Cause and effect of the TARGET2 balances
A risk-based analysis of the TARGET2 balances, their roots, and their impact on the capital market

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<td>Asset backed securities</td>
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<td>ABSSPP</td>
<td>Asset backed securities purchase programme</td>
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<td>APP</td>
<td>Asset purchase programme</td>
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<td>BIS</td>
<td>Bank for international settlements</td>
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<td>CB</td>
<td>Central Bank</td>
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<td>CBPP3</td>
<td>Third covered bond purchase programme</td>
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<td>CPI</td>
<td>Consumer price index</td>
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<td>CQS</td>
<td>Credit quality step</td>
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<td>CSPP</td>
<td>Corporate sector purchase programme</td>
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<td>EAPP</td>
<td>Expanded asset purchase programme</td>
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<td>ECAF</td>
<td>Eurosystem credit assessment framework</td>
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<td>ECAI</td>
<td>External credit assessment institution</td>
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<td>ECB</td>
<td>European Central Bank</td>
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<td>ELA</td>
<td>Emergency liquidity assistance</td>
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<td>ESCB</td>
<td>European System of Central Banks</td>
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<td>ESM</td>
<td>European Stability Mechanism</td>
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<td>EU</td>
<td>European Union</td>
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<td>FAZ</td>
<td>Frankfurter Allgemeine Zeitung (also F.A.Z.)</td>
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<td>GCB</td>
<td>German Central Bank (Deutsche Bundesbank)</td>
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<td>GDP</td>
<td>Gross domestic product</td>
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<td>HICP</td>
<td>Harmonized index of consumer prices</td>
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<td>ISIN</td>
<td>International Securities Identification Number</td>
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<tr>
<td>LOLR</td>
<td>Lender of last resort</td>
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<td>MFO</td>
<td>Marcuard Family Office Ltd.</td>
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<td>NCB</td>
<td>National central bank</td>
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<tr>
<td>NZZ</td>
<td>Neue Zürcher Zeitung (daily newspaper in Switzerland/Zurich)</td>
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<td>OTC</td>
<td>Over the counter</td>
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<td>POD</td>
<td>Probability of default</td>
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<td>PSPP</td>
<td>Public sector purchase programme</td>
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<td>QE</td>
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<td>REF.</td>
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<td>Real-time gross settlement</td>
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<td>TARGET</td>
<td>Trans-European Automated Real-time Gross Settlement Express Transfer</td>
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<td>TFEU</td>
<td>Treaty on the Functioning of the European Union</td>
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Bibliography & Sources

Books
CFA Institute, Derivatives and Alternative Investments, USA, 2010.
Da Costa Cabral, Nazaré; Gonçalves, José Renato; Cunha Rodrigues, Nuno (eds.), The Euro and the Crisis, 1st edition, Cham, 2017.
De Roure, Calebe, Fire Buys of Central Bank Collateral Assets, Frankfurt am Main, 2016.
Karadzic, Petra; Keller, Andreas, TARGET2 ein Wandelndes Pulverfass?, Wiesbaden, 2014.

Journals
**Presentations, Meetings and Speeches**


Publications and other sources


Deutsche Bundesbank, Monthly Report March, 2016, Available from

Deutsche Bundesbank, What is the origin and meaning of the Target2 balances?, 2012,
Available from

Draghi, Mario, The ECB President’s response to a MEP’s inquiry: Re: Your letter Reference
QZ-013, 2017, Available from

Draghi, Mario, The ECB President’s response to a MEP’s inquiry: Re: Your letter Reference
QZ-117, 2017, Available from

Draghi, Mario, The ECB President’s response to a MEP’s inquiry: Re: Your letter Reference
QZ-120, 2017, Available from

European Central Bank, Annual Accounts, 2015, Available from

European Central Bank, Annual Accounts, 2016, Available from


Hughes Hallett, Andrew; Fiedler, Salomon; Kooths, Stefan; Stolzenburg, Ulrich; Blot, Christophe; Creel, Jérôme; Hubert, Paul; Labondance, Fabien; Ragot, Xavier, Extending quantitative easing: Additional risks for financial stability?, 2017, Available from www.europarl.europa.eu/cmsdata/116967/COMPILATION_Feb%202017_TOPIC_1_FINAL_online.pdf, Accessed on 07.05.2017.


Newspaper Articles


**Legislation**

Consolidated version of the Treaty on the Functioning of the European Union (TFEU), Published on 7th June 2016, (2016/C 202/01), OJ C 202/47.


Protocol (No. 4) on the Statute of the European System of Central Banks and of the European Central Bank, Published on 26th October 2012, OJ C 326/230.
Web pages


I. Introduction

The discussion about TARGET2 balances was initiated by Hans-Werner Sinn\(^1\) in 2011.\(^2\) TARGET stands for “Trans-European Automated Real-time Gross Settlement Express Transfer”, with “2” denoting the second generation. The first version of TARGET went live in January 1999 and was replaced by TARGET2 in May 2008.\(^3\) TARGET2 “settles payments related to monetary policy operations, interbank and customer payments, and payments relating to the operations of all large-value net settlement systems and other financial market infrastructures handling the euro.”\(^4\) TARGET2 is operated on a single shared platform and connects its users with their national central bank (NCB), and the NCBS with the European Central Bank (ECB). It is used by more than 1,700 European credit institutions to make payments on their own, or their customers’ behalf. Worldwide, more than 55,000 banks are connected through TARGET2.\(^5\) TARGET2 movements generate balance sheet positions of all euro area countries’ NCBS through cross-border settlements. The debate is about the risk involved with TARGET2 balances, the specific risk to one country and the collective EU risk.

The German Central Bank (GCB), for example, had a positive TARGET2 balance of nearly €861 billion as of 30 June 2017.\(^6\) Conversely, Italy and Spain had a combined negative balance of €797 billion (by the end of May 2017).\(^7\) The discussion continues today because a common understanding has not yet been reached of either an appropriate definition of TARGET2 balances or the associated risk. For a layperson, it is even more difficult to understand this complex issue, because experts and politicians often either talk at cross-purposes or have a different understanding of the issue. Thus, my aim with this thesis is to shed some light on this topic through a facts-based analysis. The thesis should enable the reader to form his or her own opinion after reading an article about the TARGET2 balances.

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1 Hans-Werner Sinn is the former President of the Ifo Institute and Director of the Centre for Economic Studies. He was appointed Professor at the Ludwig Maximilian University of Munich in 1984 and professor emeritus in April 2016. See Sinn, Hans-Werner, Ad personam (personal web site).
2 Sinn, Hans-Werner, Target Debate.
4 European Central Bank, Target2.
5 European Central Bank, What is TARGET2.
6 Deutsche Bundesbank, Target2 – Balance.
II. What is this master’s thesis about?

This master’s thesis aims to explain what the TARGET2 balances are, how they were created and how their cause and effect are related. Further, it evaluates the various risks involved with both the formation mechanism and the TARGET2 balances themselves. One main driver for the increase in the TARGET2 balances in recent times is the European expanded asset purchase programme (EAPP). The GCB noted in its monthly report in March 2016 that “It is (...) reasonable to assume that the recorded increase in the TARGET2 balances might be connected with the EAPP”.8 Mario Draghi (2017), the president of the ECB, was even more precise in stating that “the recent increase in TARGET2 balances largely reflects liquidity flows stemming from the ECB’s asset purchase programme (APP). TARGET2 balances have been increasing since the start of the APP.”9 Thus, the main focus of this thesis is the EAPP that was launched in 2015. The term APP is used equivalent to EAPP in this thesis.

A. Research Problem and Questions

Many debates have occurred in relation to the TARGET2 balances, such as whether they belong to the Eurosystem and whether they qualify as credits or merely as an accounting variable. I speculate that to understand the risk in relation to the TARGET2 balances, one needs to look at the issue in a bigger context, rather than looking at it in isolation. Therefore, the aim of this thesis is to provide a risk-based outline of the TARGET2 balances in the context in which they have arisen, and to determine what other risk, if any, stems from the same source as the TARGET2 balances. With this in mind, I have formulated the research question as follows: “What are TARGET2 balances and their causes in the context of the Eurozone debt crisis post-2015, and what is the risk in relation to the situation in 2017?”

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III. TARGET System

To enable a better understanding of the TARGET system, here I provide an introduction to the history and purpose of the system. In the mid-1990s, following the change from national currencies to the euro, the question arose among the various NCBs as to “how the euro could [efficiently] circulate between the member states in a fast and reliable way.” The member states generally used a real-time gross settlement (RTGS) system for their national currency, but there was no common payment system for the euro at that time, and there was insufficient time to build a new system. They defined some minimum standards to harmonize at least some of the features of the existing RTGS systems and link them with each other. TARGET was the system that was developed to link these local systems. The RTGS systems incorporated an inherent credit risk, which the euro countries mitigated by providing collateral for overdraft facilities.

TARGET went live in 1999 following the launch of the euro, and offered a cross-border payment service. Participants in the TARGET2 system are the “EU central banks and their national communities of commercial banks.” TARGET was intended to facilitate the processing of time-critical and large-value euro payments related to monetary policy operations or systemically important payments. The most important objective was “to serve the needs of the monetary policy of the Eurosystem.” The Eurosystem contains all EU-NCBs that have the euro as their official currency, and is the same as the Eurozone and the ECB. The use of TARGET turned out to be broader than originally intended, as it was also used for commercial payments, as well as for other cross-border transactions.

11 European Central Bank, About its forerunner TARGET1 and European Central Bank, TARGET2.
13 European Central Bank, About its forerunner TARGET1.
14 European Central Bank, What is TARGET2?.
15 European Central Bank, TARGET2.
17 There are currently nineteen NCBs.
18 European Central Bank, ECB, ESCB and the Eurosystem.
As mentioned above, there was not enough time to build a new harmonized system, and so TARGET merely linked the old systems together. The second generation, TARGET2, addressed the demand for a more harmonized system. It also moved from a decentralized multi-platform structure to a technically centralized platform and offered a standard interface for ancillary systems that were operated and owned by the Eurosystem. In 2015, payments through the 79 ancillary systems comprised around 15% of all payments. More than half of all TARGET2 payments consist of customer payments, while another 30% are interbank payments.\(^\text{19}\) The TARGET2 balances are interest bearing at the main refinancing rate, and the profit and loss is distributed according to the adjusted capital key. “TARGET balances emerge when the central bank reserves created in one jurisdiction flow to another.”\(^\text{20}\) The main task of the Eurosystem is to maintain price stability and keep the inflation rates at the desired quantitative level.\(^\text{21}\) “The ECB’s Governing Council has defined price stability as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%. (…) The Governing Council has clarified that, in the pursuit of price stability, it aims to maintain inflation rates below, but close to, 2% over the medium term.”\(^\text{22}\) Additional objectives are to “[minimize] systemic risk in the payments market and [increase] the efficiency of cross-border payments in euro”.\(^\text{23}\) The Governing Council of the ECB and the members of the ECB executive board take the decisions for the Eurosystem,\(^\text{24}\) defining and implementing monetary policy for the euro area. The Governing Council of the ECB is made up of all the governors of the Eurozone NCBs,\(^\text{25}\) and decisions are taken collegially. The standard monetary policy tool they use is the interest rate, but during the European debt crisis, they utilized additional tools.

\(^\text{19}\) European Central Bank, TARGET Annual Report, 2015, 10.  
\(^\text{21}\) European Central Bank, Objective of monetary policy and Consolidated version of the TFEU, Published on 7 June 2016, (2016/C 202/01), OJ C 202/47, Article 127(1).  
\(^\text{22}\) European Central Bank, Monetary Policy – Strategy.  
\(^\text{23}\) European Central Bank, Target2 Vision.  
\(^\text{24}\) Consolidated version of the TFEU, Published on 7 June 2016, (2016/C 202/01), OJ C 202/47, Article 129(1) and Protocol (No. 4) on the Statute of the European System of Central Banks and of the European Central Bank, Published on 26. October 2012, OJ C 326/230, Article 9(3).  
\(^\text{25}\) Consolidated version of the TFEU, Published on 7 June 2016, (2016/C 202/01), OJ C 202/47, Article 283(1) and Protocol (No. 4) on the Statute of the European System of Central Banks and of the European Central Bank, Published on 26. October 2012, OJ C 326/230, Article 10(1).
A. TARGET2 balances

“[TARGET2] balances are claims and liabilities of the individual central banks of the Eurozone vis-à-vis the Eurosystem that are booked as such in the balance sheets of the NCBs.”

If the difference between the original central bank money created and the money available in this NCB’s jurisdiction is negative (positive) it is a TARGET2 liability (claim), which was created through cross-border purchases (sales) of goods and assets. The following example will make it easier to understand how TARGET2 balances appear. A German company delivers a product to a Spanish company. The Spanish company instructs its local Spanish bank (Bank A) to pay the requested amount to the German company’s German bank (Bank B). The euro transaction goes cross-border via the TARGET2 system. Both banks have accounts with their NCB. As soon as Bank A submits the payment instruction, its account is debited and Bank B’s account is credited, settling the transaction. The important thing to remember is that this payment creates a liability for the Spanish NCB to the ECB, while the German NCB now has a demand on the ECB. Thus, the ECB acts as an intermediary between the NCBs of Spain and Germany.

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28 European Central Bank, TARGET2.
29 Karadzic, Petra; Keller, Andreas, TARGET2 ein wandelndes Pulverfass?, Wiesbaden 2014, 16.
The chain mostly starts with a private person or company, moves to a house bank, and then to an NCB, with the ECB acting as an intermediary link between the two countries’ NCBs. When a cross-border transaction is undertaken within the Eurozone and is not cancelled out by the other transactions an NCB has made during the day, the NCB raises a debit or credit with the ECB for the net amount. As a result, in the above example, the GCB has a debit against the ECB and the NCB of Spain has a credit with the ECB. As mentioned previously, international commercial banks can also participate in TARGET2 via the GCB. “Inflows to accounts held at the [German] Bundesbank are generated whenever other Eurosystem NCBs purchase securities from these banks.”

Increases in the GCB’s TARGET2 balances also result from the fact that “almost 80% of bonds purchased by national central banks under the APP were sold by counterparties that are not resident in the same country as the purchasing national central bank, and roughly half of the purchases were from counterparties located outside the euro area.”\textsuperscript{32} Within the Eurozone, at the ECB level, the TARGET2 balances cancel each other out, because the debtors and the creditors are all in the Eurozone, and therefore the overall sum is zero.\textsuperscript{33} If Germany has a claim on the ECB and has a net CB outflow to Spain, which has a liability to the ECB, the TARGET2 balances increase. Conversely, a CB money flow from Spain to Germany would have the opposite effect and decrease the total TARGET2 balances within the Eurozone, because Spain “is paying some money back” to Germany via the ECB. Figure 2 shows the cross-border impact of the asset purchase programme on TARGET2 liabilities.

\begin{center}
\textbf{Figure 2: Impact of the APP on TARGET2 liabilities (Adapted from Ref. 34)}
\end{center}

\begin{itemize}
\item NCB buys domestic bonds (domestic country = “A”)
\item Investor (bond seller) has a domestic account
\item Investor leaves money at the domestic bank or buys asset with domicile of the NCB
\item NCB’s TARGET2 liabilities unchanged
\item Investor (bond seller) with an account abroad
\item Investor transfers money to another Eurozone bank or buys asset abroad but in the Eurozone (not in A)
\item NCB’s TARGET2 liabilities increase
\item Investor leaves money at the bank or buys asset elsewhere in the Eurozone
\item NCB’s TARGET2 liabilities increase
\item Investor transfers money to a bank with domicile “A” or buys asset in country “A”
\item NCB’s TARGET2 liabilities unchanged
\end{itemize}

\textsuperscript{32} Draghi, Mario, The ECB President’s response to a MEP’s inquiry: Re: Your letter Reference QZ-117, 2017, 1.

