An Evaluation of the ECB’s Outright Monetary Transactions

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Executive Summary

Since early 2009, the euro crisis has influenced most countries of the European Monetary Union (EMU), contributing to persistent low economic growth, high unemployment, steeply rising public financial costs and several problems with the region’s banks. As a result, a wide variety of policy measures have been adopted to address these problems. The central actors have included not only individual member states but also the European Central Bank (ECB), European Commission (EC) and International Monetary Fund (IMF).

While the success of many of the policies in recent years have been contested by different parties, the ECB’s Outright Monetary Transactions (OMT) program initiated in the summer of 2012 has been widely welcomed. Our paper attempts to understand and investigate OMT’s claimed success, motivated especially by the recent efforts to discontinue the policy. The implications with regard to the continuation of the program are potentially enormous, both economically and in terms of the social welfare of European citizens. Altogether, our motivation stems from the catastrophic consequences of the crisis, mixed success of most mid-crisis policy responses, and the uncertain destiny of OMT – perhaps one of the most crucial policy initiatives adopted in Europe after 2008.

Our research questions build on the uncertain contribution of OMT to the declining bond spreads in the peripheral euro nations. We ask whether OMT was responsible for the decline in their spreads after mid-2012, why this might be the case, and whether the policy can be successful in the future. The underlying policy question is simply whether European legislators should resume OMT. Our study is based on two steps: we first examine the “theory and practice” of the program, also conducting a compact literature survey on other research studying its effectiveness, and then turn to quantitative methods. Our quantitative analysis consists of a regression study and the application of the synthetic control method to examine OMT’s effect on declining bond spreads in the periphery. In the process, we also analyze the nature and dynamics of the post-Lehman hikes in peripheral bond spreads.

Our results suggest, firstly, that the post-Lehman takeoff in sovereign bond spreads in the periphery was largely induced by fears of sovereign default that were separated from “normal” associations between spreads and economic fundamentals. In particular, the synthetic control countries we construct based on spread determinants in the peripheral countries do not experience any such increases in their spreads. Our regression analysis also indicates that the mid-crisis evolution of peripheral spreads differs strikingly from the values predicted based on the stable period between 2000 and 2008. Furthermore, countries outside the periphery do not suffer from the pronounced association between spreads and fundamentals.

Secondly we find that OMT was very likely to be responsible for the rapid decline in peripheral spreads after mid-2012. The synthetic control countries we construct are not significantly affected by OMT, and some actually experience slight upward trends in their spreads after the policy is announced. The method lends strong support to OMT’s role in the declines in peripheral spreads. Similarly, the regression analysis suggests that post-OMT trends in spreads approach the stable values predicted based on the pre-crisis period. In most peripheral countries, OMT also breaks up the upward trend predicted based on the period before OMT.

Our results broadly validate earlier studies by Krishnamurthy et. al (2013) and Altavilla et al. (2014) regarding OMT’s effect, and Arghyrou and Kontonikas (2011), De Grauwe and Yi (2012) and Di Cesare et al. (2012) regarding the panic-driven nature of the increased peripheral bond spreads during the crisis. Although we consider that further research regarding the suggested long-term costs of OMT is needed, we strongly believe that the benefits of the policy outweigh the hypothetical concerns, and OMT should therefore be resumed by European policymakers. In particular, OMT had the intended effect of reducing bond spreads and stabilizing monetary policy in the European Monetary Union, and there is no indication that actually implementing bond purchases through the program will be necessary.
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1 Introduction

The euro crisis has been influencing countries of the European Monetary Union since early 2009, driving some nations close to sovereign default and therefore under third-party assistance. The crisis has been characterized by low growth throughout the eurozone, high unemployment and bond yields in several countries, as well as undercapitalized and liquidity-constrained banks around the region. The most affected member states, especially in the European periphery, have coordinated their policy responses after 2009 together with the European Central Bank (ECB), European Commission (EC) and International Monetary Fund (IMF).

While most policies during the crisis have aimed to address problems concerning public finances, the ECB’s Outright Monetary Transactions (OMT) program, announced in August 2012, has another, parallel objective – bringing down the high bond yields in the peripheral euro nations. The mechanism allows the ECB to buy unlimited amounts of short-maturity bonds from EMU member states in the secondary market. While the success of many other mid-crisis policies have been questioned by different parties, OMT has been very widely welcomed – at least apart from recent critique from German policymakers and legal institutions.

The widespread agreement concerning OMT’s success stems from the fact that spreads in the periphery – especially in Greece, Spain and Italy – dropped sharply after the ECB’s announcement of the policy. It is not however definite that it was OMT that was behind the decline, nor that OMT will be successful in the longer term. In particular, it seems that the policy's success rests on the hypothesis that the debt crisis resulted mainly from pessimistic expectations or panic instead of weak economic fundamentals. Moreover, the policy has thus far been only a promise: the ECB has not made any bond purchases under the program and most of the suggested costs are hence yet to be materialized.

Our project builds on these questions, examining the success and implications of the policy. The central research questions are whether OMT was responsible for the decline in bond spreads in the periphery after mid-2012 and why this could be the case. Our underlying policy question again, to be answered based on the research, is whether European policymakers should resume OMT in the future. The implications with regard to the continuation of the policy are potentially enormous both for the economic prospects of the eurozone and the social welfare of European citizens. Importantly, our report also contributes to the small but growing literature analyzing the effectiveness of post-Lehman monetary policy both in Europe and elsewhere.

The analysis is based on two steps: we first conduct a background review, discussing the euro crisis, problems with disintegrated bond spreads, OMT’s fundamental logic in addressing the issue, and preliminary research on the program's effectiveness (chapter 2). This review is based on relevant literature, statistics and standard economic reasoning. Secondly, we move on to quantitative analysis, relying on regression analysis and the synthetic control method to examine OMT’s effect on declining bond spreads after August 2012 (chapter 3). Chapter 4 concludes. It presents a synthesis of our results in the context of related literature, discusses potential costs of OMT, and arrives at a policy recommendation for European policymakers on the continuation of the program.
2 Background review

2.1 Euro crisis and the resulting policy measures

The third stage of the Economic and Monetary Union (EMU) of the European Union, currently involving 18 eurozone states, was launched in 1999; euro became a real currency and a single monetary policy was introduced under the authority of the European Central Bank (ECB). Euro banknotes and coins entered circulation from the start of 2002, when Greece also joined the currency area as the 12th member. Overall the EMU represents a major step in the integration of European economies, a process whose origins can be traced back to the European Coal and Steel Community and the European Economic Community formed in the 1950s (EC, 2014; Craig & De Burca, 2007).

The early years of the EMU were generally prosperous for most countries of the eurozone, characterized by financial stability and relatively high economic growth. By the end of the first decade of the 21st century, however, the atmosphere changed drastically. Soon after the outbreak of the financial crisis in 2007 and the resulting global recession, various countries in the euro area drifted into problems with rising interest rates for government bonds as well as rapidly increasing public debt levels. (IMF, 2009; Shambaugh, 2012).

The spreading global crisis, coupled with a variety of country-specific problems and institutional problems of the EMU, triggered fears of sovereign debt crises among investors, making them reluctant to lend to a number of countries in the region. In particular this was the case for five peripheral eurozone nations – Portugal, Italy, Ireland, Greece and Spain. After a point, several sources speculated that some of these countries might have to exit the euro area, and many commentators also pointed toward the full-scale disintegration of the currency area. (Koba, 2011; Lewis, 2011).

Although the eurozone has not fallen apart, the debt difficulties have continued to this day, coupled with rising unemployment rates, stagnant aggregate demand as well as liquidity problems faced by the region’s banks. According to Shambaugh (2012), the crisis should therefore be considered a combined sovereign debt crisis, growth crisis and banking crisis. The social consequences of the various economic problems can be observed most strikingly in the mid-crisis unemployment rates in the periphery, graphed in Figure 1.

