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# IMF Working Paper

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## Fragmentation and Monetary Policy in the Euro Area

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**IMF Working Paper**

European Department

**Fragmentation and Monetary Policy in the Euro Area**

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**Abstract**

The ECB has taken a range of actions to address bank funding problems, eliminate excessive risk in sovereign markets, and safeguard monetary transmission. But euro area financial markets have remained fragmented, driving retail interest rates in stressed markets far above those in the core. This has impeded the flow of credit and undermined the transmission of monetary policy. Analysis presented here indicates that the credit channel of monetary policy has broken down during the crisis, particularly in stressed markets, and that SMEs in these economies appear to be most affected by elevated lending rates. Given these stresses, the ECB can undertake additional targeted policy measures, including through additional term loans, collateral policies, and private asset purchases.

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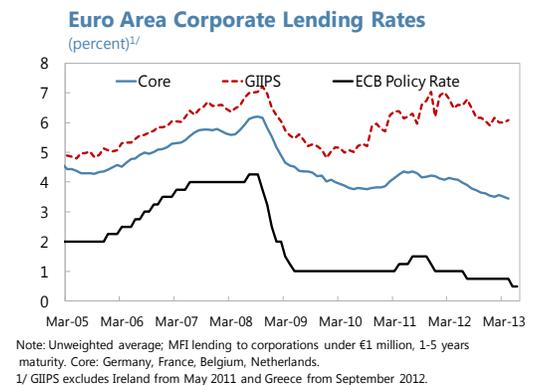
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## I. INTRODUCTION

The ECB announced the Outright Monetary Transactions (OMTs) framework to address severe distortions in sovereign bond markets and safeguard monetary transmission.<sup>1</sup> Since the announcement, excessive risk in stressed sovereign markets has been reduced and confidence in the euro restored. For example, spreads on Italian and Spanish government bonds have declined from unsustainable levels to those last seen in late 2010, prior to the deepening of the sovereign crisis. At the same time, market indicators suggest that euro redenomination risks have been taken off the table, if not completely eliminated (see Box 1).

Corporates and banks have also benefitted from the OMTs announcement. CDS spreads for corporates and banks in stressed economies have narrowed sharply in tandem with falling sovereign risks. This has led to an improvement in bond issuance, particularly among corporates. But the impact on banks appears to be less pronounced, with issuance fading relative to the surge following the introduction of three-year Long Term Refinancing Operations (LTRO), and CDS spreads widening from the start of 2013 and remaining at an elevated spread to both sovereign and corporate risks (Figure 1). However, both bank and corporate risk remains substantially below pre-OMTs peaks.

But despite improved financial conditions, monetary transmission in the periphery and stressed markets remains impaired.<sup>2</sup> In particular, private interest rates—deposit and lending rates—in these economies have increased relative to both corresponding rates in the core and the ECB’s policy rates. This divergence began in 2011, and has since become worse, with Spanish, Italian, and Portuguese corporates currently facing borrowing rates anywhere from 100-350 basis points above their counterparts in Germany.<sup>3</sup>



These marked and persistent differences in private interest rates reflect various levels of fragmentation in euro area financial markets. As a result, credit is more expensive in the hardest hit economies, especially for smaller entities that tend to play a large economic role (in terms of

<sup>1</sup> The technical features of OMTs were officially announced on September 6, 2012, following the meeting of the ECB’s Governing Council. However, the idea behind OMTs—namely the prospect of ECB action to address excessive sovereign risk premia—was first announced by President Draghi on July 26, 2012 in a speech he gave in London, and further elaborated following the ECB’s Governing Council meeting on August 2, 2012. For the purposes of this paper, the OMTs announcement is given by July 26, 2012, when markets began to price in the potential for ECB measures to address excessive sovereign risk premia.

<sup>2</sup> The Periphery is defined here as Greece, Ireland, Italy, Portugal, and Spain. Core is defined as Germany, France, Belgium, and the Netherlands.

<sup>3</sup> At a more general level, a part of the spread between stressed and core countries might reflect the re-pricing of sovereign risk, which may have been underpriced before the crisis given high debt levels for certain countries. Even in these cases, financial fragmentation could increase the cost of borrowing and limit access to credit for solvent corporations beyond the impact of sovereign risk through means that are discussed in the following section.

employment and value added). This makes it harder for recoveries to take hold, and gives rise to a vicious cycle where balance sheets of otherwise solvent borrowers deteriorate in the absence of credit, thus reinforcing pressures on banks' balances sheets and the forces of fragmentation.

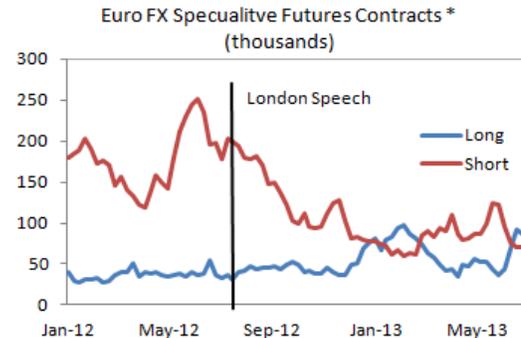
Against this background, this paper examines the main factors that contribute to fragmentation and assesses the impact of some on the transmission of monetary policy. The analysis finds that, among others, elevated funding costs, credit risk, and bank leverage help to explain the rise in relative bank lending rates in the periphery since the onset of the crisis. These findings support the policy discussion, where additional monetary policy actions are identified to help alleviate persistent fragmentation pressures and provide room for the repair of weak bank balance sheets.

The paper proceeds as follows. Section II examines financial market fragmentation. Section III discusses monetary transmission channels in the euro area. Section IV assesses the pass-through of policy rates and other variables capturing the credit channel to private corporate lending rates. And Section V draws policy considerations and conclusions.

### Box 1. Assessing OMTs and Redenomination Risks

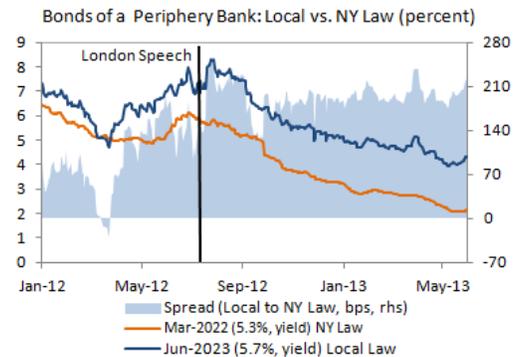
The ECB introduced the OMTs framework in response to “exceptionally high” risk premia in sovereign bond markets “related to fears of the reversibility of the euro.” Periphery sovereign yields have narrowed substantially, suggesting a decline in redenomination risk. However, isolating these risks from other market forces is difficult, so considering a few indicators can help to shed light on the extent to which these risks have been removed.

- Speculative activity in euro-currency contracts.* In the wake of President Draghi’s “London Speech” in July 2012, the number of speculative short futures contracts in euro dropped markedly after rising rapidly in the preceding months, reaching levels last seen before the crisis escalated in late 2010. This was followed by a modest rise in long contracts. Although both contracts have recently been volatile, and represent only a very limited slice of the overall euro currency market, they are often taken as an indicator of broad market sentiment and tend to be well correlated with the euro exchange rate.<sup>1/</sup> In this regard, the marked shift in investor positions suggests a distinct change in sentiment following the London speech.
- Legal jurisdiction of obligations.* Similar bonds issued by the same (large) periphery bank could be expected to trade somewhat differently if one (governed by local law) is considered to carry higher redenomination risk to the other (governed by international law). A rise in yields and widening of their relative spread could indicate the buildup of such risks, among others, prior to the London Speech. But the ensuing improvement in their yields has been significant. In addition the spread between them, while elevated, declined a bit and stabilized (beyond periods of broad market stress). Taken together, there was a clear improvement in the performance of these bonds following the London speech.



Source: Bloomberg; staff calculations

\*Commitment of Trade contracts in euro futures for non-commercial purposes.



Assessing the impact of OMTs on euro redenomination risk is complex. However, notwithstanding this, or the difficulty of disentangling factors driving market dynamics through the crisis, the indicators considered here display a marked shift in the period following the London Speech. A decline in speculative short euro currency positions and the improvement in the performance of periphery bank (and sovereign) bonds is consistent with the decline, if not removal, of euro redenomination risks.

<sup>1/</sup> According to the ECB, since the inception of the euro, the correlation between long contracts and the euro is 0.64, while that between short contracts and the euro is 0.42.

## II. FRAGMENTATION: WHY HAVE LENDING RATES DIVERGED?

Financial market fragmentation in the euro area reflects a combination of factors.<sup>4</sup> Among these, elevated bank counterparty risks, new and pending regulatory hurdles (e.g., higher liquidity ratios and “bail-in” procedures), and the increased subsidiarization of banks’ business models (partly related to the rise of regulatory “ring-fencing” in some countries)—have undermined cross-border bank flows, particularly to the periphery, and contributed to diverging term funding costs with the core. At the same time, dampened growth prospects—and for certain countries, the prolonged period of low policy rates (particularly where significant portions of banks’ mortgage books are tied to low Euribor rates)—have been weighing on banks’ profitability and capital positions. This reinforces the need for banks to deleverage and de-risk their balance sheets.