\textsuperscript{33} Sinn, Hans-Werner; Wollmershäuser, Timo, Target loans, current account balances and capital flows: the ECB’s rescue facility, Int. Tax Public Finance 2012, 468–508, 470 & 472.

\textsuperscript{34} Castillo, Sonsoles; Varela, Cristina, Target2 imbalances are rising, should we worry?, 2017, 3.
“As the sellers also make other forms of investment or purchase other securities, including non-domestic securities, additional liquidity flows occur, which contribute to keeping TARGET2 balances elevated.”\(^{35}\) Members outside the European area access the TARGET2 system via the GCB. Because of the end-of-day process described above, this results in increased TARGET2 balances for the GCB vis-à-vis the ECB. The TARGET2 balances are carried forward indefinitely. The outstanding claims against the ECB mature when a country exits the European area or becomes insolvent. If an NCB cannot erase the entire amount of its claims, the ECB suffers a loss on the balance sheet.

1. **Criticism of the TARGET2 system**

The lack of TARGET2 payment finality has been criticized because based on the system structure, a cross-border transaction results in a country raising a TARGET2 claim against another Eurozone country, and thus the transaction between the respective central banks is not finalized until the debtor country either exits the Eurozone or defaults. The amount is debited after the remitting NCB has checked the validity of the message received and ensured that the payment is covered by available funds or sufficient overdraft facilities.\(^{36}\) The inter-member state payment amount is debited in real time and credited to the relevant NCB’s account. For the person or company that has paid and the counterparty that has received payment, the transaction is now finalized. Others have criticized the fact that core countries have financed the balance of payments deficits of peripheral countries, similar to other euro rescue facilities, while avoiding the European parliament. Both the GCB and the ECB have stated that the only risk involved in relation to the TARGET2 balances is that arising from refinancing operations.\(^{37}\) This is true, but that risk could be huge, as the TARGET2 balances also measure the additional refinancing necessary to support a peripheral country’s balance of payments deficit.

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\(^{35}\) Draghi, Mario, The ECB President’s response to a MEP’s inquiry: Re: Your letter Reference QZ-120, 2017, 2.

\(^{36}\) Da Costa Cabral, Nazaré; Gonçalves, José Renato; Cunha Rodrigues, Nuno (Eds.), The Euro and the Crisis, 1st ed. 2017, Cham 2017, 37–38.

Sinn and Wollmershäuser have argued that TARGET2 balances are a form of credit, as one NCB agrees to bear a liability on behalf of another NCB in the Eurozone.\textsuperscript{38}

The Eurosystem has its own special features. Because there are currently 19 decentralized NCBs, it looks like a “normal” CB only if all of these NCBs and the ECB are considered as a single aggregated body. This consolidation means that various risks and weaknesses can be hidden, especially when there is insufficient profit and loss sharing, as well as differing insolvency risks. Given a minimum level of profit from their base money (seigniorage), a CB can remain solvent. “A central bank that has limited foreign currency-denominated and index-linked debt can always print (or create electronically) sufficient base money (…) to remain solvent.”\textsuperscript{39} The price to remain solvent is higher inflation caused by printing money. If the consolidated Eurosystem would accept the price of high inflation, the Governing Council of the ECB could decide to allow the printing of the money necessary to be considered solvent.\textsuperscript{40} The Governing Council has the power to “establish the necessary rules for standardising the accounting and reporting of operations undertaken by the national central banks.”\textsuperscript{41} The ECB is comprised of the governors of the 19 euro area countries and nine non-euro area countries in the EU. In addition to these 28 EU member state representatives, it includes the president and vice-president of the ECB. The president of the EU Council and one member of the European Commission also attend meetings, but do not have voting rights.\textsuperscript{42} The total number of votes available is 21. Each of the six members of the executive board has one vote. Therefore, 15 votes remain for the Eurozone NCB governors, which means that each month, four of the Eurozone NCB governors have no vote. Thus, the voting rights of the NCB governors rotate monthly, and the rules for this rotation are defined in the statute.\textsuperscript{43}

\textsuperscript{38} Sinn, Hans-Werner; Wollmershäuser, Timo, Target loans, current account balances and capital flows: the ECB’s rescue facility, Int. Tax Public Finance 2012, 468–508, 476.
\textsuperscript{39} Buiter, Willem, Global Economics View: The Euro Area: Monetary Union or System of Currency Boards?, 2015, 4.
\textsuperscript{40} Buiter, Willem, Global Economics View: The Euro Area: Monetary Union or System of Currency Boards?, 2015, 4.
\textsuperscript{41} Protocol (No. 4) on the Statute of the European System of Central Banks and of the European Central Bank, Published on 26 October 2012, OJ C 326/230, Article 26(4).
\textsuperscript{42} European Central Bank, General Council.
\textsuperscript{43} Protocol (No. 4) on the Statute of the European System of Central Banks and of the European Central Bank, Published on 26 October 2012, OJ C 326/230, Article 10(2).
An individual NCB cannot control their future base money revenues, and the profit and loss is shared according to the capital key. This system has created the possible risk that one NCB is insolvent even though the “consolidated Eurosystem as a whole is solvent.”\textsuperscript{44} If sovereign debt was one reason why an NCB became insolvent, it might not be possible to recapitalize its sovereign debt. Buiter (2015) saw the potential risk of high levels of sovereign debt as a result of the public sector purchase programme (PSPP): “[W]e were, are and will remain deeply concerned about the high risk of multiple sovereign defaults in the euro area in the years to come.”\textsuperscript{45}

B. TARGET2 balances and the global financial crisis

The financial crisis commenced in 2007 in the US housing market, before broadening to become a global crisis. In mid-September 2008, the US investment bank Lehman Brothers was declared bankrupt, leaving many other banks in fear of incurring losses.\textsuperscript{46} As a result, the level of trust between corporate banks decreased to zero and the interbank market died, as the banks were no longer prepared to lend money to each other. The interbank market is essential for a robust financial system, and so the Eurosystem had to take steps to mitigate this risk. One of its first actions was to replace the interbank market, or at least a major part of it. The central bank rate was lowered to a negative value and the scheme was changed from a volume tender offering to a full allotment against collateral. This meant that the corporate banks were able to obtain any amount of money they requested from the CB at a fixed interest rate, as long as they could provide eligible collateral. Some banks placed their surplus liquidity in the deposit facility because the Eurosystem did not pay interest on these amounts. Nowadays, a bank has to pay a fee for placing their money in their CB or within the Eurosystem. This measure is designed to incentivize banks to lend money. In addition to the full allotment scheme, the ECB council implemented various APPs. The Eurosystem also provided the market with long-term liquidity.

\textsuperscript{44} Buiter, Willem, Global Economics View: The Euro Area: Monetary Union or System of Currency Boards?, 2015, 5.
\textsuperscript{45} Buiter, Willem, Global Economics View: The Euro Area: Monetary Union or System of Currency Boards?, 2015, 11.
\textsuperscript{46} Deutsche Bundesbank, Die Deutsche Bundesbank Notenbank für Deutschland, 2016, 41.
Targeted longer-term refinancing operations (TLTROs), an ECB non-standard measure, provide financing to credit institutions at attractive conditions for periods of up to four years to “stimulate bank lending to the real economy.” Before the global financial crisis in 2007, the TARGET2 balances were relatively low. Some countries already had a permanent current account deficit, but because other banks in the same country borrowed money from the cross-border interbank market, the system was more or less in equilibrium. Following the global financial crisis, the trust in the union disappeared, and therefore the banks were unable to obtain interbank credit, or it was too expensive to consider. Foreign clients sold their assets and withdrew their money. As a result of the net drain of money from the system, the NCBs of weak European countries amassed a collective TARGET2 liability of around one trillion euros at the peak of the crisis. Conversely, the GCB amassed a large TARGET2 claim. For a long time, the claim of €750 billion that was reached in the summer of 2012 was the peak, but by June 2017 it had risen to about €860 billion.

47 European Central Bank, Open market operations.
48 Deutsche Bundesbank, Die Geldpolitik des Eurosystems.
The increase in TARGET2 balances from 2008 until 2014 was caused by the inoperative cross-border interbank market and the intervention of the ECB through its full allotment policy. Since autumn 2014, the TARGET2 balances have reflected the APP of the Eurosystem and the associated reallocation of CB money. Efforts to assume control over the situation and the various actions that were taken served to increase the level of sovereign debt in many countries. In Europe, the financial crisis changed to a sovereign debt crisis.

Source: ECB, Statistical Data Warehouse

Figure 3: TARGET2 balances for selected countries (May 2008–May 2017)
Especially affected were Greece, Ireland, Spain and Cyprus. As a temporary action, the European Financial Stability Facility (EFSF) came into being in 2010. In 2012, the EFSF was supplemented by a permanent solution, the European Stability Mechanism (ESM). “Together, the EFSF and the ESM had €700 billion in firepower.”\footnote{European Stability Mechanism (ESM), History.} These funds were used to provide financial aid to Euro countries in return for a commitment to undertake economic reforms. Since 2009, there has been a rash of APPs. The first of these was the initial covered bond purchase programme (CBPP1). Its aim was to ease the terms of financing for financial and non-financial institutions and to strengthen credit allocation. The second CBPP (CBPP2) was launched in 2011. Both programmes were restricted to a one-year life with a relatively small volume: €60 billion for CBPP1 and €16 billion for CBPP2. In 2010, in between these programmes, the securities markets programme (SMP) was implemented.\footnote{The SMP was announced in May 2010 and had a maximum volume of €210 billion. See Deutsche Bundesbank, Glossary.} Here, the intention of the ECB council was “to ensure depth and liquidity”\footnote{European Central Bank, Monetary policy glossary.} on the securities market and to restore the monetary transmission mechanism. The outright monetary transactions (OMT) programme that was announced in 2012 replaced the SMP and had the same objective as the SMP. “As part of the OMT programme, the Eurosystem can purchase the sovereign bonds of specific euro area countries on secondary markets with no set ex ante quantitative limits.”\footnote{Deutsche Bundesbank, Glossary.} One important aspect of this programme was that eligible bonds must fulfil the rules set by the EFSF and the ESM. So far, there have been no transactions under the framework of the OMT programme. To comply with the Treaty on the Functioning of the European Union (TFEU) Article 123, the ECB and NCB are not allowed to buy bonds on the primary market: “Overdraft facilities or any other type of credit facility with the European Central Bank or with the central banks of the Member States (…) in favour of Union institutions, bodies, offices or agencies, central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of Member States shall be prohibited, as shall the purchase directly from them by the European Central Bank or national central banks of debt instruments.”\footnote{Consolidated version of the TFEU, Published on 7 June 2016, (2016/C 202/01), OJ C 202/47, Article 123(1).}
On 22 January 2015, the ECB council decided that the previous measures were insufficient to facilitate an extended period of low inflation. Thus, the council decided to launch the EAPP known as quantitative easing (QE)\(^4\) with the ultimate goal of lifting the inflation rate.\(^5\)

QE programmes can be categorized into two different types. The first is for “emergency liquidity provisions in the eye of the storm of a financial crisis”,\(^6\) while the second is defined as a macroeconomic stimulus programme, which was the case with the QE programme of the ECB. This view implies that the economy is either already in or approaching a recession, and should be stimulated by expansionary ECB intervention actions such as lowering of interest rates, thereby stimulating demand.\(^7\)

The APP started in March 2015 with purchases of €60 billion per month and remained at that level for one year. From April 2016 to March 2017, the amount was €80 billion per month, and in April 2017 it was decreased to €60 billion per month until at least the end of 2017.\(^8\)

“The net purchases will be made alongside reinvestments of the principal payments from maturing securities purchased under the asset purchase programme.”\(^9\) The ECB is responsible for the control and coordination of the APP, which includes the corporate sector purchase programme (CSPP), the public sector purchase programme (PSPP), the third covered bond purchase programme (CBPP3) and the asset-backed securities purchase programme (ABSPP).\(^10\) The main component is the PSPP, under which the NCBs are only required to buy debt instruments issued in their jurisdiction.\(^11\) The purchase of a significant quantity of securities should place downward pressure on long-term interest rates. The QE strategy is an unconventional form of monetary policy compared with interest rate adjustments.

\(^4\)“QE refers to a policy by the central bank at a time when benchmark interest rates are at or close to zero, central banks cannot stimulate the economy by further lowering the benchmark interest rates and have to turn to massive purchases of mid- and long-term bonds to lower long-term interest rates, so as to stimulate investment and consumption by reducing the financing costs for businesses and ordinary people, and so revitalize the economy.” See China Institute of International Studies, The European Central Bank’s Quantitative Easing: Effects and Impacts, 2016.


\(^7\)Hughes Hallett, Andrew et al., Extending quantitative easing: Additional risks for financial stability?, 2017, 34.

\(^8\)Deutsche Bundesbank, Geschäftsbericht, 2016, 52.

\(^9\)Draghi, Mario; Constâncio, Vítor, Press Conference: Monetary policy decisions, Tallin, 2017.

\(^10\)European Central Bank, Asset purchase programmes.

The NCB “creates money by increasing the credit in its own account” to purchase investment-grade assets from private institutional investors. The purchases are made by the NCBs “in line with their respective stakes in the capital of the ECB, and by the ECB itself.” According to the Bank for International Settlements (BIS) quarterly review in March 2017, the TARGET2 balances reached a new high “but in contrast to 2008–12 these balances are no longer driven by solvency concerns, instead by the Eurosystem’s purchasing programmes.” As the TARGET2 balances are the result of the APP, they are supply driven, rather than stress-related and demand driven as they were during the sovereign debt crisis. In April 2015, the Eurosystem made bonds available for lending to alleviate the side effect of the PSPP on the functioning of the market. When the ECB decided to enlarge the APP in December 2016, it was not a unanimous vote. The newspaper “Frankfurter Allgemeine Zeitung” (FAZ) reported that the president of the GCB did not agree with it and the ECB director reminded the ECB Council not to start the exit from the APP too late. The president of the ECB pointed out that there had been no discussion about tapering. He also mentioned that it was an open-ended situation, and that it was important to be present in the market to maintain pressure on market yields.

IV. The Asset Purchase Programme

The APP influences financing terms, economic growth, and inflation via two different channels. The first is direct transmissions through the purchase of securities, such as covered bonds and asset-backed securities (ABS) held by private investors, which increase the market price of the asset. This is an incentive for banks to provide more credit as the basis for issuing further ABS because this expands the offering on the credit market, the price of credit decreases and more players can afford credit to purchase investments or consumer goods, boost the economy and influence the inflation rate.

