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Speculative Eurozone Attacks and Departure Strategies

Abstract

This paper shows that the eurozone payment system does not effectively protect member states from speculative attacks. Suspicion of a departure from the common currency induces a terminal outflow of central bank money in weaker member states. TARGET2 cannot inhibit this drain but only protects central bank assets. Evidence presented here suggests that a run on Italy is already on the way. The paper also considers departure strategies of strong and weak member states and the distributive effects of an orderly eurozone dissolution.

JEL-Codes: E520, E580, F450.

Keywords: currency speculation, TARGET2, eurozone, Italexit, dexit, trilemma.

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1. Introduction

Is the eurozone safe from speculative attacks? Which form would such attacks take? And if a single member state were to leave the common currency, either voluntarily or after an assault, what would its departure strategies look like, and what are the probable distributive consequences? These interrelated questions are motivated by European experience with fixed exchange rate regimes and, notably, by the increasing economic and political tensions that commenced after the financial crisis of 2007/2008 and continue until today.

European monetary cooperation started in May 1972 with the Exchange Rate Arrangement, the famous "snake in the tunnel". After the effective termination of the Bretton Woods system in 1971, the snake prescribed narrow bands of ±2.25% for major European currencies. The arrangement was characterized by frequent exchange rate realignments as well as by exits and re-entries. For instance, the United Kingdom left in June 1972, Italy left in 1973, and France left in 1974, rejoined in 1975, and left again in 1976.

In March 1979, the European Community (EC) replaced the snake with the European Monetary System, the core elements of which were a narrow exchange rate band of ±2.25%, a broad band for the Italian lira of ±6%, and an exchange rate mechanism (ERM) that provided for extended credit facilities between central banks. Notwithstanding several exchange rate realignments, the ERM worked fairly well until approximately 1990, when EC member states gradually removed capital controls; see Higgins (1993). On 16 September 1992, "Black Wednesday", Italy and the United Kingdom, plagued by high inflation and double deficits, were compelled to leave the ERM. Investors such as George Soros, who had built up short positions in British pounds and Italian liras, made huge profits.

Previously, the United Kingdom and Italy had heavily intervened in the foreign exchange markets to stabilize their currencies against the Deutschmark and avoid a departure. As they ran out of reserves, the Bank of England and Banca d'Italia received Deutschmark loans from the German Bundesbank. Under the ERM, the Bundesbank was obliged to grant support, but (as it pointed out in the famous *Emminger letter*) only to the extent that this did not interfere with its monetary policy objectives. When the Bundesbank feared losing control of the monetary base, it removed assistance to its fellow central banks, and the latter were forced to surrender. All things considered, the ERM broke because the Bank of England and Banca d'Italia were not prepared to raise interest rates to any desired level, while the Bundesbank was not prepared to lose control of its monetary base.

Immediately after these failures, the European Union (EU) started a third and hitherto final venture to discard exchange rate flexibility. Specifically, the EU established the European Monetary Institute (EMI), the predecessor of the European Central Bank (ECB), and decided to form a unified currency area rather than just pegging individual currencies. Already in 1995, an EMI working group presented a draft of the monetary union's core element, the Trans-European Automated Real-Time Gross Settlement Express Transfer System (TARGET), which has since been replaced by TARGET2. With "Black Wednesday" as a recent reminder, the principle objective of TARGET was "to serve the needs of the single monetary policy". Improving the payment system was only noted as a secondary aim; see

EMI (1995: 1). To avoid speculative attacks, the system provides unlimited overdraft between national central banks (NCBs). Tornell (2018: 11) speaks aptly of a "seamless currency union".