As the crisis has progressed, separate euro member states as well as the IMF, the ECB and the European Union have taken a variety of measures to mitigate its adverse effects and to address some of its deeper roots (see e.g. ECB, 2010; Consilium Europa, 2011; Bhatti, 2011; EFSF, 2012; Eurogroup, 2012).

Below we briefly describe the evolution of the euro crisis, with a focus on different policy responses adopted and the evolution of sovereign bond spreads in the peripheral euro countries. Our purpose is to lay down the foundations for our analysis and to better understand the behavior of financial markets during the years leading to the ECB’s Outright Monetary Transactions program in August 2012.
Directly after the outbreak of the crisis, during 2007 and 2008, the ECB provided liquidity to European banks to prevent the financial system from collapsing. In 2008, the European Commission also stepped in, adopting the so-called “European Recovery Plan”, comprising of 200 billion euros in temporary stimulus measures (Bruegel, 2014). At the end of 2008, sovereign bond spreads were still largely at pre-crisis levels, and the financial market remained calm with regard to potential problems with sovereign debt sustainability in Europe (Broner et al., 2013; see also Figure 2 in page 5). It can be argued that the initial policies taken, described above, were at least partly responsible for maintaining this state of affairs – although it is clear that low bond spreads did not reflect the fact that unemployment rates were gradually rising, especially in Spain, Ireland and Italy (see Figure 1).

During 2009 the crisis deepened, and at this point each of the five peripheral euro countries suffered from increasing unemployment. The policy measures became gradually more aggressive as well: in particular, the ECB progressively decreased interest rates on several occasions, eventually from 5% to 1% in under 12 months (Trading Economics, 2014). Sovereign bond yields in the region gradually started to disintegrate, although in 2009 the differences still remained reasonably low (see Figure 2).

The presence of the global financial crisis was now acknowledged throughout the world, and the reactive policy measures were becoming increasingly global. As a key example, G20 leaders met in London in April 2009 to discuss recent events, eventually agreeing to establish a new Financial Stability Board (FSB). The FSB's role was especially to provide early warnings of macroeconomic and financial risks and recommend suitable policy actions for countries around the world – naturally including the euro region, whose stability was deteriorating by the month. (FSB, 2014).
Towards the end of 2009, Spain and Ireland first reported much larger deficits than was expected after which, on October 16th, the Greek government surprised the media and investors with even more striking news: the public deficit of the country would reach 10% as a percentage of GDP in 2009, a figure considerably larger than what was previously reported to Brussels. The official estimate from two weeks later was 12.7%. (Bruegel, 2014).

As noted by Broner et al. (2013), these newly declared statements evidently contributed to a loss of confidence on the fiscal constraints under which euro countries were supposed to operate. While the public debt levels especially in the most vulnerable countries kept on rising, the new events influenced how the market would absorb the debt: the loss of confidence spread rapidly and, together with unemployment and public deficits, bond yields started to increase dramatically in 2010, especially in Ireland, Greece and Portugal.

In April 2010, the socioeconomic situation in Greece became increasingly dreadful as its 10-year borrowing costs reached 8.7% – an increase of 270 basis points compared to the previous month. As an initial remedy, in the beginning of May, the IMF and euro states provided a three-year loan program for the country, worth a total of 110 billion euros. (Bruegel, 2014). Decisive was also the creation of the European Financial Stability Facility (EFSF), which had a mandate to safeguard financial stability in Europe through providing financial assistance to eurozone member states (Bhatti, 2011; EFSF, 2012). The ECB also initiated new measures in May, most prominently new debt purchases in the secondary market, within the framework of the new Securities Market Programme (SMP). (Bruegel, 2014; ECB, 2010b).

Finally the European institutions and the IMF provided Ireland an assistance package worth 85 billion euros in November, after the most prominent rating agencies had downgraded its credit rating and the country had announced that reaching its long-term deficit targets would require third-party assistance. By the end of 2010, European leaders also reached an agreement to set up a permanent crisis mechanism – the so-called European Stability Mechanism (ESM) – to safeguard the financial stability of the region. (Bruegel, 2014). Despite the many policy measures and programs adopted, the direct positive effects to the economic environment in the most of the affected euro countries, with regard to both bond spreads and growth prospects, remained negligible (Trading Economics, 2014).

2011 was marked by a further deterioration of the financial and political stability in the continent. New interventions were also adopted in Greece, Portugal, Italy, Ireland and Spain, including public spending cuts, structural reforms as well as further financial support measures. The unemployment rates, debt-to-GDP ratios and bond spreads were still largely stuck on alarming upward trajectories. Italy, Portugal and Spain also began to suffer from gradually increasing spreads in 2011 after rather stable trends in 2010. (Trading Economics, 2014; Koba, 2012; see Figure 2).

In May 2011, after a request from Portugal, the European Council agreed on a financial assistance package of 78 billion euros over three years. Soon after, a new bailout package was agreed upon with the aim of ending the deepening socioeconomic crisis in Greece and preventing its further contagion to other euro countries. The package included a second €130 billion rescue loan; €37 billion worth of private sector support; a secondary market debt buy-back program; interest rate cuts on assistance loans; as well as lengthened maturities. The EFSF’s lending capacity of €440 billion was made fully effective, and the EFSF and the ESM were allowed to intervene in the primary markets for sovereign debt. (Eurogroup, 2012). In addition to Greece, the economic situation in Spain and Italy also worsened in 2011, and in October the two countries were hit hard by a wave of rating downgrades (Bruegel, 2014).
International pressure for stronger policy measures began to grow. For instance, the Secretary of Treasury of the United States urged European leaders to find a quick solution the crisis and especially to increase the firepower of the EFSF with the ECB’s help. Haircuts in the public debt stock of Greece and Portugal as well as the reactivation of the ECB’s secondary market purchases were some of the subsequent attempts to ease the crisis (ECB, 2011). Still, any signs of socioeconomic stabilization in the periphery remained unseen and after several weeks of market distress, Spanish and Italian yields reached unprecedented levels. As an example, the Italian yield curve inverted so that 2-year bonds yielded 7.7% compared to 7.3% for 10-year bonds. The spreads of triple-A rated sovereigns also widened considerably for the first time since the beginning of the crisis. (Bruegel, 2014).

According to some scholars, further problems with regard to aggregate demand and unemployment were induced by public spending cuts undertaken in various euro countries (see e.g. Krugman, 2009). In terms of political and financial stability, in turn, the ongoing fragmentation of the European banking sector also concerned policymakers. In order to address some of the liquidity difficulties in the banking sector, the ECB initiated the Long Term Refinancing Operation (LTRO) on September 2011: it lent nearly 500 billion euros to over 500 banks for 36 months – previously the operations matured after a maximum of 12 months – at a rate of only one per cent. Over €300 billion was tapped by banks in Greece, Ireland, Italy and Spain. The purpose of LTRO was simply to maintain a cushion of liquidity for banks holding illiquid assets. (ECB, 2011).

On February 2012, the ECB initiated LTRO2, which provided 800 eurozone banks with an additional €500 billion in inexpensive loans. ECB’s lending had largely replaced inter-bank lending. As an example, Spain had €365 billion and Italy €281 billion of borrowings from the ECB in June. (Werden & Fletcher, 2012). In early 2012, the ECB also began open market operations, buying government and private debt securities, which eventually totaled €220 billion.
The ECB’s policy concerning the necessary credit rating for loan deposits was also changed and the bank started to accept all debt instruments issued or guaranteed by the Greek government as collateral, regardless of the nation's credit rating. Some pressure was hence taken off of Greek government bonds and the rise in spreads slightly stabilized. (ECB, 2012c). In 2012 and 2013, the ECB further cut its bank rates, eventually reaching the historically low of 0.25% in November 2013 (BBC, 2013). In September 2012, the European Commission published its roadmap to create a so-called Banking Union of the countries in the euro region (EC, 2012): it is possible that this announcement further intensified the effect of the ECB’s OMT, discussed for the rest of this paper.