64 Auer, Raphael; Bogdanova, Bilyana, BIS Quarterly Review March, 2017, 7.
66 Schlepper, Kathi; Hofer, Heiko; Riordan, Ryan; Schrimpf, Andreas, Scarcity effects of QE: A transaction-level analysis in the Bund market, 2017, 4.
67 Frankfurter Allgemeine Zeitung (FAZ); Bundesbank-Präsident hat EZB-Beschluss nicht zugestimmt, 2016.
Secondly, if the ECB and NCB buy securities, investors can buy new assets with the money they receive—a process called portfolio rebalancing. This portfolio rebalancing channel operates indirectly and relies on spillover effects. Therefore, it requires a substantial volume of purchases, which once again increases the demand for assets, and thus asset prices rise and yields decrease. The yield represents a cost to the issuer, and thus when yields fall, it becomes cheaper to obtain money from the capital market. Portfolio rebalancing has the same effect as the first method, albeit indirectly. It provides an incentive for financial institutions to provide more credit because once again, supply increases and prices (credit rates) fall. If the additional money is being used to invest outside the European area, this could lead to a weaker euro exchange rate, which would put upward pressure on inflation. These two mechanisms improve financing terms for all market participants, and the lower cost of financing stimulates the demand for goods. This should help the EU to keep inflation near to their target threshold of just under 2%. Messages such as “the ECB is ready to do whatever it takes to preserve the Euro. And believe me, it will be enough” from Draghi and the APP signal that the ECB will keep the interest rate low. Furthermore, it has a cushioning effect on market volatility and should reduce uncertainty and strengthen trust that the ECB will continue its course. However, not everybody was convinced about the worth of the APP. The former finance minister Wolfgang Schäuble stated in a press conference in December 2014 that “I am of the view that this approach is not the solution, rather the cause (of economic woes).” Because of existing concerns, the ECB stressed that the programme “must be accompanied at the national level by structural reforms, as well as fiscal policies that support the overall recovery of the economy.” The idea was that when the NCB purchased assets from the banks, the banks would obtain additional money. Because it was costly to deposit the money with the ECB, it was assumed that the extra money would be used to finance more loans.

70 European Central Bank, How does the ECB’s asset purchase programme work?.
71 Carrel, Paul; O’Donnell, John, Germany’s Schaeuble says expansive policy cause of economic woes, not solution, Reuters 2014.
72 Delivorias, Angelos, The ECB’s Expanded Asset Purchase Programme, 2015, 1.
A. Facts and figures

Figure 4 shows the assets purchased under the PSPP.

Figure 4: Cumulative monthly net asset purchases under the PSPP\textsuperscript{73}

Table 1 provides an overview of the cumulative holdings for the various programmes included in the APP. The (rounded) holdings in millions as at 30 June 2017 were: ABSPP: €24,000, CBPP3: €223,000, CSPP: €97,000 and PSPP: €1,640,000, i.e. total holdings of €1,984,000.

\textsuperscript{73} European Central Bank, Asset purchase programmes.
Table 1: Cumulative holdings of the asset purchase programme as at 30 June 2017

<table>
<thead>
<tr>
<th>Date</th>
<th>ABSPP</th>
<th>CBPP3</th>
<th>CSPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 June 2017</td>
<td>24,135</td>
<td>222,630</td>
<td>96,620</td>
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<table>
<thead>
<tr>
<th>Primary market</th>
<th>€ mil.</th>
<th>€ mil.</th>
<th>€ mil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share in %</td>
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<td>33</td>
<td>14</td>
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<table>
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<tr>
<th>Secondary market</th>
<th>€ mil.</th>
<th>€ mil.</th>
<th>€ mil.</th>
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</thead>
<tbody>
<tr>
<td>Share in %</td>
<td>59</td>
<td>67</td>
<td>86</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PSPP</th>
<th>Monthly net purchases*</th>
<th>Remaining Weighted Average Maturity in years</th>
<th>Cumulative monthly net purchases*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1,492</td>
<td>9</td>
<td>43,563</td>
</tr>
<tr>
<td>Belgium</td>
<td>1,886</td>
<td>10</td>
<td>54,830</td>
</tr>
<tr>
<td>Cyprus</td>
<td>-34</td>
<td>5</td>
<td>215</td>
</tr>
<tr>
<td>Germany</td>
<td>11,892</td>
<td>7</td>
<td>391,895</td>
</tr>
<tr>
<td>Estonia</td>
<td>0</td>
<td>1</td>
<td>65</td>
</tr>
<tr>
<td>Spain</td>
<td>6,202</td>
<td>9</td>
<td>194,791</td>
</tr>
<tr>
<td>Finland</td>
<td>643</td>
<td>7</td>
<td>25,480</td>
</tr>
<tr>
<td>France</td>
<td>10,799</td>
<td>8</td>
<td>315,244</td>
</tr>
<tr>
<td>Ireland</td>
<td>518</td>
<td>9</td>
<td>21,787</td>
</tr>
<tr>
<td>Italy</td>
<td>9,323</td>
<td>9</td>
<td>274,086</td>
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<tr>
<td>Lithuania</td>
<td>38</td>
<td>7</td>
<td>2,620</td>
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<tr>
<td>Luxembourg</td>
<td>56</td>
<td>6</td>
<td>2,079</td>
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<tr>
<td>Latvia</td>
<td>36</td>
<td>8</td>
<td>1,579</td>
</tr>
<tr>
<td>Malta</td>
<td>16</td>
<td>11</td>
<td>956</td>
</tr>
<tr>
<td>The Netherlands</td>
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<tr>
<td>Slovenia</td>
<td>159</td>
<td>9</td>
<td>5,787</td>
</tr>
<tr>
<td>Slovakia</td>
<td>237</td>
<td>8</td>
<td>9,765</td>
</tr>
<tr>
<td>Supranationals</td>
<td>5,194</td>
<td>7</td>
<td>177,927</td>
</tr>
<tr>
<td>Total</td>
<td>51,607</td>
<td>8</td>
<td>1,638,624</td>
</tr>
</tbody>
</table>

Total APP holdings* 1,982,000

*Figures are in euro million

The total ECB balance is expected to be around €2.28 trillion by the end of 2017.

V. The Central Bank as Rescuer of Last Resort

The role of the lender of last resort (LOLR) is a historical core function of CBs, and is not specified in the treaty. In difficult economic times, when financing is impaired, the CB can react contrarily and take on more debt. The CB can use its balance sheet as a monetary tool when policy rates have reached the lower bound, especially interest rates. Through this leveraging action, the CB shifts risk from the financial system to its balance sheet, or more concretely, from the private financial sector to the public one.

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74 European Central Bank, Asset purchase programmes.
This might have implications for taxpayers, as the size of the TARGET2 imbalances between Eurozone countries shows. In normal times, “when the instrument of monetary policy is the short-term interest rate, the size and composition of the central bank balance sheet do not provide information about the monetary policy stance.”^76

The non-standard measure, the APP, is also called the balance sheet of last resort. The ECB adopted it after all conventional measures had been exhausted in early 2015. “Thus, when a central bank acts as a lender of last resort, its balance sheet size and, to some extent, composition evolve endogenously (and thus not actively), according to the demand for liquidity by its counterparties.”^77 The non-conventional measures are of a contingent nature and must adhere to specific conditions. The extent to which the measures are reflected in the balance sheet is not known in advance. “[I]t is limited by the central bank’s capacity to maintain credibility in fulfilling its mandate on a sustainable basis”,^78 otherwise it would foster unwanted side effects such as mispricing of risks and asset price bubbles, and, in sum, would provide the basis for financial and price instability. To mitigate this risk, CBs have established a framework including financial buffers and eligibility and haircut conditions. Nevertheless, the CBs’ balance sheets are leveraged upwards because they act as a balance sheet of last resort.^^79 In a currency union, the degree of risk that is assumed is even larger because of the necessary absence of an exchange rate. “The subsequent decision to launch a programme of public sector asset purchases (…) was the most significant step in the active management of the Eurosystem’s balance sheet size.”^80 In March 2017, “the balance sheet of the Eurosystem showed assets worth almost four trillion euros – € 3,856,913,000,000.”^81

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75 Rasch, Michael, Die EZB lässt die Notenpresse laufen, NZZ 2016.
77 Cour-Thimann, Philippine; Winkler, Bernhard, Central banks as balance sheets of last resort: ECB’s monetary policy in a flow-of-funds perspective, 2016, 9.
78 Cour-Thimann, Philippine; Winkler, Bernhard, Central banks as balance sheets of last resort: ECB’s monetary policy in a flow-of-funds perspective, 2016, 15.
79 Cour-Thimann, Philippine; Winkler, Bernhard, Central banks as balance sheets of last resort: ECB’s monetary policy in a flow-of-funds perspective, 2016, 1.
80 Cour-Thimann, Philippine; Winkler, Bernhard, Central banks as balance sheets of last resort: ECB’s monetary policy in a flow-of-funds perspective, 2016, 15.
VI. Financial risks of the ECB monetary policy operations

The unconventional measures taken by the ECB involve various risks including credit and market risk.

A. General risk of the ECB monetary policy operations

1. Risk of default

The liquidity-providing credit operations as well as the purchases for the quantitative easing programme of the ECB address the risk of default. To mitigate this risk, “Article 18.1 of the Statute of the European System of Central Banks [ESCB] and of the European Central Bank establishes that the Eurosystem shall only provide credit to its counterparties against ‘adequate’ collateral.”82 Collateral is deemed adequate when the requirements of marketable and non-marketable assets as defined under the ECB framework are met. These eligibility criteria for marketable assets must also be met in relation to purchases under the APP. „Only marketable assets which are eligible as collateral for the Eurosystem’s credit operations (…) are eligible“ for the APP.83 For the liquidity and funding measures, the ECB requires eligible collateral from the NCB, and applies an additional haircut. The ECB defines the haircuts for the Eurosystem’s credit operations dependent on the credit quality of the asset. It is well-known which marketable assets are eligible as collateral. The list, together with the International Securities Identification Number (ISIN), is available on the ECB website.84 The demand for these securities is much greater than that for similar assets that are not on the list. “Since the Eurosystem accepts a very broad range of marketable and non-marketable assets as collateral it has to rely on various sources of credit assessment information.”85 The ECB accepts around 30,000 to 40,000 securities as collateral but only 24% of these securities have a market price.86 The list of eligible securities is publicly available on the ECB’s website.

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82 European Central Bank, The financial risk management of the Eurosystem’s monetary policy operations, 2015, 11.
83 European Central Bank, The financial risk management of the Eurosystem’s monetary policy operations, 2015, 38.
84 European Central Bank, Eligible assets.
85 European Central Bank, Monthly bulletin April, 2014, 28.
“Favoring illiquid [and risky] assets in a depressed economy may make it harder for the economy to recover.”

The Eurosystem has established the Eurosystem credit assessment framework (ECAF), which provides harmonized minimum standards to ensure the eligibility of the collateral used. This helps to mitigate the financial risks by defining “procedures, rules and techniques which ensure that the Eurosystem accepts only assets with high credit standards as collateral” for its monetary policy operations. “The ECAF makes the credit ratings from all ECAF-accepted credit assessment systems comparable by mapping each of their rating grades to the appropriate credit quality step [CQS] of the Eurosystem’s harmonized rating scale.”

The greater the credit risk, the greater the haircut for the collateral should be to minimize the implied risk. The risk of a default consists of at least two aspects that should be reflected in the price: how probable is a default, and with regard to that, how much is the reduction in price for that risk?

a) Credit risk

The credit assessment framework of the Eurosystem is laid down in Chapter 6.3 of ECB/2011/14, the “‘General Documentation’ on the monetary policy instruments and procedures of the Eurosystem.” Therein, a probability of default (POD) of 0.4% for a one-year period is defined as credit quality step 3 (CQS3), which is equivalent to a minimum long-term rating of ‘BBB–’ by Fitch and Standard & Poor’s, ‘Baa3’ by Moody’s, or ‘BBB–’ by DBRS. A POD of 0.1% for the same period represents credit quality step 2 (CQS2), which is equivalent to a rating of A–, A3 or AL by Fitch and Standard & Poor’s, Moody’s or DBRS, respectively. Figure 5 shows the Eurosystem harmonized rating scale for external credit assessment institutions (ECAIs).

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88 European Central Bank, The financial risk management of the Eurosystem’s monetary policy operations, 2015, 15–16.
89 European Central Bank, Monthly bulletin April, 2014, 28.
90 European Central Bank, Monthly bulletin April, 2014, 29.
92 European Central Bank, Monthly bulletin April, 2014, 30.
In June 2016, the Governing Council of the ECB decided that the eligibility of marketable debt instruments that were either issued or fully guaranteed by the Hellenic Republic was given and exclusively excluded the instruments from the minimum requirements of the credit quality threshold. Additionally, it applied higher haircuts to Greek debt instruments. This exception is not relevant to the PSPP, which will be considered later. In April 2017, Draghi confirmed that “Greek government bonds are not currently eligible for purchase under the PSPP.” The ECB forced “Greece’s banks to borrow from their national central bank under the Emergency Liquidity Assistance (ELA) procedure.”

b) Ratings

As we have seen, the ratings system is a powerful instrument. However, there is the possibility of a conflict of interest, because the organizations that are being rated are those that pay the ratings agencies. Further, ratings are often a black box, because although the result is known, the figures that were obtained, why they were obtained and how the rating was calculated are not. The ECB has stated that it will require minimum disclosure standards for credit ratings

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agencies starting on 1 July 2017. Credit ratings agencies accepted by the Eurosystem have “to publish new issue reports and quarterly surveillance reports for rated covered bond programmes in order to meet the high credit standards of the ECAF.” With the introduction of these measures, the ECB aims to enhance the transparency of these ratings.

c) Set-off risk

Set-off risk refers to the risk implied by offsetting a credit against a debit with the same counterparty. Therefore, “NCBs shall employ a mechanism to ensure that set-off risk has been excluded or significantly mitigated when they accept as collateral credit claims originated after [1 January 2018].” Because of the offsetting of the debt, a claim loses part of its value, thus implying a risk for the ESCB. The set-off risk also has an impact on the credit rating.

B. Specific risk of the full allotment

1. Risk of inefficient allocation of money

A specific risk of the full allotment is that the money provided is not used as intended by the CB. Drechsler et al. found evidence that “weakly capitalized banks took out more LOLR loans and used riskier collateral than strongly capitalized banks,” which leads to an inefficient allocation of capital, resulting in higher costs. The “weak” banks, i.e. banks with a credit rating below AA, used the loans to buy risky assets with a higher default risk (destressed sovereign debt). “The resulting accumulation of risky assets by weak banks increases the likelihood of a systemic crisis and the subsequent cost of resolving it. If these costs are sufficiently large, an LOLR intervention might actually end up exacerbating a financial crisis.”


99 European Central Bank, ECB amends guidelines relating to the Eurosystem’s monetary policy implementation, 2017.


101 Drechsler, Itamar; Drechsel, Thomas; Marques-Ibanez, David; Schnabl, Philipp, Who Borrows from the Lender of Last Resort?, J. Finance, 2016, 1933–1974, 1933.

