figure 2: Real Interest Rates

Panel A: Mortgage Rates



Panel B: Consumer Rates



Panel C: Corporate Rates

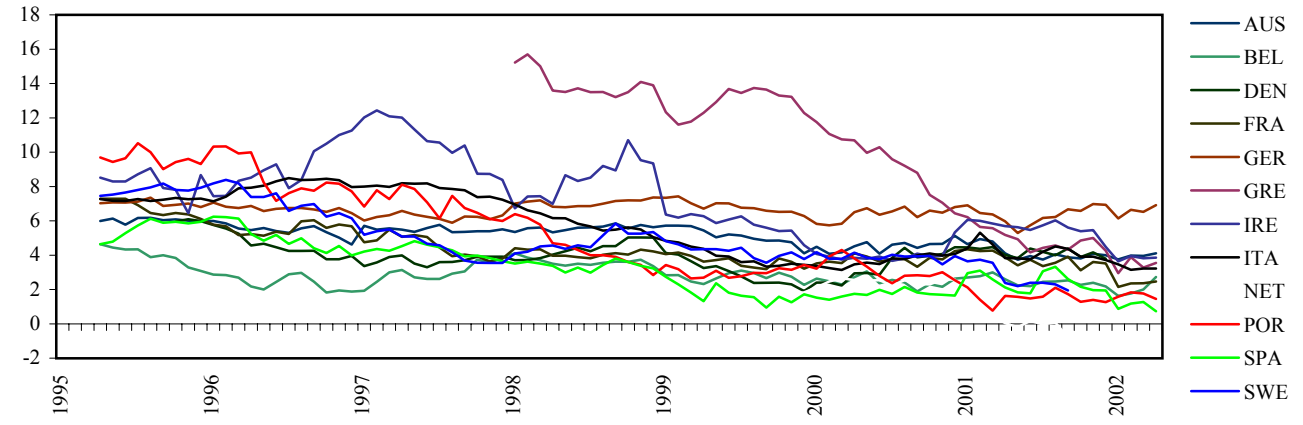
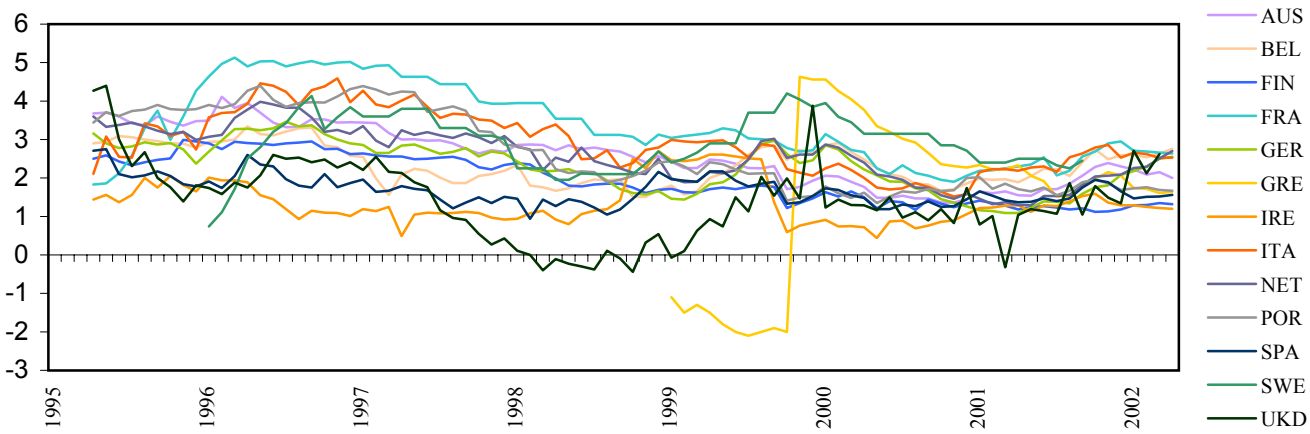
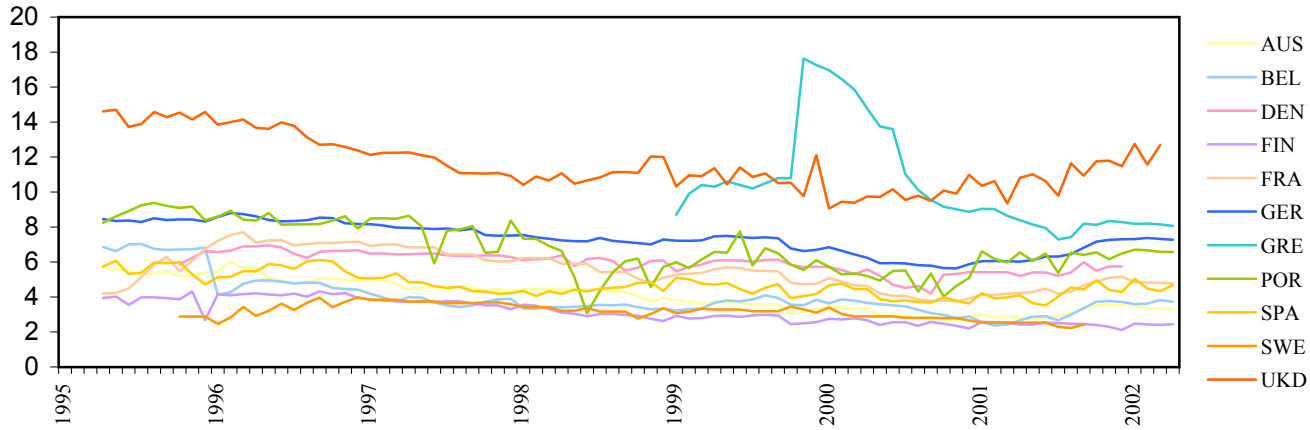


