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Do Large TARGET2 Balances Bear Risks for the Euro Area?

Maximilian J. Horst* and Ulrike Neyer**

Abstract

Large increases in TARGET2 balances in the euro area since 2008 have led to concern and debate about the appropriate interpretation and policy reaction – in particular in TARGET2 creditor countries such as Germany. Against this background, we examine the main drivers of the increases and asymmetries in TARGET2 balances that have emerged in the context of the financial and sovereign debt crises as well as in the context of the Eurosystem's implementation of quantitative easing (QE) and the COVID-19 pandemic. Moreover, this paper analyzes the potential risks for euro area member states in the case of (i) the unchanged continuity of the monetary union, (ii) the withdrawal of a member state with (large) TARGET2 liabilities, and (iii) the break-up of the whole monetary union. Depending on the outcome of exit negotiations and the operational handling, there can be direct risks in the form of default losses of TARGET2 balances and indirect risks in the form of threat potentials if TARGET2 debtor countries pretend to plan to leave the euro area. Based on this, we discuss adaption options for the TARGET2 payment system and consider an exit from the ECB's accommodative monetary policy in order to scale back the high amount of excess liquidity in the euro area banking sector which is the prerequisite for the emergence of TARGET2 balances.

Keywords: TARGET2 Balances, Payment System, Euro Area, Central Bank Balance Sheet, Monetary Policy, Quantitative Easing (QE), Excess Liquidity

JEL Classification: E42, E52, E58, F45

I. Introduction

TARGET2 balances are claims and liabilities of euro area national central banks vis-à-vis the European Central Bank (ECB).¹ They emerge as a result of

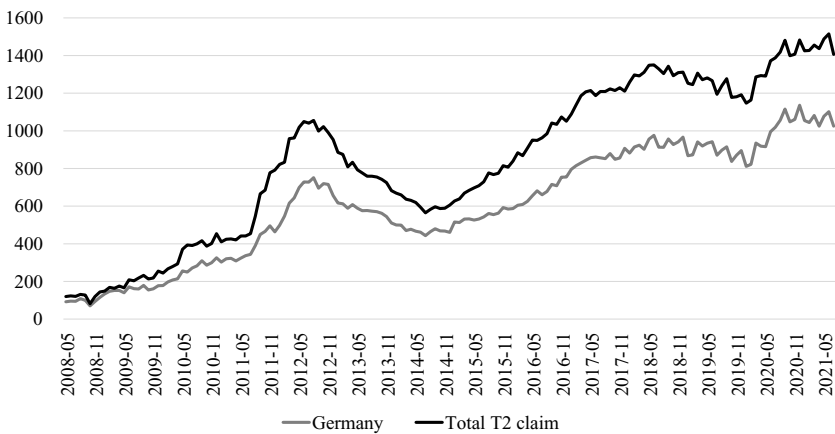
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¹ The acronym TARGET stands for Trans-European Automated Real-time Gross Settlement Express Transfer System.

cross-border payments in central bank money (reserves) between euro area national central banks.²

Until the peak of the euro area financial crisis in 2008 after the Lehman bankruptcy, TARGET2 (T2) balances fluctuated at around zero. In the aftermath of the financial crisis and during the subsequent sovereign debt crisis from 2010 onwards, they increased for the first time. Since the beginning of the Eurosystem's large-scale asset purchase program (APP) – commonly referred to as quantitative easing (QE) – in March 2015 and over the course of the COVID-19 pandemic, T2 balances have again started to increase continuously (see Figure 1). Moreover, their development is very heterogeneous across euro area countries. In July 2020, for instance, the Bundesbank's T2 claim on the ECB exceeded 1 trillion euros for the first time, while the T2 liability of the Banca d'Italia towards the ECB exceeded 500 billion euros (data source: Eurosystem). Large and asymmetric T2 balances have provoked a great amount of concern and intense debate, in particular in T2 creditor countries such as Germany.



Note: In billion euros, end of month position.

Data Source: ECB.

Figure 1: The Bundesbank's T2 Claim on the ECB as a Share of Total T2 Claims in the Euro Area

² To simplify matters, we assume that all payments are settled by credit transfers. Therefore, the terms payment and credit transfer are used synonymously in this paper.

Against this background, the first aim of this paper is to provide some detailed insights on the functioning of the T2 system, on the emergence and the interpretation of (large) T2 balances, and on their relation to euro area monetary policy implementation. The second aim of this paper involves examining potential risks of high T2 balances for euro area member states and discussing potential adaption options to the T2 system.

With respect to the first aim, we show that the reasons for the observed increases in T2 balances changed over time. The emergence of T2 balances during the financial and sovereign debt crises was a symptom of increased levels of distrust and risk perception which implied tension in the money market and funding stress in the euro area banking sector. In contrast, the increase during the QE period and the COVID-19 pandemic has mainly been a result of specific technical particularities with regard to the implementation of the Eurosystem's large-scale asset purchases. Asset purchases are primarily conducted with counterparties residing outside the purchasing country or even outside the euro area, resulting in cross-border payments and hence increasing T2 balances. Thus, T2 balances are not necessarily always a sign of crises but rather a symptom of the decentralized implementation of monetary policy by the respective euro area national central banks. In both cases, the creation and provision of excess liquidity through the Eurosystem is the common prerequisite for the emergence of T2 balances. It can be expected that as long as the Eurosystem continues its large-scale asset purchases and thus continues to create further excess liquidity, T2 balances will also continuously increase.

With respect to the second aim of our paper, we argue that the risks of large T2 imbalances for the euro area member states are scenario dependent. In case of (i) the unchanged continuity of the euro area, large T2 balances do not constitute direct risks in the form of default risks. However, they may bear indirect risks in the form of a threat potential if countries exposed to large T2 liabilities try to take advantage of this circumstance by blackmailing the other member states. In case of (ii) the withdrawal of a euro area member state that is exposed to a large T2 liability, the legal effects are by all means ambiguous and the risk of a default of the T2 liability of the exiting country depends on the results of exit negotiations and the operational handling. If a (residual) T2 liability were irrecoverable, the ECB would be exposed to a loss. This could also reduce the national central banks' equity capital. If a national central bank then needed to be recapitalized by its government, the loss might have to be absorbed by the taxpayers. In case of (iii) the break-up of the monetary union, the creditor countries' T2 claims might be at risk. Every single creditor national central bank would hold a claim on a system that would no longer exist. A total loss of corresponding T2 claims on the ECB would therefore be possible, including the consequences and potential losses for the member states and their taxpayers. Against the background that large T2 balances bear direct and indirect risks, we

discuss potential adaption options to the existing T2 payment system in order to limit the level of T2 balances and be able to settle T2 balances when necessary. We find that proposals directly and exclusively considering the T2 payment system such as introducing progressively rising penalty interest payments for T2 liabilities, a mandatory cap limiting the T2 balances, an annual gold settlement, or a collateralization of T2 balances are less suitable than proposals affecting the ECB's monetary policy. The existence of excess liquidity is the prerequisite for the emergence of T2 balances. Therefore, the ECB may consider scaling back its large-scale asset purchases or restricting its main refinancing operations with full allotment at zero interest costs, for example. As soon as the amount of excess liquidity decreases, T2 balances are expected to drop again.

The remainder of the paper is organized as follows. Section 2 describes the technical framework of the T2 payment system. As a basis for understanding the emergence of T2 balances and any subsequent analysis of their significance, it is explained in detail how cross-border payments are technically settled in the euro area. Section 3 examines the development of T2 balances during different periods. In order to interpret the drivers of the emergence of T2 balances, the technical relation between T2 balances and the concept of the balance of payments (BoP) is depicted. Section 4 analyzes the potential risks of (large) T2 imbalances with regard to three different scenarios and discusses potential adaption options to the T2 system. Section 5 summarizes the paper.

