Is the Eurozone homogeneous and symmetric? An interest rate pass-through approach before and during the recent financial crisis

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ABSTRACT

This paper examines the existence of interest rate pass through (PT) Convergence (Homogeneity and Symmetry) in the Eurozone before and during the financial crisis. Our approach is based on the introduction of a new ratio, called the 'Speed Adjusted Elasticity Ratio' (SAER). This ratio examines the time needed for the increasing/ decreasing wholesale (money market) rate to complete its transmission to the retail rate in the loan and deposit markets of the twelve member states of the Eurozone. From the derived results, and especially those in the loan rates markets, this convergence is challenged.

Keywords *Interest rates pass-through · Convergence · Financial crisis*

JEL Classification *E52· E43*

1. Introduction

While the Maastricht criteria focused on nominal convergence of inflation rates, government deficits and debts, rather less attention has been given to the convergence of financial European integration. The recent financial crisis, however, has intensified the need for more efficient European monetary integration – taking into account that the retail (deposit and lending) banking markets are still the "least" integrated financial markets within the EU (e.g., Baele *et al*., 2004). It is well known, that before 1999, the national central banks (CB) in the EU were responsible for their own monetary policy. Therefore their effectiveness was based on their ability to comprehend how changes in the key interest rates (central and money market) are transmitted to bank interest rates in

order to be able to estimate the effects of monetary policy decisions on commercial banks' behaviour. The shift from national CBs to the European Central Bank (ECB) since January 1999 may have affected the interest rate pass-through process and therefore the banks' behaviour, as Bagliano *et al.* (2000) have proven theoretically.

In the monetary policy literature, the adjustment of retail bank interest rates (deposit and lending rates) in response to changes in wholesale rates (central bank and interbank money market rates) is a cornerstone of the interest rate transmission mechanism. Such behaviour attracts special attention in the case of the Eurozone as we are dealing with a single currency and a single ECB but twelve different financial systems. Since the effectiveness of the ECB's monetary policy is related to the degree of convergence of the participating financial systems, the question that arises is if the Eurozone financial system is homogeneous and symmetric.

A variety of authors (Sander and Kleimeier 2004, 2006; Vajanne 2007; Hofmann 2006, inter alia) have paid particular attention to testing the Eurozone's feasibility of convergence through the interest rate PT mechanism. Our study advances this line of research by: a) implementing a different disaggregated model; b) applying different descriptive statistics for tracing out convergence inside the Eurozone; and c) testing how the financial crisis has affected the issue of convergence.

Analytically, we employ a symmetric/asymmetric error correction (EC) approach to the interest rate PT relationship; the latter was initially presented by Bachmeier and Griffin (2003) and further developed by Rao and Rao (2008). Our approach is based on the LSE-Hendry GETS methodology. The main advantages of the model derive from the two different speeds of adjustments, related to the separate positive and negative change in the variables (wholesale and retail rates), as well as the long run and short run rigidities that can be simultaneously estimated. The structure of such a model allows us to move further in creating our own ratio, similar to that of Scholnick (1996). This 'new' ratio called the'Speed Adjusted Elasticity Ratio' (SAER) measures the time needed (e.g. weeks, months etc.) for an increasing/decreasing wholesale rate to complete its transmission to the retail rate. Algebraically, we derive this new ratio by dividing the estimated long run PT elasticities (rigidities) by the speed of adjustment coefficients.

However, since the main target of this paper is to measure convergence through

the degree of symmetry and homogeneity in the Eurozone, we focus on the differences of PT transmissions of each member state relative to the Eurozone's transmission. As a result, interest is shown mainly in the 'deviations' that each country's SAER exhibits relative to the corresponding Eurozone SAER. Any significant deviation between the two ratios will be an indication of relative lack of convergence (the homogeneity aspect) between individual countries and the Eurozone. Moreover, any significant deviation between positive and negative PT SAER estimates could be used as a measure of the other aspect of convergence, i.e. asymmetry.

The structure of the paper is as follows: section 2 briefly discusses the literature on PT convergence; section 3 presents the data and the empirical strategy for testing homogeneity and symmetry in the Eurozone before and during the financial crisis while section 4 analyses the empirical results and section 5 concludes.

2. Review of the literature

Homogeneity exists when retail banking interest rates in different EU banking systems react similarly to changes in wholesale money market and/or CB interest rates. On the other hand, heterogeneity across banks' products in terms of PT "can be caused by cross-country differences in retail bank regulation and taxation, which may provide banks with different constraints and incentives when pricing their retail products" (see ECB, 2009 Monthly Bulletin). This issue within the current European Monetary Union (EMU) is well documented by various strands of research. Most Eurozone PT studies are based on a variant of the pioneering work by Cottarelli and Kourelis (1994). Important contributions include BIS (1994), Cottarelli *et al.* (1995), Borio and Fritz (1995), Mojon (2001), de Bondt *et al.* (2002), Sander and Kleimeier (2000, 2004), Toolsema *et al.* (2002), Heinemann and Schüler (2002, 2003), de Bondt (2005), and De Graeve *et al.* (2004). Typically, these studies find considerable differences in PT across the countries of the Eurozone. Moreover, they identify a substantial degree of short-run bank interest rate stickiness while there is very limited evidence for a full pass-through in the long run. Usually monetary transmission heterogeneities are mainly driven by financial structure differences. In such cases, the PT convergence may be at the centre of monetary transmission convergence.

Additionally, asymmetric adjustment of retail interest rates is also regularly documented. However, it has been argued that ‘‘differences in financial structure are the proximate cause for [these] national asymmetries in the monetary transmission mechanism’’ (Cecchetti, 1999). Finally, it is often argued that the single currency should act as a unifying force that has the potential to make the PT faster and at the same time more complete and homogeneous. However, as argued by Sander and Kleimeier (2004), legal and cultural differences may continue to preclude full convergence in the incumbent Eurozone.

Several different approaches have been used for testing EU financial integration. For instance, Baele *et al.* (2004) and Vajanne (2007) predominantly use the so-called beta- and sigma-convergence measures, while Sander and Kleimeier (2000), and Schüler and Heinemann (2002) investigate retail banking market integration using cointegration approach. In our study we will use the LSE-Hendry GETS methodology in retail markets (deposit and lending) of all the twelve member states and the Eurozone. Then, due to the GETS characteristics, we will create a ‘new’ ratio that will measures the time needed (e.g. weeks, months etc.) for an increasing/decreasing wholesale (e.g. MM) rate to complete the long run transmission to the retail rate for all cases examined. This ratio will be utilised, using some descriptive statistics, for testing the degree of convergence (homogeneity and symmetry) between the twelve member states and the Eurozone.