2. **Valuation haircuts for collateral assets**

The haircut is based exclusively on the assets characteristics. It does not consider any other criteria such as the counterparty’s creditworthiness or the diversification of the collateral pool. ECB/2015/35 defines valuation haircuts for marketable and non-marketable assets. The guidelines were amended in December 2016 via ECB/2016/32 (EU 2016/65) by “updating the haircut schedules for assets used as collateral in monetary policy operations” and the new guidelines came into force in January 2017. One main point in the new policy was that the scale was changed from a fixed rate to a weighted average rate reduction. The Governing Council of the ECB also reduced the fixed rate for non-marketable retail mortgage-backed debt instruments from 39.5% to 36.5%. “These adjustments aim to improve the general consistency of the framework while having an overall minimal effect on the amount of collateral available.”

“Haircuts increase with maturity, non-coupon payment, and category. In contrast to the private markets, the ECB does not take into account the correlation between collateral risk and counterparty.”

The calculation of collateral values is majoritarian based on theoretical models and is not deviated from a direct market price. This circumstance is possibly caused by the fact that for nearly 80% of the eligible collateral, no market price exists. Hence, haircuts cannot reflect market conditions.

C. **Specific risks of the APP**

The purchase of government bonds is an unusual monetary instrument that presents special risks, especially because the EU is not a political union with a single household. Every member state has its own responsibility for national economic and fiscal policy.

1. **Asset-backed securities purchase programme (ABSPP)**

ECB/2014/31 allows for the purchase of some additional asset-backed securities “which do not fulfil the credit assessment requirements” of Guideline ECB/2011/14.}

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104 European Central Bank, ECB amends guidelines relating to the Eurosystem’s monetary policy implementation.
105 European Central Bank, ECB amends guidelines relating to the Eurosystem’s monetary policy implementation.
106 De Roure, Calebe, Fire buys of central bank collateral assets, Frankfurt am Main 2016, 26.
107 Nyborg, Kjell G., Central Bank Collateral Frameworks, 2015, 35.
To be compliant, they must have at least two credit quality step 3 (BBB) ratings from any accepted ECAI and must be eligible in accordance with the general documentation regarding the monetary policy instruments and procedures of the Eurosystem. In December 2016, they changed the rules via ECB/2016/33 from a standardized fixed deduction for ABS to a weighted average deduction in line with the overall haircut approach.110 These instruments bear a higher credit risk than the other instruments that are eligible under the APP because of their low rating.

2. **Risk of insufficient eligible assets**

There was concern about a possible shortage in the bond market caused by the APP,111 as indicated by the ECB’s broadening of the field of eligible assets in December 2016. Furthermore, the ECB broadened the range of eligible assets for the APP “to ensure its continued smooth implementation”112 by decreasing the minimum remaining maturity to one year instead of two years. Additionally, the ECB permitted the CB to buy securities “with a yield to maturity below the interest rate on the ECB’s deposit facility”.113 The deposit facility interest rate has been negative since June 2014 (−0.1%), and since March 2016 (the most recent ECB decision was on 8 June 2017) it has remained constant at −0.40%. It is interesting to note that cross-asset correlation has risen since 2014, while volatility has remained flat. This is unusual, because typically if the correlation rises, volatility also rises, as was seen in September 2009 and November 2011.114

108 Deutsche Bundesbank, Die Deutsche Bundesbank Notenbank für Deutschland, 2016, 95.


111 Frankfurter Allgemeine Zeitung (FAZ); Bundesbank-Präsident hat EZB-Beschluss nicht zugestimmt, 2016.

112 European Central Bank, ECB adjusts parameters of its APP.


114 Bengoechea, Mariano; Gruber, Andreas; Brook-Walters, Natasha, Impact of the ECB’s asset purchase programme, Frankfurt am Main, 2017, 10.
In March 2015, the ECB decided to institute the secondary market public sector asset purchase programme, defining the details of the PSPP and introducing a bundle of eligibility criteria.\textsuperscript{115} Two of the criteria concern limits, namely, issue and issuer limits. Because the universe of eligible assets is finite, and especially because the ECB set issue and issuer limits, there is a risk that the programme will not be able to continue as and when required.\textsuperscript{116} During the life of the programme, there have been several changes regarding the eligibility criteria.

a) Issue share limit

The original version (Decision (EU) 2015/774 of the ECB) set an issue share limit of 25\% per ISIN for the first six months. This limit was designed to prevent the CBs from accumulating blocking minority holdings in a debt restructuring containing a collective action clause. On 10 November 2015, the limit was increased to 33\% per ISIN.\textsuperscript{117} “This indicates that the ECB does not want to be in a position in which it has the power to block a potential vote on the restructuring of ECB-held debt of a euro-area country, because not blocking such a restructuring could be interpreted as monetary financing of a member state.”\textsuperscript{118} In April 2016, the issue share limit was changed again “after consolidating holdings in all of the portfolios of the Eurosystem central banks.” The limit was increased to “50\% per ISIN for eligible marketable debt securities issued by eligible international organizations and multilateral development banks” and kept at “33 \% per ISIN for other eligible marketable debt securities, with the exception of 25 \% per ISIN for such eligible marketable debt securities containing a collective action clause.”\textsuperscript{119}

\textsuperscript{116} Claes, Grégory; Leandro, Álvaro, The European Central Bank’s quantitative easing programme: limits and risks, 2016, 4.
\textsuperscript{118} Claes, Grégory; Leandro, Álvaro; Mandra, Allison, European Central Bank quantitative easing: The detailed manual, 2015, 4.
b) Issuer share limit

Article 5 Paragraph 3 of ECB/2015/10 states that “under the PSPP, an aggregate limit of 33% of an issuer’s outstanding securities shall apply to all eligible marketable debt securities (...) after consolidating holdings in all of the portfolios of the Eurosystem central banks.”

Article 5 has been amended several times, with the latest amendment in 2016 including a change in the issue share limit per ISIN to “50 % of the outstanding securities of an issuer which is an eligible international organisation or a multilateral development bank; or 33 % of the outstanding securities of an issuer other than an eligible international organization or a multilateral development bank.”

Only 20% of the PSPP is subject to complete loss sharing, while the remaining 80% of the risk remains with the NCBs. The expanded APP does not provide for sharing of the full extent of the risk across the Eurosystem, but the “ECB is committed to the principle of risk-sharing, and that is why 20% of the purchases fall under the regime of full risk-sharing.” The monetary policy meeting in January 2015 discussed a wide range of risk-sharing options, from full risk-sharing in favour of a single monetary policy to no risk-sharing at all. The agreement that was reached, commensurate with the economic and monetary union and the treaty, was partial risk-sharing of 20% for hypothetical losses. “This included the sharing of possible losses on the NCB purchases of the bonds of supranational institutions, amounting to 12% of the additional asset purchases, as well as the sharing of possible losses on the 8% holdings of the additional purchases by the ECB.”

In a public speech, the ECB stated that the reason why government bond purchases by NCBs were not subject to loss sharing had to do with the nature of the euro area, as defined in the treaty: “[A]n environment of decentralised national fiscal authorities, and the ECB has no mandate to engage in large-scale pooling of fiscal risks.”


\[122\] The 20% is the sum of 12% invested into European-supranational institutions securities and 8% held by the ECB.

\[123\] European Central Bank, What is the expanded asset purchase programme?, 2015.

\[124\] The amount was amended to 10% starting April 2016.

\[125\] European Central Bank, Account of the monetary policy meeting of the Governing Council, Frankfurt am Main, 2015, 16.

\[126\] Coeuré, Benoît, Benoît Coeuré: Embarking on public sector asset purchases, Frankfurt am Main, 2015, 4.
In 2015, the ECB expanded the universe of eligible debt instruments by accepting marketable debt securities issued by regional or local governments of a member state whose currency is the euro. In 2017, the ECB also agreed to accept debt instruments with a remaining maturity of one year, instead of two years as specified in the previous version of the statute. The aims of the measures taken by the ECB were to reduce the risk of hitting a limit and to avoid running out of eligible debt issued. These amendments were not made without good reason. For example, as a simplified calculation by Allianz Global Investors showed, Portugal almost reached the 33% limit. That is why the net purchases for Portugal, Ireland and Finland deviated from the ECB’s capital key. “Therefore, the ECB will possibly further reduce the pace of purchases for smaller countries such as Portugal and Finland.”

3. Risk of a dependent monetary policy

There is a risk that the monetary policy loses its independence. If the Eurosystem NCBs are the biggest creditors, primarily because of the APP, member states could use political pressure to obtain a bridging grant as a substitute for capital market credit. If the member states can rely on obtaining a bridging grant from the Eurosystem, they are likely to act in a less risk-averse fashion and do not use the budget as sustainable. This constitutes a risk whereby countries become accustomed to cheap funding for a large proportion of their debt, and thus maintain political pressure to continue the programme for longer than initially intended and required from a monetary policy viewpoint. This is the case when countries do not use the low interest rates for budget consolidation, but instead use it to reduce their financing costs.

According to Jens Weidmann, the president of the GCB, this was already the case in 2016.

130 Deutsche Bundesbank, Die Deutsche Bundesbank Notenbank für Deutschland, 2016, 95.
D. Interest rate risk

A loose monetary policy can lead to greater risk-taking by financial institutions and other players in the financial market. Less risky assets earn less by way of returns, and therefore some institutions would rather invest in riskier assets with a higher rate of return. A large proportion of the assets that were bought by the CB was held by pension funds and insurance companies. As a result of the sale of these assets to the CB, they were encouraged to shift their portfolios into riskier assets such as corporate bonds and stocks with higher returns.\(^\text{132}\) This increased risk-taking could lead to an increase in financial stability risk, as well as a possible increase in “leverage in the financial sector”. Additionally, there have been concerns that the increased amount of excess reserves could lead to inflation “if banks use those reserves to fund lending.”\(^\text{133}\) When money is readily available and saving is unappealing, the incentive to use cheap money to fund consumption is high.

1. Interest rate change risk

In 2016, the GCB reported an interest rate change risk in its annual report for the first time. Therefore, the GCB restocked its reserves with an additional €1.8 billion, resulting in a €15.4 billion provision for general risks. If interest rates rise by more than 0.40%, the GCB will have to pay interest on the deposits on the liabilities side of its balance sheet. At present, the GCB is receiving interest from those deposits because of the prevailing negative interest rate.\(^\text{134}\) On the assets side of its balance sheet, there is no risk if the interest rate changes.\(^\text{135}\) The GCB uses amortized cost instead of market prices as a reporting standard for most of its APP assets.\(^\text{136}\) The securities purchased through the QE programme constitute a large proportion of the assets side of the balance sheet. The yearly amortization is calculated at the time of purchase, and then written off together with the dividend coupon.\(^\text{137}\) The assumption behind this is that the GCB retains the stock until maturity, and therefore no interest rate risk

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\(^\text{133}\) Delivorias, Angelos, The ECB’s Quantitative Easing, 2015, 4.

\(^\text{134}\) Frankfurter Allgemeine Zeitung (FAZ); Reuters, Bundesbank-Überschuss füllt auf eine Milliarde Euro, 2017.

\(^\text{135}\) Siedenbiedel, Christian, Warum steigende Zinsen für die Bundesbank ein Risiko sind, FAZ 2017.

\(^\text{136}\) Deutsche Bundesbank, Geschäftsbericht, 2016, 62.

\(^\text{137}\) Siedenbiedel, Christian, Warum steigende Zinsen für die Bundesbank ein Risiko sind, FAZ 2017.
exists as long as the issuer is solvent. If the GCB sells the security before it reaches maturity, the GCB faces a loss.

If we look at the maturity of the assets and liabilities sides of the balance sheet, we see an incongruity. On the assets side of the balance sheet of GCB we have relatively less interest rate-sensitive long-term assets and on the liabilities side, more interest rate-sensitive short-term assets. If the interest rate should raise, the sensitive side of the balance sheet, the liabilities side, reacts with higher costs, but, there is no additional income on the assets side. One interesting point to consider is that the interest rates that lead to the aforementioned effects are CB interest rates, not market rates. The GCB itself has an influence to some extent on CB rates, and is one of the NCBs that want to raise the interest rates. The provisions for general risks are therefore like a hedge for the intention to raise interest rates. 138 The GCB wrote in its annual report that a “further increase in the risk provisions is expected in the 2017 annual accounts, as only half of the interest rate risk was included in the 2016 annual accounts in view of the current forward guidance issued by the ECB Governing Council, according to which the key ECB interest rates will remain at the present or lower levels for an extended period of time, far exceeding the time horizon of net asset purchases.” 139 ECB’s holdings under the APP “are accounted for at amortised cost and an impairment test is conducted at least annually” 140 and therefore “not exposed to mark-to-market interest rate risk. However, the mismatch between the interest rate sensitivity of the income generated by these securities and that of the expenses associated with the corresponding liabilities gives rise to interest rate risk that could have a negative impact on the net interest income of the ECB”. 141

139 Deutsche Bundesbank, Annual Report, 2016, 73.
E. Risk of TARGET2 balances themselves

If a country exits the Eurozone or becomes insolvent, an expectation of full repayment of their negative TARGET2 balance is unrealistic. Therefore, the debt must be written off, either fully or partially. The loss remains with the ECB, but the NCBs are liable according to the adjusted capital key.