II. A Technical Note on the TARGET2 Payment System and the Emergence of TARGET2 Balances

1. Institutional Aspects of TARGET and TARGET2

As specified in Article 127(2) of the Treaty on the Functioning of the European Union (TFEU) and Article 3 of the Statutes of the European System of Central Banks (ESCB) and of the European Central Bank, the Eurosystem is assigned the task of providing, ensuring and supervising the operation of payment and settlement systems in the euro area. An efficient and well-functioning payment system is key for maintaining the stability of the financial system, helpful to preserve the confidence in the common currency, and a crucial condition for the smooth implementation of the common union-wide monetary policy (*Bank for International Settlements* 2003; *Bindseil/König* 2012). The first generation of the Eurosystem's own payment system known as TARGET was put into operation on 4 January 1999 with three main objectives, namely (i) to serve the needs of the Eurosystem's monetary policy, (ii) to increase the efficiency of intra-European cross-border payments, and (iii) to supply a reliable and safe mechanism for the settlement of cross-border payments (*European Central Bank* 2001). Ini-

tially, TARGET was a decentralized payment system that linked the real-time gross settlement (RTGS) funds transfer systems of national central banks and the ECB's payment mechanism. While TARGET facilitated the integration of money markets within the euro area, its decentralized nature had several shortcomings, in particular with respect to cost efficiency and technical maintenance. Therefore, it was replaced in May 2008 by its successor system TARGET2 (T2) to overcome these shortcomings.³

T2 is a payment system based on a single shared platform (SSP) that is owned and operated by the Eurosystem. Its purpose is to facilitate and accelerate the final settlement of both national and cross-border payments in central bank money (reserves). T2 payments are settled in real time and used exclusively by central banks and commercial banks. Therefore, both central banks and commercial banks have accounts in T2. In 2020, an average of around 345,000 payments amounting to about 1.8 trillion euros was processed through T2 every working day. Over the whole year, about 88 million payments with a value of about 465 trillion euros were settled through T2 (*European Central Bank* 2021).⁴ These payment transactions can be a result of payments for goods deliveries, purchases or sales of securities, the granting or repayment of a loan or the depositing of funds at a bank, for instance. While payments within a country, e.g., current account transactions between customers of different commercial banks, are settled by the respective national central bank alone, cross-border payments require the involvement of the relevant foreign national central bank (*Deutsche Bundesbank* 2020b).

2. TARGET2 Balances

T2 balances emerge as a result of cross-border payments between commercial banks and central banks in different countries. The net amount of cross-border payments between two countries (i.e., the total payment orders received and executed minus the total payment orders sent) is recorded on the balance sheets of the national central banks of the two countries involved. This happens regardless of whether the credit transfer was initiated by a commercial bank or the central bank. The accumulation of these payments over time are T2 balances. The ECB also sends and receives cross-border payment orders for the implementation of its monetary policy and therefore also has its own T2 balance.

³ For more detailed information about the TARGET and T2 payment systems, see, for example, *European Central Bank* (2001).

⁴ In 2020, the Bundesbank alone processed around 76 million transactions with a total value of about 174 trillion euros using T2. This is the equivalent of more than fifty times the total German economic output in one year (data source: Bundesbank).

To avoid each euro area national central bank having a separate balance with all of the other euro area national central banks and the ECB,⁵ at the end of each business day, all intraday bilateral balances are automatically cleared in a settlement system which means that they are simplified to one single balance – the T2 balance – with the ECB (netting procedure via novation). If banks in one country sent – in sum – more payment orders through T2 than they received, the central bank of that country would have a negative balance, i.e., a T2 liability towards the ECB. If the opposite was the case, i.e., banks received more payment orders than they sent, the central bank would have a positive balance, i.e., a T2 claim on the ECB.⁶ The sum of all T2 claims and liabilities within the whole system has to be zero, since a T2 claim (liability) of one national central bank automatically corresponds to a T2 liability (claim) of another national central bank.

To understand the emergence of T2 balances, it is essential to clarify how cross-border payments are technically settled. In the following, we describe a stylized closed system of financial accounts of the financial sector of an economy. The framework allows an illustration of the mechanics and development of intra-system claims and liabilities. We use it as a basis for understanding the nature of T2 balances and the subsequent analyses of their significance. We consider two countries (country A and country B) within a monetary union. Each country is endowed with a commercial bank and a national central bank. Moreover, there is a common union-wide central bank (see Table 1). The starting point is a firm in country B that buys a good from a firm in country A.⁷ Thus,

⁵ Since the size of bilateral imbalances (claims and liabilities) between national euro area central banks built up quite rapidly after the launch of the TARGET system in 1999, the ECB's Governing Council decided just a few months later that the TARGET balances should be netted out daily at the end of each business day by "novation". This implied that all national central banks' obligations were substituted by ECB obligations, leaving each national central bank with one single net position (if positive, a TARGET claim and, if negative, a TARGET liability) vis-à-vis the ECB (*European Central Bank* 2012, Article 6).

⁶ For example, the Bundesbank's (net) T2 claim on the ECB is indicated on the asset side of the Bundesbank's balance sheet under the item "9. Intra-Eurosystem claims"/ "9.4 Other claims within the Eurosystem (net)". At the end of December 2020, the (net) T2 claim amounted to 1,136.002 billion euros which corresponded to a share of almost 50 % of the length of the balance sheet (2,526.56 billion euros). Alternatively, the value of the (net) T2 claim is published in the statistics on the "External Position" of the Bundesbank and there under the item "External assets"/"Other investment"/"Currency, deposits and loans"/"Clearing accounts within the ESCB". At the end of September 2021, the Bundesbank's net external position (total external assets minus total external liabilities) stood at 686 billion euros. The (net) T2 claim on the ECB amounted to 1,115.13 billion euros accounting for around 78 % of total external assets (data source: Bundesbank).

⁷ Considered in isolation, this standard good transfer between the two firms leads to a surplus in country A's balance of trade and a deficit in country B's balance of trade.

both commercial banks are involved in a cross-border payment transaction which is the prerequisite for the emergence of T2 balances. Bank B arranges the credit transfer by debiting the respective purchase amount from firm B's account. The result is a decrease in firm B's deposits (D) held on its current account. In a scenario without sufficiently large amounts of excess reserves in country B's banking sector and without private capital transfers between both countries (e.g., from commercial bank A to B via a functioning interbank money market), bank B needs to take part in the central banks' refinancing operations (RO) to balance the loss in deposits. This transaction appears on bank B's balance sheet as an accounting exchange on the liability side, i.e., the length of bank B's balance sheet remains the same. Central bank B now has a claim on bank B and transmits the credit transfer to central bank A. The offsetting liability item on central bank B's balance sheet is a liability towards central bank A. Central bank A executes the credit transfer by crediting, on behalf of central bank B, the purchase amount in the form of reserves (R) to bank A's account. Hence central bank A faces a liability towards bank A. However, its balance sheet no longer balances. Central bank A needs to add a balancing item to reflect that there are now more reserves on its balance sheet than it originally created. The offsetting asset item on central bank A's balance sheet is a claim on central bank B. Bank A credits the respective amount in the form of deposits (D) to firm A's current account. Firm A can then use these funds. From the point of view of bank A's balance sheet, this transaction results in an extension of the length of its balance sheet. In sum, money (reserves and deposits) has increased (decreased) in country A's (B's) banking sector and the good has moved from country A to B.

Since all intraday bilateral claims and liabilities are transferred to the common union-wide central bank at the end of the business day, based on this example, central bank A has a T2 claim on the union-wide central bank while central bank B has a T2 liability towards the union-wide central bank. From an accounting perspective, one side effect of this example is an extension of all central bank balance sheets.⁸

Since October 2015, the euro area banking sector has been exposed to a structural liquidity surplus.⁹ Due to the liquidity created through the Eurosystem's large-scale asset purchases (QE), banks hold large amounts of excess reserves. Therefore, we consider a second scenario in which bank B faces sufficiently large amounts of excess reserves to compensate for the loss in deposits without

⁸ Note that exactly the same T2 balances emerge when there is capital flight, e.g., "safe-haven-flows" or "flight-to-quality" phenomena, from country B to A.

⁹ See, for example *Horst/Neyer* (2019), for further information regarding the characteristics and distinction between a structural liquidity *deficit* and a structural liquidity *surplus* in the banking sector.