3. Data and empirical strategy

3.1. Data selection

Monthly data (1/2003–1/2010) are retrieved from the *ECB Statistical Data Warehouse* database for all the twelve countries and the Eurozone. For the deposit market the variables used are: the overnight rate for non-financial corporations (D1) and households (D2), the rate for non-financial corporations (D3) and households (D4) with maturity up to 1 year. For the loan market, the rate to non-financial corporations up to 1 year (L1), over 1 year to 5 years (L2), the rate for consumption (excluding revolving loans and overdrafts convenience and extended credit card debt) up to 1 year (L3), over 1 year to 5 years (L4), the rate for house purchase (mortgages) for over 5 years (L5), and the overdraft rate for non-financial corporations (L6) and for households (L7) are used.

Regarding the wholesale (MM) rates we have tested four different variables: The EONIA and three different maturity Euribors (3-month, 6-month and 12-month). The appropriate wholesale rate for each retail rate in each country has been selected with correlation analysis.[1] Finally, it is worth mentioning that we split the examined time period into two sub-periods – the pre-financial crisis period (2003m1-2007m12) and the financial crisis period that could be distinct starting [2] from the beginning of the year 2008 and onwards (2008m1-2010m1).

3.2. Modelling the interest rate PT process

Usually ECB policy rates interventions have a significant and immediate effect on money market rates of different maturities. Changes in ECB policy rates in normal circumstances will result in more or less one-to-one spillover to unsecured short-term money market rates, such as the EONIA and, to a somewhat lesser extent, the different maturity Euribor (3-month, 6-month and 12-month) rates. Consequently, changes in the money market interest rates, in turn, are transmitted to the different retail bank interest rates (loan and deposits) of the twelve member-states, albeit to varying degrees. The following long term interest rates PT model (eq. 1) presents this transmission process:

$$IR_{r,c,t} = \gamma_0 + \sum_{j=1}^{n1} k_{r,c} * IR_{r,c,t-j} + \sum_{i=1}^{n2} \phi_{w,c} * IR_{w,t-i} + e_{r,c,t} \qquad (1)$$

where: $IR_{r,c,t}$ is the different retail (loan and deposit) rates r of country c of the Eurozone at time t, γ_0 is the constant mark up[3], $n1, n2,$ indicate the optimal lag lengths, $k_{r,c}$ is the coefficient of the short run interest rate rigidity (elasticity) of the different retail rates r interia of country c of the Eurozone, $\phi_{w,c}$ is the long-run interest rate rigidity (elasticity) of the selected wholesale (money market) rate w at country c of the Eurozone, $IR_{w,t-i}$ is the selected wholesale (money market) rate (e.g. the overnight rate, the 3-month money market rates etc.) at time $t-i$, $e_{r,c,t}$ is the error term for each specific retail rate r of country c of the Eurozone at time t.

[1] The correlation analysis results are available upon request.
[2] Typically the crisis starts gripping the global financial markets during the last quarter of the year 2007. However, as marked out by the data, the crisis actually emerges at the beginning of the year 2008.
[3] See Rousseas (1985).

The aforementioned long term PT model can be transformed in the following simple dynamic error correction form:

$$\Delta IR_{r,c,t} = \gamma_0 + \sum_{j=1}^{n1} \rho_{r,c} * \Delta IR_{r,c,t-j} + \sum_{i=1}^{n2} \lambda_{w,c} * \Delta IR_{w,t-i} - \theta_{r,c} * e_{r,c,t-1} + u_{r,c,t} \qquad (2)$$

Where: Δ is the difference operator, $\rho_{r,c}$ is the short run interest rate rigidity (elasticity) of the different retail rates r interia of country c of the Eurozone, $\lambda_{w,c}$ is the short run interest rate rigidity (elasticity) of the selected wholesale (money market) rate w at country c of the Eurozone, $\theta_{r,c}$ is the speed of retail rate adjustment r of country c initiated from the wholesale rate (w) changes, $e_{r,c,t-1}$ represents the error correction term and $u_{r,c,t}$ is the error term for each specific retail rate r of country c of the Eurozone at time t.

In the simple ECM (eq. 2) the retail rates ($IR_{r,c,t}$) and the speed of adjustment coefficient ($\theta_{r,c}$) cannot be analysed separately when the wholesale rates ($IR_{w,t-i}$) are increasing or decreasing. A disaggregated VECM model tackles the above issue and the aforementioned eq. 2 can be represented in the following form:

$$\Delta IR_{r,c,t} = \gamma_o + \sum_{i=0}^{l1} \rho^{-}_{r,c} \Delta IR^{-}_{r,c,t-i} + \sum_{i=0}^{l2} \lambda^{-}_{w,c} \Delta IR^{-}_{w,t-i} + \theta^{-}_{r,c} e_{r,c,t-1} +$$

$$+ \sum_{i=0}^{l3} \lambda^{+}_{w,c} \Delta IR^{+}_{w,t-i} + \sum_{i=0}^{l4} \rho^{+}_{r,c} \Delta IR^{+}_{r,c,t-i} + \theta^{+}_{r,c} e_{r,c,t-1} + \gamma_1 T + \omega_{r,c,t} \qquad (3)$$

Where: $l1$, $l2$, $l3$, $l4$ indicate the optimal lag lengths, $\rho^{-}_{r,c}$ and $\rho^{+}_{r,c}$, replacing aggregate $\rho_{w,c}$ of eq 2, represent the negative and positive rigidities (elasticities) of the short run different retail rates r interia of country c of the Eurozone, $\lambda^{-}_{w,c}$ and $\lambda^{+}_{w,c}$, replacing aggregate $\lambda_{w,c}$ of eq. 2, represent the negative and positive coefficients of the short run wholesale (money market) rate rigidities (elasticities) w at country c of the Eurozone, $\theta^{-}_{r,c}$ and $\theta^{+}_{r,c}$, replacing aggregate $\theta_{r,c}$ of eq. 2, are the speed of adjustment

coefficients in the negative and positive case, T is the time trend and $\omega_{r,c,t}$ is the error term for each specific retail rate r of country c of the Eurozone at time t.