Figure 3: Interest Rate Spreads

Panel A: Mortgage Rates



Panel B: Consumer Rates



Panel C: Corporate Rates

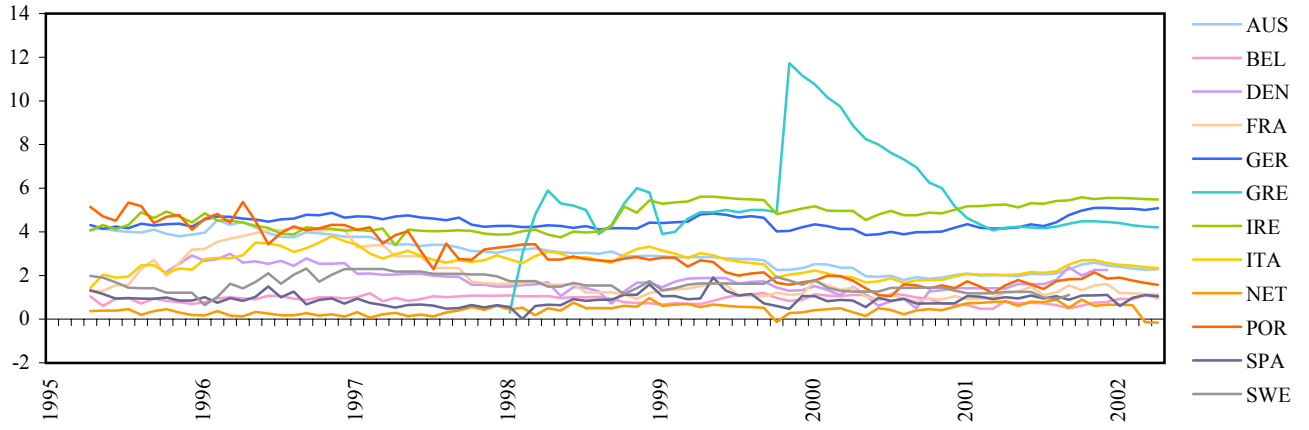
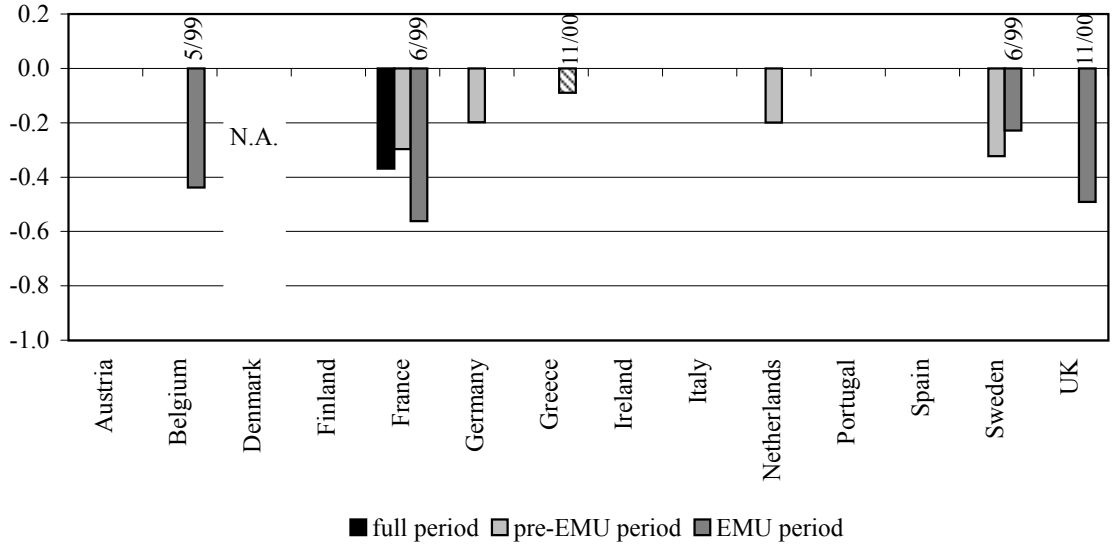
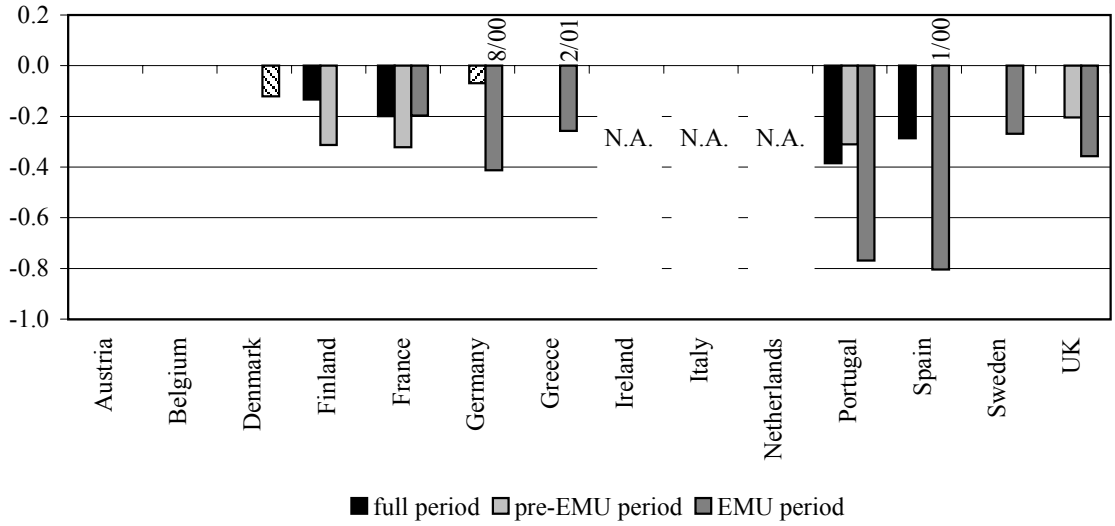


Figure 4: Speed of Adjustment in Cointegration of Nominal National Interest Rates versus EU Average

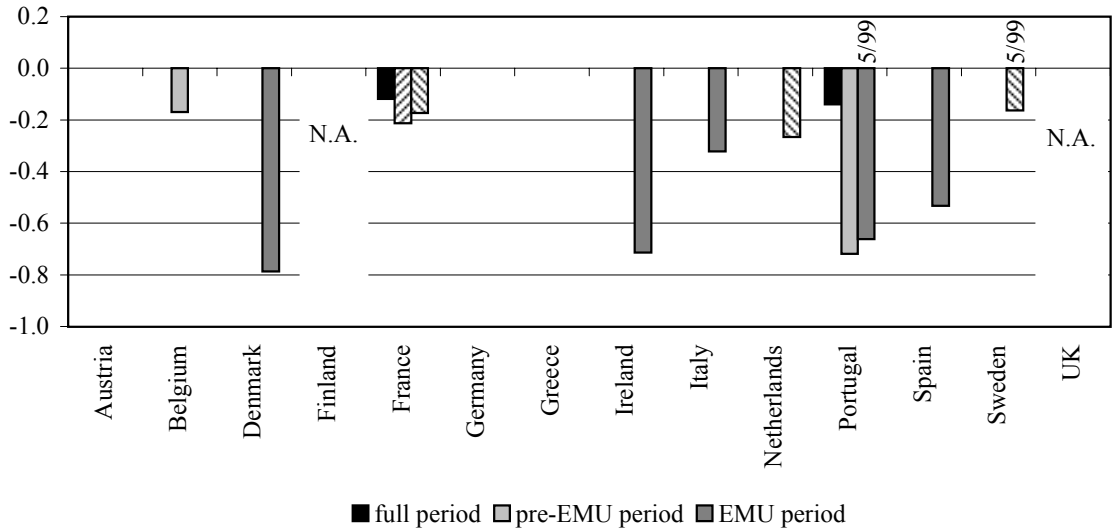
Panel A: Error Correction Terms for Nominal Mortgage Lending Rates