Table 1

Creation of T2 Balances in a Scenario without Excess Reserves
in Country B's Banking Sector and without Private Capital Transfers
from Country A to B

Commercial Bank (A)		Commercial Bank (B)	
Assets	Liabilities	Assets	Liabilities
R ↑	D ↑		D ↓ RO ↑
National Central Bank (A)		National Central Bank (B)	
Assets	Liabilities	Assets	Liabilities
T2 (CB) ↑	R ↑	RO ↑	T2 (CB) ↑
Union-wide Central Bank			
Assets		Liabilities	
T2 (B) ↑		T2 (A) ↑	

Table 2

Creation of T2 Balances in a Scenario with Sufficiently Large Amounts
of Excess Reserves in Country B's Banking Sector

Commercial Bank (A)		Commercial Bank (B)	
Assets	Liabilities	Assets	Liabilities
R ↑	D ↑	R ↓	D ↓
National Central Bank (A)		National Central Bank (B)	
Assets	Liabilities	Assets	Liabilities
T2 (CB) ↑	R ↑		R ↓ T2 (CB) ↑
Union-wide Central Bank			
Assets		Liabilities	
T2 (B) ↑		T2 (A) ↑	

taking part in the central bank's refinancing operations. In this scenario, bank B's holdings of excess reserves with central bank B decrease and the subbalances in our example emerge as represented by Table 2.¹⁰

3. TARGET2 Balances as Actual Claims and Liabilities

T2 balances represent actual claims (liabilities) of national central banks on (towards) the ECB. If they were not settled in the case of a dissolution of the euro area or the withdrawal of a member state, the T2 system would be used as a transfer system, instead of a payment system. To clarify this, we return to the example of a cross-border payment between two countries described in Section 2.2. Country B imports goods from country A, i.e., assets are transferred from country A to country B. As a consequence, T2 balances emerge to offset the transfer of assets in the respective national central banks' balance sheets.¹¹ If they were not settled, the cross-border payment would imply an asset transfer from country A to country B *financed* through the T2 system. However, since the T2 system is designed as a payment system and not as a transfer system, in the case of a dissolution of the monetary union or the withdrawal of a member state, T2 balances have to be settled (see Section 4). Therefore, T2 balances indeed represent actual claims and liabilities.¹²

III. Development and Interpretation of TARGET2 Balances

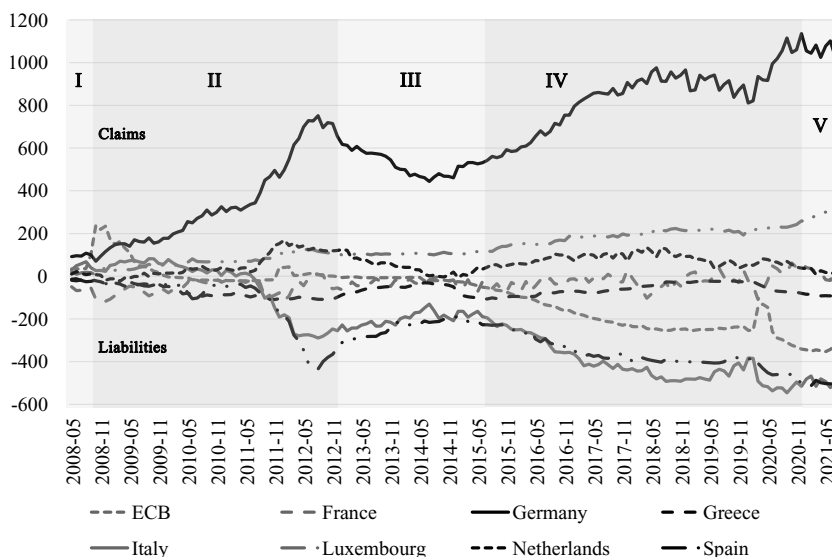
Figure 2 depicts the development of T2 balances of selected euro area countries. In the following, we distinguish between five different periods: (i) the period before the outbreak of the financial crisis, (ii) the period of the financial and sovereign debt crises, (iii) the period after the announcement of the Outright Monetary Transactions (OMT) program by the former ECB president Mario Draghi ("whatever it takes" speech), (iv) the period of the Eurosystem's QE program, and (v) the period of the COVID-19 pandemic.

Before examining the respective drivers of the increases and asymmetries in T2 balances in the euro area, we briefly describe the relationship between the emergence of T2 balances and changes in the balance of payments.

¹⁰ The emergence of T2 balances as a result of a cross-border payment for a security, e.g., in the context of the Eurosystem's QE program, is described in detail in Section 3.4.

¹¹ The same applies to a cross-border payment for a security, e.g., under the Eurosystem's QE program (see Section 3.4).

¹² For a more in-depth discussion on whether or not T2 balances represent claims or liabilities, see, e.g., *Homburg* (2019); *Spahn* (2019); *van Suintum* (2019); *Hellwig* (2018); *Hellwig/Schnabel* (2019a); *Sinn* (2019a, 2020).



Note: In billion euros, end of month position.

Data Source: Eurosystem.

Figure 2: T2 Balances of the ECB and Selected Euro Area National Central Banks

1. TARGET2 Balances and the Balance of Payments

The emergence of T2 balances is technically related to adjustments in the balance of payments (BoP). Therefore, we briefly describe the concept of the BoP to deepen the understanding of the emergence of T2 balances. The BoP of an economy documents all economic transactions within a given period of time between residents and non-residents of the economy. It thus shows the country's complex economic links with the rest of the world. The BoP primarily consists of the current account and the financial account (FA).¹³ For simplification reasons, the current account is here reduced to the balance of trade (BoT) where the value of exports and imports of goods is reflected.¹⁴ The FA records all financial transactions of domestic residents with foreign residents and can be broken down into the "private" FA and into the "official" FA.¹⁵ The private FA documents the value

¹³ To simplify matters, the terms "Capital Account" and "Balancing Items (Errors and Omissions)" are ignored. For more information regarding the individual components of the BoP, see e.g., *Deutsche Bundesbank* (2020a); *European Central Bank* (2020b).

¹⁴ Hence we use both terms interchangeably in the following.

¹⁵ Domestic residents include banks and other financial institutions, non-financial institutions, households as well as the official sector.

of private capital exports and imports. The official FA comprises “other investment” of the national central bank (OI_NCB) and the government.¹⁶ Formally, changes in the national central bank’s T2 balance are reported at a monthly frequency as part of other investments in the official FA under the item “Other Investment – Central Bank”. Since the BoP must always be statistically balanced ($BoP = 0$), either (i) the respective subbalances, i. e., the BoT and the FA, must be balanced, or (ii) a surplus in the BoT ($BoT > 0$) must be offset by a deficit of the same amount in the private or official FA ($FA > 0$), and vice versa. The BoP , BoT and FA are defined – in a simplified form – as follows:

$$BoP = BoT - FA = 0$$

with

$$BoT = Exports\ of\ Goods - Imports\ of\ Goods$$

and

$$FA = \underbrace{Capital\ Exports - Capital\ Imports}_{private\ FA} + \underbrace{OI_NCB}_{\substack{official\ FA \\ (T2\ balance)}}$$

Simplifying further, we can rewrite the change in T2 balances as an imbalance between the BoT and the private FA. Thus, the technical prerequisite for the emergence of T2 balances is an imbalance between the BoT and the private FA:

$$T2\ balance = BoT - FA(private)$$

According to this last equation, a BoT surplus and/or private net capital imports are, at least in part, offset by rising T2 claims of the national central bank. Accordingly, a BoT deficit and/or private net capital exports are offset by rising T2 liabilities. Note that changes in T2 balances are automatically mirrored in other components of the BoP, while changes in specific components of the BoP are not necessarily reflected by a change in T2 balances. To summarize, it can be stated that the increase in T2 balances is a direct measure of net cross-border payments. T2 liabilities (claims) measure (i) the proportion of a BoT deficit (surplus) which is not counterbalanced by sufficiently large private net capital imports (exports) implying a surplus (deficit) in the private FA, or, equivalently, (ii) the sum of the BoT deficit (surplus) and net capital exports (imports). Indirectly, they also measure a national central bank’s stock of reserves created and

¹⁶ Note that this stylized representation of the FA excludes the foreign exchange account and thus the central bank’s change in foreign currency reserves (“Reserve Assets”), since there is only one common currency in the monetary union.

credited to commercial banks beyond what was initially needed for domestic circulation.

2. TARGET2 Balances in “Normal Times”

Before the outbreak of the financial crisis, T2 balances in the euro area were stable and more or less close to zero (see Figure 2, first period). For illustration purposes we distinguish between core and periphery euro area countries. We consider Germany, France, Luxembourg and the Netherlands as core countries. Accordingly, Greece, Italy and Spain are periphery countries. On the one hand, core countries (and especially Germany) usually realized a surplus in their BoT as a result of (large) net exports of goods. On the other hand, however, core countries were exposed to private net capital exports (outflows) at approximately the same level. These private net capital exports have primarily been the result (i) of credit lending operations of core-country banks to periphery-country banks via the interbank money market and (ii) of investments in periphery countries carried out by core-country private sector financial market participants (firms and individuals). Hence, the surplus in the BoT was compensated by a deficit in the private FA. In sum, the BoP was practically leveled and net T2 balances were close to zero.¹⁷

3. TARGET2 Balances in the Financial and Sovereign Debt Crises

During the financial crisis, which peaked in September 2008 after the bankruptcy of Lehman Brothers, and the subsequent outbreak of the sovereign debt crisis in 2010, T2 balances in the euro area started to increase continuously (see Figure 2, second period). Core countries still faced a surplus in their BoT. However, their so far offsetting deficit in their private FA diminished or even turned into a surplus. Instead, the BoP was balanced by a deficit in their official FA, reflected by a net T2 claim on the ECB. Periphery countries still faced a deficit in their BoT. Additionally, they were exposed to private capital outflows, resulting in a deficit in their private FA. The offsetting item in their BoP was a surplus in their official FA, represented by a net T2 liability towards the ECB.

