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Integration in euro area retail banking markets – convergence of credit interest rates

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The views expressed in this paper are those of the author and do not necessarily reflect the views of the Bank of Finland.

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Integration in euro area retail banking markets – convergence of credit interest rates

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Abstract

Since the introduction of the single currency in 1999, major progress has been made towards achieving an integrated European capital and financial market. Available evidence suggests, nevertheless, that the degree of integration varies greatly depending on market segment. Retail banking markets are generally seen to be much less integrated than other segments of financial markets. Most consumers still buy retail financial services from domestic suppliers, cross-border entry of financial services firms is rare – even if it is growing – and the range of products available or terms attached thereto differ substantially across euro area countries.

The purpose of this paper is to assess integration of retail banking in the euro area from January 2003 to December 2006. The empirical analysis is based on a monthly panel of recently published harmonised interest rates from euro area monetary financial institutions. We estimate two commonly used measures of convergence, namely β- and σ-convergence, to assess the speed and degree of integration. Tests for convergence are based on a panel unit root test.

The tests provide evidence of a process of convergence in retail banking credit interest rates for households and non-financial corporations and show this convergence has recently being continuing. Thus, even if there are substantial cross-country differences in interest rate levels, progress towards integration is observable.

Keywords: financial market integration, euro area interest rates, panel data estimation

JEL classification numbers: F36, G21

Euroalueen vähittäispankkimarkkinoiden integraatio – lainakorkojen lähentyminen

Suomen Pankin keskustelualoitteita 27/2007

Laura Vajanne
Rahapolitiikka- ja tutkimusosasto

Tiivistelmä

Talous- ja rahaliiton (EMU) syntymästä lähtien Euroopan pääoma- ja rahamarkkinoiden integraatio on tiivistynyt monin tavoin. Käytettävissä olevat havainnot osoittavat kuitenkin, että rahoitusmarkkinoiden integraatio on edennyt eri sektoreilla varsin eri tahtia. Vähittäispankkitoiminnassa kehitys on ollut selvästi hitaampaa. Useimmat kuluttajat ostavat rahoituspalvelut kotimaisilta rahoituslaitoksilta, pankkitoiminta maiden rajojen yli on vähäistä – huolimatta viime aikojen kasvutrendistä – ja pankkipalvelutuotteiden sisältö ja toimintaehdot eroavat toisistaan huomattavasti eri euromaissa.

Tässä tutkimuksessa arvioidaan vähittäispankkimarkkinoiden integraatiota euroalueella vuosina 2003–2006. Empiirisessä analyysissa käytetään kuukausittaista paneeliaineistoa hiljattain julkaistuista yhdenmukaistetuista euroalueen rahoituslaitosten korkotiedoista. Arvioinnissa käytetään kahta yleistä integraation mittaria, niin sanottuja β- ja σ-konvergenssimittaria, integraation asteen ja vauhdin määrittämiseksi. Lähentymisen merkitsevyyttä testataan paneeliyksikköjuuritestin avulla. Testitulokset tarjoavat näyttöä käynnissä olevasta lähentymisestä kotitalouksien ja yritysten lainakoroissa. Siten integraatio näyttäisi kohtalaisen isoista maittaisista korkoeroista huolimatta etenevän myös vähittäispankkimarkkinoilla.

Avainsanat: rahoitusmarkkinoiden integraatio, euroalueen korot, paneeliestimointi

JEL-luokittelu: F36, G21

Contents

1 Introduction

The current degree of financial integration in Europe varies between market segments. The money market has been almost fully integrated since the introduction of the euro. Also the repo market as well as government and corporate bond markets are highly integrated. Progress has also been made in the integration of euro area equity market, where equity returns are increasingly determined by common factors. As regards the integration in European banking markets, they are generally seen to be much less integrated.[1]

Cross-border activities have increased significantly in inter-bank and wholesale business, but in retail banking integration measured as cross-border activity is still limited in the euro area. Cross-border banking mergers have only recently started to take place. The share of euro area cross-border Monetary Financial Institutions (MFI) loans granted to non-MFIs is around 4% of total loans, while the share of cross-border loans in wholesale business is around 25% at present. In the background of these minor figures we can find natural barriers to entry such as language and geographical distance and also strategic barriers such as branch network. These barriers tend to keep markets segmented despite of the common currency and market opening EU policies.[2] The promotion of financial integration of Europe's retail banking market has become an important issue for the Eurosystem and for the EU in the post-FSAP (Financial Services Action Plan) era.[3]

The purpose of this paper is to assess integration of retail banking in the euro area by using price-based indicators constructed from newly harmonised MFI interest rate data across euro area member countries. The harmonised monthly interest rate data starting from January 2003 make it possible to analyse interest rates of similar banking products for households and non-financial corporations for some commonly used lending instruments.

It is useful to note that in this paper we are not explaining the differences in interest rates levels. To be able to explain the differences we would need to construct supply and demand models for bank loans.[4] The fact that there are significant differences between the interest rates among the euro countries supports the observation that retail banking markets are still segmented due to various legal and institutional reasons.

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[1] See, for example, Indicators of Financial Integration in the Euro Area, ECB (2006), and the Financial Integration Monitor reports, EU Commission 2004–2006.

[2] A recent analysis on European banking integration is given in CEPR's and BBVA's report Integration of European Banking (2005).

[3] See eg White Paper on Financial Services Policy 2005–2010, European Commission and Report on the Retail Banking Sector Inquiry, European Commission (2007).

[4] For a recent study in this subject, see Affinito and Farabullini (2006).

We estimate two common measures of convergence, namely β- and σ-convergence, from the data in order to assess the speed and degree of integration. The paper is thus related to previous papers which have estimated β- and σ-convergence measures for euro area interest rates, such as Kleimeier and Sander (2005), Baele, Ferrando, Hördahl, Krylova and Monnet (2004), and Adam, Jappelli, Menichini, Padula and Pagano (2002), using slightly more precise categories of credit instruments and up-dating the results.

