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Financial market fragmentation and monetary transmission in the euro area: what do we know?

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We provide a survey on the literature examining financial market fragmentation in the euro area and discuss the policy options how to reduce it. The fragmentation has increased markedly since the outbreak of the global financial crisis in 2007. It declined somewhat from late 2012 onwards, but is still above the pre-crisis level. Interest rate pass-through has become less efficient primarily because of increased mark-ups and, to a certain extent, the lower responsiveness of bank interest rates to policy rates. The effectiveness of interest rate pass-through has become more heterogeneous across euro area countries, making a common monetary policy more difficult. The unconventional monetary policy conducted by the European Central Bank has reduced financial market fragmentation notably; however, this policy was not without side effects. Enhancing financial and fiscal stability in the euro area is key for the efficient functioning of the monetary transmission mechanism.

Keywords: financial market fragmentation; monetary transmission; European Central Bank

AMS Subject Classifications: E52, E58, G18

1. Introduction

Over the nearly two decades before the global financial crisis, euro area financial markets had been becoming more integrated (Baele et al. 2004). However, this trend halted with the outbreak of the global financial crisis in 2007, and, since, financial market fragmentation in the euro area has increased markedly. Financial market fragmentation is typically defined as: "a decrease in cross-border holdings of a wide range of asset classes, resulting in a divergence of related asset prices" (Ruscher and Vašíček 2016).[1]

According to European Central Bank (ECB) (2016), financial market fragmentation peaked during 2011–2012 and steadily declined after; however, fragmentation remains higher now than before the crisis (e.g. prior to 2007). The unconventional monetary policy undertaken by the ECB was instrumental in reducing the overall degree of financial market fragmentation (Al-Eyd and Berkmen 2013; Szczerbowicz 2015; Andrade et al. 2016; Krishnamurthy, Nagel, and Vissing-Jorgensen forthcoming), even though

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some segments of the financial market, such as money markets, exhibited difficulties operating in the approximately zero interest rate environment (Di Maggio and Kacperczyk 2017).

In this article, we discuss whether and how this financial market fragmentation has affected the monetary transmission mechanism, or, more specifically, interest rate pass-through, in the euro area. It is worth mentioning that interest rate pass-through consists of two elements. The first element is the responsiveness of bank interest rates to policy rates, and the second element is the mark-up (of the bank interest rate over the policy rate to reflect the risk inherent to lending).

The available empirical evidence suggest that interest rate pass-through in the euro area became more incomplete during the crisis (Belke, Beckmann, and Verheyen 2013). However, the greater incompleteness of interest rate pass-through would not necessarily pose a major policy issue *per se* because it would require more aggressive monetary policy to compensate for its incompleteness.

Examining interest rate pass-through in greater detail, the available empirical evidence suggests that greater cross-country heterogeneity in the magnitude of the mark-up has been a major factor of the incomplete interest rate pass-through in the euro area (von Borstel, Eickmeier, and Krippner 2016; Leroy and Lucotte 2016). This heterogeneity has been driven by financial (as well as fiscal) instability in some euro area countries, increasing overall financial market fragmentation (Abascal, Alonso, and Mayordomo 2015).

Finally, the paper discusses a number of specific policy options how to reduce financial market fragmentation such as the creation of full-fledged banking union, capital union or the coordination of macroprudential policies. It also notes that unconventional monetary policy has been conducive for reducing fragmentation but that unconventional policies represent only temporary solution. The measures to reduce cross-country differences in financial stability and sovereign credit risks, along with institutional stability, are key for effective monetary policy transmission in the euro area.

This report is organized as follows. We discuss financial market fragmentation in the euro area in Section 2. First, we focus on the development of fragmentation over time. Second, we examine the determinants of fragmentation, and third, we analyze whether fragmentation has an effect on the real economy and financial stability. Section 3 examines whether and how financial market fragmentation affects the monetary transmission mechanism in the euro area. We discuss several policy initiatives and measures to reduce financial market fragmentation in Section 4. Section 5 concludes.

2. Financial market fragmentation in the euro area

This section consists of three parts. First, we discuss the development of financial market fragmentation in the euro area over time. We show how this fragmentation increased markedly in the first years of the global financial crisis due to deleveraging, peaked in 2011–2012, and decreased afterward, though remaining at pre-crisis levels. Second, we discuss the determinants of financial market fragmentation during the crisis and suggest that the divergence in the financing costs of banks, along with credit and sovereign risks, were the main culprits. Redenomination risk was significant during 2011–2012. The ECB's unconventional policy measures helped reduce fragmentation. Third, we show that financial market fragmentation had consequences for the real

economy, negatively affecting investment activity in the euro area and contributing to the deterioration of financial stability.