As Rao and Rao (2005) point out, the (+)/(–) superscript on the coefficients indicates a positive/negative change in the variables included in the model. On the one hand, for any positive change ($\Delta IR_{w,t}>0$) in the independent variable, a corresponding response of all positive coefficients ($\beta^{+}_{w,c}, \theta^{+}_{c,t}$) is expected. On the other hand, the corresponding negative coefficients ($\beta^{-}_{w,c}, \theta^{-}_{c,t}$) will respond in any negative change of the dependent variable ($\Delta IR_{w,t}<0$). Moving a step forward, the disaggregated GETS model (eq. 3) could thus be presented in the following form:

$$\Delta IR_{r,c,t} = \gamma_o + \sum_{i=0}^{l1} \rho^{-}_{r,c}\ \Delta IR^{-}_{r,c,t-i} + \sum_{i=0}^{l2} \lambda^{-}_{w,c}\ \Delta IR^{-}_{w,t-i} + \theta^{-}_{r,c}\ (IR_{r,c,t} - \phi_{w,c}\ IR_{w,t})_{t-1} +$$

$$+ \sum_{i=0}^{l3} \lambda^{+}_{w,c}\ \Delta IR^{+}_{w,t-i} + \sum_{i=0}^{l4} \rho^{+}_{r,c}\ \Delta IR^{+}_{r,c,t-i} + \theta^{+}_{r,c}\ (IR_{r,c,t} - \phi_{w,c}\ IR_{w,t})_{t-1} + \gamma_1 T + \xi_{r,c,t} \qquad (4)$$

Where: $\xi_{r,c,t}$ is the error term for each specific retail rate r of country c of the Eurozone at time t.

The main advantages of the disaggregated GETS model include: i) its capability of estimating both negative and positive short-run elasticities (e.g. the $\beta^{-}_{w,c}$ *and* $\beta^{+}_{w,c}$ in eq. 4 and ii) the direct and simultaneous estimation of the long-run ($\phi_{w,c}$ or alternatively $\gamma_0 + \phi_{w,c}$) and the short-run interest rate PT rigidities in the same model.

3.3. The 'Speed Adjusted Elasticity Ratio' (SAER)

First, using equation (4), which is estimated with Non-Linear Least Squares method (N.L.L.S), we extract the values of $\phi_{w,c}$, $\theta^{-}_{r,c}$ and $\theta^{+}_{r,c}$ coefficients in each country (for each different retail rate) as well as the corresponding weighted coefficients for the Eurozone. These estimates are needed in order to derive the appropriate 'Speed Adjusted

Elasticity Ratio' (SAER). SAER represents the time needed (e.g. weeks, months etc.) for a decreasing/increasing wholesale rate to complete its transmission to the retail rate. Algebraically, this ratio is derived by dividing the estimated long run PT elasticities (rigidities), $\phi_{w,c}$,by the speed of adjustment coefficients, $\theta^{+}_{r,c}$ and. $\theta^{-}_{r,c}$.

$$\text{SAER}^{+}_{r,c} = \frac{\phi_{w,c}}{\theta^{+}_{r,c}} \tag{5}$$

$$\text{SAER}^{-}_{r,c} = \frac{\phi_{w,c}}{\theta^{-}_{r,c}} \tag{6}$$

The statistical estimates of $\phi_{w,c}$, $\theta^{-}_{r,c}$, $\theta^{+}_{r,c}$ coefficients and the SAER values are analytically presented in Tables 1 to 5 in the Appendix.[4]

Next, we calculate the difference (deviation) of each country's (positive and negative) SAER value(s) from the corresponding (weighted) aggregate for the Eurozone i.e. the country's SAER value(s) minus the Eurozone's SAER (for all different retail rates). We derive the equivalent (two) arithmetic means ($\mu^{+}_{IR_r}$, $\mu^{-}_{IR_r}$) and the standard deviations ($\sigma^{+}_{IR_r}$, $\sigma^{-}_{IR_r}$) of the above mentioned differences. As was already mentioned, we apply this methodology for two time periods. The first period is before the emergence of the recent financial crisis (2003m1-2007m12) while the second could be defined as the financial crisis period with the 'starting point' of the first month of 2008 and onwards.

The existence of a close to zero arithmetic mean and a small and consistent standard deviation value of the above differentials (a country's SAER value minus the Eurozone's SAER) provides us with evidence about the degree of homogeneity within the Eurozone area. An indication of the existence of symmetry among the Eurozone countries, for all different interest rates examined, can be found from the comparison between the difference in the values of the arithmetic mean ($\mu^{Diff}_{IR_r}$) and standard deviation ($\sigma^{Diff}_{IR_r}$), respectively. Looking at the empirical results before and during the financial crisis, we re-examine the PT interest rate convergence (homogeneity and symmetry) issue as a structure stability problem.

[4] Only the statistically significant coefficients are presented in the Appendix.

4. Empirical Results

Following the above empirical strategy we could summarise the (numerical) results, shown in the Appendix, as follows (see Table 4):[5]

Table 4: The arithmetic means and the standard deviations of the differential SAERs[d]