In this context, fragmentation can be considered and observed in a number of specific ways:

- *Cross border banking flows have declined.* Both core and periphery banks have retrenched throughout the crisis, withdrawing capital to domestic markets and reducing their foreign lending. The departure of capital from the periphery is most pronounced, with core banks, including from France and Germany, substantially reducing their exposure to these economies since the start of the crisis (amounting, for each of the French and German banks, to some 5-10 percent of GDP in Italy and Spain, and even higher in Ireland, see text figure).<sup>5</sup> Most periphery banks have also scaled back their lending to each other, while the volume of euro area unsecured overnight interbank activity has more than halved since the start of the crisis.<sup>6</sup>

Change in Cross-Border Bank Holdings, 2008Q-2012Q4  
(in percent of Counterparty Country GDP)

		Counterparty Country							
		DEU	NLD	FRA	ITA	ESP	PRT	IRE	GRC
Reporting Country	DEU		-0.7	-1.8	-5.2	-10.3	-8.2	-43.2	-10.6
	NLD	-0.7		-4.4	-4.9	-3.7	-5.0	-10.5	-5.1
	FRA	-2.1	1.4		-5.2	-4.1	-4.2	-17.6	-5.0
	ITA	-4.1	-1.2	-0.4		-0.4	-3.0	-5.5	-2.4
	ESP	0.1	-4.7	-0.8	-0.4		2.3	-4.6	-0.1
	PRT	-0.3	0.8	0.0	-0.1	-0.3		0.8	0.8
	IRE	-1.6	-2.2	-0.9	-2.3	-2.1	-2.1		-2.9
	GRC	0.0	0.3	0.0	0.0	0.0	0.0	0.1	

Source: BIS; staff calculations

- *Term funding costs have increased.* The cost of bond issuance remains elevated for both core and periphery banks, but there is a growing divergence between the two, driven mainly

<sup>4</sup> For a summary of financial integration and fragmentation in the European Union see Leaven and Tressel (2013).

<sup>5</sup> According to BIS statistics on banks’ consolidated international claims, ultimate risk basis.

<sup>6</sup> Most of the turnover in unsecured lending and borrowing has been concentrated in the overnight tenor, which accounted for 83 percent of total lending in 2012. Nevertheless, trading volumes at tenors up to one month also declined in 2012, and were very limited at the one to three month tenor, particularly when general market stresses were elevated (see ECB, 2012).

by rising periphery spreads (Figure 1). Indeed, the average spread (to benchmark rates) for periphery banks at issuance was about 380 basis points in early 2013, and 250 basis points above their counterparts in the core. Prior to the crisis, the spread between core and periphery banks was negligible. Similar developments are evident when considering secured funding markets on their own, with spreads on periphery covered bond issuance rising throughout the crisis, even as banks have become more reliant on secured forms of borrowing.

- *Banks' assets have become increasingly encumbered.* Banks in stressed economies have been forced to put up with higher levels of asset encumbrance. This reflects the shift toward secured funding, including on official liquidity facilities, and pressures from credit ratings downgrades on both private and public securities. Outside of the program countries, encumbrance has increased markedly in Spain and Italy, and it has also increased in France, though the overall level there is relatively low (see Box 2).
- *Pressures on banks' balance sheets, including on profitability, have increased.* Weak growth and high levels of private balance sheet debt in the periphery are weighing on the health of banks' balance sheets. Asset quality is declining, with nonperforming loans (NPLs) in Spain rising to 10.4 percent in February and those in Italy hitting 22.8 in January.<sup>7</sup> In addition, there are signs that bank profitability in both the periphery and core has been under pressure as firms and households deleverage. Net interest margins have moderated, while provisioning as a share of income has increased, notably for both Italian and Spanish banks (Figure 2). This comes despite the support to profitability from increased holdings of own-sovereign debt, facilitated in particular by the three-year LTRO facilities. At the same time, pressures from the low policy rate environment can also weigh on banks' profitability—for example, Spanish banks are unable to quickly re-price large mortgage books tied to low Euribor rates.
- *Periphery banks have increased their reliance on deposits.* In particular, the spreads over Germany have increased substantially for term deposits (over 2 years), reflecting the squeeze in term funding and adding further pressure to bank profitability.

These risks and challenges are increasingly reflected in periphery bank CDS spreads. After showing some improvement in the immediate wake of the OMTs announcement, spreads reached 430 basis points at the end of March 2013 (about 375 basis points above early 2008 levels). In fact, they have traded wider to those of core banks since the turn of this year, following the turbulence in the wake of the Italian elections and events in Cyprus. This rise in spreads has coincided with lower bond issuances, for both core and periphery banks. At the same time, the relative volume of euro area corporate bond issuance has increased, pointing to a degree of disintermediation and unmet demand by banks for corporate borrowing (Figure 1).<sup>8</sup>

<sup>7</sup> The figure for Italy refers to NPLs of corporates only, whereas those for Spain are for total lending (households and corporates). Indeed, cross-country comparisons of NPLs are complicated by differences in definitions. For example, Italy's impairment categories are broadly defined, capturing a wider class of impaired assets than in other countries.

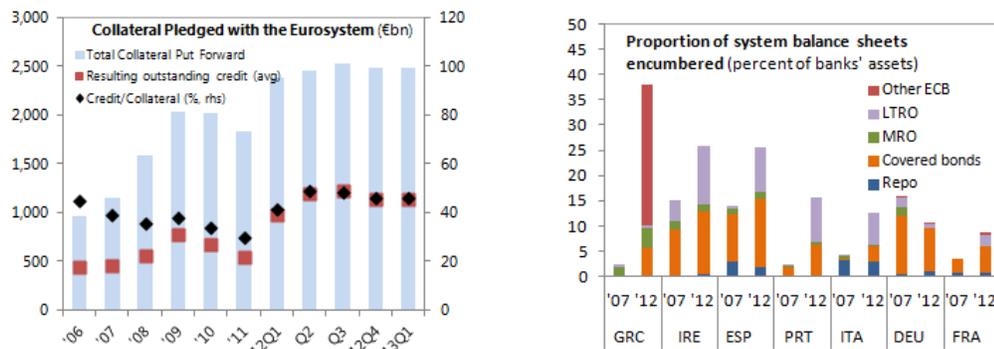
<sup>8</sup> Corporate issuers are also taking advantage of the low interest rate environment.

## Box 2. Eurosystem Collateral

Throughout the crisis, the ECB has drawn upon the flexibility of the Eurosystem's collateral framework to provide increasing liquidity support to banks. Collateral policies have been relaxed on several occasions, including by broadening the base of eligible instruments to include additional credit claims and other non-marketable assets<sup>1/</sup>, as well as increasing the scope for the use of asset-backed securities.<sup>2/</sup> Along with the introduction of the three-year LTROs<sup>3/</sup> the amounts of eligible collateral and average outstanding credit<sup>4/</sup> have increased substantially through the crisis.

However, despite these accommodative actions, there are signs of increased strains on system wide collateral, particularly in the periphery. Indeed, against higher unsecured funding costs, banks have become heavily reliant on secured borrowing, particularly through official facilities. The pressures on funding are evident at both the Eurosystem and private bank funding levels, and transmit through several channels.

- The composition of pledged Eurosystem collateral has changed throughout the crisis, with a marked rise in the share of government securities and non-marketable assets (about three quarters of which are additional credit claims) and a fall in corporate and bank bonds. In addition, the pool of higher quality government securities has decreased with ratings downgrades, and there has been a trend away from the use of cross-border assets toward domestic collateral, reflecting increased financial market fragmentation and regulatory "home bias".
- At the same time, collateral in private funding markets appears increasingly encumbered for some. Apart from a few opportunistic periods following key euro area policy initiatives, the issuance of covered bonds and other asset-backed securities declined in the past year, while banks in the periphery have seen a marked rise in associated bond spreads. In addition, the euro-denominated securitization market has declined by over €250 billion to about €1 trillion since 2009, while the euro-denominated commercial paper market has dried up. Taken alongside the strains from official borrowing, the share of encumbered assets has increased during the crisis, notably for stressed economies.
- There are also systemic factors contributing to strains on collateral. In particular, the move to central counterparty clearing systems for OTC derivatives, and larger recourse to central bank liquidity (including through asset purchase programs by major central banks), add to the overall demand for high quality collateral.



<sup>1/</sup> According to the ECB, the eligibility of additional claims increased the collateral pool by approximately €600-700 billion, but this was only expected to result in about €200 billion of acceptable collateral due to stringent overcollateralization requirements.

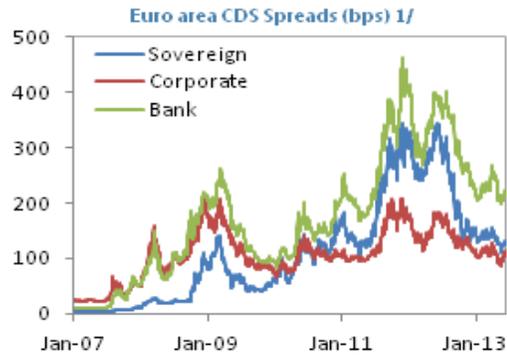
<sup>2/</sup> On July 18, 2013, the ECB announced plans to enhance eligibility of ABS as Eurosystem collateral, including by lowering the haircut on higher rated ABS and, for the first time, making eligible lower rated ABS. Risks to the ECB balance sheet were fully offset through various measures, including by raising haircuts on lower rated government securities, while total eligible collateral relatively unchanged.