Panel B: Error Correction Terms for Nominal Consumer Lending Rates



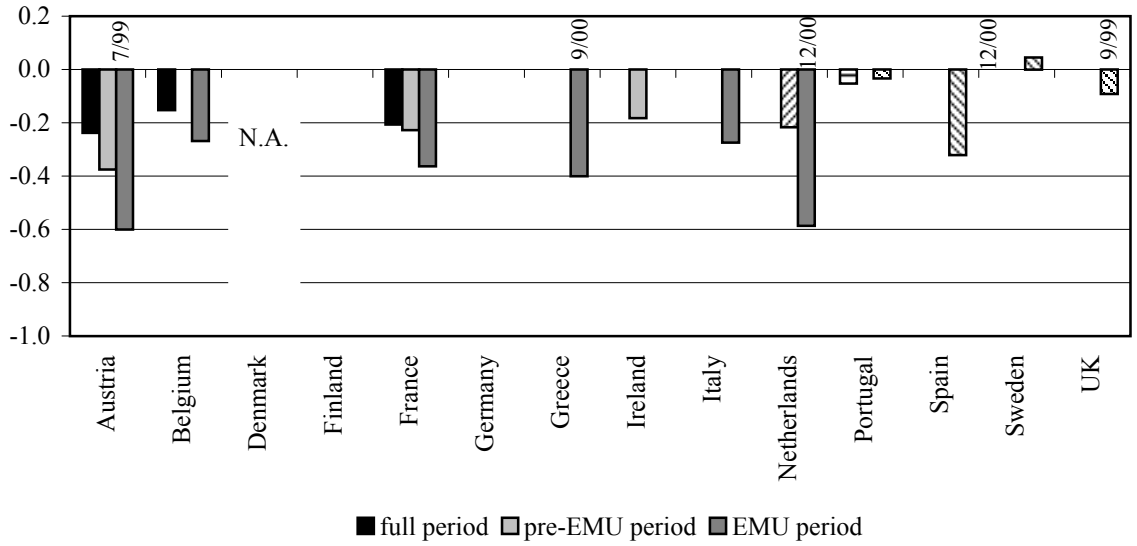
Panel C: Error Correction Terms for Nominal Corporate Lending Rates



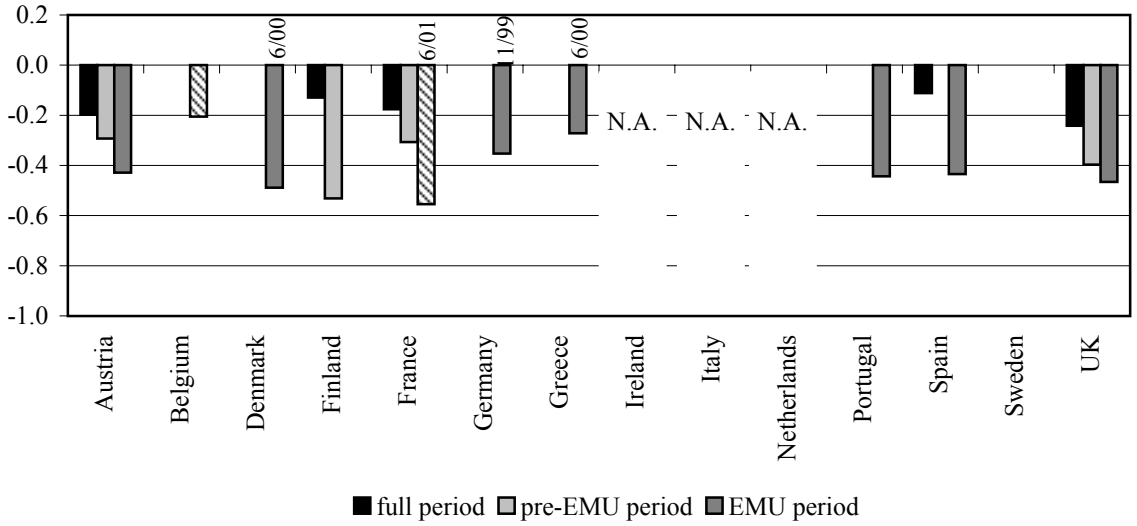
Note: ECTs are shown only when significant cointegration relationship was found. Striped bars indicate that ECT is not significantly differently from zero (10% level) with the following patterns: horizontal for full period. diagonal bottom left to top right for pre-EMU period, and diagonal top left to bottom right for EMU period.

Figure 5: Speed of Adjustment in Cointegration of Real National Interest Rates versus EU Average

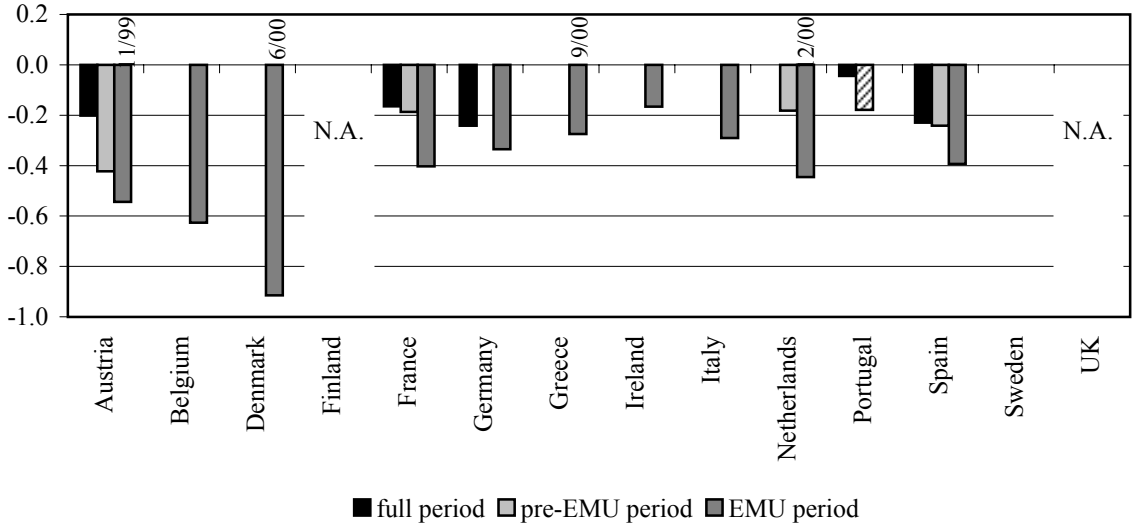
Panel A: Error Correction Terms for Real Mortgage Lending Rates



