

Box I.1: The real interest rate mechanism and adjustment in EMU

This box aims to shed new light on the ways in which differences in real interest rates across the euro area affect the ability of its Member States to adjust to shocks. The pro-cyclicality of real interest rates is a well-documented problem in Europe's Economic and Monetary Union: comparatively better cyclical conditions in some Member States drive their inflation rates up compared with the euro area average, and in turn their real interest rate down, which further aggravate the original cyclical differences. Before the global financial crisis, differences in real interest rates were driven mainly by persistent inflation differentials. Since the crisis, real interest rate differentials have been further magnified by the fragmentation of borrowing costs for sovereigns and banks as well as of bank lending rates. This last factor in particular was until recently a major impediment to the recovery given the dominant role of bank loans in financing the euro area economy. Nevertheless, recent convergence of lending rates and conditions combined with the projection of a gradual increase in inflation across Member States implies a further decrease of the pro-cyclical dispersion of real interest rates over the forecast horizon.

This box presents results of an econometric analysis of the drivers of lending rates for non-financial corporations and households (2007-14). The results suggest that, in addition to the effect of temporary fears of redenomination (i.e. the risk that a Member State could leave the euro area and that all its assets and liabilities would be redenominated in a new currency), a significant part of the divergence in bank lending rates since the crisis can be ascribed to country-specific factors including divergences in sovereign spreads, in the quality of bank balance sheets and in business cycles. The effect of some of these factors should be mitigated or even eliminated by governance changes in the EMU but others are likely to persist.

The real interest rate mechanism before and after the crisis

At the launch of the EMU, it was largely assumed that currency unification would lead to convergence in a broad range of macroeconomic variables. It was also assumed that if some Member State was hit by an asymmetric shock, appropriate policies and market-based adjustment would ultimately allow it to be absorbed. However, there was also a concern that, with a common nominal interest rate, inflation differentials could have a destabilising effect that could slow the adjustment process. A Member State experiencing a negative

demand shock would also face lower inflation than the rest of the euro area and thereby higher real interest rates.⁽¹⁾ This real interest rate mechanism would further dampen demand, reinforcing divergence vis-a-vis other Member States. Model simulations generally showed that the real interest rate mechanism would slow adjustment to asymmetric shocks but would ultimately not prevent them.

These assumptions held up quite well before the crisis as bond yields and bank lending rates gradually converged across the euro area while inflation differentials persisted. Graph 1 compares the mean nominal and real lending rate (for non-financial corporation and households) for 12 euro-area countries before and after the global financial crisis. In the pre-crisis period (upper panel of Graph 1), it is apparent that while nominal lending rates were broadly similar across Member States, some countries faced substantially lower real interest rates as a result of their positive inflation differentials.⁽²⁾ For example, whereas nominal rates were similar in Spain and Germany, persistently higher inflation in Spain pushed real interest rates close to zero, to around 2 pps. below German ones. Therefore, the Spanish economy enjoyed an overall much more favourable cyclical position at that time (average output gap in period 2003-2007 was 2.5% for Spain and -1% for Germany) and substantially easier monetary conditions.⁽³⁾

⁽¹⁾ This mechanism, which was the core argument of the well-known Walters' critique, see: Walters, A. A. (1990). *'Sterling in danger: The economic consequences of pegged exchange rates'*, Fontana Press, London.

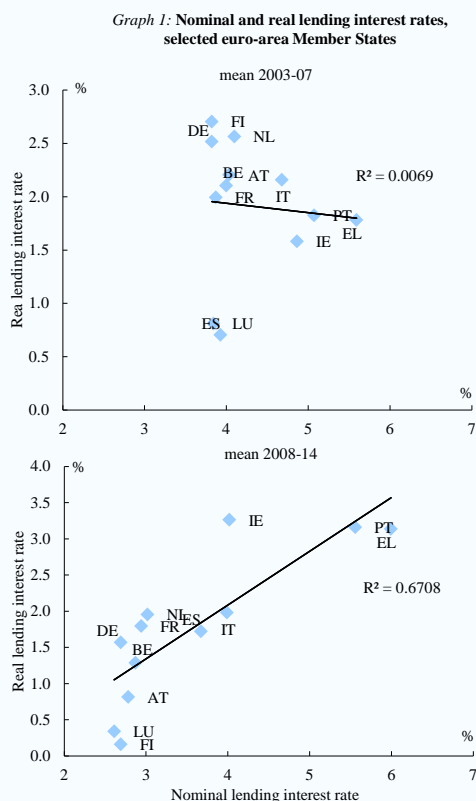
⁽²⁾ On inflation differentials in the euro area, see for example: Hofmann, B. and H. Remsperger (2005). 'Inflation differentials among the euro area countries: Potential causes and consequences'. *Journal of Asian Economics* 16(3), pp. 403-19, de Haan, J. (2010). 'Inflation differentials in the euro area: a survey', in de Haan, J. and H. Berger (eds.), *The European central bank at ten*, Springer-Verlag Berlin Heidelberg, See also: Altissimo, F., P. Benigno and D. Rodriguez Palenzuela (2011). 'Inflation differentials in a currency area: facts, explanations and policy'. *Open Economies Review* 22(2), pp. 189-233.