However, before examining these three aforementioned areas, let us briefly mention the benefits and costs of financial integration in general. Overall, it seems that financial integration is beneficial in the long term, but can be associated with some short-term costs. Agenor (2003) provides a survey of the benefits and costs of international financial integration from the country perspective (not from the individual investor perspective) and notes that the benefits of financial integration include: (i) greater consumption smoothing, (ii) higher investment and growth, and (iii) increased banking efficiency and financial stability. The costs of financial integration are (i) the concentration of capital flows and lack of access, (ii) the domestic misallocation of capital flows, (iii) the loss of macroeconomic stability, (iv) the pro-cyclicality of short-term flows, (v) the herding, contagion, and volatility of capital flows, and vi) the risk of entry by foreign banks.[2]

A related phenomenon to financial integration or financial market fragmentation is the concept of financial market contagion. Financial contagion is defined as financial market spillovers that go beyond what one would expect from economic fundamentals (Bekaert, Harvey, and Ng 2005). Therefore, this concept is useful in the sense that it makes a distinction between a "natural" level of spillovers and excessive spillovers. While it is difficult to estimate to what degree spillovers are driven by fundamentals, the literature tends to show that financial contagion exists and is typically stronger during crisis periods (Bekaert, Harvey, and Ng 2005; Horvath et al., 2017). Therefore, the message this literature delivers is that financial markets can malfunction. Consequently, this opens the possibility for policy interventions in order to improve the functioning of financial markets. Without the malfunctioning of financial markets, policy interventions are difficult to justify. However, the separate but equally important question is whether policy interventions are effective, i.e. whether they are able to improve the functioning of financial markets (or, more specifically for this type of literature, whether they are able to reduce financial contagion).

2.1. Financial market fragmentation in the euro area over time

Financial market integration improved significantly during the 1990s (Baele et al. 2004). The introduction of the common currency in 1999 has been associated with interest rate convergence, and one of main risks – redenomination risk – disappeared once the euro was introduced. Although financial integration increased markedly, some heterogeneity across different markets in terms of the degree of financial integration has remained. While money market interest rates or sovereign bond yields converged strongly, equity markets or corporate and household retail interest rates (both on deposit and lending) remained dominated by national factors. The International Monetary Fund (2013) documents that "40 percent of the euro area banks' interbank claims were vis-à-vis non-domestic banks in the EU", with "cross-border holdings accounting for 54 percent of total holdings of EU bonds by EA banks at the end of 2007", while "85 percent of loans supplied by the euro area domestic credit institutions were to domestic resident".

The period of the global financial crisis starting in mid-2007 was characterized by a greater financial market fragmentation (disintegration) in the euro area. Fragmentation occurred both in "prices and quantities". Interest rates in the various financial market segments of the euro area began to diverge (International Monetary Fund 2013).

The financial market fragmentation in the euro area was characterized by strong deleveraging and sharply reduced cross-border exposures, especially in the bond market (International Monetary Fund 2013). Abascal, Alonso, and Mayordomo (2015) show that fragmentation was more severe in southern European rather than in other euro area countries.

Figure 1 presents the FINTEC indexes, which comprehensively summarize the degree of financial integration in the euro area in a single metric. The indexes are based on aggregating information from money, bond, equity, and banking markets and are developed by the ECB, see ECB (2016) for the details on how these indexes are generated.

According to Figure 1, financial market fragmentation peaked in 2011–2012 during the sovereign debt crisis. Fragmentation decreased markedly after the announcement of the Outright Monetary Transactions (OMT) programme in 2012. The OMT programme stipulates procedures to improve the functioning of the monetary transmission mechanism in the euro area. Its important feature was the announcement of the possibility of outright transactions in secondary sovereign bond markets by the ECB. Following the introduction of the OMT programme, sovereign bond yields in many (especially Southern) European countries have fallen significantly from unsustainable levels. The relatively speedy reaction of sovereign bond yields to the announcement of the OMT programme suggests that the sovereign bond market suffered from some panic and contagious phenomena before the announcement (De Grauwe and Ji 2012).