Panel B: Error Correction Terms for Real Consumer Lending Rates



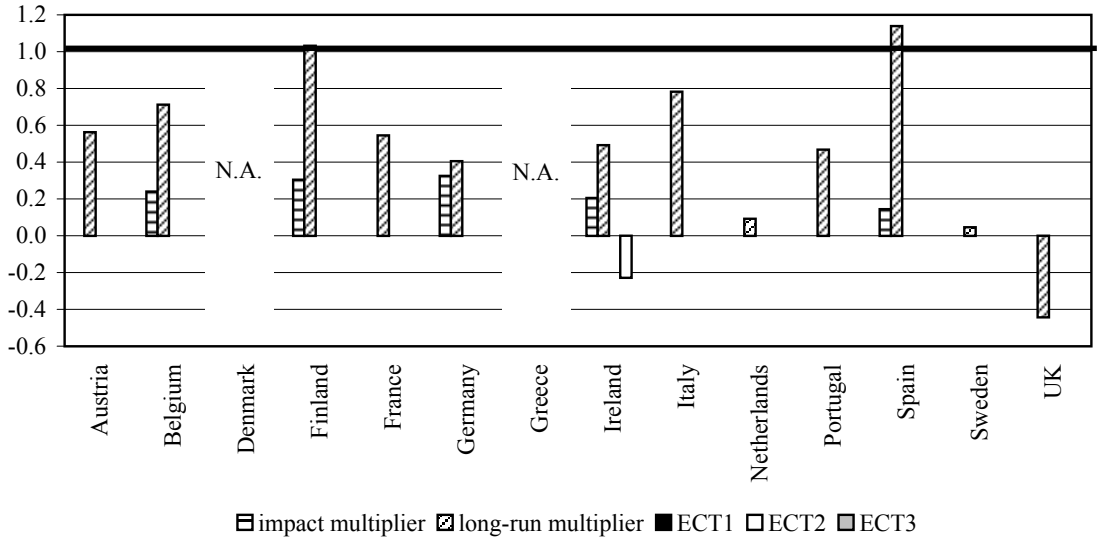
Panel C: Error Correction Terms for Real Corporate Lending Rates



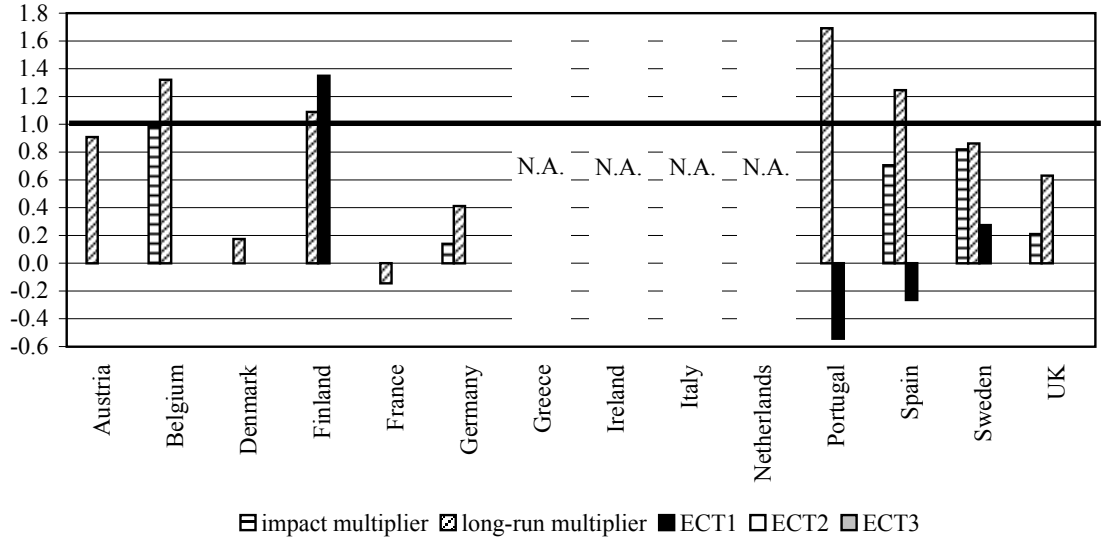
See notes to Figure 4.

Figure 6: Coefficients for the Optimally Extended Pass-Through Model in the Pre-EMU Period