	2003(1)-2007(12) before the financial crisis						**2008(1)-2010(1)** financial crisis period					
	(1) $\mu^{+}_{IR_\gamma}$	(2) μ_{IR_γ}	(1-2) $\mu^{Diff}_{IR_\gamma}$	(3) $\sigma^{+}_{IR_\gamma}$	(4) σ_{IR_γ}	(3-4) $\sigma^{Diff}_{IR_\gamma}$	(1) $\mu^{+}_{IR_\gamma}$	(2) μ_{IR_γ}	(1-2) $\mu^{Diff}_{IR_\gamma}$	(3) $\sigma^{+}_{IR_\gamma}$	(4) σ_{IR_γ}	(3-4) $\sigma^{Diff}_{IR_\gamma}$
Loan interest rates												
L1	0.40^{He}	0.36^{He}	0.04^{Sy}	0.49^{Ho}	0.51^{Ho}	-0.02^{Sy}	-0.77^{He}	-0.83^{He}	0.06^{Sy}	4.21^{He}	2.02^{He}	2.19^{As}
L2	-1.66^{He}	-1.95^{He}	0.28^{As}	2.76^{He}	3.16^{He}	-0.39^{As}	-0.27^{Ho}	-1.36^{He}	1.1^{As}	0.18^{Ho}	3.47^{He}	-3.3^{As}
L3	-1.33^{He}	-1.15^{He}	-0.18^{As}	2.56^{He}	2.11^{He}	0.45^{As}	-0.12^{Ho}	-0.06^{Ho}	-0.1^{Sy}	0.13^{Ho}	0.34^{Ho}	-0.2^{As}
L4	-0.64^{He}	-0.6^{He}	-0.04^{Sy}	0.61^{Ho}	0.58^{Ho}	0.04^{Sy}	-0.46^{He}	-0.5^{He}	0.04^{Sy}	0.31^{Ho}	0.67^{He}	-0.4^{As}
L5	-0.64^{He}	-0.59^{He}	-0.05^{Sy}	2.57^{He}	2.22^{He}	0.36^{As}	-0.96^{He}	-0.91^{He}	0.00^{Sy}	5.92^{He}	2.27^{He}	3.64^{As}
L6	0.16^{Ho}	0.19^{Ho}	-0.03^{Sy}	0.98^{Ho}	0.94^{Ho}	0.04^{Sy}	0.27^{Ho}	0.33^{Ho}	-0.1^{Sy}	0.13^{Ho}	0.38^{Ho}	-0.3^{As}
L7	-1.47^{He}	-1.49^{He}	0.02^{Sy}	1.18^{He}	1.21^{He}	-0.03^{Sy}	3.32^{He}	3.10^{He}	0.21^{As}	11.6^{He}	4.49^{He}	7.09^{As}
Total[e]	-0.77^{He}	-0.78^{He}	0.01^{Sy}	2.04^{He}	2.01^{He}	0.03^{Sy}	0.16^{Ho}	-0.03^{Ho}	0.19^{As}	2.28^{He}	2.93^{He}	-0.7^{As}
Deposit interest rates												
D1	0.65^{He}	-0.07^{Ho}	0.71^{As}	0.62^{Ho}	0.55^{Ho}	0.07^{Sy}	-0.81^{He}	-0.14^{Ho}	-0.7^{As}	2.88^{He}	0.28^{Ho}	2.59^{As}
D2	-0.29^{Ho}	0.03^{Ho}	-0.32^{As}	0.67^{Ho}	0.91^{Ho}	-0.24^{As}	0.63^{He}	0.76^{He}	-0.1^{Sy}	0.01^{Ho}	0.26^{Ho}	-0.2^{As}
D3	0.22^{Ho}	NA	0.21^{As}	0.67^{Ho}	NA	0.67^{As}	2.28^{He}	-0.33^{Ho}	2.61^{As}	0.07^{Ho}	1.25^{He}	-1.2^{As}
D4	-0.72^{He}	-0.96^{He}	0.24^{As}	1.89^{He}	0.76^{Ho}	1.14^{As}	-1.31^{He}	-0.13^{Ho}	-1.2^{As}	2.62^{He}	0.36^{Ho}	2.26^{As}
Total[e]	0.00^{H0}	-0.32^{He}	0.32^{As}	1.19^{He}	1.2^{He}	-0.01^{Sy}	0.08^{H0}	-0.04^{Ho}	0.12^{Sy}	1.88^{He}	0.84^{Ho}	1.04^{As}

Note: He (heterogeneity), Ho (Homogeneity), Sy (Symmetry) and As (Asymmetry). [d] All presented values are statistically significant at 5%. [e] The total arithmetic mean for all $SAER^{+}s$ and $SAER^{-}s$ for all countries and all banking products (retail interest rates) is derived as follows: $\mu_{total} = N_\gamma * \mu^{(\pm)}_{IR_\gamma}/N$. The total standard deviation (σ_{total}) is calculated as: $(\sigma_{total}) = \sqrt{\frac{\sum\left(N_i * \sigma^{\pm 2}_{IR_\gamma}\right) + \sum\left(\mu^{\pm 2}_{IR_\gamma} - \mu_{total}\right)^2 * N_i}{N}}$ where N_i is the number of countries (subgroup) which their SAER values were found statistically significant in each banking product, $\mu^{\pm}_{IR_\gamma}$ the (two) arithmetic means, $\sigma^{\pm}_{IR_\gamma}$ the corresponding standard deviations and N the summation of all N_i.

From the above results we observe that PT market transmission mechanisms in the Eurozone loan interest rate markets appear to behave mostly heterogeneously. The evidence (apart from the L6 case) clearly rejects the null hypothesis, i.e. the existence of close to zero arithmetic mean and small and consistent standard deviation values of the examined SAER differentials. In contrast, PT in the deposit markets appears more homogeneous.

[5] Belgium and Luxembourg produce no statistically significant results.

On the contrary, the findings for the financial crisis time period seem to be more harmonized and inclined towards homogeneity. It looks as if in hard times, PT market transmission mechanisms become more unified and interrelated. As fear and uncertainty grow in the markets, the countries' retail interest rates tend to exhibit more 'uniform' reactions to money market changes and the central bank's policies, i.e. the arithmetical means of the SAER differentials come closer to zero and the corresponding standard deviations become smaller. This may be due to the fact that the systematic risk in the total market increases relatively faster than the individual country market risk. The common risk factor becomes the main driving force in the PT interest transmission process in the Euro monetary system.

On the other hand, in the symmetry/asymmetry aspect things look more unidirectionally signalled towards the null hypothesis, i.e. PT market transmission mechanisms are quite symmetric and less dependent on market timing. However, we should not overlook that the market's symmetric behaviour is loosened throughout the crisis period.

5. Conclusions

This paper examines the existence of interest rate PT convergence (homogeneity and symmetry) in the Eurozone before and during the financial crisis. For testing the convergence we introduce a new ratio, called the 'Speed Adjusted Elasticity Ratio' (SAER). This ratio indicates the time needed for the increasing/decreasing wholesale (money market) rate to complete its transmission to the increasing/decreasing retail rate in the loan and deposit markets of the twelve member states of the Eurozone. From the derived results, and especially those in the loan rates markets, the convergence is challenged. Before the onset of the financial crisis it is challenged through the lack of homogeneity, while through the financial crisis the challenging factor becomes the lack of symmetry. This type of information (in qualitative and quantitative terms) may be quite useful for regulatory authorities in their attempt to monitor and reinforce monetary policy effectiveness in the Eurozone area.

References

Bachmeier LJ, Griffin JM (2003) New evidence on asymmetric gasoline price responses Rev Econ Stat 85: 772-776.

Baele L, Ferrando A, Hördahl P, Krylova E, Monnet C (2004) Measuring European financial integration. Oxford Rev Econ Policy 20: 509–530.

Bagliano, F C, Dalmazzo A, Marini G (2000) Bank competition and ECB's monetary policy', J Bank Finance 24: 967–983.

BIS (1994) National differences in interest rate transmission. CB Document 393, Basle.

Borio C E V, Fritz W (1995) The response of short-term bank lending rates to policy rates: a cross-country perspective. Bank for International Settlements, Financial Structure, the Monetary Transmission, Mechanism. CB Document 394, Basle: 106–153.

Cecchetti S G (1999) Legal structure, financial structure, and the monetary transmission mechanism. Fed. Reserve Bank New York, Econ. Policy Rev. 5: 9–28.

Cottarelli C, Ferri G, Generale A (1995) Bank lending rates and financial structure in Italy: a case study. IMF Working Paper 95/38, Washington, DC

Cottarelli C, Kourelis A (1994) Financial structure, bank lending rates, and the transmission mechanism of monetary policy. IMF Staff Papers 41(4), Washington, DC.

de Bondt G (2005) Interest rate pass-through: empirical results for the euro area. German Econ. Rev. 6: 37–78.

de Bondt G, Mojon B, Valla N (2002) Interest rate setting by universal banks and the monetary policy transmission mechanism in the euro area. Unpublished Working Paper. European Central Bank, Frankfurt.