<sup>3/</sup> The ongoing repayment of three-year LTROs since the start of this year implies a release of collateral back into the system. However, this also implies a reduction in excess system liquidity.

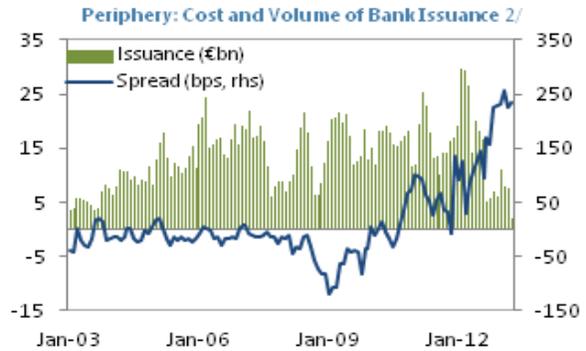
<sup>4/</sup> Banks can and do pre-pledge collateral with the Eurosystem. Therefore, the rise in credit to collateral seen shown here is likely understated, suggesting more credit became available for the given pool of collateral.

### Figure 1. Euro Area: Financial Market Fragmentation

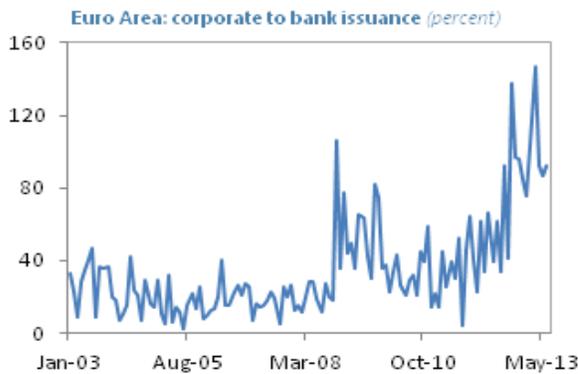
Euro area sovereign and corporate risk has declined markedly post OMTs announcement, but bank risk remains elevated...



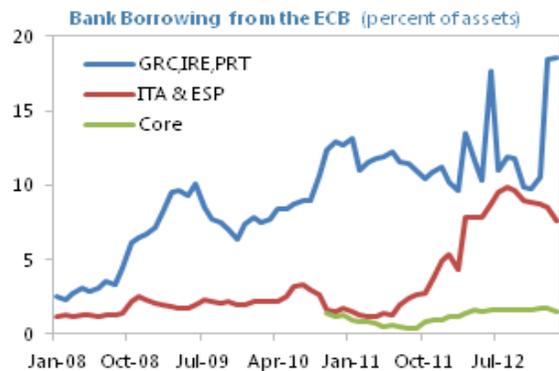
As a result, bank term funding costs have surged, particularly in the periphery relative to the core, driving periphery issuance volumes down.



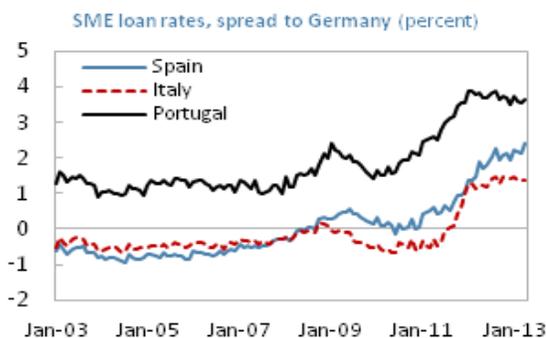
But corporates have benefitted from the post-OMTs decline in risk, boosting their relative issuance compared to banks.



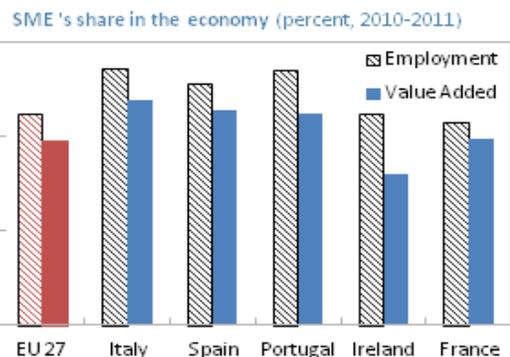
At the same time, banks in hard hit economies are heavily dependant on Eurosystem facilities, raising concerns over rising asset encumbrance.



As a result, lending rates, particularly for SMEs, in the stressed markets have been driven substantially above those in the core countries.



With SMEs playing an important role both in employment and value added, addressing fragmentation is key to supporting growth in the stressed markets.



Sources: ECB; Haver Analytics; Dealogic; Bloomberg; and IMF staff calculations.

1/ Sovereign and bank CDS exclude Greece and are weighted by total debt.

2/ Periphery is defined as Italy, Ireland, Portugal and Spain. The spread is that of periphery bank issuance costs over those of the core banks. The bonds are 1-10 year in tenor. Data shown as 3mma.

3/ Banks are first averaged within own country, and then added across country groupings.

### III. FRAGMENTATION AND MONETARY TRANSMISSION

Pressures from fragmentation and weak balance sheets have contributed to elevated lending and deposit rates in the periphery. A main consequence has been a breakdown in the monetary transmission mechanism in these economies. Indeed, despite lower policy rates, private interest rates remain high, reflecting a combination of factors, including lack of term-funding for some banks, and weak bank and corporate balance sheets and associated credit risks. But as borrowing costs have risen, access to credit has been further reduced, particularly for SMEs, and de-integration forces in EMU have strengthened.

This is particularly relevant given that the European intermediation system is mainly bank-based, with about 90 percent of NFC debt financing intermediated through the banking sector (Figure 2). Although reliance on bond financing has gradually increased since the start of the crisis—as larger corporates have turned to markets—it still remains low (at about 11 percent). As a point of comparison, the numbers for US corporates are closer to the reverse, with about 70 percent reliance on bond financing and 30 percent on bank financing (at the end of 2012).

The recent crisis and fragmentation highlights the importance of the credit channel for the euro area financial system. In addition to the conventional interest rate channel—working through short-term interest rates to the cost of capital and overall spending—the credit channel amplifies and propagates the conventional interest rate effects, mainly through: (i) the balance sheet channel (borrowers' balance sheets); and (ii) the bank lending channel (supply of loans by banks) (Bernanke and Gertler, 1995).

Prior to the crisis, while some evidence for the bank-lending channel has been detected in at least some euro area countries, no strong evidence has been found for the euro area as a whole (see ECB, 2002).<sup>9</sup> Similarly, the bank lending channel has been found to be less effective in normal times, namely during the first decade of the introduction of the euro (ECB, 2010). Post crisis, however, evidence on the credit channel has resurfaced, with adverse consequences for lending stemming from both bank lending and balance sheet channels (Hempell and Sorensen 2010; Ciccarelli et. al., 2013).

Monetary policy transmission has been impaired through interlinked interest rate and credit channels. In particular, the interest rate channel has been hampered by the decline in interbank activity. As the volume of interbank activity declined through the crisis, so did the effectiveness of the transmission of policy rate changes to money market rates. A number of factors, including counterparty risks and the rise in excess system liquidity—partly reflecting supportive ECB measures and the general decline in economic activity, among others—have weighed on interbank activity, despite reduced volatility of money market interest rates since

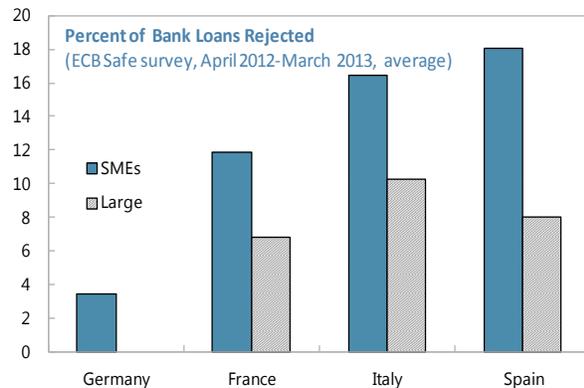
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<sup>9</sup> Also see the results of the Monetary Transmission Network established by the ECB at [http://www.ecb.int/home/html/researcher\\_mtn.en.html](http://www.ecb.int/home/html/researcher_mtn.en.html).

early 2012.<sup>10</sup> However, more recently, money market rates have begun to rise and, if sustained, could further undermine interbank activity (Figure 2). In particular, despite the ECB recently increasing its provision of forward interest rate guidance, money market rates have risen at mid to long tenors, boosting market expectations of future funding costs.

At the same time, the credit channel has been undermined by weaknesses in both bank and corporate balance sheets. The decline in wholesale funding volumes and rise in borrowing costs—which is forcing banks to deleverage, including by reducing their loan-to-deposit ratios through a combination of reduced assets and higher deposit rates—has reinforced bank balance sheet stresses and led to problems in the functioning of the monetary transmission mechanism. While the ECB’s unconventional policies have mainly addressed at restoring this channel—by substituting the lack of market funding with the official funding—lending rates remain high and overall credit growth is still subdued.

There are additional obstacles to the proper functioning of the credit channel. On the supply side, there is a lack of term-funding in some stressed countries (with deposit rates and the cost of unsecured bond issuance remaining persistently high), and ongoing weaknesses in some banks’ balance sheets despite national efforts, notably in Spain, to restructure and recapitalize banking systems. On the demand side, household and corporate balance sheets are weak, particularly in countries such as Italy, Portugal, and, Spain where private deleveraging is still ongoing.<sup>11</sup> At the same time, banks are facing increasing NPLs and may be unable or unwilling to provide credit at the rates that are prevalent in core countries, particularly given increased perceived credit risks of households and firms in the weak growth environment.