The rest of the paper is organised as follows. Section 2 presents the measurement of price-based integration indicators. Section 3 outlines the development of interest rates; spreads and dispersion in euro area retail banking, by country. Section 4 presents and comments on the estimation results for β- and σ-convergence and Section 5 provides some concluding remarks.

2 How to measure integration

The market for a given financial instrument can be considered fully integrated if all economic agents with the same relevant characteristics acting in the market face a single set of rules, have equal access and are treated equally.[5] In a common currency area there is no depreciation risk and within the euro area cross-border payment transaction costs should already be negligible. Consequently for the same deposit or credit instruments the law of the one price (risk adjusted) should hold. At least interest rates deviations should not be persistent.

Typically the first approach to assess integration of interest rates is to check a number of computed indicators such as interest rates differences, interest rate spreads and margins as well as standard deviations across the countries and products. However, if the data do not allow sorting out country effects, indicators based on econometric models might give deeper information about the speed and rate of integration. We would like to answer questions such as how far retail credit prices are from being equal as well as what is the speed of the convergence, if we are able to prove that there is a process of convergence going on.

To be able to answer questions considering convergence of interest rates across countries we use a simple idea of testing for a unit root of interest rates ie the potential non-stationarity of the series in a panel data.[6] This idea to investigate

[5] See Adam, Jappelli, Menichini, Padula and Pagano (2002).

[6] The basic way to test for a unit root of a variable is to estimate an autoregressive model, which is a linear regression of the current value of the series against one or more prior values of the series. An AR (1)-process is given by $y(t) = b*y(t-1) + u$, where yt is the variable of interest at time t, b is the slope coefficient, and u is the error component. There is a unit root present if the coefficient $|b| = 1$. If the unit root is present, the time series is said to have a stochastic trend, and there is no convergence. However, if the coefficient of the previous period is negative, the hypothesis of the unit root can be rejected.

the convergence (so called *β-convergence*) by looking for unit roots of time series has been applied in many areas of financial research when testing eg the law of one price (absolute and relative versions), purchasing power parity hypothesis and interest rate mean reversion.[7] The β-convergence concept is also well known in empirical growth literature, where the convergence is derived from the (neoclassical) growth theory. Typical convergence studies in the growth literature regress the *average* growth rate of GDP on its *initial level* and interpret a negative correlation as sign of convergence.[8]

As the β-convergence does not provide any information to what extent markets are already integrated, it is possible to investigate the rate and the evolution of the cross-sectional dispersion by so called *σ-convergence*, which can be used as an indicator of how far away a retail banking market segment is from being fully integrated. The concept tells us what is the rate of convergence at each point in time.

In the empirical growth literature σ-convergence occurs, if the cross sectional distribution of a variable (typically income per capita) decreases over time. In the case of interest rates the degree of financial integration increases when the cross-sectional standard deviation of interest rates is trending downwards.[9]

2.1 Basic convergence equation

We start by estimation the following basic version of the convergence equation

$$\Delta r_{ct} = \alpha_c + \beta r_{ct-1} + \sum_{j=1}^{L} \gamma_{cj} \Delta r_{ct-j} + \varepsilon_{ct} \tag{2.1}$$

where the dependent variable Δr_{ct} is the change in the spread of the interest rate and r is the spread of the interest rate in country c relative to some appropriate benchmark country's interest rate in time t; α_c are country dummies and ε is an error term. The estimation procedure is based on the work of Levin, Lin and Chu (2002) on unit root tests with panel data, where we assume a common β across cross-sections.

The main parameter of interest is β that denotes the speed of convergence. Under the null hypothesis of no convergence, β is equal to zero. In this case, a shock to r_{ct} is permanent. Convergence implies a negative β with the approximate half-life of a shock to r_{ct} given by ln [(0.5)/ln (1+β)].[10] The use of the 'half life'

[7] See eg Goldberg and Verboven (2005), Frankel and Rose (1995), Wu and Chen (2001), Lopez and Papell (2004).
[8] See eg Barro and Sala-i-Martín (1992) and Quah (1996).
[9] More about these concepts applied in financial integration, see Adam et al (2002).
[10] This formula is only exact for simple AR(1) process. See eg Goldberg and Verboven (2005).

has the attractive feature that the persistence is measured in units of time. Furthermore, the negative β indicates that high spreads have a tendency to decrease more rapidly than low spreads. And the size of β is a direct measure of the speed of convergence in the overall market. If the beta approaches -1, the convergence is complete. When running the equation (2.1) on different credit instruments we can compare the size of the betas to see how the speed of the convergence varies in different categories. The larger is the beta (absolute value), the faster is the convergence.

The presence of country specific fixed effects in the estimation indicates that we are testing the relative version of the Law of One Price.[11] Large values of the country specific effects could be indicative of eg persistent market segmentation related to differences in institutional and other factors. We can calculate long term differences in spreads by dividing α_c by $-\beta$.[12] Additionally, Δr_{ct-j} capture possible serial correlation in the error term.

2.2 Sigma-convergence

The degree of financial integration increases when the cross-sectional standard deviation of interest rates is trending downward. If the cross-sectional distribution collapses to a single point and the standard deviation converges to zero, full integration is achieved.

The speed at which the cross-sectional dispersion decreases can be calculated from a regression of the cross-sectional dispersion on a time trend

$$S_{it} = a_i + b \cdot t + \varepsilon_{it} \tag{2.2}$$

where S is the standard deviation of the credit instrument i across countries and t is the time trend variable.

Adam et al stress the importance that the two convergence indicators have different informational contents: β-convergence does not imply σ-convergence, which makes these two measures complementary. The reason is that mean reversion ($-1 \leq \text{beta} < 0$) does not imply that the cross sectional variance decreases over time.[13]

[11] A detailed description of the effects of fixed country dummies in an integration study is given in Goldberg and Verboven (2005).

[12] In the long run we have $r_t^* = \alpha c + (1+\beta)\, r_t^* \rightarrow r_t^* = \alpha_c / -\beta$.

[13] In fact, β-convergence could even be associated with σ-divergence.