Due to the thorough debate on TARGET2 initiated by Sinn and Wollmershäuser (2011), the design of this system is well known, so that a very brief recollection may suffice here.[1] TARGET2 essentially interconnects the payment systems of the eurozone countries. Italian bank A can transfer central bank money to German bank B, provided it has sufficient reserves available in its account with Banca d'Italia. The latter debits bank A's account and sends a payment message to the Bundesbank, which credits bank B's account. In this way, the liabilities of Banca d'Italia toward bank A are reduced, while the Bundesbank's liabilities toward bank B are increased. To restore the original net asset positions, Banca d'Italia incurs a TARGET2 liability toward the ECB, and the Bundesbank obtains a TARGET2 claim against the ECB. This netting occurs at the end of each trading day.

Until the outbreak of the financial crisis in 2007, TARGET2 balances were unobtrusive; but thereafter they climbed to ever higher levels. At the time this paper was written, Banca d'Italia's TARGET2 liability approached 500 billion euros, whereas the Bundesbank's TARGET2 claim came near 1,000 billion euros. Would these horrific amounts be settled in the event of a eurozone collapse? The Lisbon Treaty, the ECB's statute and innumerable further regulations are silent about this matter. Therefore, many economists from TARGET2 claim countries consider the balances hazardous, while economists from TARGET2 liability countries, most notably Paolo Savona from Italy, play around with profitable departure strategies.[2] The underlying fears of a eurozone meltdown are reinforced by increasing political tensions. Meanwhile, Eurosceptic parties have been established in practically all member countries. Northern factions such as the "True Finns" or "Alternative for Germany" consider the eurozone as a scheme that transfers wealth from the core to the periphery; southern camps see their countries trapped in a kind of *Dutch disease*.

The paper is organized as follows: Section 2 examines, and challenges, the view that the TARGET2 mechanism precludes intra-eurozone attacks. Proceeding from standard international macro theory, the section demonstrates that "Black Wednesday" can still occur within the eurozone because unlimited overdraft between NCBs does not yield airtight protection. This conclusion runs counter to most of the TARGET2 literature.[3] Section 3 supports the preceding theory with evidence indicating that a run on Italy is already on the way. Section 4 considers departure strategies of weak and strong member countries, taking Italy and Germany as examples. According to the section's main finding, leaving the eurozone yields a first-mover advantage, which is a characteristic feature of this currency union and does not exist in the case of departures from fixed exchange rate regimes. Section 5 concludes the paper.

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1 Cecchetti et al. (2012) and Homburg (2011) provide expositions of the early TARGET2 debate.

2 Gros (2018) reviews Savona's plan "Piano B".

3 An exception is Steiner et al. (2017) who focus on the 2011 to 2012 period.

Before starting, the motive to write the present paper should be disclosed. Before 1990, virtually no economic research on German reunification was conducted because, first, such an event seemed far-fetched and, second, questioning the mere existence of the iron curtain appeared politically incorrect. Lacking economic advice, policy makers had to experiment when the wall was torn down, and in retrospect many decisions were decidedly suboptimal. Such a research vacuum should be avoided as a matter of principle. With this in mind, the paper offers a modest piece of research on eurozone collapse and departure.

2. TARGET2 Cannot Inhibit Speculative Attacks

In an early contribution, Peter Garber asked whether the eurozone's payment system would be suitable to shield it from speculative attacks. His main conclusion was as follows:

"TARGET and its surrounding accounting procedures are the means by which the National Central Banks (NCBs) will provide credit to each other when there are cross-border payments imbalances in the euro. It may be that the sovereign governments are always willing to permit their NCBs to provide unlimited credit to each other, consistent with the obligations of the Maastricht treaty. Then, there is no possibility that a collapse of the system will occur. Alternatively, they may be unwilling to provide continued credit—especially if they are already contemplating withdrawal—and this will set the parameters for the dynamics of collapse."[4]

By now, it has become clear that member states are indeed willing to permit their NCBs to provide unlimited overdraft to each other, even though other obligations under the Maastricht treaty were consistently and heavily violated. In view of this fact, Garber's analysis implies that successful attacks on the eurozone are impossible. The following line of reasoning challenges this claim and shows that unrestricted TARGET2 balances do not suffice to protect weak eurozone members from speculation. To present the argument in familiar terms, the exposition starts with a hypothetical NCB balance sheet under a gold-exchange standard. In a balance of payments equilibrium, a country's current account balance (exports minus imports) and its capital account balance (capital imports minus capital exports) sum to zero, and the NCB's gold and foreign exchange reserves remain constant.