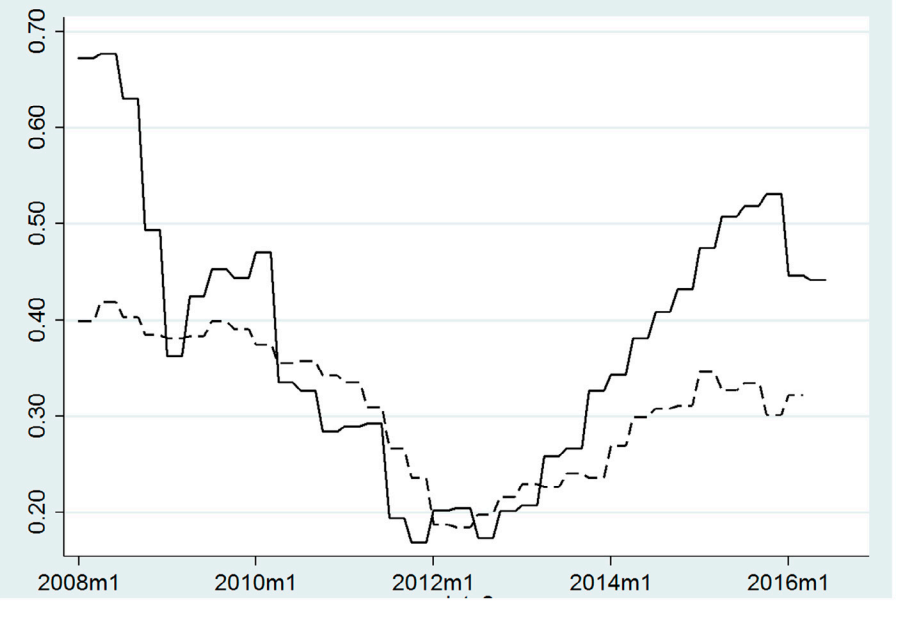

Figure 1. Financial integration in the euro area during the crisis. FINTEC indexes – price-based and quantity-based financial integration composites.
Source: The source of data is European Central Bank (2016). The indexes are restricted to lie between zero (full fragmentation) and one (full integration). A higher value of the index signals a higher financial integration. FINTEC is an abbreviation for FINancial INTEgration Composite. Price-based index in solid line. Quantity-based index in dashed line.

However, it is worth noting that observations for selected underlying indicators seem to be excluded from the construction of the FINTEC either because of a lack of data or because of extreme values (European Central Bank 2016). It is difficult to assess the importance of these excluded observations to the overall degree of financial integration. If one takes a conservative attitude, actual financial market fragmentation might be somewhat worse than portrayed by the FINTEC.

Financial market integration in the euro area has steadily improved since 2012, supported by various ECB policy measures, but the level of integration is still below its pre-crisis level (see also Abascal, Alonso, and Mayordomo 2015). The improvement in the level of financial market integration was driven by the majority of financial markets (and not simply by certain specific markets). Specifically, the ECB (2013) notes that financial integration also increased thanks to the announcement regarding the banking union in 2012. A key development was the establishment of the Single Supervisory Mechanism and the Single Resolution Mechanism.

The overall degree of financial integration increased from 2012 following the introduction of various unconventional monetary policy measures by the ECB; however, some financial market segments were adversely affected. Although prices in money markets converged, turnover in this market decreased substantially, likely as a result of the policy rates being kept around zero. More specifically, the ECB policy of zero or negative rates induced greater convergence in money market interest rates and likely did not significantly affect cross-border transactions in this market. The share of domestic counterparties remained broadly unchanged. On the other hand, total turnover in secured lending and borrowing decreased by 13% in the euro area between 2012 and 2015, by 39% in the unsecured market, and, for example, by 56% in the overnight index swaps segment (European Central Bank 2016). Di Maggio and Kacperczyk (2017) provide evidence for the case in the United States (US) and show that because of the (very) low interest rate environment, some money market funds exited the market and some accepted a higher portfolio risk. In addition, the low interest rate environment has also been unfavorable for the performance of pension funds.

The FINTEC index used by the ECB does not include data on the real estate market. In good times, this makes sense given the specificity of the real estate market. However, given the very low interest rate environment, investment in real estate becomes widespread in many European countries. House prices appear to diverge in recent years in the euro area. Examining the quarterly house price indexes from the third quarter of 2012 (e.g. at approximately the time of the speech by ECB president Mario Draghi and the banking union announcement), we observe that from 2012 to 2016, house prices declined by approximately 20% in Greece, 13% in Italy, and 6% in France; stagnated in Belgium, Spain, and the Netherlands; and increased by approximately 13% in Germany, 20% in Austria, and 32% in Ireland and Estonia (based on the house price index data provided by Eurostat and the Bank of Greece). Overall, this result suggests that we do not observe convergence in this segment. Moreover, the overheating of real estate markets might have adverse effects on financial stability.

In addition, regulatory measures may have increased the financial integration measures but posing some future risks (Kirschenmann, Korte, and Steffen 2016). According to the Capital Requirements Directive, European sovereign debt carries zero risk for calculating the capital requirements for European banks, therefore, cross-border investment in the sovereign debt was vital.