In addition to Greece, it is possible that Ireland and Portugal also partly benefited from the policy measures conducted in late 2011 and early 2012. In fact, investors gained trust on their sovereign bonds, sending their spreads into a downward trajectory even before OMT. In Ireland the direction changed in the second quarter of 2011 and in Portugal in the first quarter of 2012 (see Figure 2).

All in all, the rescue measures directed to the eurozone and especially the peripheral member states have involved spending cuts, structural reforms, emergency and bailout loans, debt restructuring as well as public and private debt write-offs, largely implemented through the EFSF and the ESM. In spite of the extensive scale of these actions, it is currently widely acknowledged that the steps taken to mitigate the crisis have been largely insufficient and accompanied by – and also allegedly contributed to – adverse economic performance (Blanchard and Leigh, 2013). Most notably, the public debt-to-GDP ratios of all peripheral countries rose between 2008 and late 2012. Similarly, unemployment rates of these countries have been constantly increasing, from around 5–8% in early 2008 to 10–25% in late 2012 – with few signs of a significant turnaround as of 2014 (Trading Economics, 2014).

As seen in the next subchapter, the ECB joined the attempts to manage the crisis by initiating its Outright Monetary Transactions (OMT) program, in which it promised to purchase government bonds if necessary – and upon request – to keep bond yields of the most vulnerable euro countries in control (ECB, 2012). While the immediate panic in the financial markets has calmed down after the policy (see Figure 3), the socioeconomic problems, including high debt levels and unemployment, still remain persistent in the euro periphery. The following chapters of the policy report will largely ignore these concerns, focusing on evaluating the logic, implications and success of OMT.

### 2.2 Features and objectives of OMT

The Governing Council of the European Central Bank announced the framework of Outright Monetary Transactions (OMT) on August 2nd, after Mario Draghi's assertion in July that the ECB would do "whatever it takes" to save the euro. Details of the program’s technical features were announced on September 6th (ECB, 2012a). The Security Markets Programme (SMP), briefly discussed above, was also terminated directly following the introduction of OMT.

The general motivation of the policy is clear: sovereign interest rates and financial costs of different euro countries, especially those in the periphery, skyrocketed in the course of the crisis between 2008 and 2012 – the ECB figured it had no other option than to step in. As an indispensable start to our discussion and analysis, Figure 3 below graphs the pre- and post-OMT spreads in selected countries, providing a broad view of the essential trends associated with the policy.
FIGURE 3. Selected pre- and post-OMT sovereign bond spreads over Germany with selected events – Lehman Brother’s collapse and the launch of OMT. Derived from data. Source: OECD (2014).

The decision to introduce the policy – potential purchases of sovereign bonds in secondary markets – had two major objectives (ECB, 2012a):

- Firstly, the initiation of the policy aimed to guarantee proper transmission of the ECB’s interest rates to the euro area economy and the singleness of its monetary policy more broadly. The potential purchases were seen to improve investor confidence in the euro, encouraging them to eventually buy up bonds in the normal market.

- Secondly, the policy implies that ECB wished to permanently return to uniform sovereign interest rates in the euro region. This is a state of affairs that prevailed before the global financial crisis triggered fears of euro break-up and sovereign defaults in 2008 (see Figure 2 in page 5).

It is important to highlight that OMT is constructed to comply with legal restrictions that govern the ECB’s actions. Firstly, the ECB's rules and mandate prevents the bank from purchasing government bonds in the primary market and thus limits its intervention to the secondary market, where it should focus on furthering its primary objective of price stability. Secondly, intervention in the secondary markets cannot be used explicitly to circumvent the prohibition of primary market intervention (see e.g. Eijffinger & Hoogduin, 2012). As a result, outright transactions under the program would be directed to the secondary market, and the primary monetary policy purpose of the singleness of the ECB’s monetary policy also seems to be in line with the objective of price stability.

Next, the technical features of OMT are presented briefly below based on ECB (2012a&b).

**Conditionality.** The potential outright monetary transactions (OMTs) are not free from requirements. Firstly, a given eurozone country can only benefit from the program if it is found to suffer from excessively high bond yields and if it complies with all terms in a specific Memorandum of
Understanding. Outright transactions are also possible only at the point of time in which the country in question "possesses or regains complete market access" – this is expected to happen after the country has received its last scheduled bailout disbursement.

Secondly, the transactions will always be implemented under specific conditions "attached to an appropriate EFSF/ESM programme" (macroeconomic adjustment or precautionary program) in which the country has to be involved. Additionally, the ECB reserves the right to mandate the IMF to participate in the design and monitoring of such programs. The OMTs will be effective as long as the country under assistance fully respects and follows the related conditions, and the purchases are terminated when the objectives are achieved or if the country ceases to respect the relevant conditions.

**Coverage.** An important feature of the OMT program is that it focuses on the shorter part of the yield curve – particularly sovereign bonds with a maturity between one and three years. The purpose is naturally that lower short-term rates ultimately translate into the longer end of the yield curve. It is also crucial to note that there are no *ex-ante* quantitative limits on the size of the transactions. This separates the potential OMTs from the ECB’s previous programs, including the Security Markets Programme (SMP), which involved a prescribed budget.

**Creditor treatment.** The seniority of any bonds purchased by the ECB under OMT will have the same conditions as the ones bought by investors. No changes in the seniority range are implemented once purchases are made. As emphasized above, OMTs are limited to transactions in the secondary markets for sovereign bonds: all revenue is directed to investors, not to the primary sovereign bond issuer.

**Sterilization.** The ECB is very clear when stating that "[t]he liquidity created through Outright Monetary Transactions will be fully sterilised". Sterilization means that the bank’s balance sheet will not be expanded in the longer term. In case OMTs are implemented, the quantity dedicated or eventually used to make these operations will be sterilized through additional compensation operations, in which the same amount of money is withdrawn from the financial market.

**Transparency.** In case of purchases, the aggregate Outright Monetary Transaction holdings as well as their market values are published on a weekly basis. Publication of the average duration of OMT holdings and the breakdown by country would in turn take place on a monthly basis. Under these specifications, the market is expected to be fully aware of the actions taken by the ECB at all levels with respect to the program.

### 2.3 General theory and supporting arguments

In this subchapter we briefly discuss the general theory, early calls and supporting arguments behind the implementation of OMT. We first shed light onto insights on the theoretical need for the policy, including calls for a lender of the last resort for the eurozone based on self-fulfilling crises (DeGrauwe & Ji, 2013) and calls for policies such as OMT to terminate the multiple equilibria prevalent in the region (Broner, Erce, Martin & Ventura, 2013).

Beginning from Broner et al. (2013), the authors present a theory of debt discrimination between domestic and foreign investors. In particular, their paper deals with financial frictions as well as secondary markets, which induce overly scarce investment and self-fulfilling crises. The framework can be applied to a situation in which a country is a member of an economic union such as the EMU, allowing for analysis of different effects for a country from this membership. The paper calls for a Europe-wide solution, pointing out to OMT as a mechanism that would “kill” the pessimistic equilibria by eliminating the differences in the probability of repayment between domestics and foreigners.
In the paper by DeGrauwe and Ji (2013), in turn, the self-fulfilling crisis stems from the fact that there is no obvious lender of last resort (LOTR) in the euro area. The absence of an explicit guarantee for cash to always be available for a sovereign country creates a fragility in a monetary union, making member countries susceptible to distrust: when suspicions of repayment difficulties arise, investors will try to sell government bonds, which will have two effects: the sovereign interest rate will increase and liquidity will flow out of the country. This decreases investment in the country – and economic growth as a consequence – reducing government revenues and increasing deficits. Ultimately the lack of LOTR helps create a self-fulfilling crisis giving rise to multiple equilibria situations, where bond markets are subject to severe liquidity crises and forces of contagion (De Grauwe, 2011; Wolf, 2011).