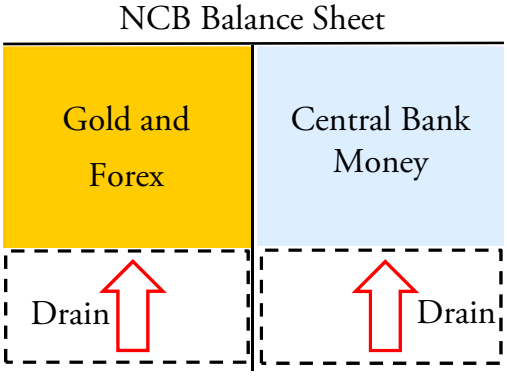

Figure 1.

Figure 1 represents a balance of payments disequilibrium, which can occur due to a current account deficit, a capital account deficit, or both. The NCB loses gold and forex reserves.

4 See Garber (1999: 197) and Kenen (2000) for a similar argument.

As long as it adheres to the rules of the gold standard, it has to reduce central bank money (domestic banknotes, coins, and bank reserves) at the same pace because central bank money is fully backed by gold and forex. An NCB aiming for external stability will raise interest rates in such a situation. This measure attracts foreign capital and depresses domestic absorption, thus restoring a balance of payments equilibrium. However, if the NCB aims at internal stability and leaves interest rates unchanged or does not raise them enough, speculators can make a safe bet because reserves are finite; a drain of gold and forex cannot last forever, so the country must eventually go off the gold standard and devalue. By shortening domestic currency and investing the funds abroad, investors make a profit after their debt becomes devalued.

Like the gold standard, Europe's currency union is also a fixed exchange rate regime. However, its treatment of balance of payments disequilibria differs from the gold standard in an important respect because the TARGET2 system protects NCB assets: If a member state becomes confronted with a current account deficit or capital flight, the resulting drain of central bank money does not induce a corresponding reduction in NCB assets but is fully offset by a TARGET2 liability.

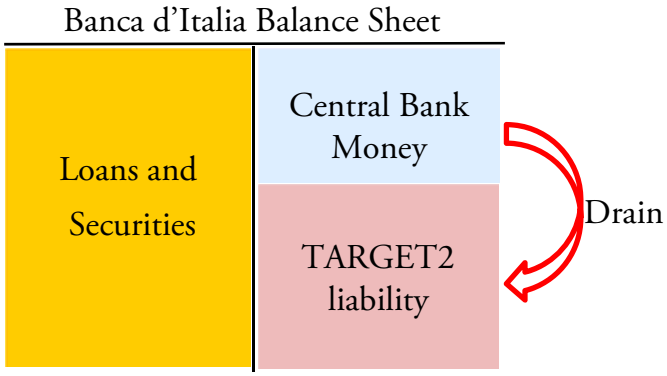

Figure 2.

Figure 2 shows Banca d'Italia's balance sheet in a simplified form that abstracts from gold, forex, equity etc. The dominant items on the asset side are loans to domestic commercial banks and securities such as government bonds. In this fiat money system, NCBs create central bank money simply by granting loans or acquiring securities in the open market. The central bank money thus produced is also used for settling international payments within the eurozone. Sending central bank money abroad via a payment message does not oblige the NCB to sell parts of its assets but is automatically accounted for by an increase in its TARGET2 liability. As legal regulations do not limit such liabilities, the system appears as a gold standard with unbounded gold reserves, which would be safe from speculation. This seems to be the gist of Garber's widely accepted contention.