Fragmentation and the broken monetary transmission mechanism appear to impact small and medium enterprises (SMEs) disproportionately. Interest rates charged for small loans in stressed countries are higher than those charged for larger loans, but are also higher than those charged for similar loans in core countries (Figure 1). While the ECB’s Bank Lending Survey indicates that demand for loans has been weak, its SAFE survey shows that SMEs applying for loans are experiencing difficulties in obtaining credit from banks, particularly in Spain, Italy, and Portugal.<sup>12</sup> Indeed, SMEs listed “finding customers” and “access to finance”

<sup>10</sup> As noted in ECB (2012), the decline in turnover of euro area money market instruments in the first half of 2012 is attributable to both the ongoing debt crisis—and the related impairment of the interbank market—and to the high excess liquidity environment that prevailed in the euro interbank market as a result of the two three-year LTROs conducted in December 2011 and February 2012.

<sup>11</sup> See Bornhorst and Ruiz-Arranz (2013).

<sup>12</sup> Survey on the access to finance of small and medium-sized enterprises in the euro-area (SAFE) (October 2012-March 2013). The survey covers about 7500 firms of which 93 percent are SMEs.

as their largest concerns. While there have been improvements in the availability of external financing (including bank loans, bank overdrafts, and trade credit) and in the associated terms and conditions during the last six months, the overall conditions have been worse for SMEs than for larger companies.<sup>13</sup>

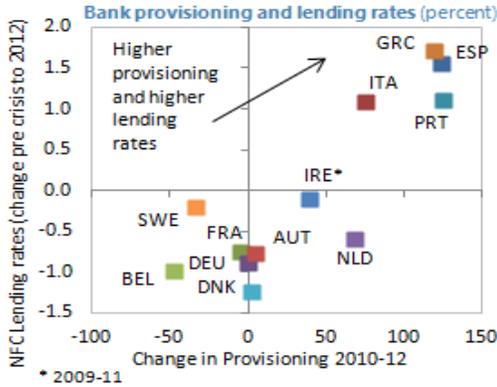
Ensuring credit availability to viable SMEs is essential to supporting the recovery in the euro area given that the SMEs are about 80 percent of employment and 70 percent of value added in Italy, Spain, and Portugal (Figure 1). In addition, SME sectors in these economies are dominated by micro-firms with less than 10 employees (about 94–95 percent of total firms), facing tougher financing conditions.

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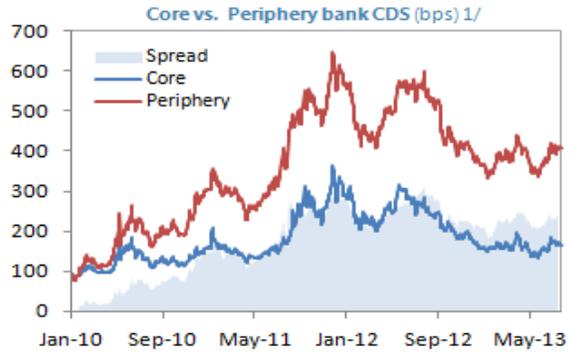
<sup>13</sup> See Box 3 of May 2013 ECB Monthly Bulletin and Box 6 of July 2013 Bulletin

### Figure 2. Euro Area: Banking Sector Developments

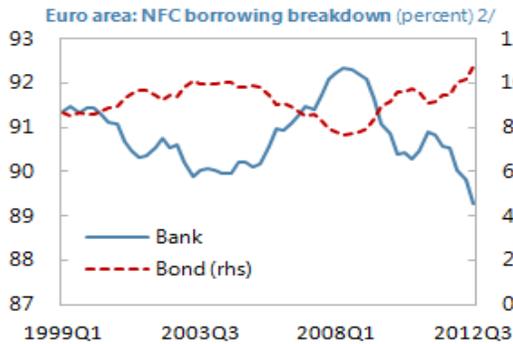
Declining asset quality and higher provisioning needs are associated with higher lending rates in stressed economies.



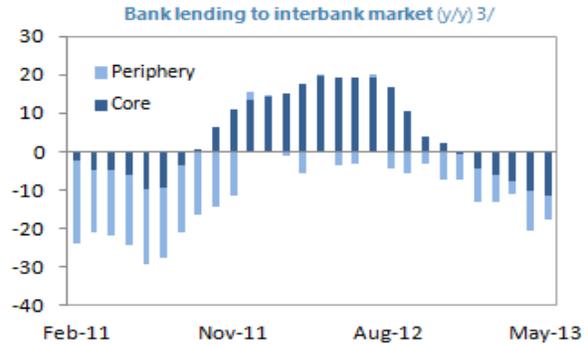
Despite the general decline risk pricing, CDS spreads for periphery banks remain elevated, and have recently diverged from those in the core.



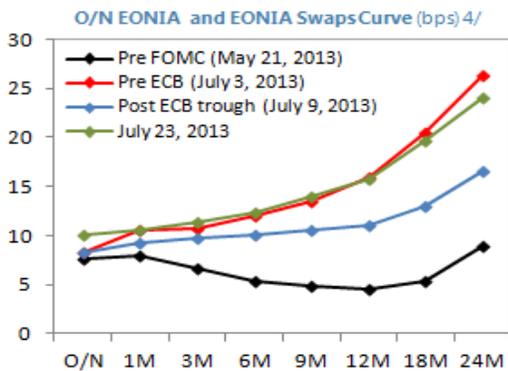
Euro area corporates are highly dependent on bank financing, despite their recent shift toward capital markets.



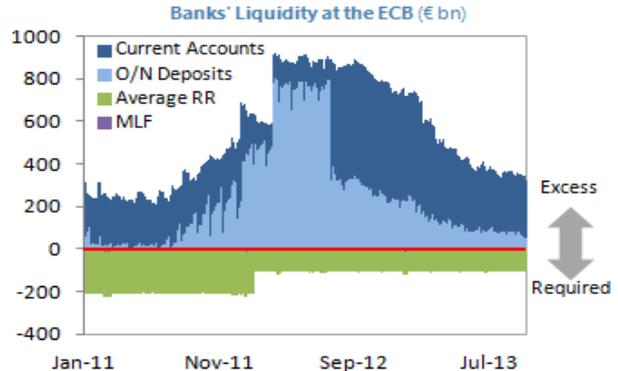
Euro area banks continue to withdraw from the interbank markets...



...And money market interest rates have increased, despite the ECB's more explicit forward guidance...



Lower interbank lending and higher money market rates add to the pressures from the decline in system excess liquidity as LTROs are repaid.



Sources: ECB; Bloomberg, Haver; and IMF staff calculations.

1/ Periphery is defined as GRC, ITA, IRE, PRT, ESP. Core is defined as AUT, FRA, DEU, BEL, NLD.

2/ Nonfinancial debt financing (i.e., securities) and bank loans each in percent of outstanding debt.

3/ Periphery is defined as ITA, IRE, PRT, ESP. Core is defined as FRA, DEU, BEL, NLD.

4/ Outright EONIA overnight and forward rates. Pre FOMC refers to data on the day prior to the release of the minutes of the FOMC meeting where the potential for "tapering" unconventional monetary support was conveyed, sparking a rise in US Treasury yields. Likewise, pre-ECB refers to the data prior to the July 3 2013 ECB meeting where more explicit forward guidance was provided.

#### IV. ASSESSING MONETARY PASS-THROUGH

Here, a simple model is used to assess the pass-through of policy rates and other variables capturing the credit channel to bank lending rates. In this regard, variables capturing both interest rate and credit channels have been included in regressions. In particular, different components of the credit channel are separately controlled for. Therefore, the monetary policy transmission channel is not only reflected in the coefficient of the policy rate, but also in the coefficients of these other control variables.

##### A. Model Specification

A vector error correction model is specified for the euro area and select individual country level lending rates (Germany, France, Italy, Spain, and Portugal) over the period January 2003 to February 2013.<sup>14</sup> Specifically, changes in bank lending rates ( $\Delta LR_t$ ) are regressed on own lags, simultaneous (exogenous) and lagged changes of market rates ( $\Delta MR_t$ ), and on other measures of the credit channel. The variables capturing the credit channel include measures of other bank funding costs, leverage, credit risk, economic uncertainty, and PMIs ( $\Delta X_t$ ). In addition, an error correction term is included to capture the adjustment to the estimated long-term relation.

$$\Delta LR_t = \varphi + \gamma(LR_{t-1} - \beta_1 MR_{t-1} - \beta_2 X_{t-1} + \kappa) + \alpha_{1t} \Delta MR_t + \sum_1^i \alpha_{2it} \Delta MR_{t-i} + \sum_1^i \alpha_{3it} \Delta LR_{t-i} + \sum_1^i \alpha_{4it} \Delta X_{t-i}$$

Alternative variables are used to test the various components of the transmission mechanism. Regressions are run using monthly lending rates for small loans (below €1 million for all maturities), large loans (over €1 million for all maturities), 3-month Euribor rates (proxying the relevant policy rates), senior financial CDS spreads (to capture credit risk of banks), bank bond spreads at issuance (for both periphery and core, to capture funding costs), asset-to-capital ratios (to capture leverage), and PMIs (to capture the overall economic outlook affecting firms' balance sheets).