In other words, according to De Grauwe (2011) and De Grauwe and Li (2012), the most important argument for the LOTR mandate has to do with preventing countries from entering a self-fulfilling “pessimistic” equilibrium, which creates an explicit coordination failure – the perception that there is not enough liquidity to save both the public and the private sector in the country. Evidence for the claim is presented by Di Cesare et al. (2012), who show that the pre-OMT spreads of the five peripheral countries were long significantly higher than the macroeconomic fundamentals would justify. The coordination failure could induce the central bank to act as the LOTR for banks instead of sovereign countries, as the banking sector in many countries is larger than the country itself. Furthermore, the government would not be able to save the banking sector, since even if there was willingness to bail out the banks, the government would lack the necessary resources.

Next, OMT should be understood in contrast to earlier programs such as the Securities Markets Programme (SMP) as well as the European Stability Mechanism (ESM), earlier EFSF. Firstly, OMT has no ex-ante quantitative limit on the potential sovereign bond purchases, which is possibly the most crucial difference between OMT and the SMP or ESM. (Giavazzi et al., 2013; Wyplosz, 2011). Other key differences include OMT’s transparency as well as the “strict and effective” conditionality requirements: the euro system would be treated as pari passu with other creditors for bonds purchased through OMT (Sapir, 2012). Pro-OMT economists also often emphasize that any concerns of moral hazard would be largely dealt with through the conditionality clause. According to this line of argument, if OMT was put to use, the conditionality would be successful in aligning incentives both in countries subject to an ESM program and in countries that are at risk of requiring third-party assistance (Cœuré, 2012).

When comparing OMT to ESM specifically, De Grauwe (2011) points out to two shortcomings from which the latter suffers. Firstly, the ESM will never have the credibility to provide liquidity in a necessary case, which is simply because of its restricted resources; fundamentally only central banks are able to commit to a credible promise of unlimited emergency liquidity. As mentioned, OMT does not suffer from this critique at least ex ante. The second problem of the ESM brought up by the Grauwe is that it has two strictly contradictory mandates – guaranteeing liquidity to troubled countries and solving the moral hazard problems created by liquidity provision.

Finally, some economists justify the OMT program by arguing that, during the crisis, the central bank had lost its ability to properly transmit monetary policy using conventional tools. The fragmentation of financial markets, which implied diverging borrowing costs for firms and households across the euro area, led to a dysfunctional transmission mechanism, also preventing the ECB from achieving its primary goal of price stability. In this sense, OMT is seen as a tool to reduce risks and again to coordinate markets from a negative equilibrium towards a positive one, eventually restoring the critical monetary policy transmission mechanism. (ECB, 2012b; Cœuré, 2013).

The most important opposing arguments and suggested long-term costs of OMT are discussed along with our quantitative results and other literature in Chapter 4.
2.4 Literature survey on the effects

After the OMT was announced by the ECB in mid-2012, there has been some research conducted on its effectiveness – in particular, on whether the policy has had a significant impact on sovereign bond spreads and monetary policy in general.

Before compiling the results of such research, it is useful to lay out the common, increasingly mainstream view of the effectiveness of the policy. Tony Barber summed up this sentiment on a Financial Times special report in May 2013: he suggested that Europe's sovereign debt and banking crises were in a clearly less dreadful state than a year before largely due to ECB’s promise of unlimited intervention to help vulnerable member states if needed. This conclusion also becomes apparent when assessing the post-OMT bond spreads in Figure 3 in page 7. In particular, the spreads of Italy, Spain and also Greece turned into a declining trajectory directly after Draghi’s implicit promise to "do whatever it takes" in July 2012 (Black & Randow, 2012).

The general interpretation is that, despite actual purchases, the financial markets took notice of the announcement, acknowledging it as an explicit "lender of the last resort" promise; the prospective OMTs were regarded as a backstop that would, if needed, counter the frozen liquidity and stressed bond rates. Merely the knowledge of the potential existence of OMT led to a decline of both short-term and long-term interest rates in the peripheral euro countries.

The main drawback of such descriptive analysis examining the evolution of spreads before and after OMT is that other things could have contributed to their decline as well: other news, policies or country-specific characteristics are not controlled for. Simply stating that OMT switches the national economy from a “pessimistic” to an “optimistic” equilibrium, which ensures proper transmission of the monetary policy, is fundamentally quite limited.

In this regard it is useful to turn to more sophisticated and quantitative research, which has been conducted to analyze the contribution of OMT to the decrease in peripheral spreads after mid-2012. The main objective of such research is generally to distinguish the part of the spread explained by economic fundamentals from the part explained by the self-fulfilling “pessimistic” equilibria – or financial market panic. Krishnamurthy et al. (2013) and Altavilla et al. (2014) are among the few researchers to investigate the problem, both conducting event studies with daily data with a focus on Spain and Italy.

Altavilla et al. find that a 200 basis points decrease in the spread of both countries can be explained by the introduction of OMT, whereas Nagel et al., examining the same case, discover average effects of 126 and 184 basis points for Italy and Spain respectively. In both cases the decrease seems to be statistically significant, while the comparative spreads for France and Germany remain unaffected. It is worth noting here that the analysis conducted in our report essentially follows a similar strategy than Krishnamurthy et al. and Altavilla et al., although we rely on quarterly data and also slightly more straightforward econometric approaches.

Finally, Hristov et al. (2014) study OMT’s impact through examining the link between bank lending rates and government bond rates. The result is simply that OMT seems to have been successful in restoring the monetary transmission mechanism – one of its main objectives – which was severely affected by crisis.
3 Quantitative analysis

3.1 Spread determinants

As described in more detail in chapters 3.2 and 3.3, our quantitative methods focus on constructing comparative data series – predicted values and synthetic counterfactuals – to analyze the dynamics of the post-Lehman explosion of the peripheral spreads as well as OMT’s impact on them after mid-2012. All the comparative data series and hence our quantitative analysis are strongly dependent on the determinants of bond spreads.

The determinants we use are based on research assessing the drivers of long-term sovereign bond spreads, the suitability of the variables to our analysis with respect to endogeneity concerns, and also the availability of data. Recent literature (especially Alexopoulou et al., 2009 & Poghosyan, 2012) emphasizes economic fundamentals in the market’s assessment of a country's creditworthiness and points out to the following indicators as the key determinants of sovereign bond spreads:

**Credit risk:**
- Debt-to-GDP ratio (used in our analysis)
- Fiscal balance (potentially endogenous; not used)
- Current account balance (used)
- Inflation rate (used)
- Exchange rate (euro countries share one exchange rate; used in synth, not in the regressions)
- Potential economic growth (no satisfactory data found)
- Unemployment rates (used)

**Liquidity risk:**
- Bid-ask spread (no satisfactory data found)

**Common risk factor:**
- Indexes of US stock volatility or market volatility of Dow Jones Eurostoxx 50 index (no satisfactory data found)

For initial tests, we conducted our two analyses using each of the variables with available data. Firstly, fiscal balance was considered overly risky in terms of endogeneity as spreads are certainly one of its main determinants, hence allowing for reverse causality. Secondly, we ended up omitting the exchange rate from the regression analysis (chapter 3.2), noting that most of the countries dealt with belong to a monetary union, where the exchange rate is fixed across member states. Exchange rate was however kept in the analysis relying on the synthetic control method (chapter 3.3) due the application's larger emphasis on international comparisons. Put together, we chose the public debt-to-GDP ratio, current account balance, inflation rate and unemployment rate to be used in both methods and exchange rate additionally in the synthetic control method.