We do not concur with this view. Under any monetary arrangement, a country falls into trouble if its banks run out of central bank money. Banks need reserves to fulfill minimum reserve requirements, to satisfy their customers' demand for notes and coins, and to make payments to one another. Under the gold standard, central bank assets and central bank

money move concurrently, because they are connected through the balance sheet identity. Therefore, central bank money drops to zero only when gold and forex reserves become depleted. In the European currency union, however, a country's total amount of central bank money may vanish even when central bank assets are still plentiful. This occurs when TARGET2 liabilities completely crowd out central bank money.

Such a hypothetical deadlock is shown in figure 3. The gradual accumulation of TARGET2 liabilities has diminished Italy's central bank money to zero. Italian banks can neither execute payments on behalf of their customers nor refill their ATMs. Of course, the figure abstracts from notes and coins that have been issued in the past as well as from minimum reserves. Neither qualification detracts from the basic message, but reinforces it. In practice, the deadlock will already be reached at a point where the amount of central bank money is still strictly positive.

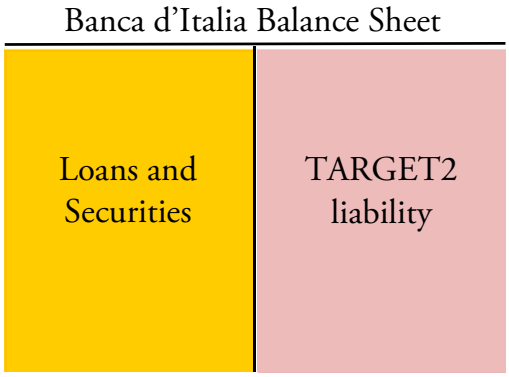

Figure 3.

Postponing the discussion of countermeasures, the previous finding may be summarized in the form of a proposition: With a given amount of NCB assets—which are protected by the TARGET2 system and limited by decisions of the ECB Governing Council—a euro-zone member country can become illiquid after a terminal outflow of central bank money. If such an event seems likely, TARGET2 speeds up rather than deters speculation because it facilitates transfers of huge money amounts within seconds.

The proposition sheds an interesting light on the rebalancing dispute. "Rebalancing" means settling balances periodically such that NCBs with TARGET2 liabilities transfer parts of their assets to NCBs with TARGET2 claims. This procedure synchronizes central bank assets with central bank money, just as under the gold standard. TARGET2 balances would largely disappear. Rebalancing is actually employed in the United States, where so-called Interdistrict Settlement Accounts that resemble TARGET2 accounts are settled each year on 1 April via a redistribution of shares in a joint portfolio that is managed by the Federal Reserve Bank of New York; see Wolman (2013).

Sinn's (2014: 245 ff.) plan to augment TARGET2 with a US style rebalancing mechanism has been fiercely opposed by ECB representatives. According to Bindseil and König (2012), "such a proposal is tantamount to abandon the monetary union". In a press conference, Mario Draghi (2018) went even further and remarked on TARGET2 that "people who

want to cap it, collateralize, limit – the truth is that they don't like the euro". Both quotes reiterate Garber's contention that only a scheme of unlimited inter-NCB overdraft can effectively protect the eurozone. These views are fallacious because the eurozone's susceptibility to attacks has nothing to do with the *asset side* of NCB balance sheets; the real danger comes from the *liability side*.

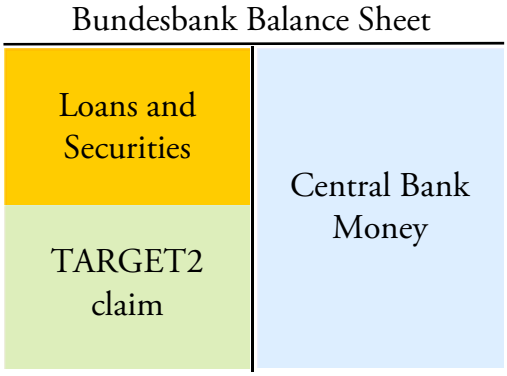

Figure 4.