Additional variables considered in the regressions include lending rates to NFCs between 1-5 year maturity, money market rates (overnight EONIA, 3-month EONIA, 3- and 7-year swap rates), measures of credit risk (sovereign yields, subordinated financial CDS), funding costs (bank equity prices, stock market indices, term deposit rates), measures of leverage (loan-to-deposit ratio), and an economic policy uncertainty index to capture overall weak and uncertain economic activity.<sup>15</sup> All of the the variables are either in percentage points or in percent.<sup>16</sup> In addition to the full sample, regressions are also run over the period January 2003-August 2008 to see how the pass-through changed following the onset of the crisis.<sup>17</sup>

<sup>14</sup> See ECB Monthly Bulletins of August 2009 and May 2010 for similar specifications.

<sup>15</sup> The Economic Policy Uncertainty Index is from Baker, Bloom, and Davis (see PolicyUncertainty.com).

<sup>16</sup> Indices are transformed by taking the log of the index and multiplying by 100 so that the results can be interpreted in percent changes.

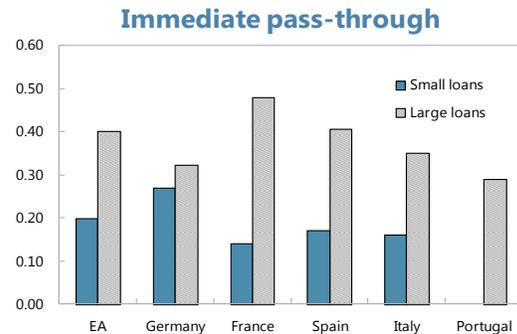
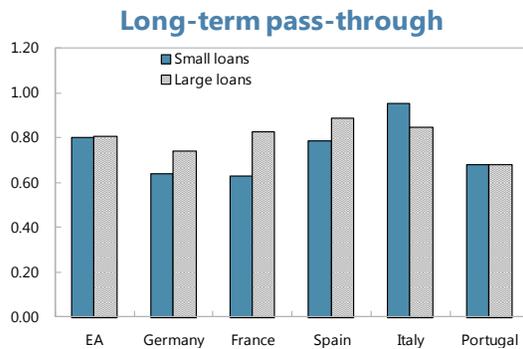
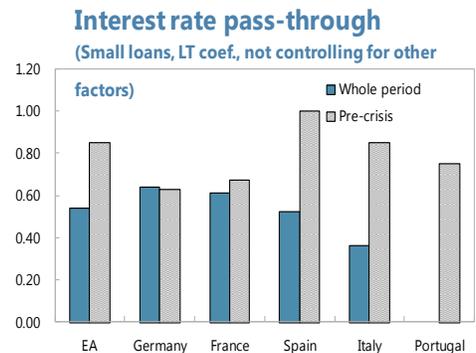
<sup>17</sup> Because of the short-sample period, the results are only indicative for the pre-crisis period and cannot be run for a separate post-crisis period. Rolling regressions are also run for the long-term coefficients as a robustness check, confirming the main findings below.

The specification of the model is different for each set of regressions, reflecting country differences. The lag length for each regression is selected based on a Wald test. The long-term relation is estimated by the first step Johansen procedure. Standard tests, such as augmented Dickey-Fuller and Phillips-Perron, indicate unit roots for the variables. While one cointegrating equation is detected for the regressions, some have either no or two cointegrating relations according to trace tests.

## B. Estimation Results

Overall, the regression results support the notion that funding costs, credit risk, and leverage have become important determinants of lending rates since the onset of the crisis, particularly in stressed countries. Moreover, these factors appear to be more relevant for small loans, which are typically associated with SMEs. Some of the main findings are as follows (see Table 1 and Tables A1-A4):

- Without controlling for other factors, the long-term pass-through from Euribor to corporate lending rates has declined since the onset of the crisis for the aggregate euro area and stressed countries, but not for individual core countries. This highlights the importance of other factors in determining lending rates in stressed countries. In this context, the cointegrating relation for the whole period for stressed countries exhibits a trend.
- Once other factors have been controlled for, the long-term pass-through from Euribor to corporate lending rates is close to pre-crisis levels (ranging from 0.6-0.9), implying that the recent divergence in lending rates is largely explained by these other factors—namely the cost of funding, credit risk, and bank leverage (Table 1 and appendix tables).
- The immediate pass-through is broadly similar across countries (about 0.2 for small loans), and larger for large loans (about 0.3 - 0.4).<sup>18</sup>



<sup>18</sup> The immediate pass-through from policy rates to lending rates for small loans is smaller for France and not statistically significant from zero for Portugal.

- For the aggregate euro area regressions, the error correction terms are smaller in magnitude for small loans (about -0.1) than for large loans (about -0.2 to -0.3), indicating a slower convergence to the long-term trends. For core countries (Germany and France), the error correction terms are at the upper end of the range (about -0.2 to -0.3), and there is not much difference between small and large loans. However, for stressed countries the error correction terms are smaller in general (about -0.1 for Italy and -0.1 to -0.2 for Spain and Portugal).

**Table 1. Summary Estimates for the Interest Pass-through to Small Loans**<sup>1/</sup>

	3M Euribor	Bond Issuance Cost 2/	ECM	Short-term Pass-through
<b>Euro Area</b>				
Pre-crisis 3/	0.86***		-0.08**	0.21***
Full sample	0.54***		0.03	0.20**
Pre-crisis	0.84***	0.2	-0.15***	0.23***
Full sample	0.82***	0.9***	-0.10***	0.21***
<b>Germany</b>				
Pre-crisis	0.63***		-0.13*	0.20**
Full sample	0.64***		-0.16**	0.27***
Full sample	0.63***	-0.11	-0.19**	0.27***
<b>France</b>				
Pre-crisis	0.67***		-0.30**	0.05
Full sample	0.61***		-0.13**	0.12*
Pre-crisis	0.61***	0.23*	-0.28***	0.18*
Full sample	0.63***	0.35***	-0.26***	0.14**
<b>Italy</b>				
Pre-crisis	0.85***		-0.13**	0.18**
Full sample	0.36		-0.02	0.16**
Pre-crisis	0.79***	0.22*	-0.26***	0.18***
Full sample	0.81***	0.74***	-0.13***	0.16**
<b>Spain</b>				
Pre-crisis	1.03***		-0.13***	0.20***
Full sample	0.52***		0.04	0.21**
Pre-crisis	0.85***	0.85***	-0.02***	0.16***
Full sample	0.83***	1.04***	-0.20***	0.17**
<b>Portugal 4/</b>				
Pre-crisis	0.76***		-0.54***	0.06
Full sample	0.39**		-0.04**	0.02
Pre-crisis	0.70***	0.05	-0.57	-0.02
Full sample	0.70***	0.85***	-0.10**	-0.02

Notes: Significant at the 1, 5, and 10 percent levels: \*\*\*, \*\*, \*.

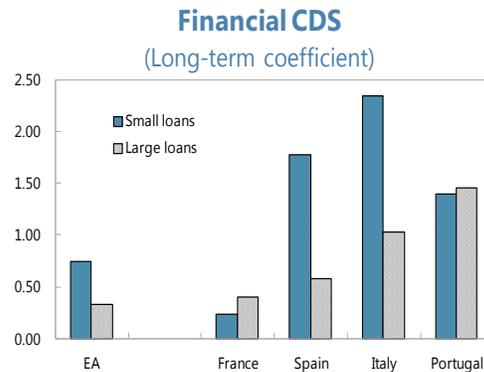
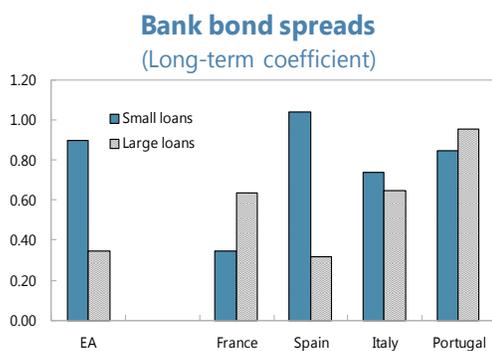
1/ Small loans are up to €1 million.

2/ The cost of issuance is calculated for both core and periphery economies.

3/ The sample period is 2003m1 to 2013m2. The pre-crisis sample ends in 2008m8.

4/ Portugal results are more sensitive to lag selection.

- The elevated cost of funding and credit risk are associated with higher lending rates for the aggregate euro area and in particular the stressed countries. This indicates that while the policy rate is still passed-through to lending rates (the coefficients are economically and statistically significant), the cost of funding and credit risks are additional important factors affecting lending rates. This suggests that as long as other funding costs and credit risk remain elevated, lending rates in stressed countries will also remain elevated.
- Credit risk is not statistically significant before the crisis period and the cost of funding is either not significant or has a lower coefficient. This in turn suggests that the transmission mechanism worked similarly for both the core and the periphery countries before the crisis, when access to funding was not an issue. Regarding the core countries, as these banks have greater access to liquidity even after the crisis period (including through the interbank market), the higher cost of funding through other channels (which is still lower compared to the stressed countries) is not necessarily binding. Broadly, the long-run coefficients for the cost of funding and credit risk are higher for small loans than for larger loans, except for Portugal, in which case the coefficients are very close.<sup>19</sup>
- Banks' leverage (given by the ratio of asset-to-capital) is significant for stressed countries, suggesting that banks with weak capital positions cannot (or do not) lower their lending rates.<sup>20</sup> Similar to the cost of funding, leverage does not seem to be an important factor for core countries—despite the variation among the core countries—given excess liquidity (visible in the ECB accounts and Target 2 balances) and ability to access interbank markets.