Finally, it is important to explain what is actually meant by the long-term interest rate. Following Alexopoulou et al. (2009), it reflects "the financial market assessment of the economic fundamentals’ sustainability, particularly with a view to the stability of the fiscal balance and risk premia.” The long-term interest rate – and hence its spread – is important to our analysis because it reflects the financial costs that a country has to pay, adding to its primary deficits, contributing to its domestic debt sustainability, and fundamentally affecting its socioeconomic situation more broadly.
3.2. Regression analysis

The purpose of the regression analysis is to use associations between bond spreads and economic fundamentals – the spread determinants specified above – from the pre-OMT period to predict the evolution of spreads after OMT, conditioning on the OMT announcement not taking place. For this purpose we use a panel data estimator with country- and time-fixed effects, relying on data from both European and non-European countries.

Importantly, the evolution of government bond yields and their spreads against Germany can be classified into two broad "regimes", covering the period prior to and following the onset of the global financial crisis. In order to obtain accurate estimations, it is crucial that our estimator captures the change between these regimes. Keeping this in mind, we propose two methods:

**Method 1.** Here we estimate the coefficients twice using different time periods – the pre-crisis period and the mid-crisis period (crisis period until the OMT announcement):

\[ Spreads_{it} = \beta_0 + \beta_1 debt_{it} + \beta_2 \pi_{it} + \beta_3 CA_{it} + \beta_4 Unemp_{it} + \gamma_i + \tau_t + \varepsilon_{it} \tag{1} \]

\[ t_1 = 2000q1, \ldots, 2008q3 \]

\[ Spreads_{it} = \beta_0 + \beta_1 debt_{it} + \beta_2 \pi_{it} + \beta_3 CA_{it} + \beta_4 Unemp_{it} + \gamma_i + \tau_t + \varepsilon_{it} \tag{2} \]

\[ t_2 = 2008q3, \ldots, 2012q2 \]

With this method we analyze two distinct cases, both representing a distinctly different exercise. Based on the relationship between fundamentals and spreads before the crisis, estimated in equation (1), we are able to predict how the spreads are expected to evolve based on fundamentals after the crisis. Here, if we assume that the pre-crisis relationship represented a sustainable steady-state or a positive equilibrium, we can examine how the crisis potentially broke down this state – in the case of the peripheral countries in particular – and what happened to the predicted values after OMT.

On the other hand, based on the relationship between fundamentals and spreads mid-crisis (between the onset of the crisis and OMT) in the countries in our sample, equation (2) predicts how the spreads are expected to evolve after OMT. It should be emphasized that the trend based on mid-crisis associations cannot be expected to reflect an explicit counterfactual to a situation without OMT. However, even though it does not allow us to quantify the causal effect of OMT, the method simply depicts the mid-crisis trend, helping us to identify the potential breaking point in the trajectory after the introduction of OMT.

**Method 2.** Here we estimate the coefficient using the full period but including interactions with a dummy that takes a value of one in the mid-crisis period (before OMT):

\[ Spreads_{it} = \beta_0 + \beta_1 debt_{it} + \beta_2 \pi_{it} + \beta_3 CA_{it} + \beta_4 Unemp_{it} + \beta_5 (post \ast debt_{it}) + \beta_6 (post \ast \pi_{it}) + \beta_7 (post \ast CA_{it}) + \beta_8 (post \ast Unemp_{it}) + \gamma_i + \tau_t + \varepsilon_{it} \]

\[ t = 2000q1, \ldots, 2012q2 \]
This method allows us to check whether there are any substantial differences compared to the first specification and thus to reassess the robustness of our results. We are also able to test whether there was a significant change in the way the market reacted to fundamentals after the crisis started. This examination will provide us with a better understanding of the dynamics of the spreads. Most importantly, we run this regression separately for the peripheral countries and the rest of the euro states to identify any notable differences in the dynamics.

**TABLE 1. The coefficients on spread determinants, method 1. Data source: Eurostat (2014).**

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Before Crisis</th>
<th>Mid-Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Government Debt to GDP</td>
<td>-0.00258</td>
<td>0.0154</td>
</tr>
<tr>
<td></td>
<td>(0.00479)</td>
<td>(0.0213)</td>
</tr>
<tr>
<td>Inflation</td>
<td>-0.0513***</td>
<td>0.0234</td>
</tr>
<tr>
<td></td>
<td>(0.0142)</td>
<td>(0.118)</td>
</tr>
<tr>
<td>Current Account Balance as a % of GDP</td>
<td>-0.00747</td>
<td>0.0786**</td>
</tr>
<tr>
<td></td>
<td>(0.00798)</td>
<td>(0.0340)</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>0.131***</td>
<td>1.059***</td>
</tr>
<tr>
<td></td>
<td>(0.0205)</td>
<td>(0.130)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.566***</td>
<td>-7.278***</td>
</tr>
<tr>
<td></td>
<td>(0.147)</td>
<td>(2.512)</td>
</tr>
<tr>
<td>Observations</td>
<td>682</td>
<td>314</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.780</td>
<td>0.896</td>
</tr>
<tr>
<td>Country and time FE</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The estimations in method 1, in both columns, suggest that some the coefficients are quite significant and they have altogether high explanatory power: the determinants chosen explain the spreads well. The second specification (mid-crisis, column 2) further indicates that, for the whole sample of countries, there has been an increase in the coefficients of the fundamentals after the crisis started, especially in current account balance and unemployment. Although we are dealing with the full sample of countries, the result suggests that the aggregate association between fundamentals and spreads changed: on average the market reacted to changes in fundamentals differently during the crisis. Method 2 offers a closer look at the issue.

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>All Sample</th>
<th>PIIGS</th>
<th>Euro states except PIIGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Government Debt to GDP</td>
<td>0.0219***</td>
<td>-0.00407</td>
<td>-0.00212</td>
</tr>
<tr>
<td></td>
<td>(0.00794)</td>
<td>(0.0215)</td>
<td>(0.00263)</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.0224</td>
<td>-0.00756</td>
<td>-0.0697</td>
</tr>
<tr>
<td></td>
<td>(0.0270)</td>
<td>(0.0713)</td>
<td>(0.0563)</td>
</tr>
<tr>
<td>Current Account Balance as a % of GDP</td>
<td>0.0104</td>
<td>0.136*</td>
<td>-0.0104</td>
</tr>
<tr>
<td></td>
<td>(0.0131)</td>
<td>(0.0738)</td>
<td>(0.00845)</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>0.105***</td>
<td>0.270*</td>
<td>0.0640***</td>
</tr>
<tr>
<td></td>
<td>(0.0246)</td>
<td>(0.138)</td>
<td>(0.0200)</td>
</tr>
<tr>
<td>Central Government Debt to GDP (MID-CRISIS)</td>
<td>0.0370***</td>
<td>0.114***</td>
<td>0.00277</td>
</tr>
<tr>
<td></td>
<td>(0.00536)</td>
<td>(0.0196)</td>
<td>(0.00190)</td>
</tr>
<tr>
<td>Inflation (MID-CRISIS)</td>
<td>-0.141</td>
<td>-0.842*</td>
<td>0.180</td>
</tr>
<tr>
<td></td>
<td>(0.185)</td>
<td>(0.464)</td>
<td>(0.113)</td>
</tr>
<tr>
<td>Current Account Balance as a % of GDP (MID-CRISIS)</td>
<td>0.0672**</td>
<td>-0.0213</td>
<td>-0.0236*</td>
</tr>
<tr>
<td></td>
<td>(0.0309)</td>
<td>(0.0528)</td>
<td>(0.0125)</td>
</tr>
<tr>
<td>Unemployment Rate (MID-CRISIS)</td>
<td>0.302***</td>
<td>0.418***</td>
<td>-0.0350***</td>
</tr>
<tr>
<td></td>
<td>(0.0683)</td>
<td>(0.0850)</td>
<td>(0.0133)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.498**</td>
<td>-0.738</td>
<td>0.154</td>
</tr>
<tr>
<td></td>
<td>(0.249)</td>
<td>(1.823)</td>
<td>(0.349)</td>
</tr>
</tbody>
</table>

Observations: 996 255 346
R-squared: 0.745 0.871 0.726
Country and time FE: YES YES YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The estimations of method 2 show that the increases in the coefficients were statistically significant for most variables. Moreover, running the regression firstly with only the five peripheral countries (PIIGS) and secondly with the rest of the euro states (excluding PIIGS) produces illuminating results. In particular, looking at the coefficients after the crisis started (bottom part of columns 2 and 3), we can see that the significant increases in most of the coefficients, especially fiscal fundamentals and unemployment, are driven by the periphery. In the rest of the euro states there has not been significant increases in the coefficients – in fact a significant decrease for the current account balance and unemployment. This suggests that spreads in the periphery compared to other countries followed completely different dynamics after the crisis started.