To substantiate this claim, figure 4 starts with a look at the Bundesbank's stylized balance sheet. For the Bundesbank, rebalancing entails an asset swap that substitutes loans and securities for TARGET2 claims, without any effect on central bank money. The same holds true analogously for Banca d'Italia (figure 2), which relinquishes some of its assets and discards its TARGET2 liabilities. Again, rebalancing has no impact on central bank money.

Finally, in a deadlock such as that depicted in figure 3, Italy is finished anyway: With rebalancing, Banca d'Italia has neither assets nor liabilities; without rebalancing, its central bank money is completely crowded out by the TARGET2 liability. Italy's bank system is illiquid in both cases. The forgoing quotes indicate that the ECB is not aware of the true Achilles' heel of the eurozone, which is located on the liability side of NCB balance sheets, not on the asset side.

Having established this theoretical point, the following section will examine concrete defense strategies. For the moment it suffices to note that a currency union composed of distinct NCBs, which may possibly depart at some point, differs markedly from a monetary system with a single central bank; it is more akin to a fixed exchange rate regime.

3. A Silent Run on Italy

The preceding section has shown that weak eurozone members are liable to lose their central bank money. TARGET2 balances cannot inhibit such a drain. According to the evidence presented in this section, monetary drying up is not a mere theoretical possibility but is what actually occurred in recent years.

Central bank money comprises bank reserves (booked in the current account and the deposit facility), banknotes, and coins. In what follows, coins are disregarded because they make up a trifling amount of central bank money (less than one percent) and need special

treatment. Banknotes are considered first. The Eurosystem, which consists of the ECB and the NCBs of eurozone member countries, is the sole issuer of banknotes. It discloses them as liability item "banknotes in circulation", a designation that is misleading on three counts:

- Many banknotes do not circulate at all but serve as a store of value. Measured by value, over a quarter of euro banknotes come in denominations of 200 and 500. These are not ordinarily accepted in daily transactions. In September 2008, when Lehman Brothers went bankrupt, the demand for banknotes of higher denominations spiked because customers became concerned about bank solvency.[5]
- Banknotes do not necessarily stay in the country whose NCB has issued them. A banknote issued by the Banque de France, for instance, may circulate in Finland or Greece, or it may sit under a mattress in Russia or Chad. All major currency issuers such as the Federal Reserve System, the Bank of England, or the Eurosystem know they cannot determine the geographical positions of their banknotes.
- The third point is subtler. According to Eurosystem regulations, 8% of banknotes are allocated to the ECB. The remaining 92% are allocated to the NCBs according to their ECB capital share (which is determined according to population and gross domestic product). This fictitious allocation affects the distribution of seigniorage among eurozone member countries.

As a result, the liability item "banknotes in circulation" in NCB balance sheets should be read as "fictitious banknote issue". It is possible, however, to infer actual banknote issues from NCB reports by adding the item "net liabilities relating to the allocation of euro banknotes within the Eurosystem" or by subtracting "net claims relating to the allocation of euro banknotes within the Eurosystem", respectively. If the first item is positive, the country under consideration has issued banknotes in excess of its ECB capital share, and vice versa.

Until 2011, Italy's NCB issued banknotes in excess of its ECB capital share, as shown in figure 5. The graph demonstrates that Italy's banknote share fell sharply in 2012 when the financial crisis turned into a sovereign debt crisis and Italy's solvency became questionable. Since then, Italy's share in eurozone banknote issues has fallen steadily to ever lower levels. How can this observation be accounted for?

One possible explanation runs as follows: The first series of euro banknotes, brought into circulation after 2000, came with country labels. Serial numbers started with letters that indicated the issuing NCB. Notes from Banca d'Italia were marked by an "S", notes from the Bundesbank by an "X", and so forth. When concerns about a eurozone collapse emerged, owners of S-euros feared that their banknotes could become converted to Italian New Liras. With a prevailing 1:1 exchange rate between S-euros and X-euros, it was profitable for citizens (and criminals) to exchange S-euros for X-euros—an application of Gresham's Law. Therefore, the number of Italian banknotes as a fraction of total eurozone banknote issues declined, and the respective fraction of German banknotes increased.