<sup>19</sup> The fact that the coefficients for both small and large loans are close to each other in Portugal may reflect broader corporate sector deleveraging pressures affecting both large and small firms. In addition, the differentiation might take place through the maturity of the loan rather than pricing (i.e. average rates are comparable for small and large companies but due to much longer maturities for the latter). As noted by the Banco de Portugal, the weighting scheme used in the MIR statistics on interest rates on new loans does not take into account the term of the operations, so that national differences in the aggregated figures may result from different maturity structures in the different countries (Goretti, M., 2013). Finally, Portuguese banks' term funding costs through bond issuance have historically been higher than those of Italy and Spain, averaging around 30-35 basis points higher in the years prior to the crisis.

<sup>20</sup> The asset-to-capital ratio switches sign when the cost of funding is included in regressions. This may be capturing the impact stemming from omitted variable bias (higher assets, such as loans, relative to capital could only be associated with lower lending rates if the cost of funding is not a concern).

- The information in sovereign risk appears to be captured in financial sector risk and bank bond spreads. Sovereign yields are significant when they are included in the regressions together with money market rates, but only for the regressions covering the entire sample period.<sup>21</sup> Indeed, sovereign yields lose significance when the other cost of funding and risk variables are included in the regression.<sup>22</sup>
- While economic policy uncertainty and PMIs are significant in certain regressions, they lose their significance when other control variables are included (except for in Spain where they remain significant). The significance of these variables could increase with additional data, reflecting the emergence of demand factors since late 2012, as evidenced in survey data.
- Term-deposits appear to be an important factor for lending rates in Italy. The coefficient on Euribor in the lending regressions is smaller as it also affects deposit rates.
- Using alternative money market rates yields qualitatively similar results. Stock market indices (an alternative measure of the cost of funding) and the loan-to-deposit ratio (an alternative measure of leverage) are not robustly significant. The importance of the latter could be captured better in a panel regression framework (capturing countries with high dependence on wholesale funding), but homogeneity assumptions on the coefficients would be too restrictive given cross country variation, even for the stressed countries. Regressions using lending rates for 1-5 year maturity do not yield consistently significant results.<sup>23</sup>

Drawing on the above results, a simple counterfactual exercise reveals that if the funding costs remained at 2008 levels, lending rates on small loans in Spain, Italy and Portugal would have been significantly lower (see Figure 3). Whereas for France there is no such dichotomy.<sup>24</sup> This clearly illustrates that elevated funding costs in particular have become a key factor for fragmentation, and thus an impediment to the monetary transmission mechanism.

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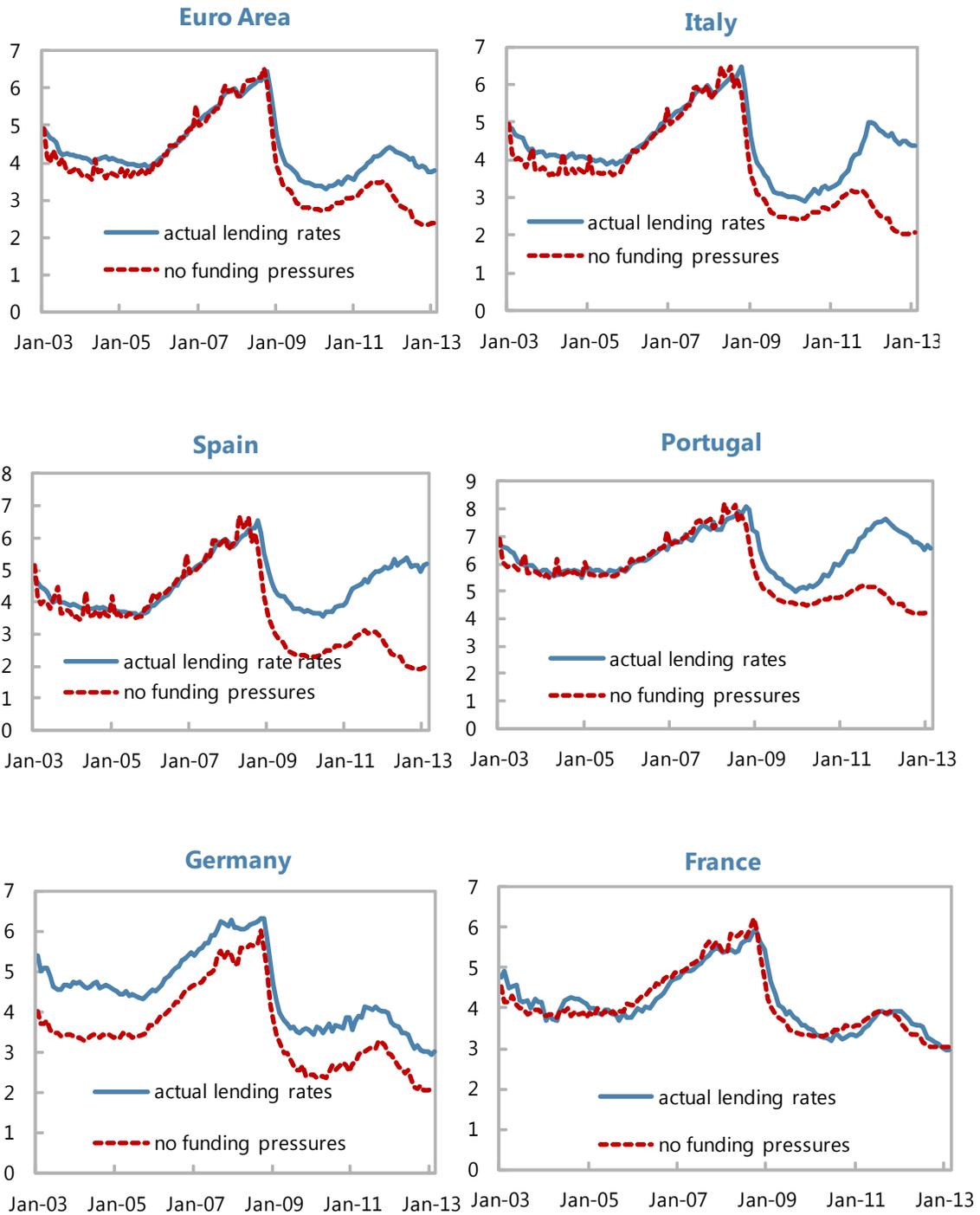
<sup>21</sup> The model with the bank funding costs do not fit to German data.

<sup>22</sup> Sovereign yields are significant also in the term deposit rate regressions (particularly for Italy), possibly reflecting that banks and sovereign are competing in the same funding market. Term-deposit regressions for the stressed countries indicate that money market rates, sovereign yields and bank bond spreads at issuance are the key explanatory variables.

<sup>23</sup> Over the last year, about 5 percent of the new loans were in this category (8 percent for small loans and 3-4 percent for large loans). About 90 percent of the loans have a maturity of less than 1 year.

<sup>24</sup> The model with bank bond yield at issuance is used as a benchmark as it fits relatively well for all the considered countries, except for Germany.

**Figure 3. Actual and Counterfactual Interest Rates with no Funding Pressures.**



Sources: ECB; Haver Analytics, staff calculations.

1/ Counterfactual interest rates are estimated by setting bank bond yields at issuance at 2008 levels and based on long-run cointegrating equations.

Other studies also find that credit risk, funding constraints, and weak firm balance sheets have affected the transmission mechanism during the crisis. The ECB considers a range of factors—including money market rates, capital-to-asset ratios, credit risks, and sovereign spreads, among others—to explain developments in various euro area retail lending rates. In particular, ECB (2010) concludes that credit risk was an important factor contributing to the widening of short-term retail lending spreads (over 2008:Q3 and 2010:Q1), while ECB (2013) finds that sovereign debt spreads and macroeconomic and borrowers' risks have had a strong positive impact on bank lending rates in Italy and Spain (over March 2011 to April 2013). Similarly, IMF (2013c) finds that sovereign and bank stress became significant drivers of lending rates in Italy and Spain from mid-2011. Goretti (2013) looks at the determinants of NFC lending rates in a panel regression framework. The paper regresses NFC lending rates on Euribor, sovereign yields, and unemployment and finds that lending rates are determined more by sovereign yields and unemployment than Euribor rates after 2010.

A recent paper by Ciccarelli, et al. (2013) looks at the functioning of the credit channel, trying to identify both bank lending and firm balance sheet channels using a panel VAR framework, differentiating the coefficients for stressed countries and others. The paper finds that the problems in the bank lending channel (due to funding constraints) have been mitigated by the ECB's unconventional monetary policy instruments, but that the transmission mechanism through the firm balance sheet channel remains impaired (as of end 2011), and appears more prevalent in small banks (which tend to lend primarily to SMEs). Finally, Zoli (2013) focuses on the Italian financial system and finds that sovereign spreads have transmitted to bank CDS spreads and bond yields, which was transmitted to firm lending rates. In addition, banks with lower capital ratios and higher NPLs were found to be more sensitive to sovereign spreads.