2.2. *Determinants of financial market fragmentation in the euro area*

There are a number of factors influencing the degree of financial market integration (or fragmentation) – some have more immediate effect, while others influence integration with a greater lag. We focus on those that have been economically relevant for the euro area in recent years. We try to systematize these factors in following paragraphs, but it is clear that some factors can be quite related; hence, listing them as two separate entries is a matter of taste. In addition, it is worth noting that some factors (typically those related to financial markets) can be influenced by factors from the real economy. A useful summary list of the factors contributing to financial market fragmentation in the euro area during the financial crisis is also provided by the International Monetary Fund (2013), which states that fragmentation was caused because of:

> a broader deleveraging process triggered by the global financial crisis, increased fragmentation within the EA [euro area] as a result of a repricing of risks, capital and funding shortages, and structural developments, including the new Basel III rules at banks.

The financing costs of banks in the euro area before the crisis had been largely uniform. Short-term costs were nearly identical, and long-term costs differed only marginally (Illes, Lombardi, and Mizen 2015). Illes, Lombardi, and Mizen (2015) calculate the weighted average cost of liabilities for banks in the euro area both for short-term and long-term costs. They show that costs began to differ dramatically starting from 2009. For example, they report that the weighted average cost of short-term liabilities in 2011–2012 was approximately 1% for Germany, 2% for Italy and Spain, and 3.5% for Portugal (note that short-term costs represent a large majority of overall financing costs for banks). Similar differences in financing costs have also been present for long-term liabilities. Nevertheless, Illes, Lombardi, and Mizen (2015) show that cross-country heterogeneity in terms of financing costs for banks has steadily declined since it peaked in 2011–2012. Interestingly, despite concerns about the stability of banks in Italy, interest rates on new business (small loans up to 1 million euro with a shorter maturity) declined significantly in 2016.

Ruscher and Vašíček (2016) note that the differences in financing costs for banks were mainly related to cross-country divergences in redenomination risk (more on this factor below), the bank-sovereign loop, and the quality of banks' balance sheets. In addition, macroeconomic imbalances materializing in worsening firm and household financial health in some euro area countries translated into different banks' borrowers' risks. Ruscher and Vašíček (2016) show that borrower risk differed widely for non-financial firms and households in the euro area, especially in 2008–2013. While the differences in household financial situations continue, borrower risk for non-financial firms has recently become more uniform (at least for the countries reported: Italy, Portugal and Spain).

In addition, Ruscher and Vašíček (2016) conduct an interesting econometric exercise and decompose the factors driving lending rates in the euro area. They find that roughly half of the fluctuations in lending rates in 2007–2014 can be explained by the ECB's monetary policy rate. They attribute the other half (i.e. why lending rates differ) to economic conditions, bank funding costs, fluctuations in bank credit risk, and changes in overall sovereign risk in the euro area. In addition, they find that the importance of these factors is country-specific and that there is no one factor that is substantially more significant than another.

Using a panel data regression framework, Abascal, Alonso, and Mayordomo (2015) also examine the determinants of financial market fragmentation in the euro area,

specifically focusing on the interbank market. They find results similar to Ruscher and Vašíček (2016) in terms of the importance of the financial costs of banks and sovereign risk. In addition, counterparty risk (as measured by the credit default swap (CDS) spreads of the main 14 banks) is an important driver of financial market fragmentation. Importantly, Abascal, Alonso, and Mayordomo (2015) find in their panel regressions that non-standard ECB measures help reduce interbank market fragmentation, with the Securities Market Programme (SMP) being the most effective (although they acknowledge that other ECB measures may have been effective, too, because it is far from easy to identify the effects separately, as they are often implemented concurrently). Abascal, Alonso, and Mayordomo (2015) emphasize that

> liquidity provided through the SMP has an effective double impact, given that, besides the liquidity the banks might get because of selling the sovereign debt to the ECB, the programme helped decrease the levels of sovereign risk, thus improving the confidence in the euro and the EMU [European Monetary Union].

In addition to panel regressions (which inherently focus on medium or long-term trends rather than short-term fluctuations), Abascal, Alonso, and Mayordomo (2015) examine the short-term effects of a number of unconventional ECB policy measures on interbank market fragmentation. Namely, they focus on the short-term effects of the announcements regarding the Covered Bond Purchase Programme (4 June 2009), SMP (10 May 2010), Covered Bond Purchase Programme 2 (3 November 2011), Long Term Refinancing Operations (8 December 2011), Banking Union (29 June 2012), Mario Draghi's speech (27 July 2012), and OMT (Sep. 6, 2012). The authors find that each of these announcements had an immediate impact and decreased the level of interbank market fragmentation. This result suggests that the ECB measures helped restore confidence in European financial markets in this period. Zaghini (2016) confirms these results using European corporate bonds data.