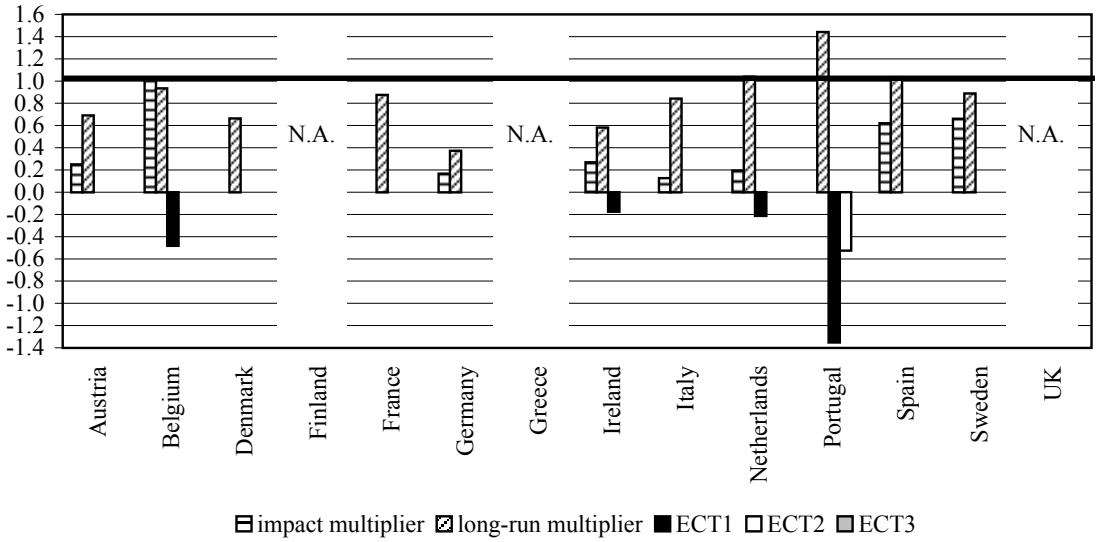
Panel A: Mortgage Lending Rates



Panel B: Consumer Lending Rates



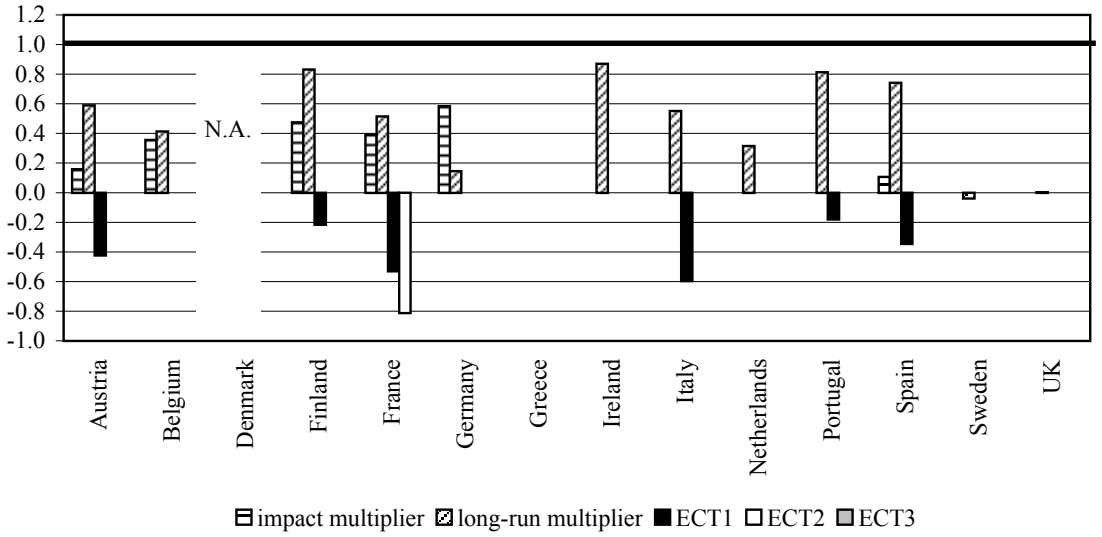
Panel C: Corporate Lending Rates



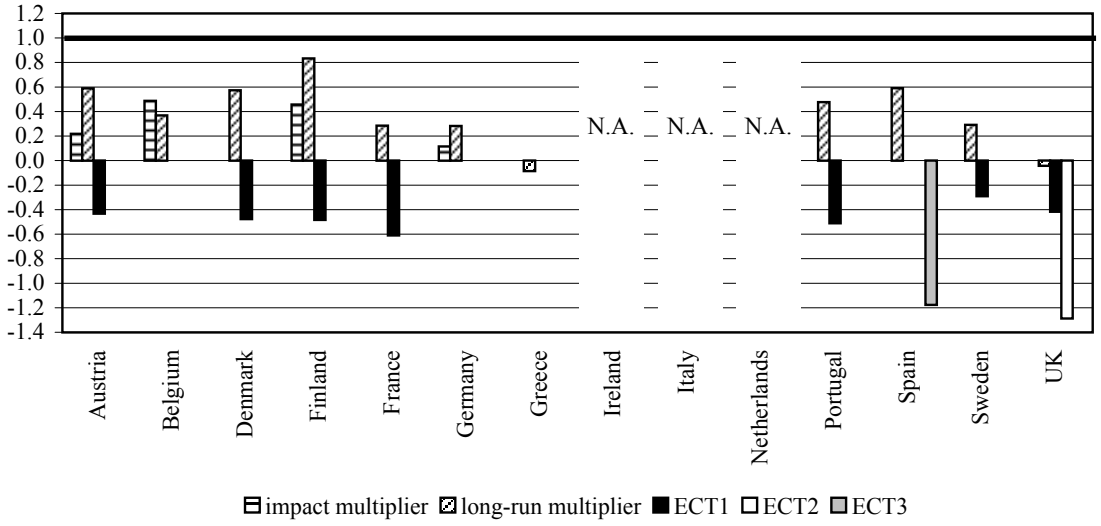
Note: Only significant impact multipliers and ECT coefficients are shown.

Figure 7: Coefficients for the Optimally Extended Pass-Through Model in the EMU Period

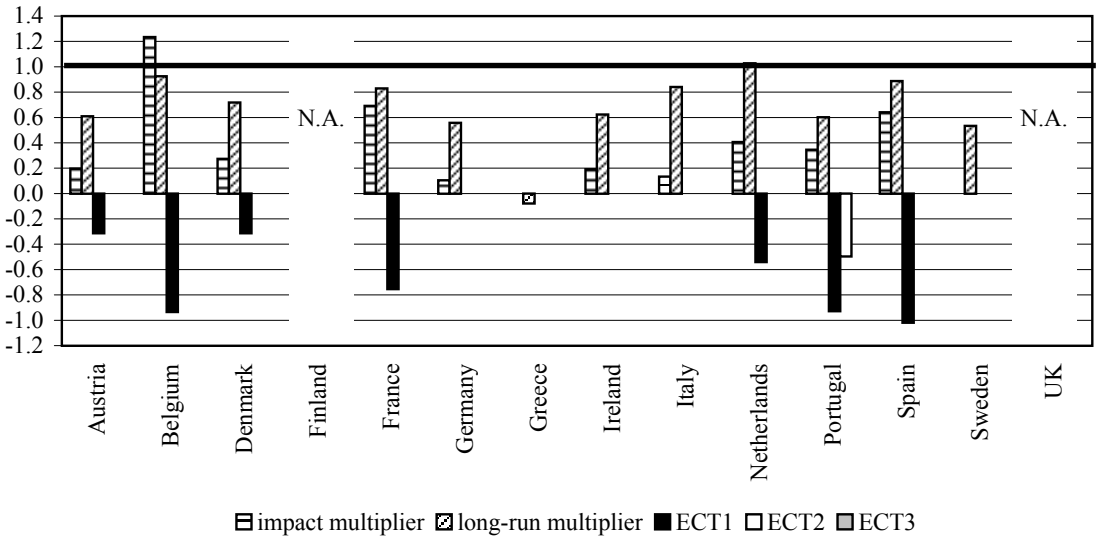
Panel A: Mortgage Lending Rates



Panel B: Consumer Lending Rates



Panel C: Corporate Lending Rates



Note: Only significant impact multipliers and ECT coefficients are shown.