The reasons are as follows: Increased levels of distrust and risk perception as well as increased information asymmetries led to tension in the money market and funding stress in the euro area banking sector. Especially private capital outflows in the form of capital flight (“safe-haven-flows” and “flight-to-quality” phenomena) from banks in periphery countries to banks in core countries im-

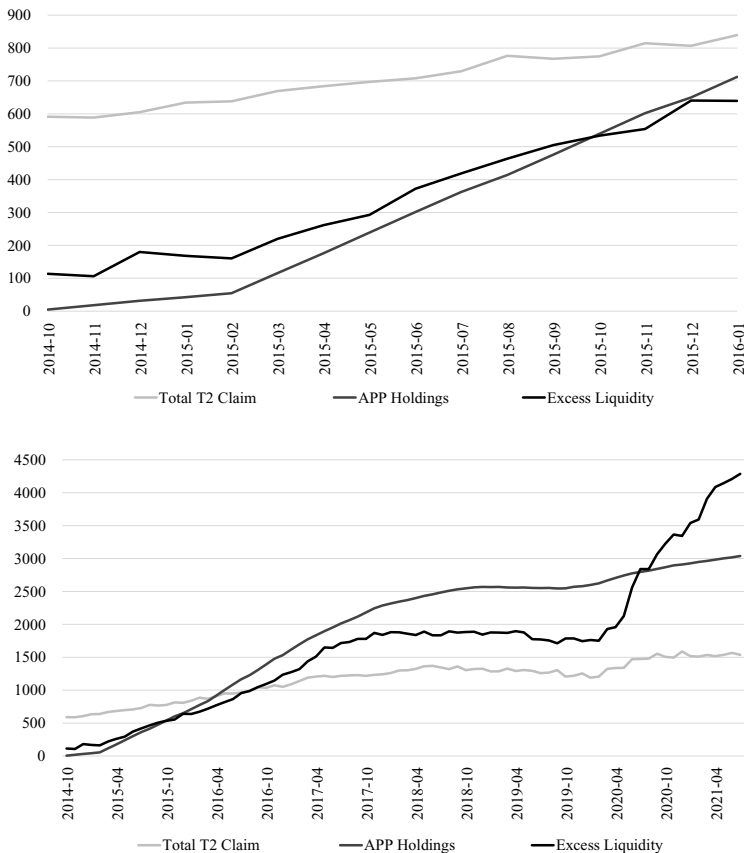
¹⁷ Exactly the opposite was the case for periphery countries. Typically, they faced a deficit in their BoT that was compensated by a surplus in the private FA due to private foreign capital inflows, so that net T2 balances in sum were also close to zero.

plied funding stress in the banking sectors of periphery countries on the one hand and additional private capital inflows to banks in core countries on the other hand. However, banks in core countries were less willing, or in some cases unable, to lend funds to foreign banks via the interbank money market (confidence crisis). Instead, they preferred to deposit their excess reserves at their national central bank. Moreover, firms and individuals refused to invest funds abroad due to increased levels of risk and distrust. As a result, banks in periphery countries were concerned by difficulties in financing themselves. The associated increase in T2 balances was supported by the fact that banks in periphery countries were forced to participate more significantly in the Eurosystem's refinancing operations in order to substitute for the loss in market-based funding and thus to close the funding gap in their balance sheets, while banks in core countries decreased their borrowing in the refinancing operations.¹⁸ However, this liquidity provided through the Eurosystem's refinancing operations was again, to a large extent, transferred via cross-border transactions from periphery countries to "safe havens", i.e., to core countries. In sum, with regard to core countries, private capital inflows increased, implying a surplus in their private FA. Their BoP was offset by a respective deficit in their official FA, represented by a T2 claim on the ECB. With regard to periphery countries, private capital outflows increased implying a deficit in their private FA. The balancing item in their BoP was a surplus in their official FA, expressed by a T2 liability towards the ECB. The overall increase in T2 balances during the financial and sovereign debt crises is commonly interpreted as a consequence of a balance of payments crisis (*Deutsche Bundesbank* 2011).

Following the announcement of the Eurosystem's outright purchases of securities, the Outright Monetary Transactions (OMT)-program, by the former ECB president Mario Draghi and his significant commitment to be willing to do "whatever it takes" to ensure the continued existence of the euro area and to preserve the euro, the high levels of distrust and risk perception started to return to normality. Imbalances in the BoT were predominantly again offset by the according adjustment processes in the private FA. As a result, T2 balances started to decline gradually towards their pre-crisis levels (see Figure 2, third period).

¹⁸ When providing commercial banks with central bank money, the respective national central banks de facto issue a liability towards the Eurosystem. Participating in the central banks' refinancing operations might go in line with a T2 liability towards the ECB, if (a part of) this liquidity is subsequently used for cross-border payments to another country via T2. The asymmetries in T2 balances in the euro area during this period are, to a certain degree, also a result of commercial banks' uneven recourse to the Eurosystem's refinancing operations implying a changed distribution in refinancing operations with central banks in the euro area. The asymmetries have been strengthened by the ample supply of liquidity by the Eurosystem: In October 2008, the ECB introduced a fixed-rate tender procedure with full allotment of all bids in the refinancing operations in order to counteract the dislocations in the money market.

4. TARGET2 Balances and the Eurosystem's Asset Purchase Program (APP)



Note: In billion euros, end of month position.

Data Source: Eurosystem.

Figure 3: Excess Liquidity in the Euro Area Banking Sector, Cumulated APP Purchases and Sum of all Positive T2 Balances

Since the beginning of the Eurosystem's large-scale asset purchases (APP, commonly referred to as QE) in March 2015, T2 balances once again started to increase continuously, reaching unprecedented levels (see Figure 2, fourth period). However, the main reasons for the increase are different compared with the period of the financial and sovereign debt crises: Large T2 balances during this period are predominantly no longer a sign of crises but instead a technical consequence of the decentralized implementation of QE in the euro area.¹⁹ Figure 3 shows that T2 balances have increased synchronously during

this period with the Eurosystem's holdings under the APP and the associated amount of excess liquidity.²⁰ In particular, the large-scale purchases of euro area government bonds under the Public Sector Purchase Programme (PSPP) since March 2015 and the creation of excess liquidity thereby induced coincide with the renewed surge in T2 balances.²¹ As the majority of APP securities are purchased from counterparties residing outside the country of the purchasing national central bank,²² the implementation of the APP involves cross-border payments via T2. Non-euro area counterparties need a current account with a euro area commercial bank in order to access the T2 payment system via the respective euro area national central bank. This is a prerequisite for participating in those payment transactions. Since most of the non-euro area counterparties have their current accounts predominantly with commercial banks in only a few selected countries such as Germany, France, the Netherlands, Luxembourg, and Finland (which serve as so-called financial centers or gateways), the QE-induced creation of excess liquidity takes place in these countries.²³ Accordingly, these countries are exactly the ones with the largest T2 claims on the ECB and their T2 claims rise continuously with the APP purchases of other national central banks (see Figure 2).

For illustrative purposes consider the following example (see Table 3): the Italian central bank purchases Italian government bonds from a counterparty resident outside the euro area. In order to participate in this cross-border transaction, the counterparty needs access to the T2 payment system. As an example, we consider a UK-based counterparty, e.g., a commercial bank, that uses a correspondent German commercial bank as an access point for T2.²⁴ In this case,

¹⁹ In this context, decentralized monetary policy implementation refers to the fact that each national central bank purchases its own domestic government bonds on behalf of the Eurosystem in accordance with its share in the ECB's capital key.

²⁰ Excess liquidity is defined here as the sum of (i) commercial banks' reserve holdings on their current accounts with their national central bank in excess of minimum reserve requirements and (ii) their recourse to the ECB's overnight deposit facility.

²¹ The APP involves four programs under which both private and public sector securities are purchased. Covering a share of more than 80% of all assets bought under the APP (until November 2021), the PSPP represents by far the most important component of the APP.