3 Data

The new harmonised MFI Interest Rates data used here covers the period 2003/1–2006/12. The following six categories of credit interest rates are studied.

Loans to households (new business):

1. Housing loans at a floating rate or up to one-year initial rate fixation
2. Housing loans with an initial rate fixation of more than five years and up to ten years
3. Loans for consumption purposes at a floating rate or up to one-year initial rate fixation
4. Loans for consumption purposes with an initial rate fixation of over one and up to five years

Loans to non-financial corporations (new business):

5. Loans up to EUR 1 million at a floating rate or up to one-year initial rate fixation
6. Loans over EUR 1 million at a floating rate or up to one-year initial rate fixation

When comparing interest rates over products and countries, it is important to identify products with same risk profile (ie interest rate fixation, maturities, collaterals etc). That is why we have used rather detailed categories of credit instruments, paying particular attention to interest rate fixation.[14]

The developments of the interest rate levels by country are shown in figure 3.1a to 3.4a.[15] The categories are chosen according to their importance at the euro area level ie categories which are the most relevant in new lending on the average in euro area.[16] As seen from the figures differences in levels between the interest rates among the countries seem to have been relatively permanent during these four years we have observations. In general credit interest rates in retail banking were first falling and then stayed stable towards the end of 2005. After the change

[14] As analysed in the recent ECB report on Differences in MFI Interest Rates across Euro Area Countries, (2006), there are still many factors which complicate the comparisons of retail interest rates across euro countries.

[15] The interest rates by country are published in a co-ordinated way on the web-sites of the ECB and NCBs since October 2006. We present here only figures for four categories by country because housing loans with an initial rate fixation of more than five years and up to ten years and loans for consumption purposes at a floating rate or up to one-year initial rate fixation are not published by country. The estimations have been done for all the six categories.

[16] Bank overdrafts were excluded because of the problems in harmonisation of interest rates in this category.

in monetary policy late 2005 also retail interest rates started to rise. This change in monetary policy regime might be a challenge to study convergence across the countries because the pass-through of changes in central bank interest rates to bank lending rates might vary between countries and depend on the direction of changes in central bank rates.

To estimate the β-convergence our main interest is concentrated on the development of interest rate spreads instead of the levels. The use of spreads cancels the effects of global macro variables such as changes in inflation which can be assumed to influence roughly in a similar way to all retail interest rates during a limited period under investigation.

There are different ways to calculate the spreads. One approach is to define spreads in relation to the average of the euro area interest rates in different product categories. The drawback of this choice is that the spreads defined this way do not focus on existing bilateral spreads in this context where the process of integration and possibilities to arbitrage are in the centre of attention. Another common way of defining spreads is to select a representative financial market rate as a benchmark. In that case the discussion of the most appropriate refunding rates by categories and countries would become into the focus.[17] The third possibility is to use the lowest country's interest rate level in each category as a benchmark. The assumption is accordingly that the lowest interest rate level reflects 'the best performing' interest rate level towards which the integration process and increased competition is forcing the interest rate of the same product in other countries. We have chosen here this third option to analyse the convergence of interest rates. To get an idea how much the choice of the benchmark matters we estimated also the equations using representative financial market interest rates as a benchmark. The choice of the benchmark influences clearly to the size of the beta-coefficient and its interpretation.[18]

The development of spreads calculated relative to the lowest country for different credit products by countries are shown in figures 3.1b to 3.4b. The spreads were calculated taking on the average lowest country's rate in each category as a benchmark. This approach – using the same country during the whole period as a benchmark- would not have been possible if the lowest country would have changed frequently during the period. But as seen from the figures, in each category the lowest country kept its position with only few exceptions. The smallest spreads are observed in large new loans (over EUR 1 million) for non-financial corporations, with initial rate fixation up to one year, and in new loans to households for house purchase (initial rate fixation up to one year). The spreads

[17] See eg the ECB report on Differences in MFI Interest Rates across Euro Area Countries, (2006 p. 39) how MFI interest rates correlate with different financial market rates by instrument categories.
[18] See table 4.1 for the results.

are significantly larger in new consumer credits and in small new loans for non-financial corporations.

Finally, figure 3.5 shows unweighted cross country dispersions of the interest rates by categories. The lowest variations are observed for the same categories as the lowest spreads ie large loans for non-financial corporation and loans for house purchase. Interest rates for consumer credits have a high dispersion. The behaviour of these dispersions confirms the common observation that in those categories where there is a homogeneous and highly competed product, there is a tendency in interest rates to behave rather similar way from country to country.

Figure 3.1a **Interest rates on new loans to non financial corporations (over EUR 1 million)**

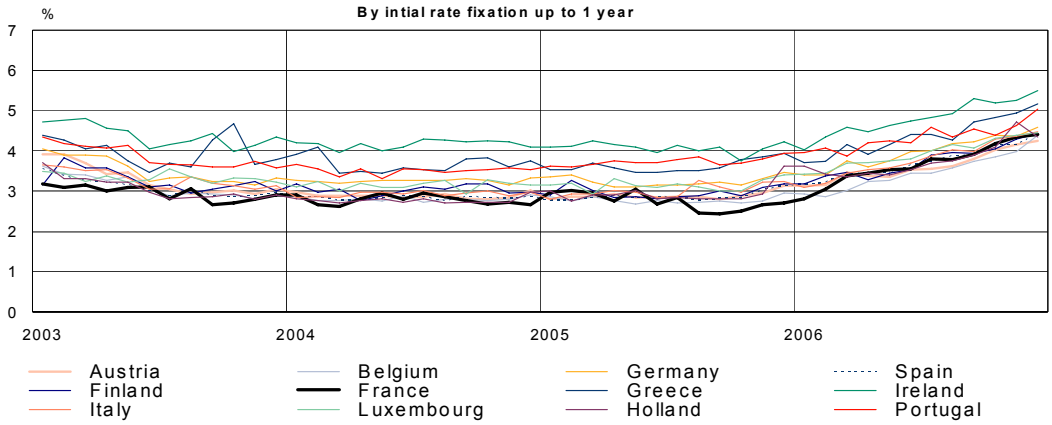


Figure 3.1b **Interest rate spreads on new loans to non financial corporations (over EUR 1 mio)**