## V. POLICY CONSIDERATIONS AND CONCLUSIONS

The ECB has deployed both conventional and unconventional policies to combat the crisis. In particular, policy interest rates have been lowered to historic levels, special liquidity facilities implemented, collateral policies relaxed and strengthened, and OMTs announced. In addition, the ECB and NCBs have had limited, direct interventions in select securities markets through the Securities Markets Program and Covered Bond Purchase Program.

Together, these actions have alleviated some funding problems for banks, reduced sovereign and private risk, removed tail risks related to the euro, and kept monetary conditions accommodative, particularly for the core countries. But financial markets are still fragmented, and weak growth has reinforced balance sheet stresses and credit risks. These pressures have pushed up retail interest rates in the periphery and restrained the flow of credit, undermining the transmission of monetary policy to stressed economies.

The evidence above suggests that, apart from policy interest rates, bank funding costs, credit risk, bank leverage, and somewhat demand factors have become important factors for lending rates, particularly on small loans, in stressed countries. In this regard, interest rate and credit channels remain impaired in the euro area. This highlights the importance of ensuring measures to clean up bank balance sheets and increase access to credit for SMEs. Repairing

bank balance sheets and making further progress on banking union are essential to restore confidence in the financial system, weaken bank-sovereign links, reduce fragmentation, and support credit and growth.<sup>25</sup> But, given that this will take time, it is important to stem the decline in real activity through various measures to support credit supply.

In this regard, the ECB has several options within its current mandate to conduct targeted policies to help reduce fragmentation and further improve monetary transmission. Although monetary policy alone cannot address underlying weaknesses in banks' balance sheets, by supporting demand to the fullest extent it can provide breathing space for this to occur while reinforcing the support provided by fiscal policies and structural reform efforts at the national levels (as discussed in IMF, 2013b).

In most cases, policies would entail additional ECB balance sheet risks, but this alone should not inhibit further needed action. Such risks could either be addressed through offsetting measures (as in the case of recent changes to the ECB's collateral policies, see Box 2), including a backstop provided by the EIB (discussed below), or sustained through gains to financial stability and/or the ECB's ability to maintain a protracted investment horizon.

More specifically, the ECB can:

*Assure term funding needs*

At a minimum, the ECB could take further action to support liquidity to weak banks. This would go some way toward addressing the constraints imposed by higher term funding costs and elevated credit risks identified above. In line with the ECB's current approach, this liquidity support could include (i) additional LTROs of considerable tenor (e.g., 3-5 years) to ensure term funding for weak banks; and (ii) a targeted review of existing collateral policies, including to lower haircuts on certain assets (e.g., additional credit claims).<sup>26</sup> In combination, the result could be akin to credit easing.

While about a third of the three-year LTROs have been repaid, this has largely been driven by core banks with ample liquidity as weaker banks in stressed countries remain reliant on official liquidity. Moreover, the ECB's balance sheet has declined with LTRO repayments, suggesting that additional collateralized liquidity support would not seem to be prohibitive in terms of any potential additional balance sheet risk.

The provision of additional liquidity should at least cover any current funding shortfalls. Moreover, while the ECB's current full allotment policy ensures that there is enough liquidity in the system, the maturity of lending operations is limited to only 3 months. This is not conducive to term lending by banks given the need to rollover frequently, and it also

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<sup>25</sup> See IMF (2013b), Euro Area Policies: 2013 Article IV Consultation Staff Report.

<sup>26</sup> On July 18, the ECB strengthened its collateral framework by enhancing the eligibility of ABS as Eurosystem collateral by lowering haircuts on higher rated ABS allowing lower rated ABS to be posted, with appropriate haircuts. At the same time, the ECB announced that it will enforce consistency among national central banks in the assessment of credit risk, which will, in practice, increase the availability of eligible collateral for ACCs.

prevents banks from matching new liabilities with exiting longer term assets, thus increasing incentives to deleverage. In this context, additional LTROs of a scale similar to those already implemented could be useful, with additional amounts provided to promote further lending activity.

A targeted review of existing collateral policies is an integral part of this option, particularly given the pressures on system collateral and the encumbrance of banks' balance sheets (see Box 2). This would increase liquidity for weak banks and promote the flow to credit to SMEs without further broadening the pool of eligible collateral.

#### *Target liquidity to SMEs*

The ECB could also take actions to ensure that liquidity is directly targeted to SMEs. In particular, the ECB could consider a targeted lending scheme, similar to Funding for Lending Scheme in the U.K. (see Box 3). While LTROs together with relaxed collateral requirements function in a way similar to these programs in providing funding for banks, they do not change incentives for banks to lend. Therefore, a new LTRO could be contingent on the provision of new lending to SMEs, directly supporting credit to this sector and improving the quality of banks' assets. But for this to prove effective, the costs to access the scheme must be less than alternative funding costs. Therefore, lower haircuts (as described above) should be considered in tandem, with appropriate offsetting measures taken to manage any potential balance sheet risks.

#### *Direct private asset purchases*

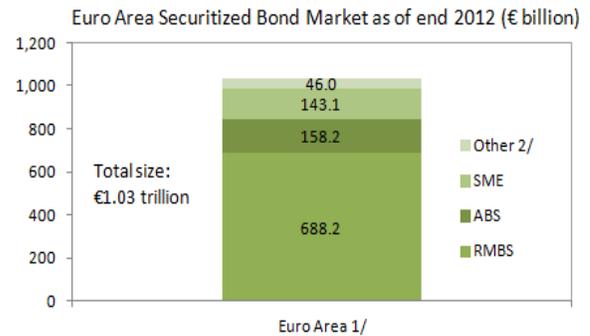
The ECB could circumvent weak banking systems through targeted asset purchases. Direct ECB purchases of private assets would support market-based credit to households and corporations while bank balance sheets are repaired. Program design could limit ECB balance sheet risks. Private assets could include: securitized assets (supporting SME financing), corporate bonds, commercial paper (NFC financing), and covered bonds (bank funding), while mortgage backed securities could be encouraged and accepted for collateral at Eurosystem liquidity facilities. Although the purchases could be small (to limit the balance sheet risks), official participation could boost confidence and thus act as a catalyst to further market activity. Depending on the nature of the program—i.e., whether or not it targeted existing loans—the impact could be timely, but may still be hampered by regulatory changes, including higher risk weights on securitized assets.

#### *Backstop from the EIB*

The EIB could provide a backstop to contain balance sheet risks in the case of direct ECB asset purchases. In particular, among the recent proposals set out by the EIB and European Commission—to leverage structural funds from the European Union's long-term budget to promote credit in stressed economies—is the prospect for loan guarantees and guarantees on

loans sold as ABS (see EIB, 2013).<sup>27</sup> Therefore, it would be possible for leveraged EU funds to provide a backstop, or first-loss guarantee, to direct ECB purchases of ABS.<sup>28</sup> Beyond the direct impact, ECB activity in the euro area ABS market would contribute to its development.

In this regard, even modest leverage of, say, 5 times would result in over €50 billion in direct support, and this could have a sizeable impact on SME-backed securities. Indeed, the euro area securitized bond market reached €1.03 trillion at end 2012, of which only about €140 billion reflects collateral backed by SME loans. The current stock of SME loans by banks is estimated at approximately €1.5 trillion. However, beyond SMEs, further support to market development could be achieved by including assets securitized by mortgages, and enhancing the commercial paper market infrastructure.



Source: AFME

1/AUT, BEL, FIN, FRA, DEU, GRC, IRE, ITA, NLD, PRT. 2/ Other: CMBS, WBS, CDO

<sup>27</sup> The proposal envisages the leveraging of up to 10 times of the allocated €10.4 billion in structural funds under various scenarios. See EIB 2013 for detailed discussion of the alternative scenarios.

<sup>28</sup> In this connection, on July 18, 2013 the ECB expressed a willingness to accept guaranteed “risk” tranches of securitized ABS to help expand the market for SME-backed ABS.

### Box 3. Funding for Lending Scheme by the BoE <sup>1/</sup>

The FLS was designed as a four-year collateral swap—participating banks placed their lower quality collateral with the BoE (with the usual haircuts and margins applied) in exchange for higher-quality gilts, which they could then use to obtain market funding at close to the policy rate. The initial FLS allowance was set at 5 percent of banks' loan books, but the allowance increased pound-for-pound with net lending (i.e., there was no ceiling on the scheme size). A pricing incentive was built in to encourage banks to lend (or minimize deleveraging), via an access fee that varied inversely with the volume of net credit extended.

Although the scheme has improved funding conditions, take-up has remained limited. The scheme has contributed to easing funding pressures on UK banks, with CDS spreads and deposit rates falling sharply since mid-2012. Some of this reduction has also translated into lower lending rates, particularly for mortgages. However take-up of the scheme has been limited and banks have not made full use of the program, even to draw down up to 5 percent of their existing loans. Overall private sector lending has not picked up. But there was a net increase in lending if one excludes banks facing deleveraging pressures (RBS, LBG and Santander UK), and FLS drawings contributed about two-thirds of that increase.

Limited impact could be explained by the following main factors.