²² Around 80% of overall APP purchases by volume occurred with counterparties that are not resident in the same country as the purchasing national central bank and about 50% of APP purchases by volume occurred with counterparties located outside the euro area, most of them being resident in the UK (Cœuré 2017; Baldo et al. 2017).

²³ For further information with regard to the QE-induced creation of excess liquidity and its heterogeneous distribution across euro area countries, see also Horst/Neyer (2019) and Horst et al. (2020).

²⁴ Around 50% of the overall purchase volume is conducted with UK-based banks that access T2 via the German central bank (Cœuré 2017; Alvarez et al. 2017).

Table 3
Emerging T2 Balances when APP Security is Purchased
from a Counterparty Residing Outside the Euro Area

APP-Counterparty (UK)		Commercial Bank (Germany)	
Assets	Liabilities	Assets	Liabilities
Bonds ↓		R ↑	D ↑
D ↑			
National Central Bank (Germany)		National Central Bank (Italy)	
Assets	Liabilities	Assets	Liabilities
T2 (ECB) ↑	R ↑	Bonds ↑	T2 (ECB) ↑
European Central Bank		Eurosistem	
Assets	Liabilities	Assets	Liabilities
T2 (Italy) ↑	T2 (Germany) ↑	Bonds ↑	R ↑

the security purchase of the Italian central bank implies that both the Italian and the German central bank are involved in a cross-border payment resulting in a T2 claim (liability) of the German (Italian) central bank on (towards) the ECB. The settlement of the payment is described in detail as follows. The UK-APP counterparty transfers the respective amount of government bonds to the Italian central bank while the corresponding purchase amount is credited to the UK-APP counterparty’s current account in the form of newly created deposits. Hence the UK-APP counterparty’s deposits increase at the expense of its government bond holdings. As the UK-APP counterparty has its deposit account with a German commercial bank, the reserves of the German commercial bank, and thus the respective liability item of the German central bank’s balance sheet, increase. Note again that, as described in Section 2, by executing the payment order, the German central bank credits the reserves to the German commercial bank’s account on behalf of the Italian central bank. The offsetting asset item of the German central bank’s balance sheet is a T2 claim on the ECB. The Italian central bank, on the other hand, has a T2 liability towards the ECB. Moreover, the deposits in the German banking sector increase, since the German commercial bank credits the respective amount in the form of freshly created deposits to the UK-APP counterparty’s current account.²⁵ The increase in the German cen-

²⁵ Note that the ECB statistics (“Monetary Financial Institutions Balance Sheet Statistics Including the Eurosistem”) distinguish between bank deposits of euro area and non-euro

tral bank's positive T2 balance (and the increase in excess reserves in the German banking sector) are thus a consequence of the bond purchases by the Italian central bank from non-euro area counterparties which have their deposit account with a German commercial bank. The consolidated balance sheet of the Eurosystem demonstrates that its government bond holdings and (excess) reserves have increased.

Thus, the residence of the purchasing national central banks' counterparties strongly influences the impact of the APP implementation on the development and distribution of T2 balances. Euro area commercial banks participate in T2 via their local national central bank. Banks located outside the euro area participate in T2 via a branch or subsidiary in the euro area or via a correspondent bank. Regardless of whether they are situated in another euro area country or outside the euro area, central bank asset purchases from non-domestic counterparties result in cross-border payments and hence imply an increase in T2 balances. Consequently, compared with the mainly demand-driven surge in T2 balances during the euro area financial and sovereign debt crisis, the drivers and the interpretation of the increase in T2 balances in the context of the APP differ notably since it is a supply-driven phenomenon (*Eisenschmidt et al. 2017*).

Additionally, to some extent during this period, the rise in T2 liabilities of at least Spain and Italy might also be reinforced by private capital outflows ("capital flight") of domestic investors due to increased levels of political and economic uncertainty.

When the ECB stopped its net APP purchases temporarily between January 2019 and November 2019, T2 balances started to decline slightly (see Figure 2, fourth period).²⁶ Additionally, in September 2019 the ECB's Governing Council introduced a two-tier system for the remuneration of excess reserve holdings. This enabled commercial banks to hold a certain amount of excess reserves on their account with their respective national central bank without being obliged to pay a negative interest rate on it.²⁷ Instead, the exemption allowance is remunerated at the ECB's main refinancing rate and is calculated as a six times multiple of the individual commercial bank's minimum reserve requirements (*European Central Bank 2019; Deutsche Bundesbank 2021b*). This new system temporarily increased interbank market activities and thereby induced cross-border

area residents. Therefore, it refers to these deposits of non-euro area residents held on accounts with euro area commercial banks as "liabilities of euro area monetary financial institutions (excluding the Eurosystem) towards non-euro area residents" in the consolidated balance sheet of the monetary financial institutions (see also *Horst/Neyer (2019)*).

²⁶ For more information with regard to the respective average monthly purchase pace since the APP beginning in 2015, see *European Central Bank (2020a)*.

²⁷ Neglecting the two-tier system, excess reserve holdings are generally remunerated at the rate on the ECB's overnight deposit facility which amounts to -0.5% (November 2021).

flows of reserves from banks in euro area countries with large amounts of excess reserves who already used their exemption allowances in full (e.g., Germany, France, Netherlands) to banks in countries with relatively low amounts of excess reserves whose exemption allowance was not used up yet (e.g., Italy, Spain, and Greece).²⁸ This redistribution/shift of excess reserves between euro area countries also temporarily implied slightly decreasing T2 balances.²⁹ However, T2 balances were rapidly again dominated by cross-border transactions evolving from large-scale asset purchases by the Eurosystem.

5. TARGET2 Balances in the COVID-19 Pandemic

T2 balances have again been rising significantly since March 2020 (see Figure 2, fifth period). The renewed rise in overall T2 balances during this period can mainly be viewed as a consequence of the expansion of the Eurosystem's asset purchases (APP) in response to the COVID-19 pandemic.³⁰ Moreover, the ECB launched a new non-standard monetary policy tool, the Pandemic Emergency Purchase Programme (PEPP), which involves temporary additional asset purchases of private and public sector securities.³¹ These measures are the reason why the volumes of the Eurosystem's monthly monetary policy net purchases as well as the overall amount of excess liquidity in the euro area banking sector are higher than ever before (see also Figure 3). Both the expansion of the APP and the additional asset purchases under the PEPP reinforce the mechanics of the emergence and distribution of T2 balances described in Section 3.4. Thus, there are more cross-border payments, resulting in an ongoing asymmetric rise in T2 balances in the euro area.

²⁸ Within the first few days of the introduction of the two-tier system, banks with unused exemption allowances borrowed about 16 billion euros via euro area money markets, meaning that cross-border transactions within the euro area as a percentage of the total volume increased by roughly two percentage points to 20 % (*Deutsche Bundesbank* 2021b).

²⁹ On 30 October 2019, total T2 claims/liabilities decreased by 32 billion euros (data source: ECB).

³⁰ On 12 March 2020, the ECB's Governing Council decided to add "a temporary envelope of additional net asset purchases of 120 billion euros" until the end of 2020 (*European Central Bank* 2020a).

³¹ The ECB's Governing Council decided to increase the initial 750 billion euros envelope for the PEPP by 600 billion euros on 4 June 2020 and by 500 billion euros on 10 December, for a new total of 1,850 billion euros. All asset categories eligible under the existing asset purchase programme (APP) are also eligible under the PEPP. The PEPP is implemented in the same way as the PSPP. Net asset purchases under the PEPP will be terminated once it judges that the COVID-19 pandemic phase is over, but in any case not before the end of March 2022 (*European Central Bank* 2020d).

Additionally, the ECB introduced (i) a third series of ten Targeted Longer-Term Refinancing Operations (TLTROs III), each with a maturity of three years, starting in September 2019 at a quarterly frequency and (ii) a new series of seven so-called Pandemic Emergency Longer-Term Refinancing Operations (PELTROs) starting in May 2020, allotted on a near monthly basis and maturing in the third quarter of 2021. In December 2020, the ECB announced that it would offer four additional PELTROs in 2021 allotted on a quarterly basis and three additional TLTROs III in June, September and December 2021.³² The implementation of both instruments, the TLTROs III and the PELTROs, creates additional excess liquidity in the system. This might also induce an additional increase in T2 balances if (a part of) this liquidity is subsequently used for cross-border payments via T2 between countries that participated in the TLTROs III/PELTROs with their respective national central bank and other countries (*Deutsche Bundesbank* 2021a).