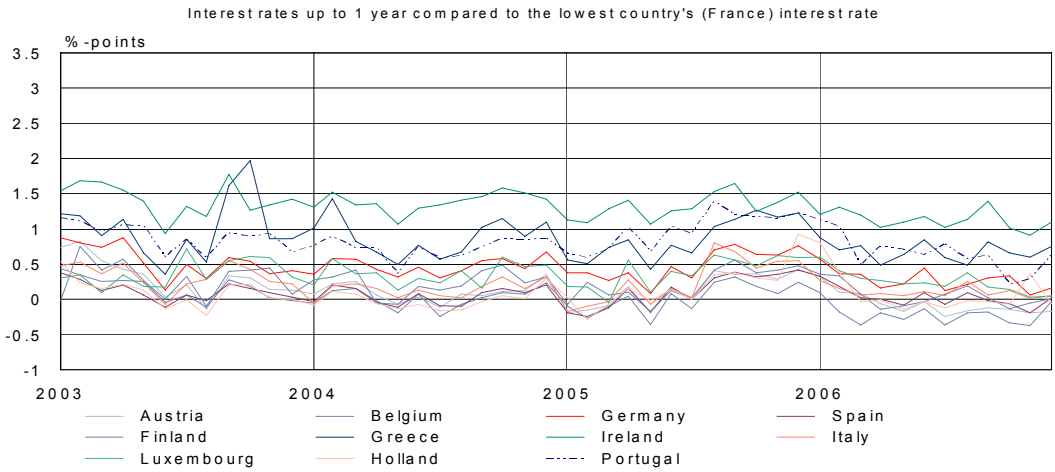


Figure 3.2a **Interest rates on new loans to non financial corporations (max EUR 1 million)**

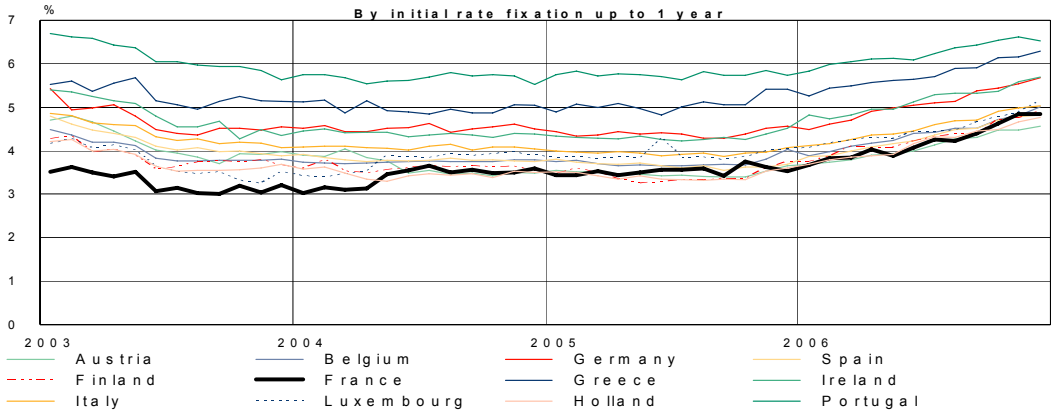


Figure 3.2b **Interest rate spreads on new loans to non financial corporations (max EUR 1 mio)**