* Greek governments bonds are not eligible under the PSPP (April 2017)

Source: ECB

Figure 6: European Central Bank capital key

The key is adjusted because only those countries that have implemented the euro as their currency are liable. The adjusted capital key is relevant in relation to the liability of the NCBs regarding a loss by the ECB because of a default of a European country. In our case, these are the national states which owe their NCB and, in the end, the taxpayers. Sinn argued that it is an illusion that an indebted country can repay all of its debts.\(^{142}\)

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\(^{142}\) Sinn, Hans-Werner, Die Lehren aus der griechischen Tragödie, FAZ 2015, 16.
Haircuts on debt have to be granted to some countries, because the solvent countries cannot afford the huge amount of money needed to restructure the Eurozone.\footnote{AWP International, Europa ist völlig auf dem falschen Trip, Handelszeitung 2015.} How and how much the haircut would affect the TARGET2 balances depends on the technical details. The NCB pays interest on a negative TARGET2 balance or receives interest on a positive balance at the rate used for the liquidity-providing operations. This interest is not part of the NCB’s profit or loss because it is shared according to the adjusted capital key. The NCBs in the Eurozone are required to share the profits or losses. A Eurozone NCB could be indirectly affected by a TARGET2 claim if any member state left the euro area or its NCB failed to settle “its TARGET2 liability (…) or its banknote liabilities to the ECB (…) and the [NCBs].”\footnote{“The Bundesbank considers this scenario to be unlikely to materialise, however, which means that the credit risks arising from Eurosystem operations to provide liquidity are ultimately the key factor.” See Deutsche Bundesbank, Annual Report, 2016, 73–74.} It has been stated that the ECB is the biggest donor to the Eurozone countries.\footnote{Rasch, Michael, Die EZB lässt die Notenpresse laufen, NZZ 2016.} However, the ECB has a different view, stating that if a member of the Eurosystem wants to leave, it must fully settle its liabilities to the ECB.\footnote{Draghi, Mario, The ECB President’s response to a MEP’s inquiry: Re: Your letter Reference QZ-120, 2017, 2.}

F. **Risk of a mixture of fiscal and monetary measures**

The president of the GCB has advised the economic council of the Christian Democratic Union of Germany (CDU) not to extend the QE for any longer than needed. He sees a risk of becoming a prisoner of either the market or fiscal policy through the programme of purchasing government bonds. The border between monetary and fiscal policy in relation to the APP becomes blurred, especially when bonds are bought “from countries that have lost the confidence of the capital markets.”\\footnote{Weidmann, Jens, Weidmann in favour of less expansionary monetary policy, 2017.} In such cases, the NCBs “are mutualising sovereign liability risks via the central bank’s balance sheet. Moreover, this weakens the disciplinary effect of market interest rates on budgetary policy.”\footnote{Weidmann, Jens, Weidmann in favour of less expansionary monetary policy, 2017.} Weidmann uses the example of firefighters, who should ensure that the damage caused by the water used to extinguish the fire is not greater than the damage caused by the fire itself.\footnote{Siedenbiedel, Christian, Weidmann wirbt für Ausstieg aus lockerer Geldpolitik, FAZ 2017.}
Critiques have also come from other areas. Karsten Junius, chief economist of Safra Sarasin, has called for greater transparency. The ECB has always pointed out that Article 123 of the Treaty prohibits monetary financing. “In particular, we [the ECB] are not allowed to buy any government bonds directly, i.e. on the primary market. Government bonds can only be purchased if they are already on the market and traded freely.”\textsuperscript{150} Newly issued government bonds are subject to a blocking period. The ECB has also emphasized that its measures are only for monetary policy purposes. This statement was made in relation to the OMT, but is also relevant to the APP, although the ECB provided no additional information in this regard. Junius observed that the ECB bought German treasury bonds under the APP shortly after their issue in February 2017. There could not have been a lot of time between the issue and the purchase, and it is unclear whether, and if so how long after their issue, the ECB bought the bonds on the secondary market. It could well have been just hours after the release of the new issue, thereby rendering the procedure null and void. Thus, the border between primary and secondary market purchases can also become blurred, as can the difference between the fiscal and monetary operations of the ECB. It would be helpful to know where the line between secondary and primary market purchases is drawn.\textsuperscript{151}

VII. Eurobonds

It has been debated whether the TARGET2 balances are similar to Eurobonds, and therefore are a fiscal and not a monetary policy measure. The similarity is more obvious from an economic rather than a legal perspective.\textsuperscript{152} One argument is that the TARGET2 balances have no influence on the monetary base because the changed refinancing behaviour balances it. The capital flight to safe harbours such as Germany and the reduction in credit being provided to riskier countries (e.g. Greece, Ireland, Italy, Portugal, and Spain) means that the volume of money that is available in the more stable countries increases. For all non-bank deposits, a minimum balance requirement must be paid to the NCB. The local banks of

\textsuperscript{150} Asmussen, Jörg, Introductory statement by the ECB in the proceedings before the Federal Constitutional Court, Karlsruhe, 2013.

\textsuperscript{151} Junius, Karsten, Finanzmarktkolumne: Wo ist die Grenze zur Fiskalpolitik?, 2017, 2.

\textsuperscript{152} Sinn, Hans-Werner; Wollmershäuser, Timo, Target loans, current account balances and capital flows: the ECB’s rescue facility, Int. Tax Public Finance 2012, 468–508, 487.
solvent countries will demand less refinancing credit from their NCBs because the demand for money at a given interest rate will remain unchanged. The amount of money will decrease further because less refinancing credits will be requested. That is why the money base remains steady, and thus cannot be a monetary measure. Inferentially, it must be a fiscal measure, although this hypothesis is very controversial.153 The experts consulted by Karadzic and Keller are at odds with one another. For some, it is clearly a credit alternative, while for others it is not.154 Sinn and Wollmershäuser argue that the TARGET2 balances and the collective collateralized Eurobonds have the same core properties. The shift of the rights of disposal relating to economic resources from the core countries to the periphery, the cash flow and credit stream, the distribution of central bank money and the question of liability are comparable.155 The Eurobonds of the peripheral countries must, in Sinn and Wollmershäuser’s scenario, be purchased by the core countries because the market conditions they would otherwise encounter are very unattractive. Through the purchase of these Eurobonds, the core countries provide the peripheral countries with credit because the money will eventually return to the core countries in exchange for goods and assets. As a result, the Eurobonds, similar to the TARGET2 balances, would not change the monetary base and would confer the right of disposal of economic resources on the beneficiary countries. The liability would also be comparable, because if a Eurozone country defaulted, the other countries would be liable according to the ECB capital key, as they are for the TARGET2 balances. One difference is that with Eurobonds, the credit would be given directly to the countries concerned. With TARGET2, the credit passes through the NCB and then on to the corporate bank. It is only natural that the NCB would hold a bond instead of a TARGET2 claim. The main difference Sinn and Wollmershäuser see is that the corporate banks of the peripheral countries could order as much “credit” as they wanted, and the NCBs of the core countries could not block the purchase of these implicit Eurobonds (“self-service rescue

154 Karadzic, Petra; Keller, Andreas, TARGET2 ein wandelndes Pulverfass?, Wiesbaden 2014, 37–47.
facility”). One counterargument is that Eurobonds can be issued in unlimited quantities, while TARGET2 balances must be collateralized and therefore the balance cannot rise ad infinitum. For Sinn and Wollmershäuser it is apparent that the TARGET2 balances are similar to the provision of credit to the peripheral countries, and it is also obvious that fear of an end to the “TARGET-politic” was the reason why some European governments insisted on implementing Eurobonds in 2010. Another important argument is that the TARGET2 balances resulted from the setup of the financial interchange system, rather than being the conscious result of a particular measure that was taken. According to the TFEU, the Eurosystem is responsible for the payment system in the Eurozone.

As noted earlier, mutualization could previously have been seen as something that was undesirable. Conversely, there was a proposal for a single debt instrument covering either all or merely some European countries. Eurobonds are one instrument that is considered capable of managing the crisis by reinforcing stability, supporting transmission of monetary policy and improving market efficiency. In recent years, many different versions of Eurobonds have emerged. Eurobonds target the mutualization of debt, and therefore losses, by pooling part of the EU government’s debt. This follows the single market ideal of the EU. The assumed advantages are the lower costs of borrowing and an improvement in stability for the European sovereign debt market. However, there are concerns that it dilutes the outstanding debt and creates a risk of moral hazard. Another debate is related to the guaranty, i.e., whether it should be a joint or several guaranty. Joint responsibility is likely to violate the no-bailout clause of the treaty, which is why the recommendations more often favour the several guaranty approach. The Eurobonds, if they are issued at some point in the future, are widely expected to pay lower yields than most national debts, especially those of weak countries.

157 Karadzic, Petra; Keller, Andreas, TARGET2 ein wandelndes Pulverfass?, Wiesbaden 2014, 42.
However, most proposals for the implementation of Eurobonds exclude countries that are subject to a troika-bailout arrangement.\textsuperscript{160} Stronger countries should benefit indirectly from a stronger financial system through more stability and greater efficiency of monetary policy transmission. One problem with Eurobonds could be the ratings system. This could be the lowest level of one individual country’s bond rating. Therefore, “the average risk premium of a portfolio of bonds may be higher than the premium charged to an individual country with the same average risk.”\textsuperscript{161} To solve the problem of moral hazard, Eurobonds with a wide variety of conditions have been proposed.

\textbf{VIII. A healthy capital market}

As we have seen, many measures have been implemented, creating various risks and side effects. In this chapter, the capital market is presented—how it works, what influence the APP has had and how it has shaped market conditions. Firstly, the term “capital market” is defined and secondly, the concept of a healthy market is discussed.

\textbf{A. Capital market}

Securities such as bonds, shares, and funds with a maturity of longer than one year are traded on the capital market, while short-term securities with a contract period of up to one year are traded on the money market. As in every market, supply and demand for mid- and long-term securities converge. An investor, being either a public or private insurer, financial institution, pension fund or private household, expects a yield on the capital invested. Trades can be executed through an exchange or over the counter (OTC) through intermediaries. The capital market is a regulated market whereby the state is responsible for establishing the preconditions for a freely functioning market and for protection of investors through the law. A market generally reacts as follows: The price of an asset rises if the rating (credit standing of a bond) increases or if market interest rates drop.

\textsuperscript{160} “Troika represents the official lenders when bailout conditions are being negotiated with the countries concerned. It also reviews the implementation of the agreed programmes. On the European side, the final decisions are taken by the euro zone’s finance ministers.” See European Parliament, Troika: find out the facts about the bailout programmes in our infographics.

Falling interest rates are driven by a low international interest rate level, a shrinking inflation rate or low capital demand, while falling market prices are driven by the opposite effects, i.e., a lower credit rating, rising interest rates, increasing demand for capital or a higher inflation rate.\textsuperscript{162}

B. A “healthy” market

In the context of this thesis, “healthy” means three things.\textsuperscript{163} Firstly, it is defined as a market with small bid–ask spreads. The bid–ask spread is the difference between the bid price and the ask price, where the bid price is the price at which someone is willing to buy a bond and the ask price is the price a seller is seeking for their bond. In a liquid market, the bid–ask spread is narrow. An investor should have a real possibility of buying or selling an instrument at the bid or ask price, respectively, not just a theoretical possibility, because it is no use to an investor to be quoted a theoretical price for an asset when in reality nobody wants to sell or buy at that price. Secondly, a high number of trades in a specific period can be an indicator of a healthy market. This implies that there are numerous investors in the market who are willing to buy and sell assets. Thirdly, a high transaction volume indicates a healthy market. This means that an investor can place a significant order without having an excessive impact on the market price. The volume can also reflect “underlying investor behaviour and not just the capacity to trade.”\textsuperscript{164}

C. Reaction of the capital market

The “ECB liquidity provision to banks mostly ‘spilled over’ into the bond markets (...) [and] shift[ed] away from bank-based financing towards more market-based financing.”\textsuperscript{165} The APP led to a scarcity of eligible bonds because the ECB’s purchases caused the covered bond market to shrink by an estimated €160 billion according to an ABN AMRO analyst.\textsuperscript{166}

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163 See also Mizrach, Bruce, Analysis of Corporate Bond Liquidity, 2015, 1.
164 Hill, Andy, Remaking the corporate bond market, 2016, 12.
165 Cour-Thimann, Philippine; Winkler, Bernhard, Central banks as balance sheets of last resort: ECB’s monetary policy in a flow-of-funds perspective, 2016, 33.
166 Hale, Thomas, How the ECB’s purchases have changed European bond markets, Financial Times 2017.
\end{flushright}
Consequently, this reduced market liquidity. The analysis of Schlepper et al. (2017) showed the same result, namely, that liquidity conditions in the Bund market deteriorated over the period observed.\textsuperscript{167} The secondary European market for investment-grade corporate bonds reached an outstanding nominal volume of €3,900 billion in June 2016.\textsuperscript{168} However, trading volumes are lagging compared with the growth in the outstanding volume of these bonds. Regarding the bid–ask spread, Hill (2016) reported that the theoretical and effective prices had drifted away from each other. This suggests “increasingly impaired liquidity conditions.”\textsuperscript{169} Bond trades are often executed OTC; nevertheless, the size of an average trade on trading platforms has decreased, and now tends to be around €2 million. Larger institutional orders, the so-called “block-size orders”, are unusual these days. A characteristic of bond trades is that they tend to be most liquid during the first week after issue. Hill’s buy-side results for liquidity showed that around two-thirds of interviewees reported that overall liquidity had deteriorated. However, according to the survey, the liquidity for small-ticket trades remained the same, with 25% of interviewees saying that liquidity had improved, while another 25% stated the exact opposite. The contribution of the monetary policy was a compression of the credit spread and a stimulation of the search for yield in asset classes other than bonds.\textsuperscript{170} This led to more passive buy-and-hold strategies because an active strategy would not lead to a positive performance premium, meaning the market became more buy-side driven. The QE measure also led to a less fundamentals-driven price setting. Credit ratings and information about the bond and the issuer were deemed less important, and thus the credit risk was not properly considered. The APP caused a shift towards lower-rated and longer-duration debt instruments as intended, and distorted asset prices as a side effect.\textsuperscript{171} The APP is the main driver behind government bond yields being at an excessively low level; they fell significantly, especially between the announcement of the PSPP and the programme’s first

\textsuperscript{167} Schlepper, Kathi; Hofer, Heiko; Riordan, Ryan; Schrimpf, Andreas, Scarcity effects of QE: A transaction-level analysis in the Bund market, 2017, 21.
\textsuperscript{168} Hill, Andy, Remaking the corporate bond market, 2016, 6.
\textsuperscript{169} Hill, Andy, Remaking the corporate bond market, 2016, 13.
\textsuperscript{170} Hill, Andy, Remaking the corporate bond market, 2016, 20.
\textsuperscript{171} European Central Bank, Bond Market Contact Group (summary of the discussion), Frankfurt am Main, 2017, 1–2.
purchase, “pushing (…) into ‘bubble’ territory”. Investors other than insurance companies, pension funds and Japanese investors were net sellers of euro area government bonds. The Financial Times reported that the “ECB purchases have brought the yields of different countries closer together, and a reduction in purchases will force the market to reassess country-specific risks, especially those associated with the rise of anti-establishment political movements, such as the Netherlands and France.” The QE also caused excess liquidity, which in itself caused other indirect effects of the APP. This liquidity is stored in the ECB’s deposit facility, if one has access to it; if not, the excess liquidity is often stored in safe, short-term sovereign bonds because of the duration risk. This was the case for non-euro area investors with no direct access to the Eurosystem, and thus as a direct effect of the APP, demand increased while the supply decreased. Schlepper et al. (2017) analysed high-frequency QE purchase data for German treasury bonds, as well as high-frequency inter-dealer data from MTS, to measure the impact on prices and the functioning of the bond market. They used 10-year German treasury bonds (also known as Bunds) because they are AAA rated, and therefore serve as a benchmark for the risk-free rate. They argued that if the highest-rated bonds are affected, then other bonds must also feel the impact. MTS is the “main inter-dealer venue for EUR-denominated sovereign bonds.” Their results indicated that a scarcity of bonds has an impact on bid–ask spreads and, indirectly, on market liquidity. Further, they showed that “the price impact varies greatly with market conditions: it is considerably higher during episodes of illiquidity and when yields are higher.”