Figure A1: Rolling Chow Tests - Nominal Interest Rates

Panel A: Mortgage Lending Rates

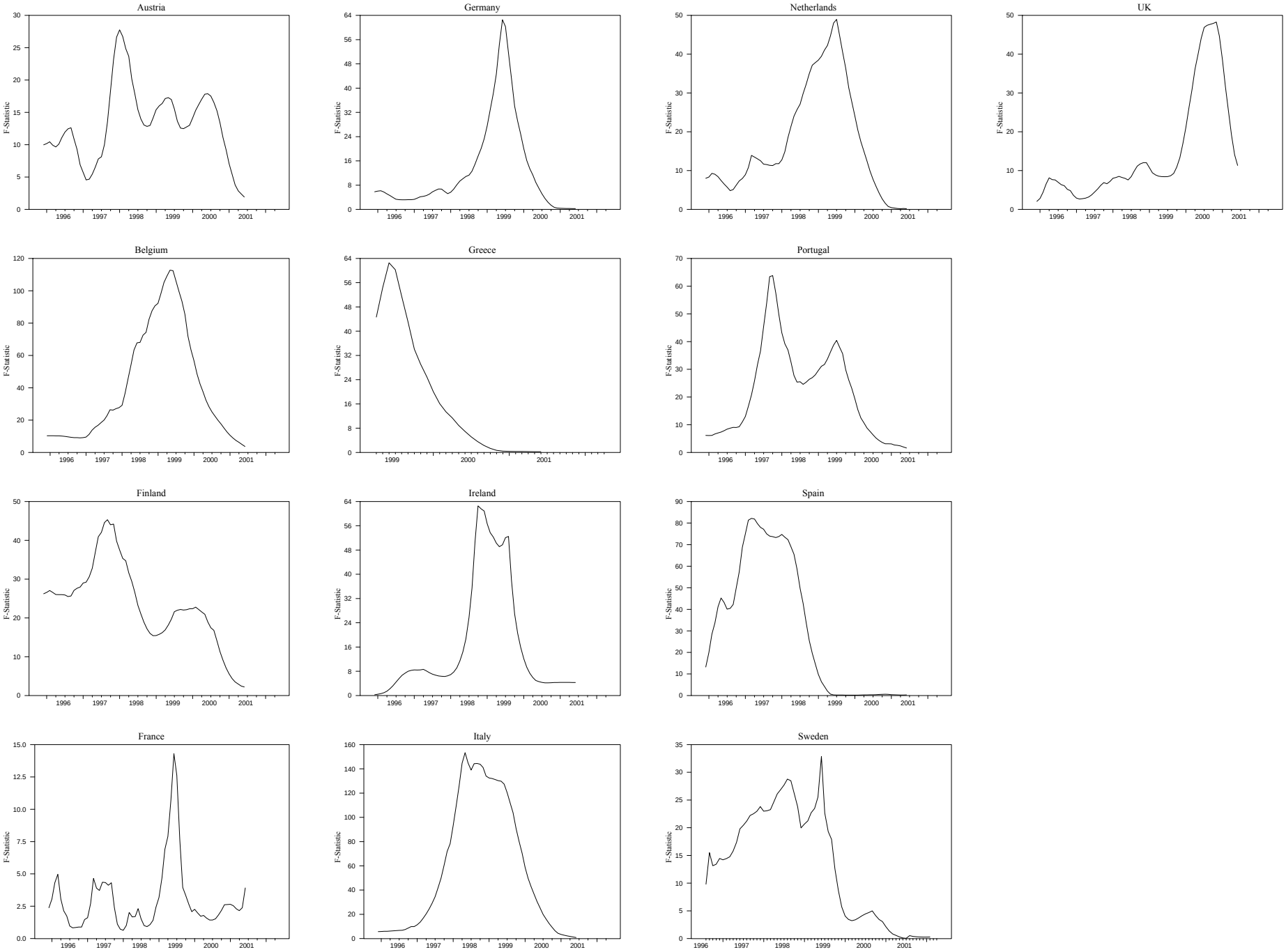


Figure A1 continued

Panel B: Consumer Lending Rates