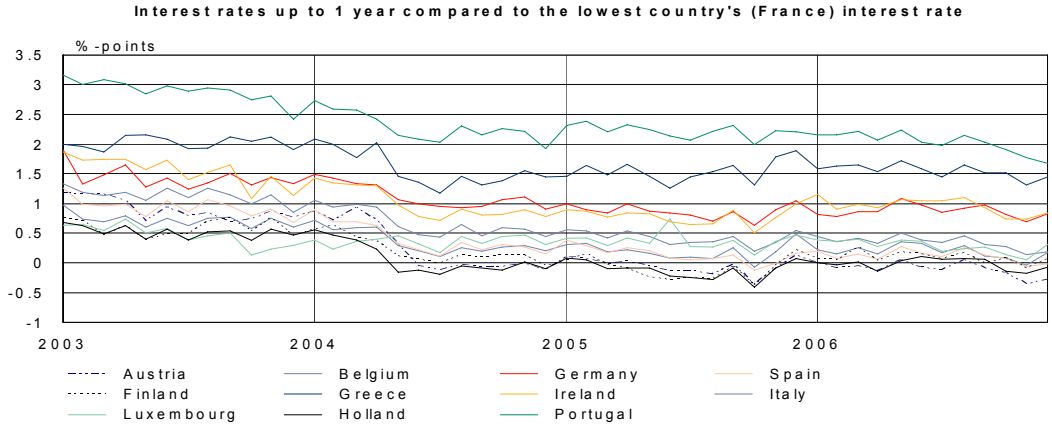


Figure 3.3a **Interest rates on new loans for house purchase**

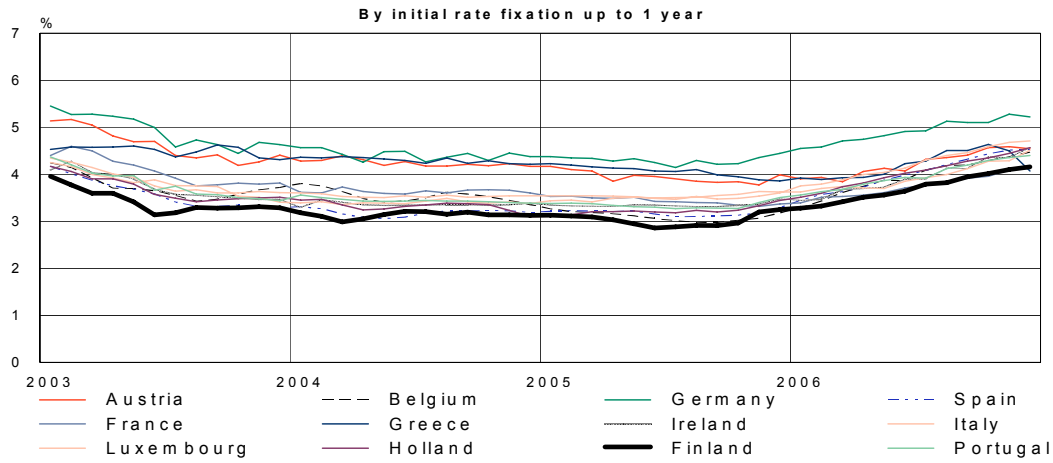


Figure 3.3b **Interest rate spreads on new loans for house purchase**

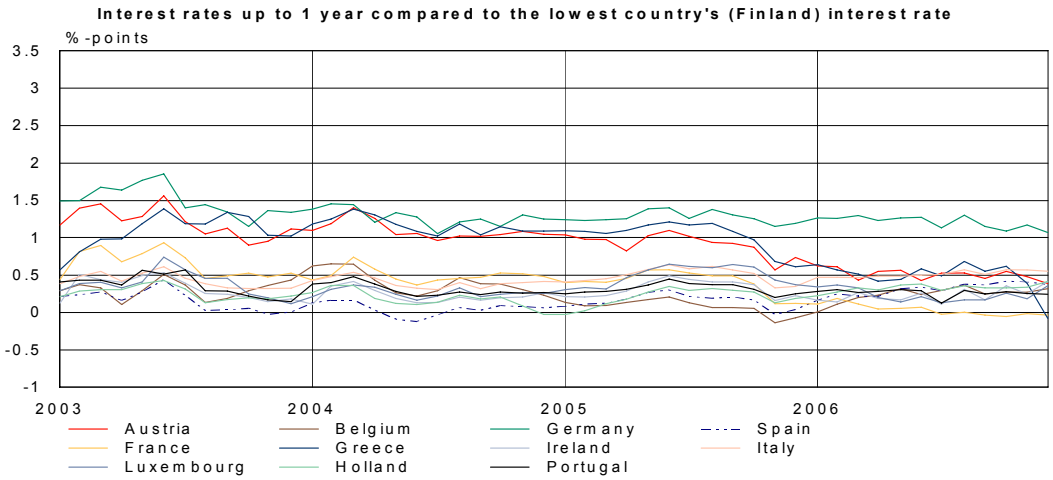


Figure 3.4a **Interest rates on new consumer credit**

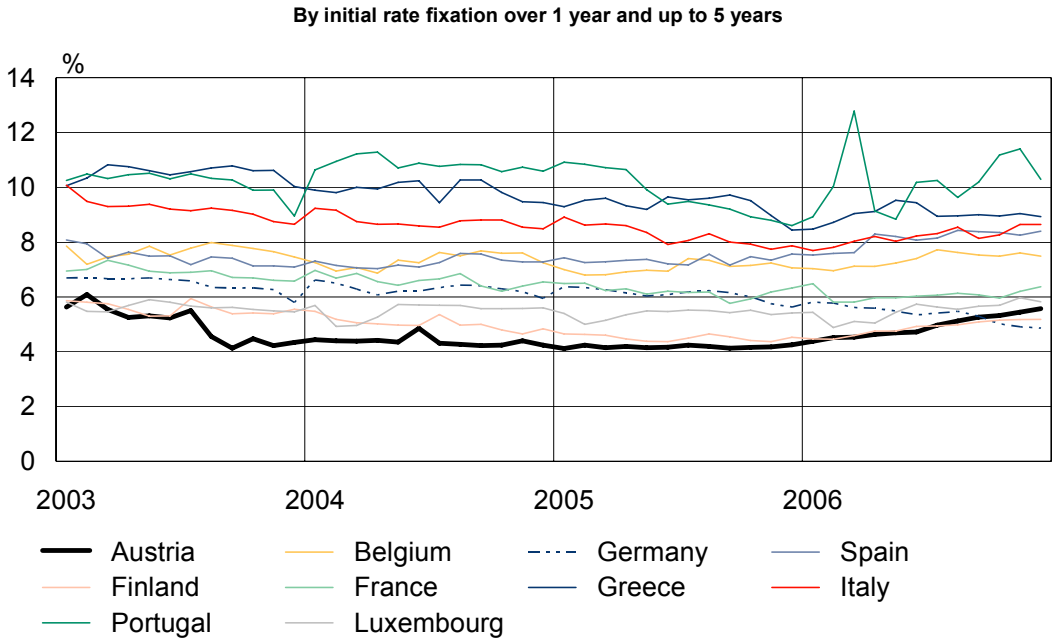


Figure 3.4b **Interest rate spreads on new consumer credit**

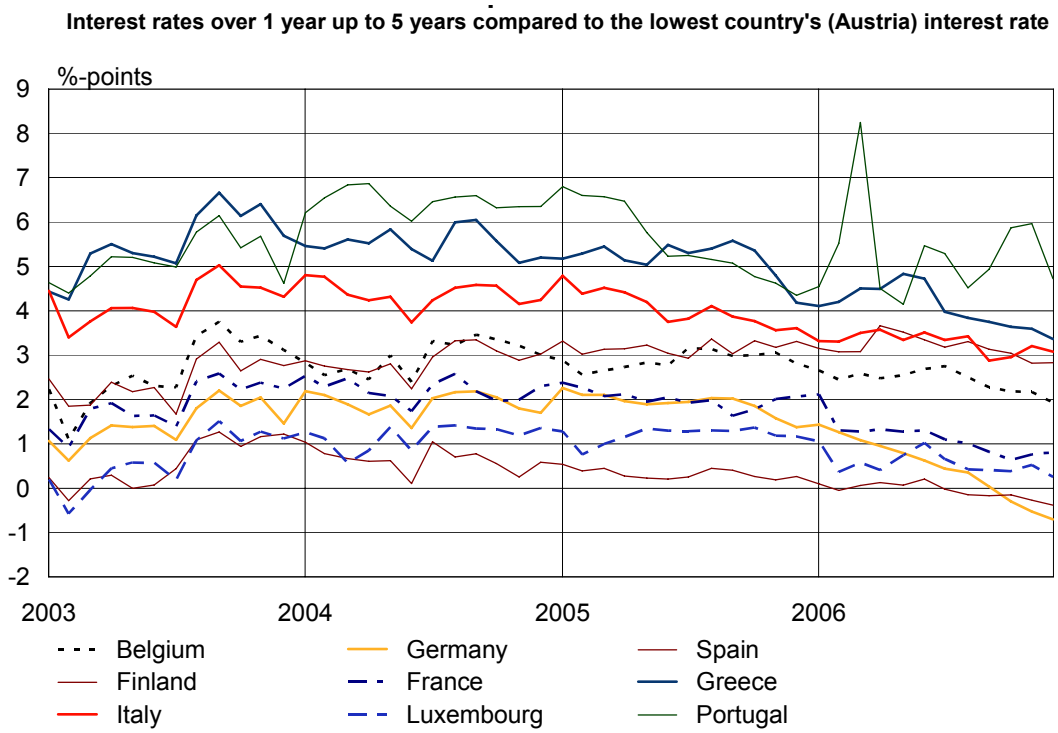
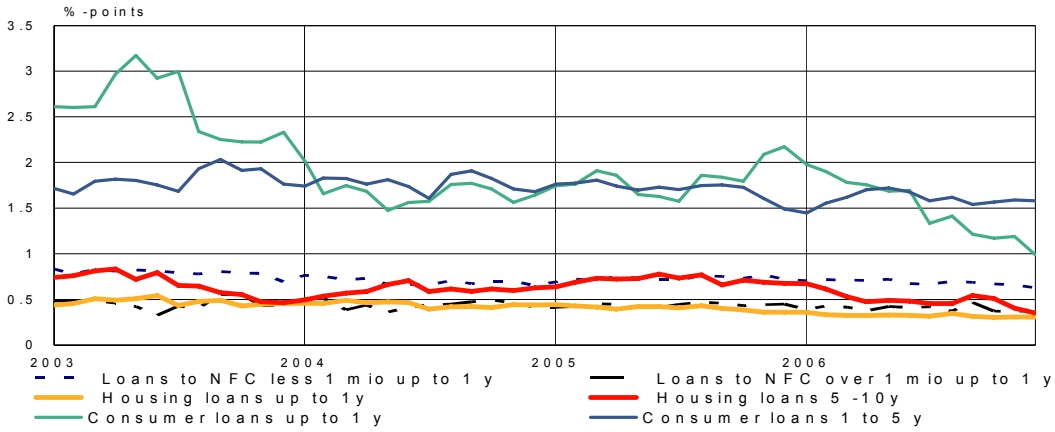


Figure 3.5 **Unweighted standard deviation of interest rates**



4 Estimation results

In the econometric analysis we use for each credit product a panel that consists of 528 country-month [11·48][19] observations. The panel regression has been run for all six credit interest rates spreads described above.

The main estimation results are shown in table 4.1. The β-coefficients are in all categories negative varying between -0.114 and -0.441 (base: lowest country). The speed of the integration has been fastest in interest rates for the large loans to non-financial corporations and lowest in loans for small non-financial corporations. The approximate half-lives calculated from the model [(ln(0.5)/ln(1+β)] are from one month to six months. This means that a shock in the interest rate for big loans to non-financial corporations takes one month to halve, while for small company loans it takes 6 months.

The Lin, Levin and Chu unit root tests show that the hypothesis of the unit root (β= 0, no convergence) have to be accepted in the following categories: (i) housing loans with interest rates fixation variable or up to one year and (ii) consumer loans with interest rates fixation variable or up to one year. In other four cases it we can reject the null hypothesis of a unit root. The precision of the test is, however, not the best possible (10%) except the category of big loans for non-financial corporations.