⁽³⁾ For a pre-crisis review of the evidence on the real interest rate mechanism see: European Commission (DG ECFIN) (2008). 'EMU@10 — Successes and challenges after ten years of Economic and Monetary Union'. *European Economy* 2/2008.

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By contrast, the global financial crisis and, above all, the euro area debt crisis unleashed powerful fragmentation forces on financial markets that partly reversed the pre-crisis convergence trend in nominal borrowing costs. ⁽⁴⁾ As shown in the lower panel of Graph 1, the real interest rate dispersion between Member States has increased since the global financial crisis, and this increase is mainly a reflection of an increase in nominal interest rate differentials. As the largest rate increases have also taken place in the most cyclically depressed countries (Greece, Portugal), the nominal differentials have tended to amplify the traditional real interest divergences caused by inflation differentials.

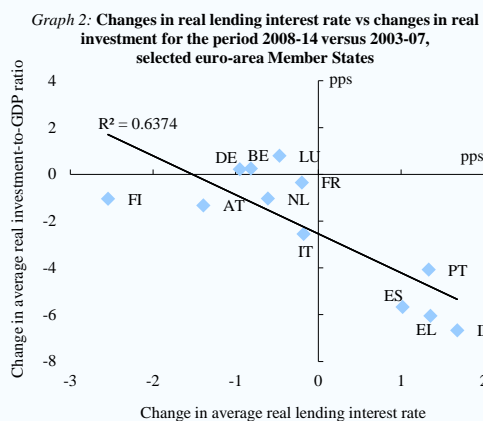


Note: The nominal lending interest rates are calculated as the mean of the composite indicators of the cost of borrowing for non-financial corporations and households. These indicators are available from 2003 (ECB MFI statistics). The year-on-year HICP inflation rate is used as deflator to obtain the real lending rate. **Source:** AMECO, ECB.

Investment is arguably the main channel through which real interest rate differentials turn into real

⁽⁴⁾ See for example: Al-Eyd, A. and S.P. Berkmen (2013). 'Fragmentation and monetary policy in the euro area'. *IMF Working Paper* 13/208.

economic activity differentials. This investment channel can be simply illustrated by comparing the changes in the ratios of real investment to GDP between pre-crisis period (2003-2007) and post-crisis (2008-2014) and the corresponding changes in real interest rates for 12 euro area countries (Graph 2). There is a clear negative correlation across euro area Member States suggesting that the higher the increase in real interest rates relative to the pre-crisis period, the more severe the decline in investment activity. ⁽⁵⁾



Note: The real lending interest rates are calculated as the mean of the composite indicators of the cost of borrowing for non-financial corporation and households. These indicators are available from 2003 (ECB MFI statistics). The year-on-year HICP inflation rate is used as deflator. The real investment is the share of real investment on GDP. **Source:** AMECO, ECB.

The real interest rate mechanism seems to have contributed to intra euro area imbalances by providing excessive stimulus to the economies of the periphery that were operating above their potential, and subsequently by delivering tighter monetary conditions when they most needed easing.

Given the magnitude of nominal interest divergence since the global financial crisis, an econometric analysis has been carried out to understand the determinants of nominal and

⁽⁵⁾ The correlation shown is only illustrative and cannot be interpreted as a causal relationship. However, the effect of the real interest rate mechanism on economic activity is supported by a range of pre-crisis econometric studies. See for example: Goodhart, C. and B. Hofmann (2005). 'The Phillips curve, the IS curve and monetary transmission: evidence for the US and the euro area'. *CESifo Economic Studies* 51(4), pp. 757-775. Angeloni, I. and M. Ehrmann (2007). 'Euro area inflation differentials.. *The B.E. Journal of Macroeconomics* 7(1), Article 24.

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consequently real interest rate dispersions in the euro area since then. Given the dominant role of bank loans in financing the euro area economy, the analysis focuses on bank lending rates for non-financial corporations and households.

An econometric analysis of the determinants of lending rates in the euro area

The econometric analysis uses a set of vector autoregressive (VAR) models that link the lending rates both for non-financial corporations and households to their possible determinants. In line with the recent literature on the interest rate pass-through,⁽⁶⁾ these variables include: (i) monetary policy (as proxied by money market rates), (ii) real economic activity, (iii) sovereign credit risk, (iv) banking-sector credit risk, (v) banking-sector funding costs, and (vi) borrower credit risk.

The VAR analysis is carried out for the euro area as a whole and for individual Member States. The analysis uses monthly data from September 2007 to June 2014.⁽⁷⁾ It therefore covers almost the entire period since the global financial crisis and includes phases of greater and lesser financial turmoil in the euro area. Data availability allows for the inclusion of nine euro area countries: Austria, Germany, Spain, Finland, France, Ireland, Italy, the Netherlands and Portugal.