There is in fact evidence of the changed pricing behavior by the market during the crisis: our regressions confirm the interpretation of Arghyrou and Kontonikas (2011) that, during the euro crisis, markets have penalized the fiscal and other macroeconomic imbalances in the periphery much more stringently than they did before the crisis.

Next, instead of spending time on further discussing these descriptive regressions, we turn to the related graphs: our main insights are indeed drawn from the graphical analysis, which is conducted by focusing on one peripheral country, Italy, as an example. It should be emphasized that, regardless of the peripheral country in question, the results are very similar; Italy is chosen here arbitrarily. The graphs for all peripheral countries are available in Appendix 1.

Both methods lead to similar results in describing the evolution of the spreads based on fundamentals. Figure 4 indicates that, based on the relationship between fundamentals and bond spreads between the Lehman Brothers collapse and OMT – in all sample countries – the post-crisis fundamentals of Italy suggest skyrocketing post-OMT bond spreads for the country. Although the fitted values are far from representing an actual counterfactual, we can infer that OMT contributed to breaking up the mid-crisis association between spreads and fundamentals. Figure 5 based on method 2 confirms this result.

Again in Figure 4, the fitted values based on pre-Lehman estimates suggest that the evolution of spreads during the financial crisis was abnormal: based on the pre-crisis association, the mid-crisis fundamentals of Italy would suggest a lower and relatively constant spread over Germany between 2009 and 2014. If we assume that the pre-crisis relationship represented a sustainable steady-state or a positive equilibrium, we can conclude that the economic crisis broke down this state of affairs in the case of Italy (and other peripheral countries). Moreover, OMT seems to have contributed to bringing the actual spread closer to this potentially optimal level after mid-2012.

The graphs for other peripheral countries found in Appendix 1 provide largely similar results. Some notable cases that partly differ from Italy are Portugal and Ireland, in which the predicted post-OMT trends eventually turn into a declining trajectory: in the case of these countries, the mid-crisis association between fundamentals and spreads better reflects some sort of a beneficial steady state, and OMT’s contribution was probably smaller. Noting that the decline in their spreads began earlier than the initiation of OMT reinforces this conclusion. Other research also supports this view, and the significant effects that have been found consistently concern Greece, Spain and Italy (see chapter 2.4).

### 3.3 Synthetic control method

The synthetic control method, developed by Abadie and Gardeazabal (2003) and extended by Abadie, Diamond and Hainmueller (2010, 2014), is a tool to estimate causal inference in comparative case studies. The method estimates the effect of a policy intervention (e.g. OMT) by comparing the evolution of an aggregate outcome variable (e.g. bond spread) for a unit affected by the intervention (e.g. Spain) to the evolution of the same aggregate outcome for a synthetic control group. This synthetic control group is constructed by looking for a weighted combination of control units (e.g. other OECD countries) chosen to approximate the country affected by the policy in terms of the outcome predictors (e.g. determinants of bond spreads).

The evolution of the outcome for the resulting synthetic control group is an estimate of the counterfactual of what would have been observed for the affected unit in absence of the intervention. The methodology can be used rather simply in STATA.

We present our basic results focusing on Spain. The graphs for other peripheral countries can be found in Appendix 2 and they are also briefly discussed at the end of this subchapter with regard to any specific findings. At any rate it is notable that, regardless of the peripheral country in question, the results are again very similar. Spain is chosen here arbitrarily – similarly to Italy in the regression analysis above.

To start off, Figures 6 and 7 below present an example of the application of the synthetic method in the context of the OMT program. Note that the synthetic control group is always constructed of two different sets of countries – non-euro OECD countries and non-European OECD-countries. In Figure 6, the aggregate outcome variable is the long-term interest rate or yield, whereas in Figure 7 it is the bond spread over Germany – the variable which we mainly use in our analysis. Focusing on the yield however provides a more transparent account of how the evolution of the synthetic outcome approximates the evolution of the actual outcome in the so-called matching period.
As mentioned above, the synthetic control group is constructed by looking for a weighted combination of non-affected comparison countries, chosen to approximate Spain – the unit affected by the OMT – in terms of the spread determinants. The matching period, in all specifications in which the method is used, is Q1/2000–Q4/2009 – or the period before the euro crisis actually started. The matching period corresponds to "a common period over which all predictors should be averaged" (specified by the xperiod command) and a "period over which the mean squared prediction error (MSPE) should be minimized" (specified by the mspeperiod command). The MSPE corresponds the squared deviations between the spread for the treated country and the synthetic control country, summed here over all pre-euro crisis time periods.

In simple terms, the matching period is the period over which spread determinants such as inflation and debt-to-GDP are compared between Spain and non-euro control countries to build the synthetic control group. The control group is generally comprised of several non-euro countries. After the algorithm has constructed the control, it is interesting to compare the bond spreads between synthetic Spain and actual Spain. What we are particularly interested in is what happens to the difference in spreads after the crisis starts (Q4/2009) and after the ECB has initiated Outright Monetary Transactions (Q4/2012).

Both figures, found in page 18 below, reveal similar insights. Firstly, the synthetic control closely approximates Spain in the pre-crisis period. This suggests that there are countries in the sample for which similar evolution of the spread determinants corresponds to similar evolution of the bond spreads. In other words, the relationship between the fundamentals and spreads is comparable between the synthetic Spain and Spain itself.

Secondly, after the crisis begins in the eurozone, the methodology allows us to see what happens to the spread of the synthetic Spain, which is indeed constructed of several countries – those that best match Spain with regard to pre-crisis fundamentals. The differences are clear: the control yields decline and spreads stay approximately constant, while the actual yields and spreads skyrocket. As in the case of the regression analysis, the synthetic method suggests that Spain – together with other peripheral countries – experienced something else than general problems with economic fundamentals. This can be interpreted as panic over a possible sovereign default or breakdown of the currency union that was disconnected from "normal" associations between spreads and fundamentals.

Even more importantly, the graphs point out to OMT’s effect in decreasing the bond yield and the spread over Germany: the control countries do not experience much decline in their outcome variables after OMT and, in the case when synthetic Spain is constructed from non-European control countries, the yields and spreads actually tend to increase. OMT probably had a small effect on the spreads of non-euro countries in Europe, while outside of Europe the effect can be expected to be non-existent. The distinction between OMT’s potential effect on Spain compared to that on the synthetic counterfactuals is illuminating and validates the results of the regression analysis. Again in the case of Ireland and Portugal, other policies may have been partly responsible for the decline in their spreads, which began before OMT’s initiation.