Next, redenomination risk, which is the risk that a country leaves the euro area and redenominates its assets and liabilities in a new currency, was present before the well-known Mario Draghi speech in London on 26 July 2012, where Mr. Draghi emphasized that "Within our mandate, the ECB is ready to do whatever it takes to preserve the euro… believe me, it will be enough". Although sovereign bond yields fell following this speech and the later announcement of the OMT programme (6 September 2012), it is not simple to accurately estimate the effect of these actions on redenomination risk. However, Al-Eyd and Berkmen (2013) show that the speech and the OMT programme very likely contributed to a lower redenomination risk. Following these events, speculative activity in euro-currency contracts declined markedly, and similar bonds were found to have a similar price regardless of whether they were traded under a local or international jurisdiction. Similarly, Krishnamurthy et al. (2014) find that redenomination risk was present during 2011–2012, but that ECB policies successfully reduced the risk.

In addition, different financial market structures in euro area countries can also be a factor of financial market fragmentation. Greater bank competition and alternative sources of financing, such as stock markets, typically lead to lower lending rates. Gori (2017) examines the determinants of financial market fragmentation in the euro area and finds that the differences in balance sheet characteristics (such as capital ratio or liquidity) of banks matter for the fragmentation. In addition, Gori (2017) finds that these differences in balance sheet characteristics contribute to greater heterogeneity in the interest rate pass-through.

2.3. *Effects of financial market fragmentation in the euro area on the real economy and financial stability*

Financial market fragmentation affects real economy developments as well as financial stability (the interactions between financial market fragmentation and monetary policy transmission are discussed in the following section). Ruscher and Vašíček (2016) show how financial market fragmentation translates into different nominal as well as real interest rates across euro area countries. Nominal interest rates have been typically higher since the outbreak of crisis (and, in general, they remain so in 2016) in several euro area countries, such as Greece, Portugal, and Spain, in comparison to other euro area countries. At the same time, these countries often exhibited lower inflation rates than the rest of the euro area, which further amplified the differences in real interest rates among euro area countries. Ruscher and Vašíček (2016) show that these differences in real interest rates seem to exert a strong negative effect on investment activity.

Financial market fragmentation has also negatively influenced financial stability in the euro area (Abascal, Alonso, and Mayordomo 2015). Banks in some euro area countries, mainly in southern Europe, encounter higher funding costs, which negatively affect their profitability and, subsequently, their stability. The underperformance of these banks is amplified by weak economic activity in these countries, which is associated with the declining asset quality of banks.

3. Financial market fragmentation in the euro area and monetary policy transmission

A highly relevant policy question is whether the financial crisis changed the effectiveness of the monetary transmission mechanism. We focus here on more narrowly defined question – whether financial market fragmentation impaired monetary transmission in the euro area and, if so, which factors were likely behind the impairment.

There is a vast theoretical and empirical literature examining the different channels and aspects of the monetary transmission mechanism. Given our interest in the effects of financial market fragmentation, in this section, it is relevant to focus on the evidence regarding interest rate pass-through (e.g. how policy rates affect bank interest rates or different interest rates in financial markets).[3]

Empirical research on interest rate pass-through before the financial crisis largely focused on whether pass-through is complete in the long-term (i.e. when policy rates are increased by the ECB by one percentage point, do bank interest rates also increase by one percentage point) and the speed of the pass-through. Andries and Billon (2016) provide a survey of interest rate pass-through estimates in the euro area prior to financial crisis. When we consider the empirical studies, which provide the estimates of pass-through from 1999 onwards (i.e. they do not mix two distinct monetary policy regimes – monetary union from 1999 and national monetary policies from before 1999) and which cover substantial part of data during the euro area existence until the crisis, we observe that the literature typically finds that pass-through was near complete and took several months (see Table 2 in Andries and Billon (2016)).

Higher spreads do not pose a major threat to monetary policy in a monetary union. Unless the spreads are prohibitively high (and cause some immediate side effects such as increasing significantly sovereign credit risk), they could be addressed by more aggressive monetary policy. However, conventional monetary policy (i.e. setting the short-term policy rate) in a monetary union cannot address the divergence in spreads.

If spreads in the individual euro area countries respond heterogeneously to single monetary policy in Frankfurt, then monetary policy has heterogeneous effects on individual euro area countries and the risks that monetary policy will not have stabilizing effects on the euro area increase.