The fastest convergence estimated for big loans to non-financial corporations supports the view that companies taking large loans might have negotiation power as they have the possibility to request loan offers from different banks and even from foreign banks. The conditions of loans offered by banks could thus be expected to turn rather similar.

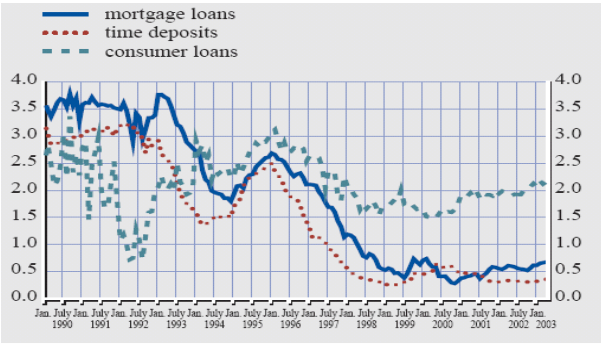
[19] There are some exceptions, see the footnotes in table 4.1.

On the other hand, the rejection of the convergence of new loans to house purchase with a rather small |β|, even if the spreads across the euro area are narrow (compare figure 3.3b), might be logical. As shown by Baele et al the standard deviation of interest rates housing loans decreased dramatically already during the nineties.[20] Since 2003, the keen competition in housing loans typical in euro area is reflected by decreasing margins in all countries but the shocks to interest rates might be eliminated more slowly in already integrated markets. Therefore one of the explanations for a low convergence could be that since the absolute interest rate differences have already declined, the speed of convergence gets lower. The observation is in line with the commonly observed non-linearities in the speed of convergence: large shocks and large differences tend to be eliminated faster than the small differences.[21] New loans for housing with a longer interest rate fixation (5–10 years) seem to have still somewhat faster convergence than loans with a short interest rate fixation.

For new consumer credits with a short maturity of interest rate the reasons to reject the convergence are different. In this category the spreads are still very large and credit products might differ considerably by country. Consequently it might be difficult to find noteworthy convergence in this group. The results with respect to consumer loans with longer interest rate fixation show that interest rates have converged somewhat faster.