It is likely that T2 balances in the euro area will remain high as long as the Eurosystem continues to purchase assets on a large scale and thus continues to create further excess liquidity. As soon as the Eurosystem scales back its unconventional monetary policy measures and the amount of excess liquidity created by those measures decreases automatically, the cross-border interbank money market is expected to regain its significance with regard to commercial banks' liquidity management (see Section 3.2) and T2 balances are expected to drop again.

IV. Potential Risks of Large TARGET2 Imbalances – Three Scenarios

Large and asymmetric T2 balances in the euro area have sparked substantial controversy. Section 3 has shown that reasons for increasing T2 balances across euro area countries can be various and that high T2 balances are not necessarily a sign of crises. However, they reflect imbalances between the individual components of a country's BoP. The emergence of T2 balances is associated with an uneven supply of reserves by national central banks across euro area countries. This section investigates whether or not and to what extent large and asymmetric T2 balances might include risks for an individual country but also for the whole monetary union. We examine the potential risks for euro area member states and in particular for countries facing (large) T2 claims on the ECB with respect to three potential scenarios: (i) an unchanged continuity of the monetary union, (ii) a withdrawal of a euro area member state facing a large T2 liability towards the ECB, and (iii) a dissolution of the euro area. Considering the potential risks of large T2 imbalances, we discuss adaption options to the existing T2 payment system in order to limit the level of T2 balances and be able to settle T2 balances when necessary.

³² For more detailed information, see also *European Central Bank* (2020c).

1. *Unchanged Continuity of the Monetary Union*

In the case of an unchanged continuity of the euro area, (large) T2 imbalances do not represent sources of direct risks in the form of default risks. Nevertheless, one main point of criticism with respect to the current design of the T2 payment system is the absence of a regular netting procedure for T2 balances (see, e.g., Sinn/Wollmershäuser (2012)). For instance, the US-equivalent “Interdistrict Settlement Account” (ISA) balances are netted regularly once a year via a transfer of gold certificates between the Federal Reserve Banks (*Federal Reserve System* 2021). However, even though T2 are not netted out in the euro area, they may also decrease in the future without any intervention or adaptation of legal foundations being necessary (an example would be the aftermath of the sovereign debt crisis between 2012 and 2015, Figure 2). T2 balances reflect asymmetries, in particular with regard to an uneven creation of central bank money by euro area national central banks, as explained in Sections 2 and 3. Technically, they represent a claim (or a liability) that can never be called due. However, they have built up in exchange for goods and assets (see Section 2.3). This might provoke some indirect risks. T2 balances may offer an opportunity for blackmail, i.e., they may involve a threat potential, for (over-indebted) countries facing large T2 liabilities towards the ECB which may pretend to plan to leave the euro area (mainly a political component). For instance, those countries might request (further) fiscal transfers, debt mutualization, monetary support (e.g., the continuation of a negative interest rate policy), or other privileges within the monetary union.

Especially the counterbalancing characteristic of T2 balances in the central banks’ balance sheets is criticized (Fuest/Sinn 2018a, b). In contrast to gold or foreign reserve assets, for instance, T2 claims do not represent counterparts that can be transferred into other assets or sold. For illustration purposes, the T2 system and the associated adjustment processes are briefly compared with those under the gold standard system, the Bretton-Woods system of fixed exchange rates and a flexible exchange rate regime.

Under the (pure) gold standard system, payment transactions are settled with gold.³³ For instance, if a country faces larger exports than imports of goods, its stock of gold increases.³⁴ The increasing gold stock will imply an increasing money stock and thus increasing price levels in the economy. Consequently, the

³³ Under the classic gold standard system (approx. 1880–1914 and 1925–1931) both the circulating money stock of an economy and its currency were bound to gold.

³⁴ Either transactions are directly paid with gold or the fact that the currency is subjected to appreciation pressure as a result of the country’s BoT surplus implies an import of gold due to arbitrage processes. Both result in an increase in the country’s stock of gold.

country's competitiveness compared with foreign countries decreases. Exports of domestic goods decrease and imports of foreign goods increase until the BoT, and thus also the BoP, are balanced again. Therefore, compared with the T2 payment system, national central banks which receive more payment orders than they send accumulate gold on the asset side of their balance sheet that compensates for the increase in reserves on the liability side, and vice versa. In this system, the offsetting asset item is physical in nature. In contrast to a T2 claim, it can normally be converted into other assets or sold at any time.

Under the Bretton-Woods system (1944–1973), all national currencies had a fixed exchange rate with the dollar, and the dollar (reserve currency) in turn had a fixed exchange rate with gold, which was guaranteed by the US Federal Reserve Bank. For instance, the national central bank of a country facing a BoT surplus needed to supply domestic currency and to buy foreign currency in order to prevent an appreciation of its own currency. Thus, the balancing item in the central bank's balance sheet was an increase in foreign reserve assets. As well as gold, foreign reserve assets can be converted into other assets or sold at any time. Note that with regard to T2 deficit countries, if a central bank's stock of gold or foreign reserve assets is exhausted, there is a natural limit for further imports of goods (BoT deficits). This country is then unable to send any further payment orders to other countries. So there is a natural upper limit for its BoT deficit.

In the euro area, the exchange rates are, by definition, fixed. There is only one common union-wide currency and it is impossible to determine whether a euro coin or banknote originates from Italy or Germany, for example. In this regard, T2 balances technically can be compared with the stock of foreign reserve assets as a result of central banks' interventions on foreign exchange markets in a system of fixed exchange rates (Sinn 2020; van Surtum 2019).³⁵

In a system with (totally) flexible exchange rates, the adjustment of foreign reserve assets equals zero. An imbalance in the BoT is instead offset by an adjustment of the exchange rate. There is no impact on the central bank balance sheet. However, as pointed out, since there is only one common currency in the euro area, this balancing mechanism does not work.

It is commonly criticized that, under the T2 system, there is no such (physical) compensation. Instead central banks accumulate T2 claims (liabilities) which technically level the central banks' balance sheets, but whose value cannot be called due. Accordingly, with regard to the current design of the T2 pay-

³⁵ During the era of the Bretton-Woods system until 1973, the Bundesbank accumulated about 400 tons of gold. Currently (November 2021), the Bundesbank's T2 claim would correspond to 30,000 tons of gold, which is more than all central banks in the world own together.

ment system, there is neither a floor nor a ceiling for T2 balances as long as there is enough excess liquidity in the banking sector.³⁶

In contrast, some economists understate the issue of large T2 imbalances between euro area countries by stressing that they are interest bearing so that there is compensation for countries facing large T2 claims. Indeed, T2 claims and liabilities are remunerated at the ECB's main refinancing rate. However, there are no interest payments from countries facing T2 liabilities to countries facing T2 claims. Instead, national central banks report their interest claims (obligations) resulting from T2 claims (liabilities) on their individual monetary income statement as revenues (costs). These interest claims (obligations) therefore increase (reduce) national central banks' monetary income. However, the overall monetary income of the Eurosystem is distributed between national central banks according to their share in the ECB's capital key. Since each T2 claim (liability) of a national central bank on (towards) the ECB stands vis-à-vis a T2 liability (claim) of the ECB towards (on) that national central bank, the sum of overall interest claims and obligations balances out to zero. Therefore, the remuneration of T2 balances has no impact on the Eurosystem's monetary income and its distribution between national central banks (*European Central Bank* 2004; *Hellwig/Schnabel* 2019a, b).

In sum, in the case of an unchanged continuity of the monetary union, (large) T2 imbalances represent in particular indirect risks. (Over-indebted) countries that are subject to large T2 liabilities might have an incentive to try to take advantage of this circumstance by blackmailing the other euro area member states. This risks destabilizing the monetary union. Apart from this threat potential, although there are no direct risks originating from T2 imbalances as long as their value is continuously and legally validly reported on the national central banks' balance sheets, in any case, T2 imbalances express asymmetries with regard to the creation of reserves by national central banks and its distribution across euro area countries. However, this is more a symptom of the decentralized implementation of monetary policy in the euro area by the respective national central banks than an inadequacy with regard to the design of the payment system.