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172 Bengoechea, Mariano; Gruber, Andreas; Brook-Walters, Natasha, Impact of the ECB’s asset purchase programme, Frankfurt am Main, 2017, 11.
173 Hale, Thomas, How the ECB’s purchases have changed European bond markets, Financial Times 2017.
175 MTS is an electronic bond trading platform organized around a centralized limit order book, similar to equity exchanges. MTS market participants—typically major banks’ bond dealing desks—can provide liquidity by posting limit orders, and trades executed based on price and time priority. See MTS, MTS: an electronic bond trading platform provided by London Stock Exchange Group.
177 Schlepper, Kathi; Hofer, Heiko; Riordan, Ryan; Schrimpf, Andreas, Scarcity effects of QE: A transaction-level analysis in the Bund market, 2017, 1.
1. Price-impact

Schlepper et al. (2017) estimate an “immediate (5-minute) price impact of a typical asset purchase of about 1.6 basis points (bps) on average”\textsuperscript{179} in the period from September 2015 till October 2016. The price increase in the bonds that were purchased is unique. Because bond transactions, especially larger orders, are conducted OTC and therefore are not public, there is a five-minute delay in the price effect until the information is included in the market. In their study, Schlepper et al. found a price effect of such purchases of between 1 and 3 basis points, and double that figure for acquisitions of €100 million or more. Overall, the PSPP increased the price of German treasury bonds by 78 to 218 bps.\textsuperscript{180} An increase of 218 bps for the Bund price led to a decrease of 22 bps in the yield. “[T]he Bund yield curve shifted into negative territory at the announcement” of the PSPP.\textsuperscript{181} Nearly $2 trillion or 30% of European sovereign debt showed negative yields. Bond yields faced historical lows, e.g. the five-year sovereign bond had a negative yield of 0.025%. By November 2015, the value of Eurozone bonds with negative yields had increased by about €0.6 trillion to €2.6 trillion as a result of the announcement by the ECB that it would continue with the QE.\textsuperscript{182}

The heightened political uncertainty coupled with the ECB’s large-scale purchase programme is “undeniably distorting prices in the entire euro bond market” and continues to put downward pressure on yields.\textsuperscript{183} “Yields from the short end to the mid-range of the curve are still hovering in negative territory.”\textsuperscript{184} In Germany, more than 50% of outstanding government bonds have a yield of less than −0.4%, while Italy only has around 15% of outstanding government bonds with a negative yield. For the entire Eurozone, about 40% of outstanding government bonds have a negative nominal yield.\textsuperscript{185}

\textsuperscript{179} Schlepper, Kathi; Hofer, Heiko; Riordan, Ryan; Schrimpf, Andreas, Scarcity effects of QE: A transaction-level analysis in the Bund market, 2017, 3.
\textsuperscript{180} Schlepper, Kathi; Hofer, Heiko; Riordan, Ryan; Schrimpf, Andreas, Scarcity effects of QE: A transaction-level analysis in the Bund market, 2017, 6.
\textsuperscript{181} Schlepper, Kathi; Hofer, Heiko; Riordan, Ryan; Schrimpf, Andreas, Scarcity effects of QE: A transaction-level analysis in the Bund market, 2017, 6.
2. **Bid–ask spread**

Bid–ask spreads have increased over the life of the PSPP, especially those for eligible bonds. “The (relative) bid–ask spread for purchased bonds scaled by purchase volume is between 4 and 8 basis points higher than for bonds not purchased on that particular day.”\(^{186}\) Even the size of the PSPP trades has increased; 92% of PSPP purchases are within the bid–ask spreads available on MTS, or at an even better price than the best bid price. As a consequence, PSPP traders obtained a better price “than those on the main inter-dealer venue”\(^{187}\) in 99% of the trades conducted. The spreads for purchased bonds showed worse liquidity in the case of PSPP-eligible bonds than for bonds not purchased during the programme. The bid–ask spread for purchased bonds increased by 33% compared with those not purchased. If the spreads are weighted in line with the PSPP, the bid–ask spreads increased by 200%, from 10 bps to 30 bps.\(^{188}\) However, as Draghi pointed out, “Our monetary policy targets price stability, not spreads.”\(^{189}\)

3. **Transaction volume**

PSPP transactions are relatively large compared with wholesale market transactions, and are conducted once per day. By way of comparison, a typical German bond is, on average, traded six times per day and is only one-third of the size of a PSPP transaction. Schlepper et al. (2017) support the assumption that block trades are difficult to execute on the MTS or other trading systems as a result of a low-liquidity market. For the CSPP, 58% of transactions are below €10 million, 34% are between €10 and €50 million and 8% are over €50 million.\(^{190}\)

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\(^{186}\) Schlepper, Kathi; Hofer, Heiko; Riordan, Ryan; Schrimpf, Andreas, Scarcity effects of QE: A transaction-level analysis in the Bund market, 2017, 4.

\(^{187}\) Schlepper, Kathi; Hofer, Heiko; Riordan, Ryan; Schrimpf, Andreas, Scarcity effects of QE: A transaction-level analysis in the Bund market, 2017, 15.

\(^{188}\) Schlepper, Kathi; Hofer, Heiko; Riordan, Ryan; Schrimpf, Andreas, Scarcity effects of QE: A transaction-level analysis in the Bund market, 2017, 21.

\(^{189}\) European Central Bank, Monetary dialogue with Mario Draghi, 2017, 9.

IX. Impact of TARGET2 and its roots on the capital market participants

A. Impact of the TARGET2 system on the capital market participants

The TARGET2 system provides access to important liquidity. The counterparties in the Eurosystem obtain “unlimited intraday credit free of interest against collateral.” 191 “Minimum reserve holdings are available for settlement purposes during the day.” 192 Additionally, the TARGET2 system reduces the transaction risk by settling cross-border transactions immediately.

1. Investors

During the financial crisis, risk-adverse investors wanted to reduce their risk in relation to countries that were in debt. Therefore, they reduced their exposure to these countries and withdrew their money back to their home country. The well-functioning TARGET2 system, in combination with the money provided by the Eurosystem allowed the investors to draw also higher amounts of money off, effectively avoiding bad debts. In the case of a country’s bankruptcy, investors would have faced significant write-offs.

The provision of liquidity by the ECB and the existing TARGET2 system helped to avoid further cases of insolvency, and therefore investors could sell assets at approximately their fundamental value. 193

2. Banks

In a situation where the Eurozone faced a lot more defaults and the banks had to write off a large number of assets, the banks’ equity-to-asset ratio would have decreased and more assets would have been needed. If the banks could not afford to increase their asset holdings, some form of rescue measures would have been required. 194

191 Deutsche Bundesbank, TARGET2 – Benefits.
192 European Central Bank, The current target system, 2005, 2.
193 Fratzscher, Marcel; König, Philipp; Lamber, Claudia, Target-Salden – ein Anker der Stabilität, 2013, 22.
194 Fratzscher, Marcel; König, Philipp; Lamber, Claudia, Target-Salden – ein Anker der Stabilität, 2013, 22.
B. Impact of the APP on the capital market participants

As noted in the previous chapter, an investor faces various risks, for which they should receive an appropriate rate of return. In theory, this means that the riskier an investment, the higher its return should be. The aim of the APP was to influence the prices of bonds “and push investors into equities or corporate bonds.” As a result of the APP purchases, asset prices increased and the bond yield decreased. “[T]he fall in yields after the programme announcement is larger, the longer the maturity of bonds.” This price increase heightened the risk that the price differed from the asset’s fundamental value. Investors following a buy-and-hold strategy were less affected if they had bought the asset before the programme started, as this strategy benefited from the increase in asset prices. Bond investors can make money by buying a (high-priced) bond, waiting for the price to rise even higher, and then selling the bond at a profit. However, once the investor has sold the bond, he has to decide where to invest his money. During the financial crisis, the conditions for reinvestment were not very attractive. If the investor wanted to reinvest in bonds, he could do so, but only if he agreed to negative interest rates, higher bond prices and lower yields. However, an investor usually wants a positive yield, and so is more likely to invest in other asset classes such as listed equities, private equities, real estate, or alternative assets. A second possibility is to invest for a longer term, which can result in a higher level of risk as a result of the greater exposure to interest rate fluctuations. “Long-duration bonds are riskier, because they are more sensitive to interest rate risk.”

1. Retail Investors

A retail investor, perhaps owning a house with a Lombard loan mortgage, does not want higher risk, because this could place his home at risk. Savers do not earn much either, with balances attracting zero or even negative amounts of interest because of the negative interest rates.

196 Andrade, Philippe; Breckenfelder, Johannes; De Fiore, Fiorella; Karadi, Peter; Tristani, Oreste, Working Paper Series The ECB’s asset purchase programme: an early assessment - No. 1956/September 2016, 3.
197 Andrade, Philippe; Breckenfelder, Johannes; De Fiore, Fiorella; Karadi, Peter; Tristani, Oreste, Working Paper Series The ECB’s asset purchase programme: an early assessment – No. 1956/September 2016, 3.
Thus, the CBs purchased some longer-duration bonds from the private sector to reduce private investors’ duration risk. Liable investors who need money will also profit from lower interest rates because it provides the opportunity for relatively cheap money. If the rate is not fixed for the entire investment period, the risk of a higher interest rate persists. The money could be used to repay existing debt.

2. **Banks and Financial Intermediaries**

As investors, banks and financial intermediaries also profited from the higher asset prices, as the value of their assets increased. The higher the banks’ exposure to sovereign bonds, the higher the increase in their stock price. “The increase in bank capital releases leverage constraints and thus creates space for a reallocation of portfolios towards other risky assets, including lending.” On the contrary, lower yields impact on the banks’ profitability. “Since banks engage in maturity transformation, a flattening of the yield curve should (...) reduce their profitability.”

Maturity transformation is a bank’s core function, as this mechanism allows the bank to transform long-term and relatively illiquid assets into liquid claims. This is “one of the critical functions that the financial sector provides for the community.” A flattening yield curve negatively affects the banks’ profits through lower interest rate margins. These “lower margins may delay their deleveraging process and impair the recovery of bank lending”, especially when the bank is unable to raise new external capital. Over a longer period, this can adversely impact the banks’ financial stability. Andrade et al. found that the negative effect of lower profits and the associated threat to financial stability was “more than compensated by” the benefits of the higher prices of sovereign bonds. “Nowadays, financial intermediaries are stronger than they were before the crisis.”

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199 Andrade, Philippe; Breckenfelder, Johannes; De Fiore, Fiorella; Karadi, Peter; Tristani, Oreste, Working Paper Series: The ECB’s asset purchase programme: an early assessment – No. 1956/September 2016, 22.


203 Mario Draghi, European Central Bank, Monetary dialogue with Mario Draghi, 2017, 6.
Lower interest rates can have an indirect effect on the credit quality of loans if the decrease in the interest rate leads to debt reduction, and therefore also reduces the likelihood of default.

3. Central Banks in the European Area

The APP transferred the risk of potential portfolio losses from the CBs’ balance sheets to that of the ECB. For example, debt restructuring can negatively impact the valuation of assets and thereby reduce the asset value on the ECB’s balance sheet. “This risk of QE purchases is unavoidable in the euro area, because there is no area-wide fiscal issuer that can be considered as truly risk free. The provision that PSPP purchases by national central banks are not subject to loss sharing can be understood in the light of this risk.”

4. European Area Countries

High-debt economies benefit from lower interest rates, as they can issue bonds with lower rates of interest, which results in lower costs. For example, Spain, Ireland, Italy, and Portugal could benefit from lower interest rates, whereas Greece is not a part of the QE programme. One problem Greece faces is its high borrowing costs. The two-year rate was about 7% in March 2017, compared with 2% in Italy and 1.7% in Spain. Both Italy and Spain were included in the APP, and benefited from it. Greece would need “to regain access to capital markets in its own right, [therefore the ECB] (...) should add Greek bonds to the list of securities eligible for purchase under its quantitative easing program.” Greece’s low credit rating would have seen it automatically excluded from the QE programme “except for a waiver the ECB issued in June 2016 to help keep the country’s banking system afloat.” However, there is a hurdle to be overcome, namely, that Greece’s sovereign bonds are not eligible until the European Governing Council is confident that they are sustainable. The CB is not allowed to buy more than one-third of the sovereign bonds of any one country.

204 Andrade, Philippe; Breckinfielder, Johannes; De Fiore, Fiorella; Karadi, Peter; Tristani, Oreste, Working Paper Series The ECB’s asset purchase programme: an early assessment – No. 1956/September 2016, 49.

205 Gaffey, Conor, Germany and Greece losers in ECB’s quantitative easing plan, Newsweek 2015, 1.

206 Gilbert, Mark, Greece Should Be Added to ECB’s Bond-Buying List, Bloomberg 2017.

207 Gilbert, Mark, Greece Should Be Added to ECB’s Bond-Buying List, Bloomberg 2017.

208 Ashworth, Marcus, Nemesis Calling Greek Bonds, Bloomberg 2017.
As a result of the previous Greek bailouts, the EU institutions already hold huge amounts of Greek debt, and the CB is only allowed to buy less than 2 billion euros before it reaches the prescribed limit. “The central bank can’t buy more than a third of the bonds issued by any country, so QE would have to stop within a few months.”209

Germany bears a risk based on the significant number of assets it purchased under the PSPP. However, it could benefit from higher export earnings because of the declining value of the euro.210 If the APP were to be expanded again, the Eurozone should set clear conditions regarding the fiscal measures that must be undertaken by governments if their country is to be eligible for the cheap credit. It is well-known that monetary policy support without accompanying fiscal consolidation and structural reforms cannot boost long-term growth.211 Disregarding all the negative side effects, everybody benefited because through the APP, the Eurozone and all other countries connected to and interacting with the EU gained some time to introduce appropriate fiscal policy measures. Without this opportunity, some countries might have left the Eurozone or become insolvent. However, some governments started to depend on the support provided by the Eurosystem,212 and thus the time that was gained was not fully utilized. Draghi stated that “Big changes create winners and losers, and losers have to be looked at with much greater attention than we’ve done in the past. (...) [I]t has always been said that that there has to be a principle of indemnification or compensation whenever there are big changes in society. There are ways to take care of the losers. And so in a sense we have to go back and think about that.”213

X. Return to a Healthy and Efficient Capital Market

The ECB has outlined several criteria that need to be fulfilled before it will consider ending QE and the extraordinary monetary policy measures that have accompanied it. The ECB has “to be confident that the inflation rate is durably converging towards our objective of an inflation rate which is close to but below 2%, and that it’s a self-sustained convergence.”214

209 Ashworth, Marcus, Nemesis Calling Greek Bonds, Bloomberg 2017.
210 Gaffey, Conor, Germany and Greece losers in ECB’s quantitative easing plan, Newsweek 2015, 1.
212 Vorndran, Philipp, Zins(w)ende, 2017, 2.
213 European Central Bank, Monetary dialogue with Mario Draghi, 2017, 10.
214 Draghi, Mario; Constâncio, Vítor, Press Conference: Monetary policy decisions, Tallin, 2017.
The APP is one tool that has been used in an attempt to achieve the four preconditions set by the ECB, namely, “[1] that we [the ECB] see a convergence towards our objective; [2] that we see a durable convergence over the medium term, [3] that is over the relevant policy horizon; and [4] we have to see that it is self-sustained.”\(^\text{215}\) To measure inflation (and deflation), the ECB uses the HICP. The ECB’s inflation target of slightly less than 2% is motivated by a measurement buffer and a safety margin that is necessary to accommodate intercountry differences. The measurement buffer takes into account the fact that some products improve, e.g. as a result of innovation and more efficient manufacturing processes, whereas the safety margin provides a buffer zone in the event of emerging deflation. This buffer means that the ECB has more time to reverse a deflationary trend and has “to revert less frequently to unconventional measures.”\(^\text{216}\) The ECB’s inflation target is a euro area average, and is needed because of the different inflation rates across the various euro countries. This goal is quite difficult to achieve because of the huge economic gap between some countries. The ECB inflation forecast for the next three years is “1.3% for 2017, 1.5% for 2018 and 1.7% for 2019 (these are year-over-year forecasts for Europe’s [HICP]).”\(^\text{217}\) These figures could lead to the expectation that the ECB discontinues its QE programme sometime around 2019. However, the tapering could also start earlier because of the 33% issuer and issue limit, especially in the smaller Eurozone countries. Based on this limit, a reduction in asset purchases would be necessary in 2018 in some countries. Alternatively, the ECB could amend the policy by increasing the limits or buying other assets instead. “PIMCO expects [the ECB] will taper QE purchases to €40 billion per month in the first quarter of 2018, to €20 billion per month in the second quarter, and then finally end QE in June 2018.” Communication regarding the proposed tapering is expected in September 2017.\(^\text{218}\) Allianz anticipates that the Governing Council of the ECB will wind back its APP step by step, commencing in 2018 at the earliest. Until this tapering commences, the ECB’s monetary policy will remain exceptionally loose.\(^\text{219}\)

\(^{215}\) Committee on economic and monetary affairs, monetary dialogue with Mario Draghi, Brussels, 2017, 8.
\(^{216}\) European Central Bank, Why are stable prices important?.
\(^{219}\) Petersen, Ann-Katrin, Kapitalmarktbrief Mai, 2017, 3.
According to Marcuard Family Office’s (MFO) investment outlook for July 2017, the ECB may not end its purchasing programme before July 2018, but markets will start pricing in this shift earlier. As the next step, MFO assume that the ECB “would probably start with gradual interest rates hikes, before reducing their bond holdings.” The GCB wrote in its June report that it is important to strengthen the fiscal rules, in order to maintain the trust in national finances especially henceforth with a less expansive monetary policy.  