To evaluate the robustness of the estimations in relation to time they were repeated twice using two different time span (2003/01–2005/12) and (2003/01–2006/05). Monetary policy changed in euro area late 2005 and the rates have been on an upward trend since then. As known, the dynamics of banks' interest pass-through of changes in policy rates differ across the euro area countries and there are asymmetries how the banks adjust their rates when policy rates are increasing compared to declining rates.[22]

[20] Standard deviation of interest rates on consumer and mortgage loans and time deposits 1990–2003



Source: ECB.

[21] See Goldberg and Verboven (2005).

[22] For the recent empirical results, see Gropp, Kok-Sörensen and Lichtenberger (2007).

Table 4.1 **Beta- and sigma-convergence 2003–2006**

Credit instrument	Beta-convergence (eq 2.1). Base: Lowest country	Beta-convergence (eq 2.1). Base: Market rates	σ-convergence (eq 2.2)
Non-financial corporations			
New big loans (over EUR 1 million). Interest rates fixation variable or up to one year.	-0.441 *6.50****	-0.281 *-4.01****	-0.0013*** *(0.00045)*
New small loans (up to EUR 1 million). Interest rates fixation variable or up to one year.	-0.114 *-1.39**	-0.038 *0.55*	-0.0025*** *(0.00041)*
Households			
New loans for housing. Interest rates fixation variable or up to one year.	-0.167 *-0.66*	-0.040 *-1.45**	-0.0040*** *(0.000283)*
New loans for housing.[1] Interest rates fixation over 5 up to 10 years.	-0.185 *-1.35**	-0.211 *-3.62****	-0.0038*** *(0.00108)*
New consumer loans.[2] Interest rates fixation variable or up to one year.	-0.131 *0.77*	-0.027 *1.31*	-0.0266*** *(0.00345)*
New consumer loans.[3] Interest rates fixation over 1 up to 5 years.	-0.173 *-1.24**	-0.065 *-1.02*	-0.0056*** *(0.00097)*

[1]Excluding Luxemburg and Portugal.
[2]Excluding Luxemburg.
[3]Excluding Netherlands and Portugal.

Note: The dependent variable in equation (2.1) is the change of the spread of the credit instrument. The specification includes a set of country dummies, one lag of the level of the spread, and one lag of the dependent variable. The number of lags of the dependent variable was determined by including longer lags and testing their statistical significance. It turned out that one lag was enough and the longer lags did not contribute to the estimation results. The estimates of the betas are derived using the Levin, Lin and Chu method for testing the panel unit root, and the relevant test statistics N(0, 1) are shown in italics under the coefficient. If the Ho (there is a unit root) can be rejected by 1%-level, it is marked with ***, by 5%-level with **, and by 10%-level with *. In equation (2.2) the dependent variable is the unweighted standard deviation of the credit instrument across countries. The specification includes a constant and a time trend. It is estimated by OLS; the trend coefficients and their standard errors (in parenthesis) are reported.

Table A1.1 in Appendix demonstrates the estimation results. In general estimated betas are turning smaller (in absolute value) when new observations are added to the data. The reason for slower convergence as indicated earlier might be that the pass through of monetary policy changes might vary when monetary policy regime changes. The convergence process seems to slow down when the banks have to adjust their retail interest rates towards rising interest rates.

To evaluate the robustness of the estimations against the benchmark they were repeated using corresponding financial market rates for each loan category as a benchmark. The results show that the beta-coefficients differ significantly from

those of the lowest country. The results are also somewhat less supporting the convergence; in three cases the unit root can not be rejected. As discussed earlier, choosing market interest rates as the benchmark might also have some drawbacks which are not included if the base is the lowest country. A problematic issue is the interpretation of the beta, since the convergence is now conditional in addition to the fixed country effects also to the banking margin, which has not been constant during the period investigated.

The coefficients for σ-convergence are all negative and in all categories statistically significant indicating increased degree of integration. The fastest decrease of dispersion has occurred in consumer credits, but the other categories show also clear decrease of dispersion. These results are intuitively reasonable because these dispersions in retail banking rates are still noteworthy in all categories compared to other market segments of financial markets.

The country specific dummies are jointly significant at the 1% level. Therefore imposing a common constant across the countries does not appear to be justified. The fixed effects capture the differences in levels of interest rates which still remain. Even if banking markets might be considered quite open from a legal perspective, there still are other types of barriers to integration in place as mentioned earlier.

The long term interest rates differences (α_c/-β) calculated by the model are shown in table 4.2. They are on the average the smallest in large loans to non financial corporations (nfc) with a short initial interest rate fixation and the largest in consumer credits with a short initial interest rate fixation.

An illustrative way to describe the convergence process is to compare these long term differences to current spreads. As can be observed from the table 4.2, the spreads at the end of 2006 are generally lower than these average differences estimated by the model. Thus the convergence process can be observed also by decreasing spreads towards the end of the period.

Table 4.2 **Long-term interest rate differences and spreads at the end of 2006, basis points**

	Big loans to nfcs up to 1 y		Small loans to nfcs up to 1 y		Housing loans up to 1 y		Housing loans 5 to 10 y		Consumer credits up to 1 y		Consumer credits 1 to 5 y	
	Esti-mated	End 2006	Esti-mated	End 2006	Esti-mated	End 2006	Esti-mated	End 2006	Esti-mated	End 2006	Esti-mated	End 2006
Austria	6	-17	-9	-28	81	39	98	74	87	99	Base	Base
Belgium	-4	-2	23	17	25	32	43	44	192	145	286	193
Germany	41	16	94	82	126	107	82	60	75	41	131	-70
Spain	6	3	16	-2	18	37	282	279	393	458	305	283
Finland	17	1	6	7	Base	Base	36	46	Base	Base	37	-38
France	Base	Base	Base	Base	30	-3	Base	Base	104	200	182	81
Greece	83	75	158	145	86	39	189	94	390	192	500	336
Ireland	128	109	87	84	26	41	98	102	95	99	351	326
Italy	18	6	42	18	47	55	93	115	629	572	394	308
Luxemburg	33	4	32	30	34	35	..	..	..	..	102	26
Holland	7	-6	-3	-8	26	42	68	61	330	376	..	..
Portugal	78	62	206	167	29	24	..	..	313	293	..	..
Average	38	23	59	46	48	41	110	97	261	244	254	160

5 Conclusions

There are clear differences in the levels of retail lending interest rates for various loan instruments across the euro countries. In spite of the differences in levels it is, however, possible that the integration process is under way. We have tested the potential convergence using two common integration indicators based on econometric models, the so called beta- and sigma convergence.