In addition, based on pre-crisis data, researchers typically find that the degree of interest rate pass-through differs across interest rate categories. Pass-through is typically strongest in regards to interest rates on mortgages and small loans for non-financial firms (e.g. those below 1 million euro), followed by interest rates on large loans for non-financial firms. The reaction of consumer rates (e.g. the rate for loans for households other than for housing – usually for durable goods) is typically weaker because the individual risk premium is more dominant than the monetary policy shocks (see Horváth and Podpiera 2012; or Belke, Beckmann, and Verheyen 2013).

In addition, there has been some evidence that bank characteristics influence the nature of interest rate pass-through (Sander and Kleimeier 2004; Gambacorta 2008; Horváth and Podpiera 2012). This is an important exercise in order to understand how the functioning of the financial sector shapes interest rate pass-through.

Interest in interest rate pass-through renewed during the financial crisis, when the ECB lowered its policy rate significantly after the fall of Lehman Brothers but many other interest rates did not follow the decrease in the policy rate. Al-Eyd and Berkmen (2013) note that this divergence was caused by: "the combination of factors, including lack of term-funding for some banks, and weak bank and corporate balance sheets and associated credit risks". This impairment in interest rate pass-through has been observed especially in southern euro area economies and in selected interest rates, such as government bond yields and for lending to small- and medium-sized enterprises (for example, the Italian and Spanish corporate sectors are dominated by small- and medium-sized enterprises). Ruscher and Vašíček (2016) argue that from a policy perspective, it is important to understand whether this divergence is a one-off or more lasting phenomenon.

Leroy and Lucotte (2016) find substantial heterogeneity in interest rate pass-through across euro area countries, both for interest rates for households and for non-financial firms. They also examine the determinants of interest rate pass-through and find that not only are short-term factors, such as bank risks, important, but that more long-term factors related to financial structure, such as market capitalization, bank competition, and banking sector concentration, are also important. The latter factors suggest that the heterogeneity found in interest rate pass-through can be long lasting.

Importantly, von Borstel, Eickmeier, and Krippner (2016) examine interest rate pass-through to bank interest rates in the euro area during the financial crisis both from the perspective of conventional as well as unconventional monetary policy. Regarding conventional monetary policy, they find that the reaction of bank interest rates to policy rates did not change during the crisis in the euro area. However, banks increased mark-ups during the crisis due to an increase in perceived risk and, therefore, we can observe that falling policy rates were not accompanied by a decrease in bank rates. Regarding unconventional monetary policy, their results suggest that unconventional policy was as important as conventional policy. However, it was not because of strong pass-through; rather it was because the unconventional policy shocks were large. Therefore, according to their results, policy-makers should focus on reducing bank mark-ups by alleviating credit constraints and reducing borrowers' risk.

4. How to reduce financial market fragmentation in the euro area? Some policy options

Below we provide the major factors that may help reduce financial market fragmentation in the euro area. Some may have more immediate effects, while others, such as improving the overall institutional and legal framework, may have slower but longer-lasting effects.

4.1. Unconventional monetary policy

The effects of the ECB's unconventional monetary policy have been discussed largely in previous sections. It has been shown that its unconventional policy helped to reduce financial market fragmentation (Al-Eyd and Berkmen 2013; Szczerbowicz 2015; Andrade et al. 2016; Krishnamurthy, Nagel, and Vissing-Jorgensen Forthcoming). However, solutions attained through unconventional monetary policy are, by definition, temporary. The magnitude and scope of unconventional policies become more limited once inflation risks re-appear in the euro area. Unconventional monetary policies also have non-negligible international spillovers, with negative effects on the stability of the international monetary system (Taylor 2016).

4.2. Coordination of macroprudential policies across the euro area

Given the strong interconnectedness of European financial systems, macroprudential policies may have non-negligible spillovers across national economies. Although the empirical evidence is somewhat limited, Ongena, Popov, and Udell (2013) examine large multinational banks and show that stricter bank regulation and higher capital adequacy are associated with lower bank lending standards abroad. Banking and capital unions are examples representing international coordination regarding financial integration and financial stability issues. It is also important to emphasize the interactions between macroprudential policy and monetary policy. Macroprudential policy should ideally reduce the risks stemming from a very loose monetary policy in the euro area (such as those related to overheating in the real estate market). Though, macroprudential policy alone cannot eliminate these risks; therefore, coordination between monetary and macroprudential policies are vital (Galati and Moessner 2013; Rubio and Carrasco-Gallego 2014).