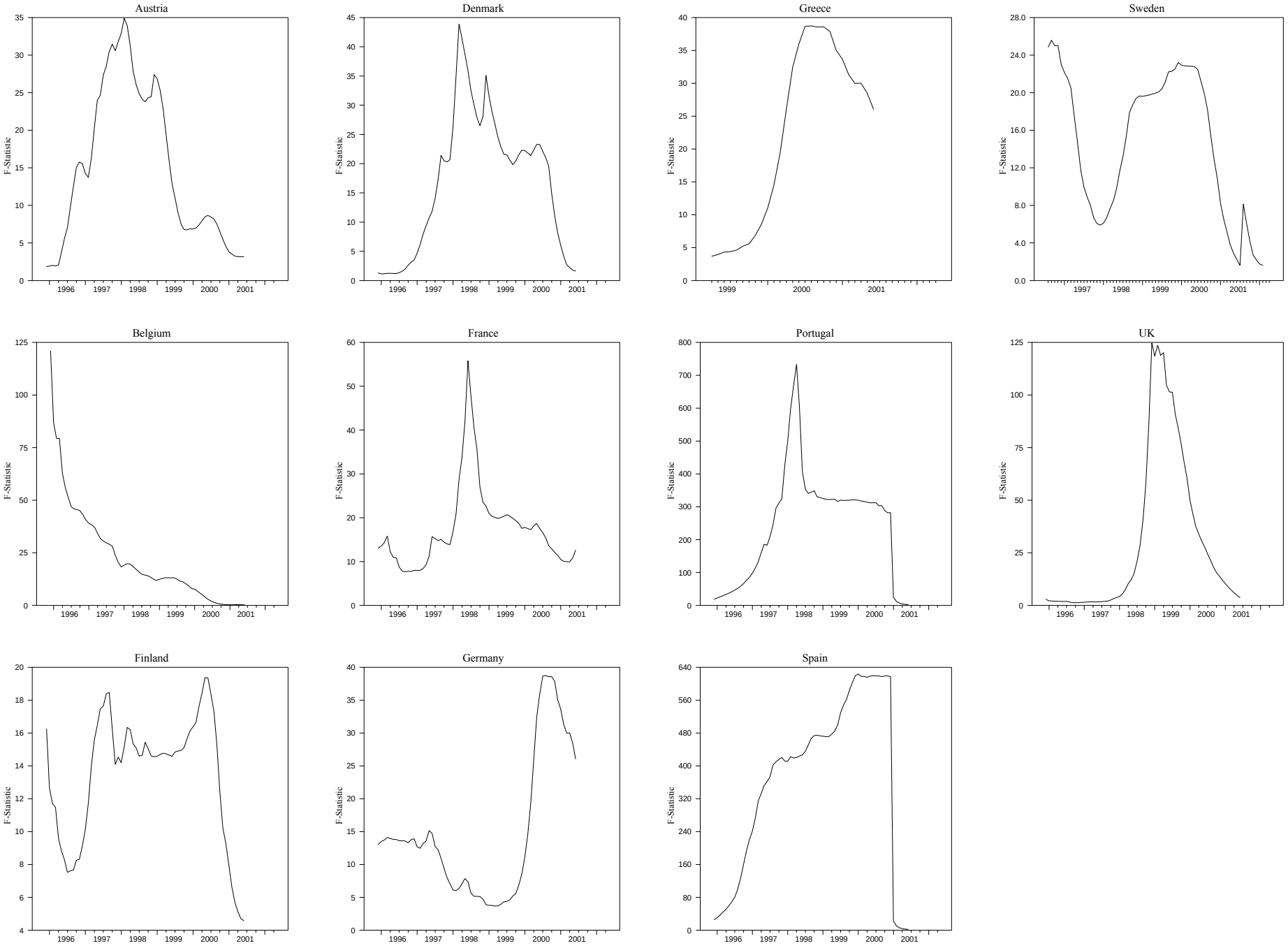


Figure A1 continued

Panel C: Corporate Lending Rates

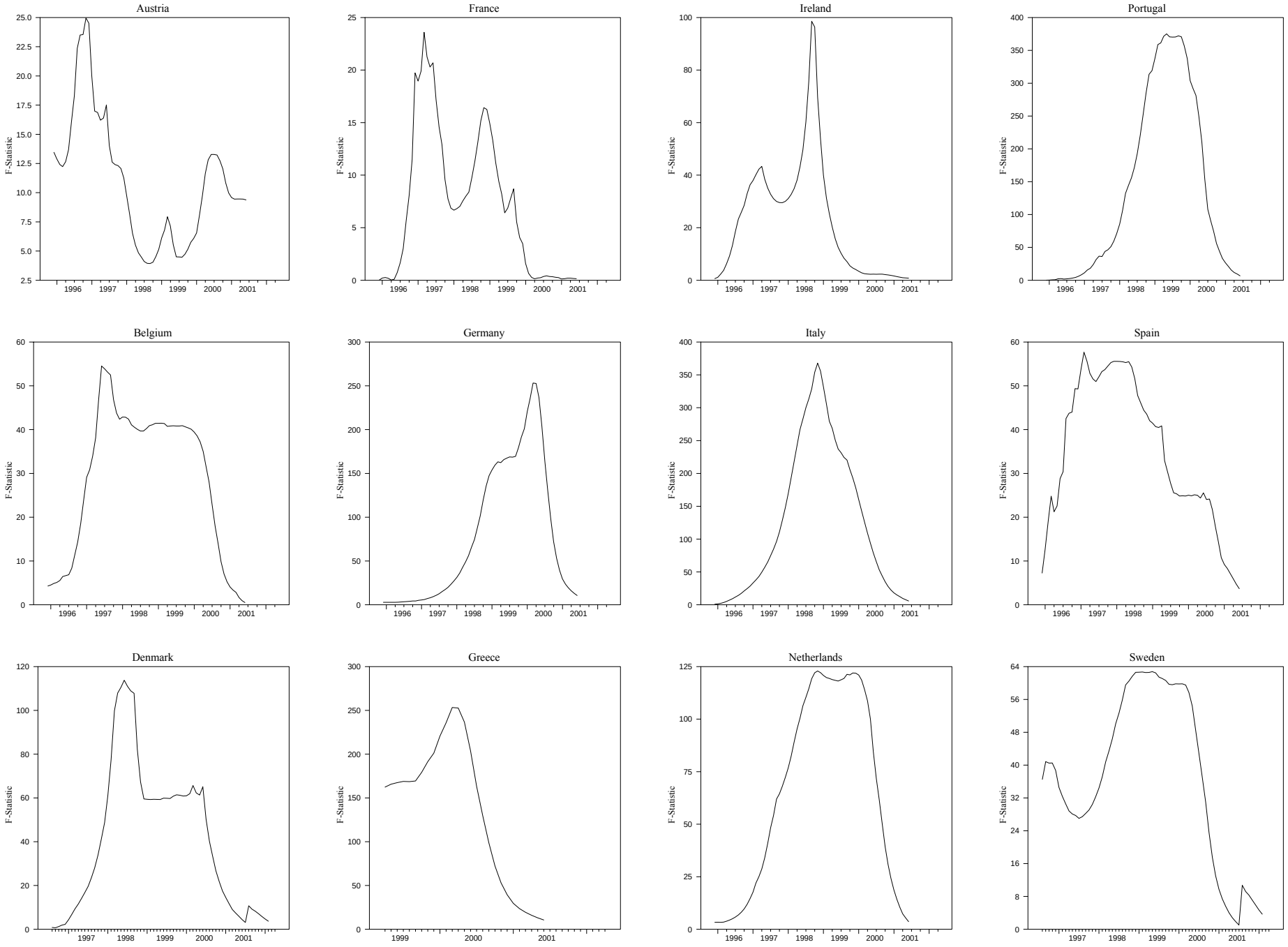


Figure A2: Rolling Chow Tests - Real Interest Rates

Panel A: Mortgage Lending Rates