We find in addition to these persistent 'long-term' differences in the retail lending interest rates some evidence for convergence in the interest rates. The speed of convergence varies in the different categories of the products.

During the period analysed (2003–2006) the spreads of the large loans to non-financial corporations show the fastest speed of convergence. We can expect that integration pushes the spreads closer to each other because of the increased competition in a primarily unrestricted environment. Even if there is not so much cross border businesses in retail banking, the threat of the entry to the markets is one of the relevant factors influencing the behaviour of the banks. The conditions under which loans are offered could therefore be expected to become rather similar in the course of time. Also the standard deviation of the interest rates across the countries is the smallest in this category.

Housing loans are integrated in the euro area, particularly those loans with variable or short term interest rate fixation. The standard deviation of the interest rates on housing loans across the countries has been fluctuating between 40 and 50 basis points which corresponds to the figures for large loans to firms. However, the estimated beta-convergence is clearly lower than the corresponding

beta for large loans to enterprises, which can be understood because the convergence had mainly occurred already before the period included in this study.

The results with respect to consumer credits for households show that loans with a longer fixation of interest rates have converged rather quickly even if there remain quite significant differences in the levels of interest rates. This result is in line with the observation that large differences tend to be eliminated faster than small differences. Also the dispersion of the consumer credit interest rates is still high but there is a negative, statistically significant trend in the dispersion. There are nevertheless many difficulties when comparing interest rates for consumer credits by country because the classifications, collaterals and pricing behaviour of the banks might differ significantly across the euro area.

The results of convergence in euro area retail interest rates provided in this paper compared to the previous results show many similarities measuring the convergence, but there are also some interesting differences.[23] These results here are, however, still very preliminary, and thus allow only for cautious conclusions.

First, the availability of the harmonised statistics on interest rates on MFI loans gives us a possibility to asses the convergence of these interest rates at a more detailed level than before. Even if there are still difficulties with the data, the analysis of convergence should now be on sounder basis than before. With the new statistics we can analyse separately eg the interest rates for large and small loans to non-financial corporations with short term and longer term original interest rate fixation while earlier the interest rates for enterprises were split only into short term and long term loans, a classification that did not tell as much about how the interest rates are determined.

Second, the use of panel data estimation is advantageous compared to single country estimations because the length of time series is still rather short in the new statistics. To integrate the old and new statistics to get longer time series is also possible but going to history requires lot of extra work[24] and the level of disaggregation is lost nevertheless because there is not any extensive data available before 2003 by country following the new detailed classification. The common problems of testing the panel estimation when country specific fixed effects are allowed are possible to bypass using the unit root tests developed for panel data. According to the results it seems that estimated convergence is also statistically significant in most of the cases.

On the other hand, the results of the estimations here show similar progress of the convergence in retail interest rate markets as found in recent studies testing the purchasing power parity of exchange rates,[25] the law of one price of commodity

[23] Eg Baele, Ferrando, Hördahl Krylova and Monnet (2004), and Adam, Jappelli, Menichini, Padula and Pagano (2002).
[24] There is a project at the ECB on this subject going on.
[25] Eg Frankel and Rose (1996), Lopez (2006).

markets,[26] or the mean reversion of Eurocurrency interest rates.[27] In the previous research on these fields the results used to be rather negative in relation to the hypotheses, and the unit root hypothesis (there is a unit root) could not be rejected. In the light of the new research in these areas there are now more favourable empirical evidences found for these fundamentals.

[26] Goldberg and Verboven (2005).
[27] Wu and Chen (2001).

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Appendix

Table A1.1 **Beta – convergence, different estimation periods[1]**

Credit instrument	Beta convergence (Eq 2.1). Base: lowest country		
Non-financial corporations	2003/01–2005/12	2003/01–2006/05	2003/01–2006/12
New big loans (over EUR 1 million)	-0.522	-0.506	-0.441
Interest rates fixation variable or up to one year	*-3.72****	*-5.38****	*-6.50****
New small loans (up to EUR 1 million)	-0.127	-0.132	-0.114
Interest rates fixation variable or up to one year	*-0.91*	*-2.30*	*-1.39**
Households			
New loans for house purchase	-0.321	-0.240	-0.167
Interest rates fixation variable or up to one year	*-2.46****	*-1.33*	*-0.66*
New loans for house purchase[2]	-0.276	-0.234	-0.185
Interest rates fixation over 5 up to 10 years	*1.02*	*-2.25****	*1.35**
New consumer loans[3]	-0.195	-0.162	-0.131
Interest rates fixation variable or up to one year	*-0.31*	*-0.16*	*0.77*
New consumer loans[4]	-0.391	-0.339	-0.173
Interest rates fixation over 1 up to 5 years	*-5.72****	*-5.13****	*1.24*

[1]The dependent variable in equation (2.1) is the change of the spread of the credit instrument. The specification includes a set of country dummies, one lag of the level of the spread, and one lag of the dependent variable. The number of lags of the dependent variable was determined by including longer lags and testing their statistical significance. It turned out that one lag was enough and the longer lags did not contribute to the estimation results. The estimates of the betas are derived using the Levin, Lin and Chu method for testing the panel unit root, and the relevant test statistics N(0, 1) are shown in italics under the coefficient. If the Ho (there is a unit root) can be rejected by 1%-level, it is marked with ***, by 5%-level with **, and by 10%-level with *.
[2]Excluding Luxemburg and Portugal.
[3]Excluding Luxemburg.
[4]Excluding Netherlands and Portugal.

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