Weidmann stated that the continuing economic recovery of the Eurozone allows a for return to a normalization of the monetary measure, which means turning away from a ultra-loose monetary policy. It should not be an abrupt stop, but rather a smooth reduction of the QE. The timing and pace of the tapering are dependent on the sustainability of the inflation rate and how self-supporting the inflation is. It is possible that the ECB will commence the tapering earlier than anticipated. One additional predictor could be that, according to Draghi, “[t]he crisis is now behind us” and “the financial sector is now more resilient [worldwide].” Domestic demand, which has been strongly supported by the APP, is the main driver of the Eurozone recovery, and hence the starting point for the tapering will be heavily dependent on natural, unsupported demand. The longer the ECB maintains exceptionally low interest rates, the higher the risk of misallocation of resources, with a consequent impact on financial stability and the “functioning of market discipline”. Returning to a more normal market situation after the ECB ends the QE programme, or at least tapers it, might lead to “more fundamentals-based investing and trading, and a greater opportunity to capture ‘alpha’.” From the point of view of the investor, this scenario is dependent on the banks’ and brokers/dealers’ willingness to act as market-makers. Additionally, the longer the APP continues, the more investors come to rely on it and the accompanying low interest rates. This could result in higher asset prices,

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221 Deutsche Bundesbank, Monatsbericht Juni, 2017, 29.
222 Deutsche Bundesbank, Erholung öffnet Perspektive für geldpolitische Normalisierung.
223 Mario Draghi, Response by Mario Draghi, President of the ECB, on the receipt of an Honorary Doctorate from Tel Aviv University, Tel Aviv, 2017.
225 “Alpha is risk-adjusted return in excess of the required rate of return, but, more colloquially, stands for positive excess risk-adjusted return, the goal of active managers.” CFA Institute, Derivatives and Alternative Investments, USA, 2010, 188.
226 Hill, Andy, Remaking the corporate bond market, 2016, 21.
as seen in the bond market, where low yields result in higher prices. One could argue that the bond market is the mother of all bubbles.\textsuperscript{227}

One important question to be answered by the ECB is when the time is right to start exiting the QE programme. The ECB will have to achieve a trade-off between the positive effects of the programme and the undesirable side effects. Even if the ECB would like to continue the programme, they will face the challenge of the scarcity of eligible bonds as a result of their self-imposed issuer and issue share limits. The European area faces many challenges because of its structure, one being the TARGET2 balances, which would not exist if there was a single CB for the Eurozone instead of the ECB and one NCB per country. More structural reforms are also needed because the various European countries have different competition levels, different priorities, different schedules and different cultures. The ECB cannot eliminate the structural and fiscal problems by itself. “[I]n the Eurozone, the problems are structural, such as the inflexible labour market, high welfare system and other issues, all which have to be addressed.”\textsuperscript{228} Each country has its own agenda in terms of structural reforms. For example, in some countries you have issues in relation to the judiciary, in others there are education issues, and in yet others there are issues relating to the labour market. However, in all countries, and this should be the primary consideration, there should be a focus on the creation of a single market to provide competition in the trade of goods and services.\textsuperscript{229} These changes are needed if the EU is to continue as a homogeneous unit. “QE alone is not enough to achieve sustainability in economic development.”\textsuperscript{230}

According to the TFEU the primary objective of the ECB and the NCB is “to maintain price stability (…) support the general economic policies in the Union (…) act in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources, and [act] in compliance with \textsuperscript{231} (…) the following guiding principles:

\textsuperscript{227} Vorndran, Philipp, Zins(w)ende, 2017, 2.  
\textsuperscript{229} European Central Bank, Monetary dialogue with Mario Draghi, 2017, 10.  
\textsuperscript{231} Consolidated version of the TFEU, Published on 7 June 2016, (2016/C 202/01), OJ C 202/47, Article 127(1).
stable prices, sound public finances and monetary conditions and a sustainable balance of payments.”232 Philippe Lamberts, a Belgian member of the European parliament (MEP), asked Draghi if there could be another definition of price stability. Lamberts referred to the reference in TFEU Article 127 to TFEU Article 3233 “which mentions social progress, environmental sustainability and all the rest of it.”234 Draghi’s answer was clear. “For us, that is the only relevant definition of price stability for our own monetary policy mandate.”235 “It’s not employment; it’s not growth.”236 A stronger economy and a declining unemployment rate might make the ECB more confident about a stable economic situation, but it is not a defined criterion. The motivation behind the inflation target is to protect the economy from the negative spiral of either inflation or deflation. An inflationary spiral causes prices to rise, which leads to a demand for higher salaries, which in turn leads to further increases in prices. Conversely, a deflationary spiral leads to lower prices, and therefore lower incomes, which can make it difficult for people to pay their mortgages and other debts. In the end, this can lead to a rise in unemployment and can also reduce the amount of tax received by the government. “The negative consequences of deflation are therefore felt by everyone.”237

It has been argued that the ECB is too focused on the consumer price index (CPI) in measuring inflation, even though it is allowed to use other measures.238

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232 Consolidated version of the TFEU, Published on 7 June 2016, (2016/C 202/01), OJ C 202/47, Article 119(3).
233 I am presuming he also referred to TFEU Article 4(2).
TFEU Article 3(1): 1. The Union shall have exclusive competence in the following areas: (a) customs union; (b) the establishing of the competition rules necessary for the functioning of the internal market; (c) monetary policy for the Member States whose currency is the euro; (d) the conservation of marine biological resources under the common fisheries policy; (e) common commercial policy.
TFEU Article 4: 1. The Union shall share competence with the Member States where the Treaties confer on it a competence which does not relate to the areas referred to in Articles 3 and 6.
2. Shared competence between the Union and the Member States applies in the following principal areas: (a) internal market; (b) social policy, for the aspects defined in this Treaty; (c) economic, social and territorial cohesion; (d) agriculture and fisheries, excluding the conservation of marine biological resources; (e) environment; (f) consumer protection; (g) transport; (h) trans-European networks; (i) energy; (j) area of freedom, security and justice; (k) common safety concerns in public health matters, for the aspects defined in this Treaty.
234 European Central Bank, Monetary dialogue with Mario Draghi, 2017, 10.
235 European Central Bank, Monetary dialogue with Mario Draghi, 2017, 10.
236 Draghi, Mario; Constâncio, Vítor, Press Conference: Monetary policy decisions, Tallin, 2017.
237 European Central Bank, Why are stable prices important?.
238 Rasch, Michael, Die EZB lässt die Notenpresse laufen, NZZ 2016.
Axel Weber, a former member of the Governing Council of the ECB, argued that the CPI is a proximal reference, but is not a perfect indicator of the value of money, indeed there is no such thing. The reason why no perfect indicator exists is the lack of stability in the relationship between the volume of money and prices, which thus creates an imperfect correlation. Additionally, the CPI only contains a small and shrinking subset of all relevant prices, and exhibits a delayed reaction to changes in the money base. Thus, the target that is pursued is neither strong nor stable, and does not include prices for real estate, commodities, financial assets, and exchange rates. While price stability is an honourable aim, the focus is too narrow and too short term. There should be space for the discernment of the policymaker in charge.

Short-term deviations from the target level of price stability, which these days is represented by the CPI, must be accepted in the pursuit of long-term stability. Further, because the CPI is not a precise index, the tolerance limit should be even broader. For example, the Federal Reserve System uses the gross domestic product (GDP) deflator to measure inflation. The ECB was criticized for missing its target for years, and it will not reach it by the end of 2017 or even by the end of 2018 either. Through its emphasis on the inflation target, the ECB has placed itself in a communication trap and, if it cannot honour its pledge, might lose creditability. Sinn, who has castigated the ECB for its politics, has stated that if the ECB is unable to stimulate a higher level of inflation and through this a reduction in debt, the euro will collapse. If this is not achieved, the EU will simply become a transfer mechanism to finance weaker, non-competitive countries via more solvent ones.

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239 Axel A. Weber is Chairman of the Board of Directors of UBS Group AG. “[Mr.] Weber was president of the German Bundesbank between 2004 and 2011, during which time he also served as a member of the Governing Council of the European Central Bank, a member of the Board of Directors of the Bank for International Settlements, German governor of the International Monetary Fund, and as a member of the G7 and G20 Ministers and Governors.” For more details see www.ubs.com/global/en/about_ubs/corporate-governance/board-of-directors/cv-axel-weber.html.


242 Barmettler, Stefan; Merkel, Karin, Migration beisst sich mit dem Sozialstaat, Handelszeitung 2016.
To summarize, the ECB will exit the QE programme when it is confident of “a self-sustained, durable convergence towards an inflation rate which is below, but close to, 2%”. To measure the inflation rate, the ECB uses the HICP. The arguments put forward by MEPs, journalists and others suggest that even though the criteria that are used appear to be black and white, there might be a grey area that provides room for interpretation by the ECB.

XI. QE Exit Strategies

Before initiating the exit strategy, two questions must be answered by the ECB: “when to stop easing, then after that when to start tightening.” The ECB will need more time than the US to adopt its exit strategies and recover from the crisis because it has to deal with two unique challenges. Firstly, it has to counter “the adverse effect of symmetric shocks stemming from the euro area crisis”, and secondly it has to cope with asymmetric shocks “related to fragmentation of financial markets along national borders.” It is also very important to keep in mind that “the ECB’s tapering and exit strategies from the present loose monetary policy cannot be disentangled from the current fiscal adjustment needs in the euro area, as fiscal consolidation is still necessary in most euro area member states.”

A. Conventional interest rate policy

Interest rates are one instrument in the ECB framework, and an exit from the QE programme would probably involve an increase in interest rates. Conversely, it is “not unusual for central banks to hold interest rates at a very low level for a while after they stop easing and before they start tightening” their monetary policies. Low capital market interest rates have a negative impact on the productive structure of an economy, as well as on its stability. The BIS argues that pure inflation targeting is not conducive to financial stability because it does not consider the financial cycle.

243 Draghi, Mario; Constâncio, Vítor, Press Conference: Monetary policy decisions, Tallin, 2017.
245 Sibert, Anne et al., Exit strategies and the impact on the euro area, 2013, 87.
246 Sibert, Anne et al., Exit strategies and the impact on the euro area, 2013, 87.
247 De la Dehesa, Guillermo, Tapering and exiting from present monetary policies, 2013, 94.
This can lead to an excessively expansive and asymmetrical monetary policy. Nearly every price is either influenced by or derived from the interest rate. A project that was commenced when very low interest rates prevailed may not be able to be finalized if interest rates rise and the owners are unable to meet the higher costs of any refinancing that is required. The sole focus of the ECB on consumer prices could have a negative impact and lead to unprofitable investments. Very low interest rates also tend to undermine an efficient allocation of capital resources to the most productive projects. In general, the lower the interest rate, the more willing the banks are to extend or renew existing loans instead of lending to new businesses, creating an entry hurdle for more productive and innovative firms. This phenomenon is known as “zombification”, and “[t]he continuation of the EAPP is likely to further contribute to those zombification side effects.”

The impact on the interest rate curve is important for the business model of commercial banks. One source of earnings for banks is maturity transformation, which involves borrowing money over the short term and lending it to clients for longer periods. The spread between those two transactions represents the bank’s profit. The bank must bear the risk that short-term rates rise above the long-term interest rates that are locked in for its customers’ loans, leaving the bank to pay more than it receives for its loan products. Mortgage loans in particular are more often extended at a fixed rather than a floating interest rate. Regarding liquidity, one needs to be very careful when exiting an expansive monetary policy because market participants have been accustomed “to plenty of liquidity for a very long time.” Liquidity is one factor the ECB will monitor closely, because “liquidity is there until it isn’t.”

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253 European Central Bank, Monetary dialogue with Mario Draghi, 2017, 16.
254 European Central Bank, Monetary dialogue with Mario Draghi, 2017, 16.
1. **Interest rate hikes**

There are two reasons why the ECB could raise interest rates before commencing tapering. If the ECB raises interest rates to a less negative value, zero, or even a positive value, the banks would benefit and it would have a positive effect on interest margins and the credit supply. If the ECB wants to extend the QE programme until 2018 or beyond, “it could be part of a trade-off with the hawks for a longer QE programme.”

The strategy options can differ in terms of the pace of easing, how many steps are required to reach the terminal level and what the terminal level should be. These questions must be answered by the ECB before it commences the exit process. Its “framework permits short-term interest rates to be changed while keeping some non-standard measures in place, should continued credit support be needed.” Thus, the framework allows the ECB to combine the continuation of non-standard measures with a modification of interest rates. “[T]he Eurosystem retains appropriate flexibility as to the way in which interest rate action will be combined with the unwinding of the additional credit support measures, notably its extended framework for longer-term refinancing operations.” An increase in the interest rate will lead to lower asset prices and lower bond valuations, and could eventually lead to losses on the CBs’ balance sheets. Higher asset prices may also impact the exchange rate. “The exit strategy will also be constrained by its impact on public debt sustainability: if the interest rate rises faster than the growth rate, the debt GDP ratio will become unstable.” The ECB needs to be very careful in relation to the exit strategy and the sale of public debt. The market must be able to absorb it, and will impose a risk premium. The ECB must take this premium into account and stay within a range that does not trigger panic in the market that forces the ECB to reverse the interest rate increase.