De Graeve F, De Jonghe O, Vander Vennet R (2004) The determinants of pass-through of market conditions to bank retail interest rates in Belgium. National Bank of Belgium Working Papers, Research Series 47, Brussels.

ECB (2009) Monthly Bulletin, August: 93-105.

Heinemann F, Schüller M (2002) Integration benefits on EU retail credit markets–evidence from interest rate pass-through, Zentrum für Wirtschaftsforschung Paper, Mannheim.

Heinemann F, Schüller M (2003) Integration benefits on EU retail credit markets—evidence from interest rate pass through. In: Cecchini, P. (Ed.), The incomplete European market for financial services. Springer Verlag, Berlin:105–129.

Hofmann B (2006) EMU and the transmission of monetary policy: Evidence from business lending rates. Empirica 33: 209-229.

Mojon B (2001) Financial structure and the interest channel of the ECB monetary policy. Econ. Prévision 147: 89–115.

Rao BB, Rao G (2008) Are US gasoline price adjustments asymmetric? App Econ Letters 15: 443-47.

Rousseas S (1985) A mark up theory of loan rates, J Post Keyn Econ 8: pp. 135-144.

Sander H, Kleimeier S (2006) Convergence of interest rate pass-through in a wider euro zone? Econ Systems 30: 405-23.

Sander H, Kleimeier S (2004) Convergence in Euro-zone retail banking? What interest rate pass-through tells us about monetary policy transmission, competition and integration. J Intl Money Finance 23: 461-492.

Sander H, Kleimeier S (2002) Asymmetric adjustment of commercial bank interest rates in the Euro area: an empirical investigation into interest rate pass-through. Kredit Kapital 35: 161–192.

Sander H, Kleimeier S (2000) Asymmetric adjustment of commercial bank interest rates in the Euro area: Implications for monetary policy. paper presented at the conference Financial structure, bank behaviour and monetary policy in the EMU. Groningen, 5–6 October.

Scholnick B (1996) Asymmetric adjustment of commercial bank interest rates: Evidence from Malaysia and Singapore. J Intl Money Finance 15:485-496.

Toolsema LA, Sturm J-E, de Haan J (2002) Convergence of monetary transmission in EU: new evidence. CESifo Working Paper 465, Munich.

Vajanne L (2007) Integration in euro area retail banking markets – convergence of credit interest rates. Discussion Papers No 27, Bank of Finland Research.

Appendix: Table 1: The long run PT rigidities (elasticities)

Before the financial Crisis (2003(1)-2007(12))																				
$\phi_{w,c}$	EU	DE	EU-DE	IE	EU-IE	GR	EU-GR	ES	EU-ES	FR	EU-FR	IT	EU-IT	NL	EU-NL	AT	EU-AT	PT	EU-PT	FT	EU-FT
Loan rates																					
Lo1	0.83	0.81	0.02			0.69	0.14	1.03	-0.20	0.56	0.27	0.78	0.05	0.74	0.09	0.93	-0.10			0.90	-0.07
Lo2	0.89	1.01	-0.12	1.11	-0.22	0.77	0.12	1.07	-0.18	0.89	0.00	0.89	0.00	0.85	0.04	0.87	0.02	0.76	0.13	0.97	-0.08
Lo3	0.67	0.56	0.11	1.16	-0.49	0.81	-0.14	0.99	-0.32			0.32	0.35	0.96	-0.29	0.86	-0.19	0.59	0.08	1.49	-0.82
Lo4	0.33	0.26	0.07			0.37	-0.04	0.43	-0.10	0.61	-0.28	0.31	0.02			1.11	-0.78	1.03	-0.70	0.97	-0.64
Lo5	0.55	0.29	0.26	1.00	-0.45	0.43	0.12	1.07	-0.52	0.23	0.32	0.88	-0.33	0.36	0.19	0.80	-0.25	0.85	-0.30	0.99	-0.44
Lo6	0.81	0.76	0.05	1.07	-0.26	0.35	0.46	0.82	-0.01	1.07	-0.26	0.76	0.05			1.05	-0.24	0.89	-0.08	1.00	-0.19
Lo7	0.55	0.66	-0.11	0.02	0.53	0.90	-0.35	0.88	-0.33	0.59	-0.04	0.35	0.20	0.68	-0.13	0.91	-0.36	0.78	-0.23	1.20	-0.65
Deposit rates																					
de1	0.43	0.55	-0.12		0.43	0.17	0.26	0.41	0.02	0.08	0.35			0.54	-0.11	0.57	-0.14	0.3	0.13	0.58	-0.15
de2	0.22							0.24	-0.02					0.21	0.01	0.34	-0.12	0.1	0.12	0.36	-0.14
de3	0.95					1.09	-0.14	0.92	0.03	0.91	0.04			0.94	0.01	0.97	-0.02	0.99	-0.04	1	-0.05
de4	0.89							0.91	-0.02	0.83	0.06			0.8	0.09	0.91	-0.02	0.95	-0.06	1.02	-0.13
Financial Crisis Period (2008(1)-2010(1))																					
$\phi_{w,c}$	EU	DE	EU-DE	IE	EU-IE	GR	EU-GR	ES	EU-ES	FR	EU-FR	IT	EU-IT	NL	EU-NL	AT	EU-AT	PT	EU-PT	FT	EU-FT
Loan rates																					
Lo1	0.77	0.62	0.15			0.74	0.03	0.74	0.03	0.58	0.19	0.81	-0.04	0.74	0.03	0.81	-0.04	1.01	-0.24	0.99	-0.22
Lo2	0.77	0.6	0.17	1	-0.23	0.61	0.16	0.68	0.09	0.44	0.33	0.9	-0.13	1.39	-0.62	0.72	0.05	0.88	-0.11	0.84	-0.07
Lo3	0.24	0.04	0.2			0.31	-0.07	0.46	-0.22					0.26	-0.02	0.6	-0.36	0.84	-0.6	1.28	-1.04
Lo4	0.26	0.15	0.11			0.4	-0.14	0.39	-0.13	0.21	0.05	0.01	0.25			0.71	-0.45	0.32	-0.06	0.41	-0.15
Lo5	0.44			0.6	-0.16	0.46	-0.02	0.95	-0.51	0.09	0.35	0.62	-0.18	0.17	0.27	1.25	-0.81	1.17	-0.73	0.92	-0.48
Lo6	0.79	0.56	0.23	0.76	0.03	0.65	0.14	0.07	0.72	0.58	0.21	0.84	-0.05			0.73	0.06	0.83	-0.04	1.02	-0.23
Lo7	1.23	0.56	0.67			0.63	0.6	0.42	0.81	1.52	-0.29	0.7	0.53	0.75	0.48	1.51	-0.28	0.5	0.73	1.28	-0.05
Deposit rates																					
de1	0.4	0.58	-0.18			0.21	0.19	0.42	-0.02					0.6	-0.2	0.59	-0.19	0.27	0.13	0.52	-0.12
de2	0.2							0.09	0.11					0.08	0.12	0.39	-0.19			0.28	-0.08
de3	0.93					0.96	-0.03			1.02	-0.09			1.06	-0.13	0.91	0.02	0.87	0.06		
de4	0.79							0.7	0.09	0.83	-0.04			0.78	0.01	1.05	-0.26			1.05	-0.26