The euro area-wide VAR model suggests that only around half of overall developments in bank lending rates since the beginning of the global financial crisis can be linked to monetary policy, the rest is a reflection of redenomination fears and country-specific risks. The perceived redenomination risk, magnified the traditional

sovereign credit risk and reinforced the overall nominal interest rate divergences across Member States mainly between 2010 and 2012.⁽⁸⁾

The country VAR models confirm that a major part of the divergences in bank lending rates from the euro area-wide developments (pronounced mainly in the periphery) can be explained by three factors: (i) sovereign credit risk differences (while the divergence of sovereign spreads reached extreme values during the period of perceived redenomination risk, some degree of divergence had been present since the onset of the global financial crisis in 2008 and persists at moderate levels to the present day), (ii) banking-sector credit risk differences and (iii), real economic activity differences. In particular, bank lending rates increase following an increase in sovereign and banking risk and a decline in real economic activity. The increase of sovereign and banking risk make bank funding more costly, which makes the banking sector raise lending rates to the private sector as well. When real activity declines, borrower risk increases, which again implies higher lending rates for the private sector as banks increase their mark ups to reflect this higher borrower risks. Consequently, all three factors affect bank lending rates in a pro-cyclical way, increasing it when financial markets are stressed and the economy is in downturn. It is important to note that the effect of these risk factors that hinder the transmission of common monetary policy, is not only related to the most acute phases of the euro area debt crisis, but the whole period since the global financial crisis.

Conclusions

Since the beginning of the EMU, the convergence of nominal interest rates in a context of persistent inflation differentials led to pro-cyclical real interest rate differentials. Since the global financial crisis, the euro area has seen a significant fragmentation of its financial markets, including renewed divergences of borrowing costs that have added to inflation differentials in driving this real interest rate dispersion. Therefore, the real interest rate mechanism has contributed to the intra-euro area imbalances and consequently hindered the rebalancing.

⁽⁶⁾ For pre-crisis evidence see for example: de Bondt, G. (2005). 'Interest rate pass-through: Empirical results for the euro area'. *German Economic Review* 6(1), pp. 37-78. For post-crisis evidence, see for example: Darracq Paries, M., D. Moccerro, E. Krylova, and C. Marchini (2014). 'The retails bank interest rate pass-through: the case of the euro area during the financial and sovereign debt crisis'. *ECB Occasional Paper Series* 155, Gambacorta, L., A. Illes and M. Lombardi (2014). 'Has the transmission of policy rates to lending rates been impaired by the Global Financial Crisis?'. *BIS Working Paper* 477, von Borstel, J., S. Eickemeier and L. Krippner (2015). 'The interest rate pass-through in the euro area during the sovereign debt crisis'. *CEMA (Australian National University) Working paper* 15/2015.

⁽⁷⁾ The sample is adjusted to the availability of the series defined above. While most interest rates from MFI statistics are available from 2003, some risk measures, particularly bank risk and risk of non-financial corporations, are available only from 2007 onwards.

⁽⁸⁾ Klose, J. and B. Weigert (2014) found that redenomination risk represented a systemic component in determining sovereign yields between September 2011 and August 2012 on top of common sovereign default risk. Klose, J. and B. Weigert (2014). 'Sovereign yield spreads during the euro crisis: fundamental factors versus redenomination risk'. *International Finance* 17(1), pp. 25-50.

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Given the importance of bank loans for the financing of the euro area economy, this box has presented some new econometric evidence on the drivers of nominal bank lending rate for non-financial corporations and households. The results suggest that since the global financial crisis bank lending rates in the euro area countries have been driven to some degree by factors unrelated to the single monetary policy, and that these factors have a significant country-level dimension.

Pro-cyclical real interest rate differentials have reduced over the last few years as most of the country-specific risk factors have dissipated. Following the gradual re-convergence of sovereign yields and bank funding cost across the euro area, bank lending rates continued decreasing in 2015, particularly in the periphery. In line with the current forecast, inflation rates are expected to turn positive in 2016 in most Member States, helping to decrease further the real interest rates, which in some countries were still being driven up by deflationary developments in 2015. The euro area's negative output gap is expected to close gradually over the next few years suggesting that most Member States should start seeing inflationary pressures again that could help to further reduce the pro-cyclical dispersion of real interest rates.

However, the nominal and real interest rate differences across Member States might reappear in the future cycles. High public (and private) indebtedness together with high levels of non-performing loans in some countries cast doubts on the sustainability of current funding costs. Still, the role of sovereign risk and banking risk as drivers of nominal interest rate differences should be permanently mitigated by policy and governance changes such as the completion of the Banking Union.⁽⁹⁾ Nevertheless, some dispersion of nominal borrowing costs will remain as long as there are cyclical differences across Member States. Countries experiencing idiosyncratic downturns can expect higher interest rates as a consequence of higher borrower risk. Thus, interest rate differences are unavoidable and might represent a natural part of adjustment to shocks in a currency union. Nevertheless large and persistent real interest rate differentials reinforcing the cyclical divergences among the Member States represent a major drag to the effective functioning of the EMU and need to be avoided in the future.

⁽⁹⁾ See for example: Goyal R., P. Koeva-Brooks, M. Pradhan, T. Tressel, G. Dell'Ariccia and C. Pazarbasioglu (2013). 'A banking union for the euro area'. *IMF Staff Discussion Note* SDN/13/01.