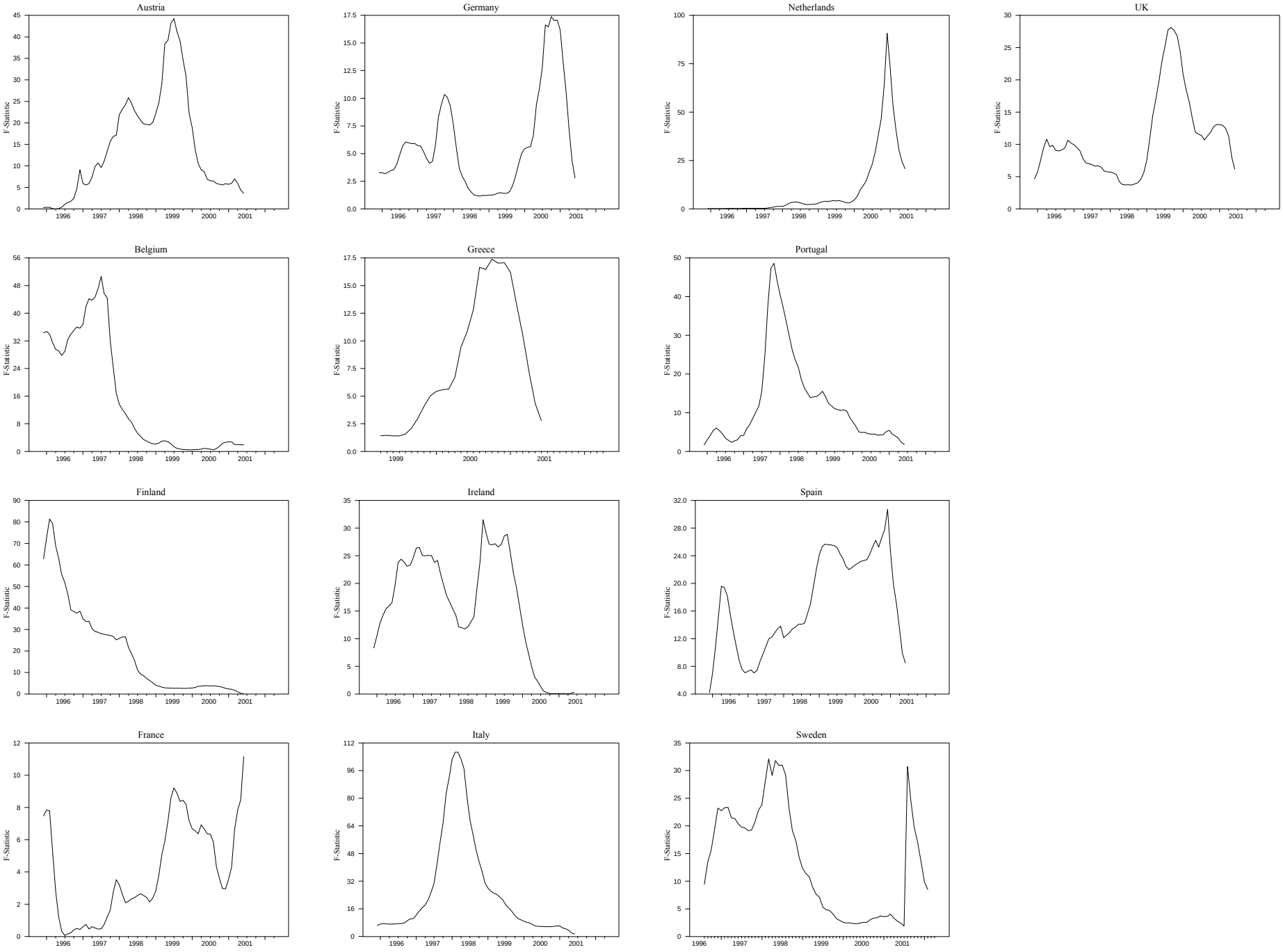


Figure A2 continued

Panel B: Consumer Lending Rates

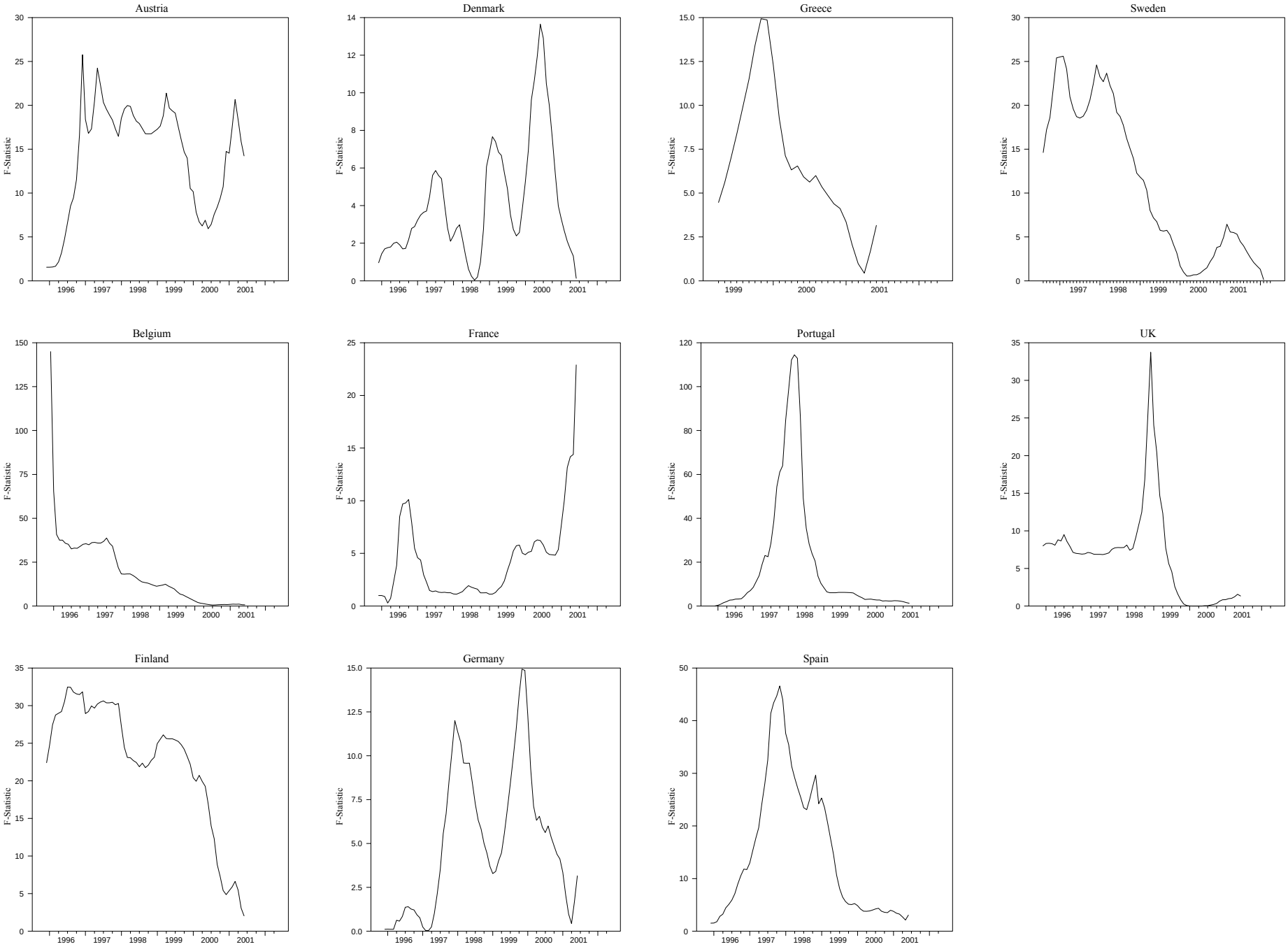


Figure A2 continued

Panel C: Corporate Lending Rates