Appendix: Table 2: The speed of adjustment coefficients

Before the financial Crisis (2003(1)-2007(12))

$\theta^{-}_{r,c}$	EU	DE	EU-DE	IE	EU-IE	GR	EU-GR	ES	EU-ES	FR	EU-FR	IT	EU-IT	NL	EU-NL	AT	EU-AT	PT	EU-PT	FT	EU-FT
Loan rates																					
Lo1	0.35	0.41	-0.06			0.55	-0.2	0.41	-0.06	0.34	0.01	0.53	-0.18	0.38	-0.03	0.33	0.02			0.37	-0.02
Lo2	0.41	0.21	0.2	0.56	-0.15	0.34	0.07	0.11	0.3	0.35	0.06	0.69	-0.28	0.08	0.33	0.29	0.12	0.34	0.07	0.36	0.05
Lo3	0.72	0.51	0.21	0.8	-0.08	0.86	-0.14	0.9	-0.18			0.62	0.1	0.66	0.06	0.32	0.4	0.36	0.36	0.19	0.53
Lo4	0.48	0.37	0.11			0.75	-0.27	0.48	0	0.39	0.09	0.37	0.11			0.56	-0.08	0.53	-0.05	0.52	-0.04
Lo5	0.19	0.05	0.14	0.26	-0.07	0.19	0	0.13	0.06	0.37	-0.18	0.63	-0.44	0.21	-0.02	0.25	-0.06	0.33	-0.14	0.19	0
Lo6	0.34	0.25	0.09	0.75	-0.41	0.21	0.13	1.14	-0.8	0.4	-0.06	0.56	-0.22			0.27	0.07	0.42	-0.08	0.35	-0.01
Lo7	0.69	0.3	0.39			0.6	0.09	0.25	0.44	0.55	0.14	0.41	0.28	0.19	0.5	0.21	0.48	0.77	-0.08	0.48	0.21
Deposit rates																					
de1	0.5	0.23	0.27			0.46	0.04	0.31	0.19	0.91	-0.41			0.41	0.09	0.35	0.15	0.93	-0.43	0.4	0.1
de2	0.24							0.24	0	0.43	-0.19					0.56	-0.32	0.41	-0.17	0.14	0.1
de3																					
de4	1.02							0.59	0.43	0.62	0.4			0.57	0.45	0.84	0.18	0.29	0.73	0.43	0.59

$\theta^{-}_{r,c}$	EU	DE	EU-DE	IE	EU-IE	GR	EU-GR	ES	EU-ES	FR	EU-FR	IT	EU-IT	NL	EU-NL	AT	EU-AT	PT	EU-PT	FT	EU-FT
Loan rates																					
Lo1	0.35	0.41	-0.06		0.35	0.56	-0.21	0.42	-0.07	0.34	0.01	0.54	-0.19	0.4	-0.05	0.34	0.01			0.37	-0.02
Lo2	0.4	0.21	0.19	0.56	-0.16	0.34	0.06	0.11	0.29	0.36	0.04	0.68	-0.28	0.1	0.3	0.3	0.1	0.34	0.06	0.36	0.04
Lo3	0.72	0.51	0.21	0.83	-0.11	0.85	-0.13	0.89	-0.17			0.62	0.1	0.63	0.09	0.31	0.41	0.36	0.36	0.16	0.56
Lo4	0.49	0.37	0.12			0.77	-0.28	0.45	0.04	0.4	0.09	0.38	0.11			0.5	-0.01	0.55	-0.06	0.5	-0.01
Lo5	0.18	0.05	0.13	0.25	-0.07	0.2	-0.02	0.11	0.07	0.36	-0.18	0.63	-0.45	0.2	-0.02	0.24	-0.06	0.33	-0.15	0.18	0
Lo6	0.34	0.25	0.09	0.74	-0.4	0.22	0.12	1.21	-0.87	0.35	-0.01	0.57	-0.23			0.27	0.07	0.41	-0.07	0.36	-0.02
Lo7	0.69	0.3	0.39			0.6	0.09	0.25	0.44	0.56	0.13	0.42	0.27	0.19	0.5	0.22	0.47	0.77	-0.08	0.47	0.22
Deposit rates																					
de1	0.27					0.54	-0.27	0.28	-0.01	0.78	-0.51			0.45	-0.18	0.34	-0.07	0.94	-0.67	0.38	-0.11
de2	0.28							0.23	0.05	0.4	-0.12			0.19	0.09	0.6	-0.32	0.37	-0.09	0.15	0.13

de3	0.54				0.57	-0.03	0.31	0.23	0.74	-0.2			0.59	-0.05	0.92	-0.38	1.23	-0.69	0.82	-0.28
de4	0.36						0.13	0.23	0.62	-0.26			0.55	-0.19	0.36	0	0.27	0.09	0.31	0.05

Financial Crisis Period (2008(1)-2010(1))