5 According to ECB (2011), only one-third of euro banknotes is used for transaction purposes.

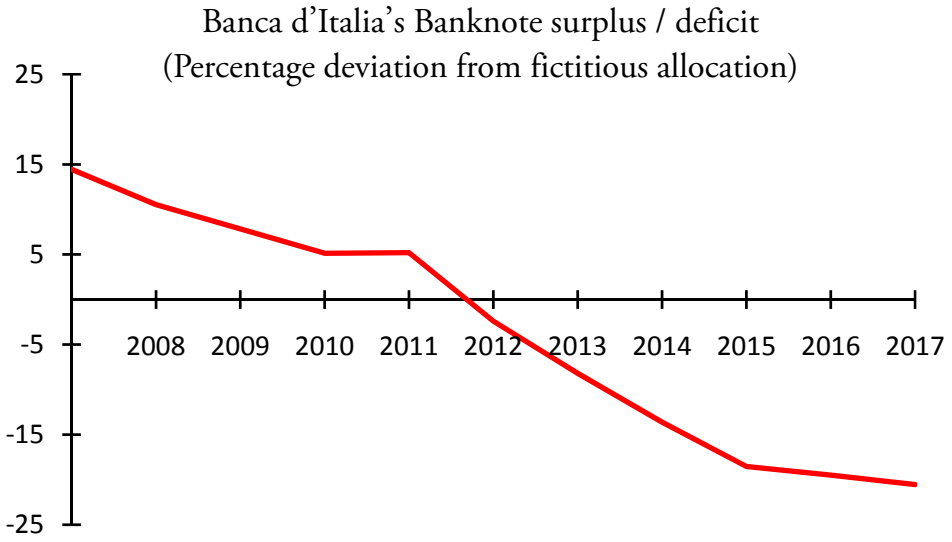

Figure 5.[6]

In 2013, the Eurosystem released the second series of euro banknotes, thereby changing the meaning of the first letter in the serial number. The letter no longer reveals which NCB had issued the note but rather the printing plant where it was physically produced. In the second series, "S" stands for Banca d'Italia's own printing press, whereas the letters "R", "W", and "X" represent factories in Berlin, Leipzig, and Munich, respectively. This change in definition has not impressed banknote owners much. Clearly, banknote use depends on various country specific determinants such as payment habits or tourism. However, the abrupt plunge in Italy's banknote issues after 2011 can hardly be explained by such factors.

Alternatively, one could think of attributing the sharp drop in Italy's banknote issue to the Monti legislation that introduced a limit (with exceptions) of 1.000 euros on cash payments. However, the lasting currency drain is inconsistent with the fact that Renzi lifted the cash limit to 3.000 euros in 2016. Moreover, Italy is not alone; during 2012, banknote liabilities dropped by 7% in Spain, 8% in Greece, and 194% in Portugal.[7]

Banks' reserves with Banca d'Italia, the other major part of Italy's central bank money, followed a different pattern, as shown in figure 6. In spite of the easing policies undertaken during and after the financial crisis, notably long-term refinancing operations (LTRO), bank reserves flew off continuously from 2007 to 2014, when they reached a minimum of only 15.4 billion euros. Then came APP, the Eurosystem's asset purchase program. Between the end of 2014 and October 2018, the APP increased eurozone bank reserves from 367 to 2,023 billion euros. Its main component, the public sector purchasing program, worked as follows: The ECB's Governing Council determined the total amount of Eurozone monthly purchases and distributed it among NCBs according to their ECB capital share, with each

6 Source: Banca d' Italia, *Annual Reports for 2008–2014* and *Annual Accounts for 2015–2017*.

7 Sources: Banco de España, Bank of Greece, Banco de Portugal, *Annual Reports 2012*. Portugal's total banknote liability was in fact negative.