4.3. Banking union

The main motivation for the establishment of more comprehensive banking union in the euro area has been to break the adverse loop between the banking sector and sovereign debt and to reduce the degree of financial market fragmentation. The banking union consists of three major pillars (Belke and Gros 2016): (1) harmonized regulation and single supervision, (2) a crisis resolution scheme, and (3) a deposit insurance systems for banks. While the euro area has undertaken important steps to create a banking union by establishing the Single Supervisory Mechanism and Single Resolution Mechanism, the third pillar is still missing. Importantly, risk reduction in the euro area financial sector is key prior to deepening of the risk sharing mechanism.

Belke and Gros (2016) provide a useful comparison of the banking union in the euro area and the US and note marked differences between the two. The US banking

union has existed for nearly 90 years, while steps towards the establishment of a banking union in the euro area have only recently been undertaken. Importantly, they show that the financial sector has a greater capacity to absorb shocks as compared to the common budget (fiscal capacity), making a case for a banking union rather than a fiscal union.

Regional disturbances in the US banking sector during the financial crisis were addressed at the federal level by the Federal Deposit Insurance Corporation, which seized the problematic banks and covered their losses. In addition, large, internationally active banks absorbed the negative shocks. The role of these internationally active banks was especially important. To the contrary, the risk sharing mechanism of these "internationally active banks" was largely missing from euro area banks, resulting in a sizeable accumulation of government debt (as, for example, in the case of Ireland). The aforementioned international risk sharing mechanism has successfully operated only in certain cases, for example, as in the Baltic countries, where foreign banks served as shock absorbers and as substitutes for the banking union, to a certain extent.

In principle, international risk sharing through a banking union is likely to be beneficial. However, Belke and Gros (2016) raise several important issues that could undermine the ability of a banking union to curb regional financial shocks. These issues include the lack of an explicit fiscal backstop and the possible excessive risk taking of banks once they contributed the target level of funds to the Single Resolution Fund. Calzolari, Colliard, and Lóránth (2016) note that large banks may try to avoid the increased monitoring stemming from supranational supervision by the ECB by changing the form of foreign representation from subsidiaries to branches. The International Monetary Fund (2013) mentions the coordination issues between the existing supervisory architecture with that provided under the umbrella of the ECB. Lízal (2014) emphasizes that the benefits of a banking union depend on these factors: membership in the euro area, the impact of the financial crisis on the stability of the national banking sector thus far, the costs spent on stabilizing national banking sectors thus far, and the position of banks and their supervisors in the single EU market.

4.4. Capital union

The European financial system is largely bank-based (for example, approximately 90% of the debt of non-financial corporations is intermediated via the banking sector). There are two arguments why the greater development of capital markets can be beneficial for the euro area. First, the more general argument is that there is evidence showing that different forms of financing help cushion negative shocks and, therefore, reduce the size of an economic recession. In addition, there is evidence that stock markets can be more growth-promoting than other financial intermediaries (Valickova, Havranek, and Horvath 2015). In addition, Coricelli and Frigerio (2015) examine the so-called creditless recoveries and find that credit constraints are softened in sectors that rely more on alternative sources of financing. Second, asymmetric shocks cannot be addressed by national monetary policy in a monetary union, which makes different forms of international risk sharing more important. Constâncio (2015) emphasizes the roles of the cross-ownership of productive assets, fiscal transfers, and consumption smoothing in international risk sharing mechanisms. In this regard, the European Commission announced its action plan for a European Capital Markets Union (CMU) as of September 2015.

There is also empirical evidence showing that the degree of international risk sharing is lower in the euro area than in fiscal federations such as the US or Germany. Furceri and Zdzienicka (2015) show that international risk sharing improved after the introduction of a common currency in the euro area, but declined severely during the financial crisis when it was naturally needed the most.[4]

4.5. *Financial stability and sovereign debt*

A well-functioning financial market is a key for an effective monetary policy transmission mechanism and especially the differences in the quality of financial markets across the euro area countries can be especially harmful because single monetary policy would be more likely to affect individual countries in a currency union heterogeneously (Acharya et al. 2015). The regression results by von Borstel, Eickmeier, and Krippner (2016) suggest that it was primarily the increase in the mark-up due to financial instability, rather than the weaker sensitivity of bank interest rates to monetary policy shocks, that was behind the weak interest rate pass-through in the euro area during the financial crisis. As it is well known, Europe experienced adverse interactions between the stability of banks and sovereigns. Therefore, sovereign debt restructuring – along with reducing the elevated levels of non-performing loans – is key to improving the long-term outlook for the financial sector in the euro area. Several feasible proposals on sovereign debt restructuring have been put forward (Pâris and Wyplosz 2014; Corsetti et al. 2015; and Andritzky et al. 2016).