FIGURE 7. Synthetic control method applied to Spain using bond spreads over Germany. The matching period used is again Q1/2000–Q4/2009 (pre-euro crisis). Please find the data sources on the graph.
3.4 Results from quantitative analysis

The purpose of the quantitative analysis was to examine OTM’s effect on declining bond spreads in the peripheral countries after mid-2012 and to analyze the dynamics of mid-crisis hikes in the spreads. For these purposes we relied on simple, graphically oriented regression analysis as well as the synthetic control method introduced by Abadie and Gardeazabal (2003).

Our results suggest, firstly, that the post-Lehman increase in sovereign bond spreads in the periphery was largely induced by fears of sovereign default that were disconnected from “normal” associations between spreads and economic fundamentals. Our regression analysis indicates that the mid-crisis evolution of peripheral spreads differs strikingly from the values predicted based on the stable period between 2000 and 2008. Furthermore, countries outside the periphery do not suffer from the pronounced association between spreads and fundamentals. The synthetic control method confirms these results: the synthetic control countries we construct based on the spread determinants or fundamentals of the peripheral countries do not experience any such increases in their spreads.

Secondly we find that OMT was very likely to be responsible for the rapid decline in peripheral spreads after mid-2012. The regression analysis suggests that post-OMT trends in spreads approach the stable values predicted based on the pre-crisis period. OMT also breaks up the upward trend predicted based on both the whole pre-OMT period and the mid-crisis (pre-OMT) period. Similarly, the synthetic control countries we create do not experience major downward shifts or changes of direction after the program is announced – as opposed to the real spreads. The method also lends strong support to OMT’s significant role in containing the elevated financial costs in the peripheral euro countries after mid-2012.
4 Conclusions and recommendations

4.1 Key conclusions and related literature

Our quantitative analysis lends support to OMT’s effect on the declining peripheral bond spreads after mid-2012 as well as to the panic-driven evolution of the spreads before the OMT announcement. The results broadly validate earlier research by Krishnamurthy et. al (2013) and Altavilla et al. (2014) regarding OMT’s effect, and Arghyrou and Kontonikas (2011), De Grauwe and Yi (2012) as well as Di Cesare et al. (2012) regarding the panic-driven nature of the increased sovereign bond spreads in the periphery during the crisis.

Related literature also sheds light on the fundamental logic behind our findings. In particular, although the market’s assessment of creditworthiness of the peripheral countries probably reflected a real default risk, the default risk itself stemmed not from the deteriorating sustainability of economic fundamentals but from the institutional construction of the European Monetary Union – in particular, the lack of a lender of the last resort. The absence of large-scale fiscal backstopping, which OMT came to represent, made the risk of sovereign defaults and eurozone breakup self-fulfilling.

Furthermore, OMT evidently had the intended effect of reducing bond spreads and stabilizing monetary policy in the euro region. There is also no direct indication that implementing outright bond purchases through the program will ever be necessary. Regardless, it is still possible that the program will have to be used, which would lead to additional issues to consider with regard to the true costs and benefits of the policy. It is also clear that, even if no purchases are made, the policy remains open to critique from various perspectives. Related concerns are discussed in more detail below.

4.2 Reservations, long-term concerns and potential costs of OMT

Moral hazard. Many concerns about OMT are associated with moral hazard. The general argument stems from the idea that sovereign debt markets function as a disciplining device. If governments decide to adopt irresponsible economic policies, for instance through permanent and unsustainable imbalances in national accounts, the markets will normally penalize them by asking for a higher interest rate. The critics of OMT claim that the awareness of potential bond purchases undermines incentives for reform at the national level through more lenient government financing conditions.

In particular, it is important to notice that OMT acts as a kind of guarantee for investors. If the OMT announcement (even without the realization of bond purchases) brings spreads below their natural market levels, therefore mispricing sovereign bonds, states might have incentives to leverage in excess and hold overly risky positions, especially when it comes to borrowing by the government. (Siekmann & Wieland, 2013b; Mody, 2014).

Altogether it is surely possible – although rather uncertain – that the risks associated with ex-ante guarantees from the OMT promise are materialized ex-post. However, the statement requires the assumption that OMT indeed brings spreads below market-driven natural levels. As we concluded earlier in the quantitative analysis, this has not been the case so far: the mid-crisis stage seems to reflect abnormal associations between peripheral spreads and fundamentals, and OMT has thus far merely revised this relationship towards the longer-term steady-state. Moreover, the steady-state level is based on the associations between spreads and fundamentals that most other OECD countries share.
Harmful conditions. Some authors agree with the premise of OMT but believe that the conditions accompanied by prospective bond purchases would lead to negative outcomes: Boone and Johnson (2012) for instance underline that countries potentially benefiting from OMT would also need to enforce spending cuts and structural reforms, although further austerity is politically impossible to enforce in southern Europe. Mitchell (2012) argues that, if put to use, the fiscal conditions attached to OMTs would help deteriorate the growth prospects of the peripheral countries further. These concerns characterize a broader debate in post-crisis economic policy in the eurozone and elsewhere, in which mainstream economists argue for further fiscal adjustments and internal devaluation, whereas more heterodox and Keynesian scholars often have very contrasting views. The debate is evidently reflected in the arguments regarding the ECB’s underlying role as well as OMT program itself.

Our conclusion based on relevant literature is that the conditions actually provide an effective way of further discrediting the claims regarding moral hazard. Following Cœuré (2012), the conditionality attached to OMT would, in the case of actual purchases, better align the incentives for the sovereign in question: the purchases would both alleviate the growing debt concerns driven by skyrocketing interest rates and incentivize the government to improve fiscal balances if necessary.

Internal inconsistency. Some economists question the internal consistency of the program. Starbatty (2012) for instance argues that the conditional clause incorporated in OMT cannot be credible, because suddenly stopping bond purchases – due to unsatisfactory fulfillment of the conditions – would imply further harm to the monetary policy transmission mechanism. Effectively the authors argue that, once started, outright bond purchases can no longer be stopped.

Based on literature and also suggestive descriptive evidence, the more probable scenario is that, if outright monetary purchases were implemented, it would be significantly easier for the given country to fulfill the specified conditions. The fiscal balances of the peripheral countries, for instance, have been under distinctly less strain after the sheer OMT announcement. The financial costs that are added to primary deficits had grown enormous when approaching mid-2012, making it extremely difficult for countries to cope with the pressure to improve public financials. After OMT this has not been the case, which is also easy to witness empirically in the decreasing deficits in the periphery. In the case of actual purchases, a similar effect on spreads and public deficits could be expected.

Fiscal redistribution from OMT. According to this argument, sovereign debt purchases expose the ECB to balance sheet risk, which could lead to fiscal redistribution among euro countries. Under a scenario in which some countries that are benefiting OMTs default on their debt, the hypothetical losses would have to be shared among all euro countries according the proportion of capital that each country represents in the ECB's balance sheet (Siekmann & Wieland, 2013a). According to monetary theory, however, as long as the ECB – together with the euro – maintains its confidence among global investors, any credit risk accumulated in its balance sheet will not have to be accounted for by sovereign countries. Moreover, as a matter of the ECB's legal framework, it can run as large a negative balance sheet as it wishes without terminating any of its basic functionalities (Ward, 2012). Still it is clear that there are economic risks involved, in particular with respect to inflation.

Inflation. Inflation could indeed be induced in case the ECB eventually had to make outright bond purchases. One could for instance point out to the fact that bonds from different countries are not perfect substitutes. According to a more general argument, an expansion of a central bank's balance sheet would eventually flow into prices. First it is useful to remind that, according to the ECB, OMT would use sterilization to offset any effects on the eurozone money supply. This alone would invalidate the general suggestion. Of course, an ex-ante promise of sterilization does not guarantee it ex-post. Hence it is useful to turn to literature and empirical evidence.
A glance at central bank balance sheets after the global financial crisis leads to an alarming conclusion: the balance sheets have expanded significantly. Figure 8 portrays this observation in the case of the three largest central banks – European Central Bank (ECB), U.S. Federal Reserve (Fed) and Bank of England (BoE).