NCB buying sovereign bonds only from its own country. The additional central bank money thus created allowed reserves with Banca d'Italia to increase, at least for a while.

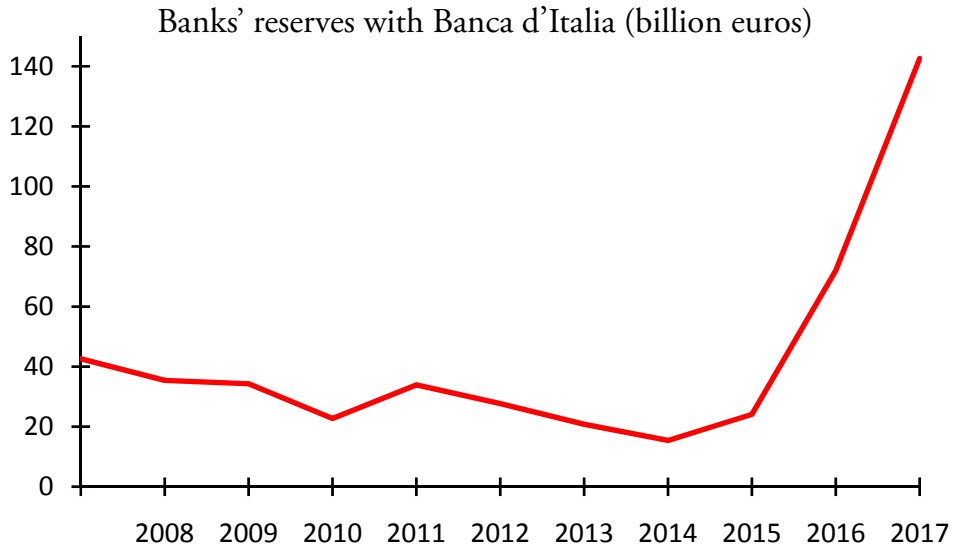

Figure 6.[8]

This lulling picture, however, shifted dramatically with the change of government that took place in spring 2018. Figure 7 makes use of a set of monthly data that the ECB provides since 2016. The graph shows a sharp drop in Italian bank reserves, from 132 billion euros in April 2018 to 68 billion euros in July. This means that Italian banks lost almost one half of their central bank reserves within just four months. One cannot avoid the impression that the APP stopped Italy's depletion of central bank money only temporarily. When the program is terminated at the end of 2018, the ongoing drain will no longer be replenished by freshly created reserves.

Between December 2014 and August 2018, Banca d'Italia created central bank money amounting to 390 billion euros by granting loans and buying securities.[9] Of this newly created money, only 53 billion euros stayed in Italy, whereas the rest flew off. If this process continues, it goes without saying that, under a Soros-type attack, Italy's banks will be unable to find funds in the interbank market. For fear of redenomination, banks located in other eurozone countries will simply refuse to purchase Italian financial assets or grant loans.

8 Source: Banca d' Italia, *Annual Reports for 2008–2014* and *Annual Accounts for 2015–2017*.

9 The figures refer to the monetary instruments A5 and A7. Sources: *Banca d'Italia Annual Report for 2014* and series ILM.M.IT.N.A050000.U2.EUR, ILM.M.IT.N.A070000.U2.EUR from the ECB data base.