In addition, macroprudential policies have been shown to have a positive effect on financial stability (Cerutti, Claessens, and Laeven 2017). However, it is crucial to realize that the efficiency of financial intermediaries is a key for long-term growth (Hasan et al. 2017). Therefore, macroprudential policies should be designed in a way to maximize the efficiency of financial intermediaries in promoting growth as much as possible (Hasan et al. 2017).

4.6. *Law, institutions, and finance*

High-quality institutions are key for sustainable financial development (Baltagi, Demetriades, and Hook Law 2009). A country with ill-defined institutional and legal frameworks will have difficulty attracting investment, resulting in lower cross-border investment. Daude and Fratzscher (2008) show how portfolio investment is highly sensitive to the quality of host country institutions – namely, to the degree of information disclosure, accounting standards, risk of expropriation, and costs of disputes. Schiantarelli, Stacchini, and Strahan (2016) find that judicial efficiency is an important factor for bank stability. The quality of the legal system, such as its insolvency rules or company laws, is central to reducing financial friction (European Commission 2015). However, these rules, as well as the ability to effectively enforce these rules, differ across euro area countries.

Baltagi, Demetriades, and Hook Law (2009) find that institutional quality is an important factor of financial development. The World Bank provides worldwide governance indicators that try to assess institutional quality in six areas: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence, Government Effectiveness, Rule of Law, and Regulatory Quality. When examining these indicators, for example, rule of law, we can observe some heterogeneity for euro area countries. We find countries such as Germany and the Netherlands at the top of

the world ranking. Other countries, such as Estonia, Lithuania, Latvia, and Slovakia, made significant progress and their rule of law indicator improved substantially over last 10 years. Notably, the value of rule of law index for Italy, Spain, and especially Greece dropped during the financial crisis (data are available up to 2014). However, it remained largely the same in other euro area countries (or even improved, such as in the case of the Netherlands). Overall, even though we do not want to overemphasize the precision of these soft indicators, it seems that the institutional quality in euro area countries does not converge.

5. Conclusions

Financial market fragmentation increased markedly during the financial crisis. Euro area financial markets were the most fragmented during 2011–2012 (European Central Bank 2016). Fragmentation decreased afterward partially due to the unconventional monetary policy measures (of massive scale) implemented by the ECB (Al-Eyd and Berkmen 2013; Szczerbowicz 2015; Andrade et al. 2016; Krishnamurthy, Nagel, and Vissing-Jorgensen Forthcoming). Nevertheless, euro area financial markets are still more fragmented now than before the outbreak of the global financial crisis in 2007 (European Central Bank 2016). We emphasize that although financial market fragmentation decreased after 2012, there are still some warning signs, such as the significant decrease in turnover in money markets or the cross-country divergence in housing prices in the euro area.

Financial market fragmentation in the euro area reduced the effectiveness of monetary policy transmission. Bank interest rates in some euro area countries did not fall following the interest rate cuts by the ECB. We argue that this low interest rate pass-through was primarily caused by the increase in mark-ups due to higher perceived risks (Al-Eyd and Berkmen 2013). A lesser reaction of bank interest rates to monetary policy shocks occurred as well, but its importance was likely less as compared to the increase in the mark-ups.

We discuss a number of policy initiatives to improve the effectiveness of the monetary policy transmission mechanism. In general, these initiatives should promote the smooth functioning of financial markets in the euro area. Some measures, such as unconventional monetary policy, have already shown that they are able to reduce financial market fragmentation in the euro area. However, the magnitude of unconventional policies will become more limited once inflation risks re-appear in the euro area, and other measures, such as sovereign debt restructuring, coordination of macroprudential policies, or a properly executed banking union, can be the key to reducing financial market fragmentation and to promoting a well-functioning monetary transmission mechanism in the euro area.

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Notes

1. Financial market integration is another term often used in this regard. Researchers typically refer to financial market integration as the opposite of financial market fragmentation. Sometimes the term financial market de-integration is used instead of fragmentation.
2. However, Bonin, Hasan, and Wachtel (2005) show that the foreign bank entry to the central and eastern European countries improved efficiency and performance of domestic banks.
3. Given that monetary policy rates change in discrete steps, researchers typically use short-term money market rates instead of monetary policy rates in the regression analysis, assuming that policy and money market rates co-move strongly. However, this co-movement became somewhat weaker during the crisis, see von Borstel, Eickmeier, and Krippner (2016).
4. Furceri and Zdzienicka (2015) propose a supranational fiscal stabilization mechanism in the euro area in order to curb the impact of recessions on individual countries, given that individual countries (especially those with high debt and fiscal deficits in good times) are constrained by the Stability and Growth Pact. An alternative to fiscal stabilization would be a market-based solution via an integrated capital market in the euro area.

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