Here it is illuminating to examine the actual empirical relationship between inflation and central bank balance sheets. While the conventional wisdom would predict higher inflation in the eurozone, USA and Japan after 2008, this does not seem to hold in practice: inflation has been broadly stable or decreased in these regions after the crisis (Corsetti and Dedola, 2013).

**FIGURE 9.** Euro area base money (trillions of euros, right scale) and inflation (moving 12-months average rate of change, left scale) between early 2005 and early 2014. Derived from data. Please find the sources on the graph.
As an example, Figure 9 presents the money base and inflation rate in the eurozone since early 2005. The "bumps" in the base (red line) largely represent bond purchased by the ECB through the SMP, and are also visible in Figure 8 as "liquidity operations". Despite broadly similar-looking post-crisis trends, base money does not seem to offer decent explanatory power on forthcoming inflation. For instance, the first two major initiatives by the ECB after the Lehman collapse are associated with failing inflation, and the purchases made in late 2011 and 2012 follow the gradually recovering inflation rate – they do not stimulate it.

Further support to this narrative – suggesting that actual OMTs would not necessarily lead to inflation – can be found from literature. The paper by De Grauwe and Ji (2013) argues that the potential activation of outright monetary purchases by the ECB could have an effect on the inflation rate depending on whether the eurozone stays in a liquidity trap. Their argument is simply that the monetary multiplier during crises becomes smaller. After conducting an econometric analysis for evaluating the effect of the monetary base on inflation, the authors reach the conclusion that, as long as the crisis goes on, bond-buying programs will not have inflationary implications. Furthermore, it seems evident that most purchases, even through OMT, can be expected to discontinue after the crisis.

However, the inflation argument can be made even without actual purchases; perhaps the market expects higher inflation in the future due to the prospective, expected costs from OMT, which the ECB allegedly has to balance out. In this case, it is useful to examine expected inflation.

When looking at the time periods before and after OMT, inflation was 2.4% in July 2012 (according to the ECB and Eurostat), unchanged from the previous month, while short-term expectations settled at 2.3% and 1.7% for 2012 and 2013 respectively. This small revision downward is explained by declines in energy and commodities prices, weak growth prospects and increasingly limited wage demands. Expectations for 2014, in turn, stand at 1.9%.

Longer-term inflation expectations seem to remain at the same level as well – at 2% according to the ECB’s monthly bulletin in August 2012, November 2012 and February 2013. Moreover, the estimated probability of inflation of "2% or more" remained at around 50% (49%–52%) between August 2012 and February 2013. During the same period, the uncertainty about longer-term inflation expectations, as measured by the standard deviation of the point forecasts, decreased by 0.1 percentage points – from 0.3 to 0.2.

Inflation expectations could potentially indicate that the market would expect the ECB to use inflation in the future to balance out sovereign bond purchases through OMT. A simple look at the statistics on expected inflation invalidate this concern: there are no significant changes visible. Altogether our analysis suggests that, while inflation remains a possible yet uncertain concern, there are no explicit reasons to believe that it would present itself as a major concern in the near future.

**Problems with full sterilization.** In case OMT was to be implemented, problems might arise if the ECB decided to adopt full sterilization. Since eurozone bond yields differ from country to country, the timing and likelihood of default of different countries differ as well: if the ECB holds large quantities of bonds from several eurozone member states, problematic implications on the money supply could occur. In particular, in the case of default, interest must be paid on the deposit accounts, but the defaulted bonds will not bring any more income – which has a direct effect on the money supply. So in a way, the success of the OMT relies on avoiding sovereign defaults. If this was not the case, the ECB would need to set an optimal consumption portfolio to avoid misalignments of potential inflation expectations from its targets. Altogether the scenario can be considered a valid risk, although many steps are required for the threat to be realized – especially the implementation of OMT and sovereign defaults even under the program. Moreover, even in the case of default, expanding the central bank's balancing does not necessarily have inflationary consequences, as explained above.
OMT would not guarantee monetary policy transmission. OMT was implemented partly in order to harmonize monetary policy in the euro region. The ECB’s success in terms of this objective rests on the assumption that the bond yields are correlated to a great extent with the bank-lending rate. However, this seems not to be exactly the case in the eurozone. In fact, an estimation of a figure of the ECB’s sovereign bond purchases that would guarantee the needed correlation – a correlation which would correspond appropriate monetary policy transmission – are 250 billion euros. This is 37% of the short-term debt of the crisis-struck countries of the eurozone. (Hristov et al., 2014).

We note here that although not perfectly, OMT still has improved monetary policy transmission in the euro region and the stated correlation is constantly improving.

Broken ECB mandate. An additional argument against OMT, raised by many critics especially on the legal front, is the claim that the policy surpasses the ECB’s mandate. Especially the German Court has been drawing from this premise for the previous few years. The critics of the ECB have also more broadly questioned whether OMT and the earlier Securities Markets Programme (SMP) comply with the Treaty on the Functioning of the European Union (TFEU), which prohibits the ECB and national central banks from granting loans in favor of any government entity (EU, 2013). The German Court for instance argues that the ECB’s purchases of sovereign bonds on the secondary markets with the aim of financing government budgets independently from capital markets would violate the prohibition of monetary financing. (Oendahl & Nowakowski, 2013; Siekmann & Wieland, 2013a).

Our stance, again based on literature, is clear: in case the ECB indeed breaks its mandate through OMT, our results simply indicate that the mandate is not economically or socially optimal. The eurozone should not be kept in captivity of nonfunctional legal restrictions.

4.3 Policy recommendation

After considering the relevant literature, our quantitative results, and the suggested costs of the program, we strongly believe that OMT should be resumed by European policymakers. Continuation of the policy would guarantee that the euro regime would have its lender of the last resort – similarly to most sovereign countries today – standing ready to purchase sovereign debt in order to neutralize the effects of temporary market disruptions.

Moreover, terminating OMT now would be likely to threaten the recovery process and the long-term stability of the European Monetary Union, in particular through inducing higher spreads and public financial costs in the region’s countries. This risk would be much higher than the suggested costs from actually having to implement outright bond purchases. Furthermore, as been stated many times, OMT is likely to remain a promise with no explicit costs.

Still, given our extensive analysis in the previous subchapter, specific warranties are certainly needed. Most importantly, the Governing Council of the ECB should follow the terms of conditionality very strictly in order to neutralize the suggested moral hazard problems – namely that countries selling debt at guaranteed low costs might postpone necessary policy reforms or engage in fiscal free-riding.

Finally it is clear that OMT alone cannot be sustainable nor guarantee the future stability of the eurozone. Additional policy measures, clearly outside the scope of this paper, are needed – and to some extend implemented – to help strengthen the recovery of the monetary union and to improve its long-run stability.
References


ECB (European Central Bank), (2012c). Summary of ad hoc communication, February 13th.


Appendix 1: Graphs from the regression analysis

FIGURES 10–19. Regression analysis for the five peripheral countries (left) and five arbitrarily chosen comparison countries (right). All specifications for fitted values of bond spreads are presented. Note that the y-scales in the graphs is equivalent throughout with the exception of Greece.
Appendix 2: Graphs from the synthetic control method

FIGURES 20–25. Synthetic control method applied to the five peripheral countries using bond spreads over Germany. The matching period used is Q1/2000–Q4/2009 (pre-euro crisis). For Greece there are two graphs: one where the y-scale matches the other graphs and one where the spread is fully visible.
FIGURES 26–31. Synthetic control method applied to the five peripheral euro countries using long-term interest rates (or yields). The matching period used is again Q1/2000–Q4/2009. There are again two graphs for Greece. Note that Italy’s synthetic control based on non-euro countries only involves non-European countries, so there’s only one control curve.