2. Withdrawal of a Euro Area Member State

Whether country-specific risks may occur in the case of a withdrawal of a euro area member state that faces a T2 liability towards the ECB primarily depends on the operational handling of the ECB, the European Commission and the remaining euro area member states. The withdrawal of a member state from

³⁶ See also *Horst/Neyer* (2019).

the euro area is not intended and has not been included in the Treaty on the Functioning of the European Union, or in the Statutes of the European System of Central Banks (ESCB) and of the European Central Bank. Thus, no solutions have been designed accordingly. Therefore, the legal effects are ambiguous. It is to be expected that, in the context of the exit negotiations, the ECB and the European Commission would insist that the T2 liability of the withdrawing country persists in the same amount and has to be treated as a debt. The withdrawing country would possibly claim that the T2 liability does not reflect any debt and thus any obligation. We described in Section 2 that T2 balances serve as an item in the central banks' balance sheets to neutralize a shift in net assets between central banks occurring from cross-border transactions. Consequently, they represent a claim or a liability and need to be balanced – through a respective transfer of financial assets, for instance – in the case of a withdrawal or the dissolution of the monetary union. In this context, in January 2017, the former ECB president Mario Draghi released an extraordinary letter which he had written to two Italian members of the European Parliament stressing that “if a country were to leave the Eurosystem, its national central bank's claims on or liabilities to the ECB would need to be settled in full” (*Draghi* 2017).³⁷ However, he neither mentioned how they would have to be settled, nor on which legal foundation his statement was based. The withdrawing country would possibly stress that the T2 liability does not reflect any debt or obligation, but only a statistical balancing item in the central bank's balance sheet. Thus, in particular due to the missing legal basis, it is unlikely that a consensual agreement would be reached.

If we assume that the concerns that the ECB may lose its T2 claim on a member state opting to leave the euro area are justified, the consequences for the remaining member states might be as follows: If, for instance, Italy chose to leave the euro area, its T2 liability amounting to around 500 billion euros (November 2021) would need to be settled.³⁸ However, neglecting the political controversy, it is unlikely that Italy would financially be able to repay its debt. After the exit, Italy would introduce its own currency, i. e., the lira, for example. The lira would immediately depreciate against the euro. The claims on private and public debtors on the asset side of the Italian central bank's balance sheet would be denom-

³⁷ Mario Draghi's letter was a response to a request of two Italian European Parliament members who asked officially in December 2016 whether and how T2 balances of a net debtor member state would be settled technically if the country decided to quit the monetary union.

³⁸ The withdrawal of Italy from the monetary union is still unlikely, but not impossible. The Lega party and its federal secretary Matteo Salvini have frequently stressed during their government participation in 2018-2019 that Italy should consider to withdraw from the euro area. In May 2019, they convinced the Italian parliament to prepare a resolution for the introduction of a new parallel currency (Mini-BOTs). This has been considered as a credible exit threat by the other euro area member states.

inated in lira while the T2 liability would still be denominated in euro. Technically, the Italian central bank would de facto go bankrupt (Sinn 2018). Thus, the concerns that the T2 liability might be irrecoverable could be appropriate. However, so far this does not necessarily imply that losses for taxpayers will accrue.

If the leaving member state were unable or refused to repay its T2 liability, the ECB would (i) try to exploit the deposited collateral at the Italian central bank. However, the collateral deposited at the Italian national central bank is a result of its refinancing operations conducted with domestic commercial banks, for instance. Thus, the ECB would have no recourse to this collateral (*Deutsche Bundesbank* 2012, p. 25). Moreover, it is likely that the liquidation of this collateral may be insufficient to balance the T2 liability.³⁹ Then, (ii) if the T2 liability of the leaving member state were irrecoverable, the ECB would have the possibility – according to Article 33.2 of the ESCB Statutes – to take the missing amount out of its general reserve fund. The reserve fund is part of the ECB's accruals for financial risks and cannot exceed the sum of the capital shares paid up by the euro area national central banks at the ECB which roughly amounts to 7.5 billion euros in total (data source: ECB). Thus, compared with the T2 liability of the Italian central bank amounting to around 500 billion euros, this seems to be an insufficient solution. (iii) Also according to Article 33.2 in connection with Article 32.5 of the ESCB Statutes, and following the decision of the ECB's Governing Council, the ECB could offset the shortfall against the overall monetary income of the relevant financial year.⁴⁰ In 2020, the ECB's monetary income amounted to 1.6 billion euros which also might be insufficient to balance the Italian T2 liability. (iv) Another possibility for the ECB would be to create an adjustment item for the “default of T2 claims” on its balance sheet.⁴¹

A sharing of the loss between the remaining national central banks is neither included in the Treaty on the Functioning of the European Union, nor in the ESCB Statutes.⁴² However, if the ECB stated that a residual claim were irrecov-

³⁹ Note that this circumstance may also be supported by the fact that the (quality) requirements for collateral have been lowered significantly in the context of the financial and sovereign debt crisis and once again in April 2020 in the context of the COVID-19 pandemic.

⁴⁰ According to Article 32.5 of the ESCB Statutes, the overall monetary income is shared between the national central banks in accordance with their share in the ECB's capital.

⁴¹ We abstain here from additional potential losses for the Eurosystem occurring from the circulating amount of cash denominated in euro in the country that has withdrawn from the euro area. The country could still use this cash after the exit to settle payments in euro, if the Eurosystem would not try to devalue the cash holdings before (Sinn 2019b). Since this is not directly related to the country's T2 balance, we neglect this aspect in our analysis.

⁴² See also *Siekmann* (2017).

erable, the ECB would have to write-off the residual claim as a bad debt and thus would be exposed to a loss in its balance sheet through a reduction in its equity (*Deutsche Bundesbank* 2012, p. 25). This loss could be divided between the remaining member states. The prerequisite for this is that the national central banks vote – in their capacity as shareholders in the ECB's Governing Council – for a sharing of the loss by qualified majority measured in terms of their respective capital shares (according to Article 10.3 of the ESCB Statutes). The national central banks would then participate in the loss according to their share in the newly adjusted ECB's capital key (*German Council of Economic Experts* 2018, p. 186). For instance, if Italy left the euro area, Germany's share in the ECB's capital key would increase from 26 % to 31 %. Thus, the Bundesbank's share of loss would de facto reduce its T2 claim on the ECB by around 155 billion euros (corresponding to 4.7 % of the German GDP). Consequently, the Bundesbank's equity would decrease. National central banks are owned by the respective member state. If they earn a profit, this profit is distributed to the respective finance ministry. A central bank can also generate losses and even operate with negative equity. However, in this context, the German Federal Constitutional Court ("Bundesverfassungsgericht") stated that the German government would, depending on the respective amount, need to recapitalize the Bundesbank to (i) ensure the Bundesbank's proper business activities, (ii) ensure its financial independence, and (iii) also avoid a loss in the Bundesbank's credibility (*Bundesverfassungsgericht* 2016, Rn217; *Bundesverfassungsgericht* 2017, Rn126).⁴³ Then, the irrecoverable amount could be passed on to the taxpayers. For example, the German government could carry out the recapitalization by refunding the missing equity capital through the emission and transfer of new government bonds to the Bundesbank. This would increase the government debt accordingly. Alternatively, the Bundesbank could also add an adjustment item to its balance sheet to balance the loss, like it already did in 1973 at the end of the Bretton-Woods era when the Bundesbank's foreign reserve assets (dollars) suddenly depreciated (*Siekmann* 2017).

In sum, this should show that the risk that (a portion of) the irrecoverable amount could be passed on to the taxpayers cannot be ruled out but is nevertheless rather low and depends on many other factors. Whether this risk materializes, mainly depends on the amount of the T2 liability as well as on the outcome of exit negotiations and the operational handling. Since a withdrawal is not intended and thus not included in legal agreements, one can only speculate about the possible consequences. In this context, it also has to be mentioned that there

⁴³ This assessment was also shared by the *European Central Bank* (2016) and the *Deutsche Bundesbank* (2012, p. 29) which even pronounced that losses realized within the Eurosystem would have to be absorbed by the taxpayers of the euro area member states.

could be a risk of imitations by other member states depending on the outcome of the exit negotiations and the compromises granted. This could trigger a downward trend and destabilize the whole monetary union. Therefore, the ECB, the European Commission and the remaining member states would have an incentive to create a precedent by making as few concessions as possible.

Note that the amounts of T2 claims and liabilities of the remaining national central banks play no role in this scenario. For instance, with respect to the Bundesbank, its T2 claim officially exists on the ECB and not on a single member state. Hence, even in the case of the withdrawal of Italy, it would continue to exist unchanged as long as the monetary union continues to exist.