$\theta^{-}_{r,c}$	EU	DE	EU-DE	IE	EU-IE	GR	EU-GR	ES	EU-ES	FR	EU-FR	IT	EU-IT	NL	EU-NL	AT	EU-AT	PT	EU-PT	FT	EU-FT
Loan rates																					
Lo1	0.98	1.2	-0.22			0.37	0.61	0.6	0.38	1.15	-0.17	0.94	0.04	1.23	-0.25	1.33	-0.35	0.14	0.84	0.94	0.04
Lo2	0.8	0.72	0.08	0.43	0.37	0.39	0.41	0.77	0.03	0.66	0.14	0.68	0.12	0.11	0.69	1.08	-0.28	0.74	0.06	0.71	0.09
Lo3	0.69	1.05	-0.36			1.15	-0.46	1.64	-0.95					1.26	-0.57	0.97	-0.28	0.79	-0.1		
Lo4	1.5	1.91	-0.41			0.8	0.7	0.85	0.65	0.72	0.78	0.15	1.35			0.8	0.7	0.14	1.36	0.52	0.98
Lo5	0.3			1.06	-0.76	0.2	0.1	0.13	0.17	0.67	-0.37	0.46	-0.16	0.17	0.13			0.25	0.05	0.54	-0.24
Lo6	0.74	1.17	-0.43	1.2	-0.46	0.56	0.18	0.61	0.13	1.07	-0.33	0.69	0.05			1.51	-0.77	0.63	0.11	1.62	-0.88
Lo7	0.18	0.26	-0.08			0.38	-0.2	0.88	-0.7	0.15	0.03	0.67	-0.49	0.46	-0.28	0.11	0.07	0.49	-0.31	0.76	-0.58
Deposit rates																					
de1	0.91	1.01				2.08	-1.17	1.04	-0.13							0.88	0.03	0.37	0.54	0.51	0.4
de2	0.2							1.12	-0.92					0.99	-0.79	0.57	-0.37			2.52	-2.32
de3	0.8					0.96	-0.16	0.22	0.58	2.06	-1.26			1.45	-0.65	0.71	0.09	2.18	-1.38	0.43	0.37
de4	1.3							1.45	-0.15	2.2	-0.9			1.17	0.13	0.74	0.56			1.4	-0.1

$\theta^{+}_{r,c}$	EU	DE	EU-DE	IE	EU-IE	GR	EU-GR	ES	EU-ES	FR	EU-FR	IT	EU-IT	NL	EU-NL	AT	EU-AT	PT	EU-PT	FT	EU-FT
Loan rates																					
Lo1	0.98	1.23	-0.25			0.37	0.61	0.61	0.37	1.16	-0.18	0.97	0.01	1.37	-0.39	1.41	-0.43	0.14	0.84	1.57	-0.59
Lo2	0.88	0.76	0.12	0.48	0.4	0.38	0.5	0.77	0.11	0.64	0.24	0.8	0.08	1.01	-0.13	1.1	-0.22	0.77	0.11	0.78	0.1
Lo3	0.66	1	-0.34			1.06	-0.4	1.72	-1.06					1.34	-0.68	0.94	-0.28	0.82	-0.16	1.36	-0.7

Lo4	1.52	1.89	-0.37			0.8	0.72	0.86	0.66	0.73	0.79	0.15	1.37			0.74	0.78	0.17	1.35	0.51	1.01
Lo5	0.31			1.14	-0.83	0.21	0.1	0.11	0.2	0.68	-0.37	0.48	-0.17	0.17	0.14	0.33	-0.02	0.54	-0.23	0.54	-0.23
Lo6	0.8	1.17	-0.37	1.23	-0.43	0.59	0.21	0.57	0.23	1.04	-0.24	0.73	0.07			1.48	-0.68	0.64	0.16	1.61	-0.81
Lo7	0.19	0.26	-0.07			0.39	-0.2	0.88	-0.69	0.16	0.03	0.69	-0.5	0.5	-0.31	0.16	0.03	0.47	-0.28	0.77	-0.58
										Deposit rates											
de1	1.14	0.11	1.03		1.14	1.91	-0.77	0.62	0.52					0.93	0.21	1.33	-0.19	1.71	-0.57	0.62	0.52
de2	0.26							1.03	-0.77					1.05	-0.79	1.31	-1.05			2.87	-2.61
de3	0.32					1.89	-1.57			1.17	-0.85			1.06	-0.74	2.27	-1.95	2.63	-2.31		
de4	1.18							1.46	-0.28	2.07	-0.89			0.19	0.99	0.28	0.9			0.92	0.26

Appendix: Table 3: The Speed Adjusted Elasticity Ratio (SAER)

Before the financial Crisis (2003(1)-2007(12))

$SAER^{-}_{r,c}$	EU	DE	EU-DE	IE	EU-IE	GR	EU-GR	ES	EU-ES	FR	EU-FR	IT	EU-IT	NL	EU-NL	AT	EU-AT	PT	EU-PT	FT	EU-FT
Loan rates																					
Lo1	2.371	1.98	0.3958			1.255	1.1169	2.512	-0.141	1.65	0.724	1.472	0.9	1.95	0.424	2.82	-0.4468			2.432	-0.061
Lo2	2.171	4.81	-2.639	1.982	0.189	2.265	-0.094	9.727	-7.557	2.54	-0.372	1.29	0.881	10.6	-8.45	3	-0.8293	2.235	-0.065	2.694	-0.524
Lo3	0.931	1.1	-0.167	1.45	-0.52	0.942	-0.011	1.1	-0.169			0.516	0.414	1.45	-0.52	2.69	-1.7569	1.639	-0.708	7.842	-6.912
Lo4	0.688	0.7	-0.015			0.493	0.1942	0.896	-0.208	1.56	-0.877	0.838	-0.15			1.98	-1.2946	1.943	-1.256	1.865	-1.178
Lo5	2.895	5.8	-2.905	3.846	-0.95	2.263	0.6316	8.231	-5.336	0.62	2.273	1.397	1.498	1.71	1.18	3.2	-0.3053	2.576	0.319	5.211	-2.316
Lo6	2.382	3.04	-0.658	1.427	0.956	1.667	0.7157	0.719	1.6631	2.68	-0.293	1.357	1.025			3.89	-1.5065	2.119	0.2633	2.857	-0.475
Lo7	0.797	2.2	-1.403		0.797	1.5	-0.703	3.52	-2.723	1.07	-0.276	0.854	-0.06	3.58	-2.78	4.33	-3.5362	1.013	-0.216	2.5	-1.703
Deposit rates																					
de1	0.86		0.86		0.86	0.37	0.4904	1.323	-0.463	0.09	0.772			1.32	-0.46	1.63	-0.7686	0.323	0.5374	1.45	-0.59
de2	0.917		0.9167		0.917			1	-0.083							0.61	0.3095	0.244	0.6728	2.571	-1.655
de3																					
de4	0.873		0.8725		0.873			1.542	-0.67	1.34	-0.466			1.4	-0.53	1.08	-0.2108	3.276	-2.403	2.372	-1.5
$SAER^{+}_{r,c}$	EU	DE	EU-DE	IE	EU-IE	GR	EU-GR	ES	EU-ES	FR	EU-FR	IT	EU-IT	NL	EU-NL	AT	EU-AT	PT	EU-PT	FT	EU-FT
Loan rates																					
Lo1	2.371	1.976	0.396			1.23	1.139	2.45	-0.08	1.65	0.724	1.444	0.927	1.85	0.521	2.74	-0.36			2.432	-0.06
Lo2	2.225	4.81	-2.58	1.98	0.243	2.26	-0.04	9.73	-7.5	2.47	-0.25	1.309	0.916	8.5	-6.28	2.9	-0.68	2.24	-0.01	2.694	-0.47
Lo3	0.931	1.098	-0.17	1.4	-0.47	0.95	-0.02	1.11	-0.18			0.516	0.414	1.524	-0.59	2.77	-1.84	1.64	-0.71	9.313	-8.38
Lo4	0.673	0.703	-0.03			0.48	0.193	0.96	-0.28	1.53	-0.85	0.816	-0.14			2.22	-1.55	1.87	-1.2	1.94	-1.27
Lo5	3.056	5.8	-2.74	4	-0.94	2.15	0.906	9.73	-6.67	0.64	2.417	1.397	1.659	1.8	1.256	3.33	-0.28	2.58	0.48	5.5	-2.44
Lo6	2.382	3.04	-0.66	1.45	0.936	1.59	0.791	0.68	1.7	3.06	-0.67	1.333	1.049			3.89	-1.51	2.17	0.212	2.778	-0.4
Lo7	0.797	2.2	-1.4			1.5	-0.7	3.52	-2.72	1.05	-0.26	0.833	-0.04	3.579	-2.78	4.14	-3.34	1.01	-0.22	2.553	-1.76
Deposit rates																					
de1	1.593					0.31	1.278	1.46	0.13	0.1	1.49			1.2	0.393	1.68	-0.08	0.32	1.273	1.526	0.066
de2	0.786							1.04	-0.26					1.105	-0.32	0.57	0.219	0.27	0.515	2.4	-1.61
de3	1.759					1.91	-0.15	2.97	-1.21	1.23	0.53			1.593	0.166	1.05	0.705	0.8	0.954	1.22	0.54
de4	2.472							7	-4.53	1.34	1.134			1.455	1.018	2.53	-0.06	3.52	-1.05	3.29	-0.82