- *Low cost advantage of accessing the scheme:* There is not a big cost advantage right now to draw down from the FLS. Banks face three costs: an access fee (ranging 25bps to 150bps depending on banks' net lending position), a BoE haircut on the collateral swapped to obtain the gilts, and the cost of market financing obtained using the gilts (essentially close to the policy rate). At present, these combined costs are not lower than what most banks would pay on wholesale or deposit funding raised directly, reducing the incentive to access the scheme. This, however, could also reflect the scheme's success in reducing banks' funding costs.
- *Abundant liquidity and weak/low quality demand for credit:* With households deleveraging and bigger corporations able to borrow directly from markets at cheap rates, demand for bank credit is weak. Moreover, banks' perceived credit risk, especially on lending to SMEs and unsecured credit to households, is likely to have been elevated, given weak aggregate demand and earnings prospects.
- *Health of UK banks:* There are still lingering concerns about the health of UK banks, especially asset quality and the adequacy of existing capital buffers. As a result, despite being flush with liquidity, some banks have eschewed credit origination, persisting with previous deleveraging plans, and using the cheaper funding to boost net interest margins instead.
- *Design of capital charge on FLS lending:* The scheme initially allowed banks to offset under Pillar-II the regulatory capital charge in respect of FLS-funded loans. However, the offset was done on the basis of average risk weight, which constituted a de facto incentive for banks to substitute increased secured lending, but reduce SME lending. This is unlikely to be a significant factor, and the April 2013 modification to the Scheme has addressed this by significantly improving the attractiveness of SME lending.

<sup>1/</sup> See Annex 5 of IMF (2013a), the U.K. 2013 Article IV Staff Report, for further details.

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**Table A1. Estimates for the Interest Pass-through to Small Loans: Euro Area and Core <sup>1/</sup>**

	3M Euribor	Bond Issuance Cost 2/	Financial CDS	Sovereign Yield	ECM	Short-term Pass-through
<b>Euro Area</b>						
Pre-crisis 3/	0.86***				-0.08**	0.21***
Full sample	0.54***				0.03	0.20**
Pre-crisis	0.84***	0.20			-0.15***	0.23**
Full sample	0.82***	0.9***			-0.10***	0.21***
Pre-crisis	0.87***		-0.05		-0.21*	0.22**
Full sample	0.79***		0.75***		-0.10**	0.22***
<b>Germany</b>						
Pre-crisis	0.63***				-0.13*	0.20**
Full sample	0.64***				-0.16***	0.27***
Full sample	0.63***	-0.11			-0.19***	0.27***
Full sample	0.64***		-0.02		-0.34***	0.25***
Full sample	0.57***			0.17**	-0.29***	0.24***
<b>France</b>						
Pre-crisis	0.67***				-0.30**	0.05
Full sample	0.61***				-0.13**	0.12*
Full sample	0.63***	0.35***			-0.26***	0.14**
Full sample	0.61***			-0.04	-0.15****	0.11*

Notes: Significant at the 1, 5, and 10 percent levels: \*\*\*, \*\*, \*.

1/ Small loans are up to €1 million.

2/ Cost of issuance is calculated for both core and periphery countries.

3/ The sample period is 2003m1 to 2013m2. The pre-crisis sample ends in 2008m8.

**Table A2. Estimates for the Interest Pass-through to Small Loans: Periphery <sup>1/</sup>**

	3M Euribor	Bond Issuance Cost 2/	Financial CDS	Leverage	Sovereign Yield	PMI	Uncertainty	2yr+ Deposit Rate	ECM	Short-term Pass-through
<b>Italy</b>										
Pre-crisis	0.85***								-0.13**	0.18**
Full sample	0.36								-0.02	0.16**
Pre-crisis	0.79***	0.22*							-0.26***	0.18**
Full sample	0.81***	0.74***							-0.13***	0.16**
Pre-crisis	0.86***		-0.14*						-0.34***	0.21***
Full sample	1.1***		2.35***						-0.03***	0.20***
Pre-crisis	0.70***				0.26***				-0.31***	0.13***
Full sample	0.51***				1.6***				-0.06***	0.18***
Full sample	0.71***			-0.62**					-0.05**	0.16**
Full sample	0.38**					-0.08**			-0.04**	0.15**
Full sample	0.23***						0.68***		-0.23**	0.13**
<b>Spain</b>										
Pre-crisis	1.03***								-0.13***	0.20***
Full sample	0.52***								0.04	0.21**
Pre-crisis	0.85***	0.85***							-0.03	0.21**
Full sample	0.83***	1.04***							-0.17***	0.16**
Pre-crisis	1.05***		-0.10						-0.15***	0.16***
Full sample	0.89***		1.8***						-0.08***	0.23
Full sample	0.79**				2.8***				-0.02**	0.19**
Full sample	0.77***	1.1***		0.09**					-0.20***	0.18**
Full sample	0.79***	1.05***		0.05			0.002**		-0.20***	0.21**
Full sample	0.54***						0.03***		0.02	0.18***
Full sample	0.79	1.1***		0.05*			0.03**		-0.2***	0.21***
<b>Portugal</b>										
Pre-crisis	0.76***								-0.54***	0.06
Full sample	0.39**								-0.04**	0.02
Pre-crisis	0.70***	0.05							-0.57	-0.02
Full sample	0.70***	0.85***							-0.10**	-0.02
Pre-crisis	0.80***		-0.01						-0.25**	0.14
Full sample	0.67***		1.4***						-0.06**	0.08
Full sample	0.55***	0.90***		0.41**					0.18**	0.00

Notes: Significant at the 1, 5, and 10 percent levels: \*\*\*, \*\*, \*.

1/ Small loans are up to €1 million.

2/ Cost of issuance is calculated for both core and periphery countries.

3/ The sample period is 2003m1 to 2013m2. The pre-crisis sample ends in 2008m8.

**Table A3. Estimates for the Interest Pass-through to Large Loans: Euro Area and Core <sup>1/</sup>**

	3M Euribor	Bond Issuance Cost 2/	Financial CDS	Sovereign Yield	Uncertainty	PMI	ECM	Short-term Pass-through
<b>Euro Area</b>								
Pre-crisis 3/ Full sample	0.86*** 0.67**						-0.5** -0.04	0.32** 0.37***
Pre-crisis Full sample	0.90*** 0.81***	-0.32** 0.35***					-0.39** -0.29**	0.31** 0.40***
Pre-crisis Full sample	0.92** 0.80***		-0.09 0.33***				-0.17*** -0.24**	0.23*** 0.36***
Full sample	0.66***					-0.03***	-0.01	0.40***
<b>Germany</b>								
Pre-crisis Full sample	0.77*** 0.72***						-0.41*** -0.26***	0.28** 0.35***
Full sample	0.77***	0.17**					-0.29***	0.37***
Full sample	0.71***		0.08				-0.17*	0.32**
Full sample	0.79***				0.002**		-0.48***	0.47***
Full sample	0.72***			0.01			-0.26***	0.33***
<b>France</b>								
Pre-crisis Full sample	0.89*** 0.68***						-0.39*** -0.07*	0.46*** 0.44***
Full sample	0.84***	0.65***					-0.29**	0.49***
Full sample	0.84***		0.40***				0.29**	0.48***

Notes: Significant at the 1, 5, and 10 percent levels: \*\*\*, \*\*, \*.

1/ Large loans are greater than €1 million.

2/ Cost of issuance is calculated for both core and periphery countries.

3/ The sample period is 2003m1 to 2013m2. The pre-crisis sample ends in 2008m8.

**Table A4. Estimates for the Interest Pass-through to Large Loans: Periphery <sup>1/</sup>**

	Bond Issuance		Sovereign			2yr+ Deposit	Short-term		
	3M Euribor	Cost 2/	Financial CDS	Leverage	Yield	PMI	Rate	ECM	Pass-through
<b>Italy</b>									
Pre-crisis	0.82***							-0.66**	0.25
Full sample	0.63***							-0.06**	0.36**
Pre-crisis	0.79***	0.24						-0.65**	0.21
Full sample	0.87***	0.65***						-0.17**	0.35**
Full sample	0.81***		1.04***					-0.07***	0.31***
Full sample	0.63***				1.0**			-0.06**	0.36**
Full sample	0.79***			-0.49***				-0.08***	0.34***
Full sample	0.33**					-0.08**		-0.07**	0.36**
Full sample	0.87***	0.72***		0.25***				0.14	0.32***
Full sample	0.42***						0.52***	-0.34***	0.35***
<b>Spain</b>									
Pre-crisis	0.78***							-0.42***	0.34***
Full sample	0.89***	0.32**						-.01	0.42**
Pre-crisis	1.03***		-0.22**					-0.59**	0.39**
Full sample	0.78***		0.58**					-0.11**	0.39**
Full sample	0.86***	0.49***		0.04**				-0.47**	0.41**
<b>Portugal</b>									
Pre-crisis	0.85***							-0.49***	-0.05
Pre-crisis	0.73***		0.42**					-0.75**	0.14
Full sample	0.67***		1.46***					-0.14**	0.05
Full sample	0.74***	0.97***						-0.22	0.18
Full sample	0.64***				0.47**			-0.08*	0.05
Full sample	0.70***	1.04***		0.42**				-0.93**	0.29**

Notes: Significant at the 1, 5, and 10 percent levels: \*\*\*, \*\*, \*.

1/ Large loans are greater than €1 million.

2/ Cost of issuance is calculated for both core and periphery countries.

3/ The sample period is 2003m1 to 2013m2. The pre-crisis sample ends in 2008m8.