3. *Dissolution of the Monetary Union*

In its assessment of the risks of large T2 balances, the *Deutsche Bundesbank* (2018, p. 17) stressed that the amount of its T2 claim on the ECB is irrelevant in the event of a withdrawal of a (single) member state from the euro area. However, in the case of a break-up of the whole euro area, the surplus countries' T2 claims are at risk. They hold a claim on a system that no longer exists. A legal basis for T2 claims does not exist for this case. Neither the ESCB Statutes nor the EU treaties contain any proposals for how such a scenario could be handled. A total loss of corresponding T2 claims on the ECB would therefore be possible including the potential consequences for the member states and their taxpayers (see Section 4.2).

Probably the simplest solution would be if T2 liabilities were repaid by T2 debtor countries by selling goods and securities with an equivalent value to T2 creditor countries or by realizing private net capital outflows from creditor to debtor countries. However, there is no possibility to enforce this behavior (*Deutsche Bundesbank*, 2019). For instance, even if T2 debtor countries were able and willing to sell the according amount of goods and securities, it is questionable whether T2 creditor countries would be willing to buy them.

However, it has to be considered, that in the event of a dissolution of the monetary union, the initial member states would be exposed to many other serious risks in addition to the default of T2 balances. T2 claims only represent one single aspect in the overall consideration of intra-Eurosystem claims and liabilities that would need to be settled.

4. *Solution Approaches*

(Large) T2 balances reflect asymmetries with regard to the creation of reserves between euro area national central banks. They bear direct and indirect risks. T2 balances serve as an offsetting item in the central banks' balance sheets

to neutralize a realized transfer of assets between the countries involved. Because the T2 system is designed as a payment system instead of a transfer system, T2 balances represent actual claims and liabilities. Thus, there should be a possibility to call them due and to redeem them when necessary. However, compared with other counterbalancing assets in the central banks' balance sheets such as gold or foreign reserve assets, there is neither a chance of transferring them into other assets, nor to sell them.

Against this background, in order to limit the level of T2 balances and to establish the settlement of T2 balances, several adaption options for the existing T2 payment system or solution approaches are frequently discussed in the literature. One proposal for limiting the amount of T2 balances involves introducing progressively rising penalty interest payments for T2 liabilities. It is questionable whether this proposal would be feasible since it primarily concerns the debtor countries which would probably vote by majority against this proposal. Alternatively, an annual gold settlement for the T2 balances that would follow the rules prevailed with the US Federal Reserve districts until 1975, or a settlement of T2 balances like in the US ISA system could be implemented. This would allow T2 balances to be settled annually. However, this would again require a unanimous decision by the ECB's Governing Council, which is unrealistic due to the current high level of heterogeneity between the euro area member states. In this context, a mandatory cap limiting the T2 balances has also been proposed. However, this would restrict the free movement of capital within the monetary union, thereby delaying the process of integrated financial markets and supporting a segmentation of money markets. A collateralization of T2 balances is scarcely conceivable in light of the current level of T2 balances. In this context, the selection of acceptable eligible collateral may prove complicated. Moreover, depending on its communication, the ECB would risk a loss of credibility if it declared that the T2 balances previously considered "safe" would suddenly need to be collateralized. This could cause additional distrust towards the ECB.

We have shown that large T2 imbalances are not a reason but a symptom of asymmetries, or even crises, within the euro area. Consequently, solutions or adaption options that do not address the T2 payment system directly and exclusively, but rather concern the ECB's general monetary policy, for instance, are potentially more appropriate. As soon as the Eurosystem scales back its unconventional expansionary monetary policy measures and the amount of excess liquidity created by those measures decreases, the cross-border interbank money market is expected to regain its significance with regard to commercial banks' liquidity management and the reallocation of central bank money. T2 balances are then expected to drop again. In this scenario, for example, potential imbalances in a country's balance of trade must be offset by the appropriate adjustments in the private financial account as was the case before the outbreak of the financial and sovereign debt crises when T2 balances fluctuated close to zero.

Against this background, the ECB could also try to scale back its refinancing operations with full allotment at zero interest costs. Requirements for eligible collateral could also be tightened. The ECB would then be tasked with setting the correct framework which would mainly involve (i) reestablishing a scarcity of central bank money and thus a reduction in overall excess liquidity and (ii) a functioning interbank money market.⁴⁴ Of course, the appropriate exit from an unconventional monetary policy is subject to a complex benefit-risk assessment and has to be evaluated sensitively in consideration of many more macroeconomic aspects. Nevertheless, the existence of (large amounts) of excess liquidity, and thus of a structural liquidity surplus in the euro area banking sector, is the prerequisite for the emergence of T2 balances. As long as the Eurosystem eases its monetary policy, continues its large-scale asset purchases and thus continues to create further excess liquidity, it is likely that T2 balances in the euro area will increase further. Consequently the reduction of overall excess liquidity and the return to a structural liquidity deficit in the euro area banking sector, as it was actually the case until October 2015,⁴⁵ should be the appropriate way to reduce T2 balances and thus the potential risks involved.

V. Summary

T2 balances are claims and liabilities of euro area national central banks vis-à-vis the ECB. They emerge as a result of cross-border payments between national central banks. A positive (negative) T2 balance indicates that the amount of payment orders a national central bank received has exceeded (fallen below) the amount of payment orders it has sent to other national central banks. Large and asymmetric T2 balances in the euro area have sparked substantial controversy. Against this background, the first part of this paper deals with the functioning of the T2 system and the causes of the observed large increases in T2 balances. The second part of this paper analyzes potential risks of large T2 balances for euro area member states and discusses adaption options to the T2 system.

The drivers and causes of large and asymmetric T2 balances have changed over time. Following the outbreak of the financial crisis and during the subsequent sovereign debt crisis, T2 balances started to increase for the first time in the euro area. T2 balances during this period are a symptom of increased levels of distrust and risk perception as well as increased information asymmetries

⁴⁴ If necessary, the ECB could also try to support the reactivation of the interbank money market in a first step by collateralizing the credit operations to increase the level of trust between commercial banks.

⁴⁵ For detailed information with regard to the distinction between a structural liquidity deficit and a structural liquidity surplus as well as their significance for monetary policy implementation, see, e.g., *Horst/Neyer* (2019).

which implied tension in the money market and funding stress in the euro area banking sector. Thus, in this context, they can be interpreted as a sign of crises. However, the second period of increasing T2 balances from the beginning of the QE period in 2015 and over the course of the COVID-19 pandemic until today is mainly a consequence of the technical particularities with regard to the implementation of the Eurosystem's large-scale asset purchases. Thus, T2 imbalances during this period are predominantly no longer a sign of crises. In particular, they are a symptom of the decentralized implementation of monetary policy by the respective euro area national central banks. In both scenarios, the provision of (large amounts of) excess liquidity by the Eurosystem is a prerequisite for the emergence of T2 balances.

Potential risks arising from large T2 balances are scenario dependent. In the scenario of (i) an unchanged continuity of the euro area, large T2 balances do not constitute direct risks. However, they may bear indirect risks in the form of a threat potential if countries exposed to (large) T2 liabilities were to try to take advantage of this circumstance by blackmailing the other member states. In the event of (ii) a withdrawal of a euro area member state facing a (large) T2 liability, direct risks exist in the form of losses for the remaining national central banks as well as for the remaining member states and their taxpayers. Their extent primarily depends on the outcome of exit negotiations and the subsequent operational handling. Depending on these negotiations, an additional potential risk could arise in the form of imitations if other member states exposed to (large) T2 liabilities opted to leave the euro area as well. This could bear the risk of destabilizing the monetary union. In the event of (iii) a dissolution of the whole monetary union, the creditor countries' T2 claims may be at risk. They would hold claims on a system that no longer exists. A total loss of corresponding T2 claims on the ECB would be possible.

Against the background that large T2 balances bear direct and indirect risks, we discuss potential adaption options to the T2 system. We find that proposals directly and exclusively considering the T2 payment system such as introducing progressively rising penalty interest rates for T2 liabilities, a mandatory cap limiting the T2 balances, or a collateralization of T2 balances are less suitable than proposals affecting the ECB's monetary policy such as scaling back its large-scale asset purchases or restricting its main refinancing operations with full allotment at zero interest costs, for example.

Last but not least, from the ECB's point of view, it may be advantageous to expand its communication with regard to the relevance of large T2 imbalances in the future. A willingness to deal with criticisms as they arise could help to avoid increasing levels of concern and distrust with regard to the T2 payment system. A detailed and successful central bank communication has become more and more important in the past few years. In particular with regard to this sensitive

topic, the ECB's objective should be to provide a high level of information in order to decrease the level of uncertainty and to reach a high level of credibility to ensure the basis for a successful monetary policy.

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