Financial Crisis Period (2008(1)-2010(1))																				
$SAER^{-}_{r,c}$	EU	DE	EU-DE	IE	EU-IE	GR	EU-GR	ES	EU-ES	FR	EU-FR	IT	EU-IT	NL	EU-NL	AT	EU-AT	PT	EU-PT	FT	EU-FT
Loan rates																					
Lo1	0.786	0.5167	0.269			2	-1.2143	1.233	-0.448	0.504	0.2814	0.862	-0.076	0.6016	0.184	0.609	0.1767	7.2143	-6.429	1.053	-0.267
Lo2	0.963	0.8333	0.1292	2.3256	-1.363	1.564	-0.6016	0.883	0.0794	0.667	0.2958	1.324	-0.361	12.636	-11.67	0.6667	0.2958	1.1892	-0.227	1.183	-0.221
Lo3	0.348	0.0381	0.3097			0.27	0.07826	0.28	0.0673					0.2063	0.141	0.6186	-0.271	1.0633	-0.715		
Lo4	0.173	0.0785	0.0948			0.5	-0.3267	0.459	-0.285	0.292	-0.118	0.067	0.1067			0.8875	-0.714	2.2857	-2.112	0.788	-0.615
Lo5	1.467			0.566	0.9006	2.3	-0.8333	7.308	-5.841	0.134	1.3323	1.348	0.1188	1	0.467			4.68	-3.213	1.704	-0.237
Lo6	1.068	0.4786	0.5889	0.6333	0.4342	1.161	-0.0931	0.115	0.9528	0.542	0.5255	1.217	-0.15			0.4834	0.5841	1.3175	-0.25	0.63	0.4379
Lo7	6.833	2.1538	4.6795			1.658	5.17544	0.477	6.3561	10.13	-3.3	1.045	5.7886	1.6304	5.203	13.727	-6.894	1.0204	5.8129	1.684	5.1491
Deposit rates																					
de1	0.44	0.5743	-0.135			0.101	0.3386	0.404	0.0357							0.6705	-0.231	0.7297	-0.29	1.02	-0.58
de2	1							0.08	0.9196					0.0808	0.919	0.6842	0.3158			0.111	0.8889
de3	1.163					1	0.1625	4.136	-2.974	0.495	0.6674			0.731	0.431	1.2817	-0.119	0.3991	0.7634	2.395	-1.233
de4	0.608							0.483	0.1249	0.377	0.2304			0.6667	-0.059	1.4189	-0.811			0.75	-0.142
$SAER^{+}_{r,c}$	EU	DE	EU-DE	IE	EU-IE	GR	EU-GR	ES	EU-ES	FR	EU-FR	IT	EU-IT	NL	EU-NL	AT	EU-AT	PT	EU-PT	FT	EU-FT
Loan rates																					
Lo1	0.786	0.5041	0.2816			2	-1.214	1.21	-0.427	0.5	0.2857	0.835	-0.049	0.54	0.246	0.574	0.211	7.214	-6.43	0.631	0.155
Lo2	0.875	0.7895	0.0855	2.083	-1.208	1.605	-0.73	0.88	-0.008	0.688	0.1875	1.125	-0.25	1.376	-0.5	0.655	0.22	1.143	-0.27	1.077	-0.2
Lo3	0.364	0.04	0.3236			0.292	0.0712	0.27	0.096					0.194	0.17	0.638	-0.275	1.024	-0.66	0.941	-0.58
Lo4	0.171	0.0794	0.0917			0.5	-0.329	0.45	-0.282	0.288	-0.117	0.067	0.104			0.959	-0.788	1.882	-1.71	0.804	-0.63
Lo5	1.419			0.526	0.893	2.19	-0.771	8.64	-7.217	0.132	1.287	1.292	0.128	1	0.419	3.788	-2.369	2.167	-0.75	1.704	-0.28
Lo6	0.988	0.4786	0.5089	0.618	0.3696	1.102	-0.114	0.12	0.865	0.558	0.4298	1.151	-0.163			0.493	0.494	1.297	-0.31	0.634	0.354
Lo7	6.474	2.1538	4.3198			1.615	4.8583	0.48	5.996	9.5	-3.026	1.014	5.459	1.5	4.974	9.438	-2.964	1.064	5.41	1.662	4.811
Deposit rates																					
de1	0.351	5.2727	-4.922			0.11	0.2409	0.68	-0.327					0.645	-0.29	0.444	-0.093	0.158	0.193	0.839	-0.49
de2	0.769							0.09	0.682					0.076	0.693	0.298	0.472			0.098	0.672
de3	2.906					0.508	2.3983			0.872	2.0345			1	1.906	0.401	2.505	0.331	2.575		
de4	0.669							0.48	0.19	0.401	0.2685			4.105	-3.44	3.75	-3.081			1.141	-0.47