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256 PICTET; Ducrozet, Frederik, Euro Area: monetary policy, 21 March 2017, 1.
257 European Central Bank, The ECB’s exit strategy.
258 Trichet, Jean-Claude, The ECB’s exit strategy: Speech by Jean-Claude Trichet, President of the ECB at the ECB Watchers Conference Frankfurt, 2009. (Trichet was president of the ECB from 2003 to 2011.)
259 Sibert, Anne et al., Exit strategies and the impact on the euro area, 2013, 25.
260 Sibert, Anne et al., Exit strategies and the impact on the euro area, 2013, 27.
2. **Interest rate corridor**

The interest rate corridor lies between the marginal lending facility, which is the ceiling, and the deposit facility, which acts as the floor. In normal times, the market rates, as measured by the Euro Overnight Index Average (EONIA), are close to the main refinancing rate. Regarding the interest corridor, an exit strategy raises the question, both during the exit process and afterwards, of the “width of the corridor of deposit, main refinancing and marginal lending rates.”

B. **Unconventional liquidity and funding measures**

1. **Tender procedure**

The challenge for the ECB is to smoothly implement a restriction of liquidity to participating counterparties. The unconventional full allotment must be changed to a restricted allotment of liquidity without adversely impacting the liquidity of the market.

2. **Collateral pool**

The ECB has implemented relatively loose collateral requirements. These requirements should be tightened over time until they return to normal market conditions. Asset prices could deviate from the underlying price because not all risks are fully included in the pricing mechanism.

C. **Unconventional balance sheet policy (QE)**

One could argue that an extension of the QE programme will allow more time for structural reforms. However, it will actually be a waste of time, because fiscal policy will lack discipline and pressure from the capital market sector will abate. “[T]he pace of reform implementation for a group of ‘euro area deficit countries’ (France, Estonia, Greece, Ireland, Italy, Portugal, Slovak Republic, Slovenia and Spain) has decelerated considerably.”

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261 Sibert, Anne et al., Exit strategies and the impact on the euro area, 2013, 52.
Therefore, no more will be done regarding fiscal measures, only the same measures or even less, but over a longer time period. “[T]hus, an extension of QE is most likely no suitable way to trigger additional structural reform eagerness.”

1. **Tapering of, or exit from QE**

“The term ‘tapering’ refers to the interruption of unconventional monetary policies and the related expansion of central banks’ balance sheets. The term ‘exiting’ refers to the raising of interest rates and related portfolio adjustments of central banks’ balance sheets.” The degree of tapering defines the pace of reduction of the various programmes. For each programme, the ECB must define how long it will continue with the programme, at what pace and in what format. It could terminate programmes sequentially, or reduce the extent of all programmes simultaneously. The reduction in the pace of each programme could be handled in a similar fashion, or differently; there are many combinations available to the ECB.

2. **Reinvestment policy**

The reinvestment policy determines how the ECB deals with the principal payments on the securities purchased under one of the APPs. In pursuing an exit strategy, the ECB would not reinvest any principal payments. Another option would be to reinvest just a fraction of the payments.

3. **Balance sheet normalization**

The normalization of the balance sheet, which involves a reduction in the amount or value of assets purchased under the APP, can occur in three different ways. Firstly, the assets can be held until they expire, with no reinvestment of any cash flow that is generated. Secondly, the assets can be sold on the secondary market. Thirdly, a combination of the first two methods can be applied.

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265 De la Dehesa, Guillermo, Tapering and exiting from present monetary policies, 2013, 94.
D. Communication

In December 2016, Rasch stated in an NZZ article that the ECB had already missed a big chance to initiate an exit strategy from its ultra-expansive monetary policy. It was suggested that it was important to announce the exit early, because the ECB needs time to prepare the market. A statement from the ECB emphasizing the opportunities presented by an exit instead of the potential risks and weaknesses would have provided a positive psychological stimulus. Only confident investors invest.267 “In other words, to revive investment or consumption, businesses and consumers have to believe in the prospect of rising incomes, rising profits and higher prices, alongside available credit, low borrowing costs and sufficient liquidity before they will invest or consume their way out of recession and into recovery.”268 Therefore, the psychological aspect should not be underestimated, and must be taken into consideration, although that is not the focus of this thesis. “The real risk here, if there is one, is the absence of an explicit exit strategy to demonstrate how the expanded liquidity/money aggregates will be eliminated.”269

XII. Summary

The TARGET2 balances belong to the Eurozone, as they are part of the framework of the Euro area payment system. However, the driver of the TARGET2 balances has changed. They are no longer predominantly driven by market stress, but rather by the APP and liquidity programmes of the ECB. The APP was implemented by the ECB to reach its inflation target. However, it had the side effect of significantly increasing the TARGET2 balances. The APP changed the Eurosystem’s balance sheet management approach from passive to active. The ECB, as a lender of last resort, also influenced the TARGET2 balances through its liquidity-providing credit operations. Thus far, no cap has been set for the TARGET2 balances. The asset holdings following the APP changed the structure of the CB’s balance sheet. The new balance sheet structure combined with a low interest rate environment inherently involves the risk of rising interest rates. The fall in interest rates led to higher bond prices and lower yields.

An investor who already held a bond when the APP commenced made a profit because of the increase in the asset price. However, if he sold the asset, he faced the same problem as other investors who had not invested in bonds, namely, low or negative yields. In response, market participants tended to shift their investments into riskier assets, creating an adverse effect on financial stability. Market prices were also blurred, and deviated from fundamental values. This price effect could present the risk of an inadequate estimate of the probability of a default. To mitigate the risk of a default, the ECB developed a collateral framework. This defines the eligibility criteria for marketable and non-marketable assets. One criterion is to meet the ECB’s credit risk requirements. The ECB had to define which assets were eligible for the programme so that there were sufficient instruments to buy and, at the same time, some of the risks were reduced. For the collateral received against liquidity provided, the ECB was able to apply haircuts as an additional instrument. The ECB sets collateral haircuts in line with ratings of the eligible assets, aiming to minimize the default risk or at least make it more transparent. In response to the limited amount of high-quality collateral, the ECB accepted lower-rated instruments than it had accepted before the crisis, and therefore favoured holders of low-quality bonds. The collateral requirement can cause a reduction in the amount of available assets.

On the contrary, the ECB could not use haircuts for the APP, and so it implemented other measures to reduce the concentration risk. To avoid over-concentration on a particular bond category, the ECB set issue and issuer limits to ensure at least a minimum amount of diversification. The ECB implemented these unconventional measures to gain time for economic reforms. The liquidity and funding measures that were instituted at the beginning of the financial crisis were very helpful, and proved essential to replacing the stagnant interbank market until trading could be reactivated. As mentioned earlier, the APP was implemented to enable the ECB to achieve its goal of an average inflation rate of just under 2%. However, because there are some huge economic gaps between the various euro countries, this goal is not easy to reach.
XIII. Conclusion

A. Asset Purchase Programme and the full allotment

The intervention of the ECB, which provided the market with liquidity at the beginning of the financial crisis when the interbank market was dead, was inevitable. The APP helped the ECB to fulfil its mandate of an inflation rate close to but below 2%. From this perspective, the APP was successful, although it carried certain risks and produced some negative side effects. An intended outcome of the APP was an increase in bond prices, which led to a shift into riskier assets, which could have led to a financial stability risk. The APP also caused a distortion of asset prices, especially bond prices, which deviated from their fundamental value. It has been stated that the ECB would not purchase assets from the primary market to avoid destroying market prices. However, this argument is not convincing because more than 70% of the eligible assets did not have a market price. Additionally, it was not specified how long the ECB should wait following an issue to buy an asset. The easing of eligibility criteria to obtain liquidity made the behaviour of both market participants and, more importantly, countries less sustainable. This has led to the questions of whether the APP is still fulfilling the requirements of the ECB, whether these are the right requirements for the current situation, and if the ECB should continue with the APP. Another question, that will require different actions depending on the answer, is whether the European area is currently facing a liquidity crisis, a solvency crisis, or a mixture of both. Currently, the ECB’s strategy is very path dependent, but it is questionable whether this is sufficient reason to continue with the APP. I would therefore suggest exiting the APP. The negative side effects are increasing, and immense sums of money are needed if the APP is to have a positive impact on the inflation rate. Of course, the ECB should not cease all measures immediately, but it should commence a tapering process. Some smaller programmes such as the CSPP and the ABSPP could be discontinued immediately.
B. **TARGET2 balances**

The large TARGET2 balances are the result of the structure of the euro area payment system involving decentralized local central banks in combination with the measures taken by the Eurosystem. The APP increased the TARGET2 balances, and with them the risk management costs of the NCB especially of the GCB. When the APP ceases and if no other QE measures are instituted in its place, the TARGET2 balances should stop rising as quickly as they have done in recent times, and should stabilize when the economic situations of the various Eurozone countries achieve greater harmony. The TARGET2 balances served to reveal a structural problem within the EU, and while they were the cause of much debate, the problem is much more complex, and requires an examination of the EU as a whole.

C. **Structural problem of the EU**

One of the biggest problems is the fact that the various countries in the Eurozone are extremely diverse regarding their ability to compete both with one another and beyond the EU. If they were not bound by a single currency, they would be able to accommodate these differences through exchange rates, but this instrument is no longer available. The big challenge is to bring the various countries in the Eurozone to a more equal economic level and inspire their enthusiasm to move closer together and grow into a single entity instead of numerous different countries. The EU countries need to ask the question, do they want to stay in the European Union, given all the various positive and negative effects that membership entails. Negative effects are likely to be felt first, and must be overcome before the positive long-term effects can prevail. It is important to rally EU citizens behind the common goal of strengthening the EU as a whole and improving the situation for all parties involved, i.e., sacrificing their individual objectives in favour of this overarching goal. To reach this goal, it is important to give the people a vision. This would require creating apprenticeships and investing in education and jobs in general, which could also alter the ECB’s inflation target. The money that has been invested in the APP, which has had little impact on inflation, would be better used for scholarships or other social investments. Further, the ECB, and indeed the entire EU, should consider whether the goal of an inflation level of close to 2% is the right one.
I question this, because it is an overall target, and could result in a situation where some countries have very high inflation while others have very low inflation, meaning that both countries have significant, albeit different problems. It is dangerous to set overall targets when the countries concerned are experiencing different conditions.

The EU also needs to become more transparent. The TARGET2 balances were hidden by the ECB for a long time, and even when they were revealed, the problem was either trivialised or ignored. Because the various EU countries are subject to such different conditions, which was common knowledge before they entered the Eurozone, the EU should think about providing more help for specific countries to develop their economy. This would require additional fiscal measures. It is therefore important to have a clear definition of the tasks, competences and responsibilities that apply across the institutional architecture of the Eurozone.

Sixty years after the Treaty of Rome and twenty-five years after the Maastricht Treaty, which formed the basis for the Economic and Monetary Union, there is still a lot to do, including completing the institutional architecture and improving the existing framework even further. The ECB, together with the NCBs, did what they could on the monetary policy side, and sometimes even instituted measures in a grey zone somewhere between fiscal and monetary policy. To overcome the lack of supporting fiscal policy and moderate progress on structural reforms in the EU, it is necessary to act in concert and use all the available resources to work towards the common goal of a single European community.
Abstract

TARGET2 is the Eurosystem framework that enables fast settlement of central bank transactions involving both national and cross-border payments. TARGET2 movements generate balance sheet positions for all euro area countries’ national central banks through cross-border settlements. This thesis discusses the roots of the TARGET2 balances and the inherent risks involved. These balances have been controversial, especially in Germany, since the topic was raised by Hans-Werner Sinn at least ten years ago. One main driver of the TARGET2 balances has been the asset purchase programme (APP), a measure taken by the European Central Bank (ECB) under its quantitative easing (QE) programme. The ECB’s aim is to maintain price stability while keeping the inflation rate below, but close to 2% over the medium term. The APP and the consequent increases in the TARGET2 balances carry certain risks. One outcome that was intended by the ECB was an increase in bond prices, which led to negative yields and a shift to lower-rated and longer-duration debt instruments by investors. The APP caused a distortion of bond prices and a deviation from the fundamental value of the asset. This was accompanied by a shortage of eligible assets in the bond market that led to a broadening of the eligibility criteria for the APP. The QE programme could lead to an adverse effect whereby the member states become accustomed to always receiving the money they need, and therefore begin to act in a less risk-averse manner, which is unsustainable. Besides the risk created by the APP and the TARGET2 balances themselves, this thesis focuses on the impact on the capital market, in particular on the increase in the bid–ask spreads over the course of the programme, especially in relation to eligible bonds. After discussing the risks related to the TARGET2 balances, the roots of the balances and their impact on the market and its participants, the thesis focuses on possible exit strategies for the ECB, which has at least three options: conventional interest rate policy, unconventional liquidity and funding measures, and an unconventional balance sheet policy (i.e., QE). Regarding conventional interest rates, the question the ECB has to answer is whether it wants to raise rates, and if so, when and by how much. In relation to QE, the ECB can select either a tapering or an exit strategy for each programme. It can also adjust the requirements for the collateral pool, which were previously lowered, especially regarding the required ratings.
The communication strategy in relation to an exit must be chosen wisely, because the psychological factors that are involved can have a significant impact on the financial markets.

The thesis concludes that the TARGET2 balances were needed, but their positive effect is now decreasing, and various adverse side effects are increasing. These effects and other economic factors must be balanced, which is difficult in a fragmented market such as the European Union (EU). The EU’s lack of fiscal measures makes the situation even more difficult for the ECB.
XIV. Appendix

Resume of Anna Sarah Meier

Anna Sarah Meier was born on 22.12.1985 in Zurich, Switzerland. She is currently working as a client and product eligibility expert at Zürcher Kantonalbank (Zurich Cantonal Bank), setting up a role engine with the aim of proofing all securities transactions pre-trade regarding eligibility. Overall, she has more than ten years of experience in the finance industry. She previously worked at Schwyzer Kantonalbank (Schwyzer Cantonal Bank) in the management support and project team, and was a member of the nostro committee. Prior to that, she worked as compliance officer for UBS Fund Management Switzerland dealing with proxy voting disclosures and was a member of the class action committee. At the beginning of her career, she worked in wealth management at VZ Vermögenszentrum. While working full-time, she completed a Master’s of Science (MSc) in Business Administration, majoring in innovation management, and a Master’s of Advanced Studies (MAS) in Business Psychology. She holds a Certified International Investment Analyst (CIIA) Diploma and a Certificate in Negotiation from Harvard Law School.

Anna Meier undertakes the Executive Master of European and International Business Law programme at the University of St. Gallen during 2016/2017.
Statement

I hereby declare:

- that I have written this paper without any help from others and without the use of documents and aids other than those stated above
- that I have mentioned all the sources used and that I have cited them correctly according to established academic citation rules
- that I am aware that my work can be electronically checked for plagiarism and that I hereby grant the University of St. Gallen copyright in accordance with the Examination Regulations in so far as this is required for administrative action.

Zurich, 18.07.2017

Signature: [Signature]