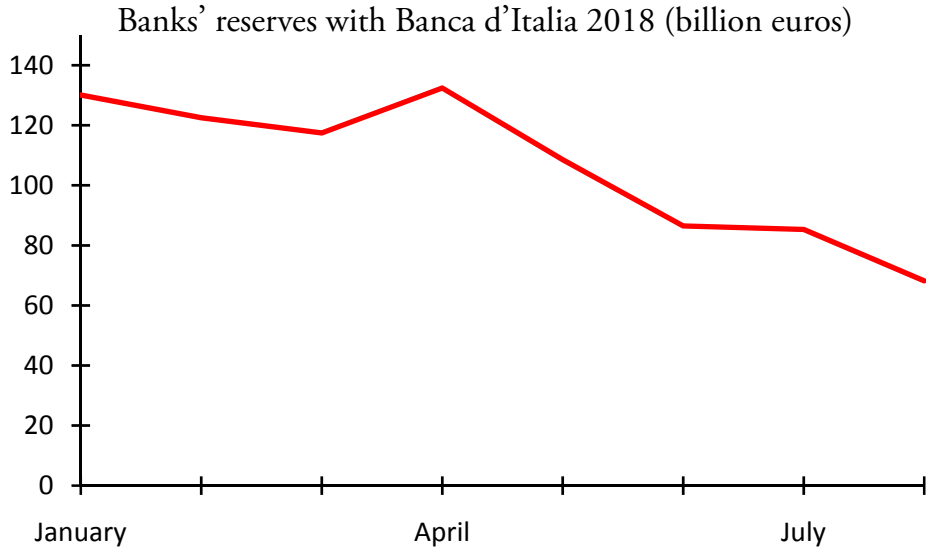

Figure 7.[10]

Two countervailing forces determine the further dynamics. On the one hand, Italy's banks will request additional loans from Banca d'Italia to replenish their reserves. Such is possible under the ECB's full allotment policy as long as the banks are considered solvent and can post eligible collateral. On the other hand, domestic and international speculators will borrow in Italy, transfer the money, and make safe investments abroad (that can be used as collateral for further rounds of borrowing). This resembles Soros's short-long strategy and accelerates the central bank drain.

Is Banca d'Italia in a position to offset arbitrary money outflows by acquiring additional assets? To answer this question, one must remember that it is the ECB Governing Council alone that implements monetary policy through decisions on interest rates and the joint monetary base, the sum of currency issues and bank reserves. The Council also determines which assets are eligible as collateral or for outright purchases. Under the asset purchase program, NCBs must even accept specific amounts of securities allocated to them. However, there are two exceptions:

- The agreement on net financial assets (ANFA) gives NCBs some discretion to buy securities beyond what is necessary for monetary policy purposes. Such discretion can be used to delay a monetary drain but cannot stop it because the Governing Council annually determines the maximum amounts of net financial assets.
- In exceptional cases, NCBs may grant emergency liquidity assistance (ELA) to banks. Legally, ELA is a part of ANFA.

The point of interest here is that the ECB Governing Council can inhibit ANFA and ELA measures with a majority of two-thirds of the votes, cf. article 14.4 of the ECB statute. Although the Council may at first be permissive, it will eventually pull the plug if other

10 *Source*: European Central Bank Statistical Warehouse, sdw.ecb.europa.eu, series ILM.M.IT.N.L020000.U2.EUR.

eurozone members are not prepared to lose control of the monetary base. After all, losing control of the monetary base would mean that some country injects ever higher portions of central bank money into the system at the expense of the others; Tornell (2018) characterizes this as a common-pool problem. Greece, which had to accept fiscal assistance and capital controls in 2015 after the Council banned further increases in ELA, provides a clear example that the Council will eventually inhibit national money printing. In Latin, *mors certa, hora incerta*.

Returning to the question of disproportionate bank loan provision, the ECB Governing Council faces essentially the same choice: Either it stops the process (e.g., by repealing the full allotment policy) or it loses control of the monetary base and authorizes an unbounded negative externality that is placed upon other eurozone countries.[11]

As a concrete example of the final stage of a Soros-type attack, consider an Italian bank whose customer orders a transfer of one million euros. Like its Italian fellow banks, the bank has depleted its reserves, as in figure 3. After excessive rounds of Italian central bank money creation, the ECB Governing council has blocked further credit access to Banca d'Italia, and with Italexit in the air, banks abroad will surely refuse to provide credit in the interbank market. Hence, the Italian bank under consideration cannot execute the money transfer.[12] Importantly, TARGET2 is incapable of stopping this terminal outflow because it only safeguards Banca d'Italia's assets and not Italy's central bank money.

To emphasize the core point, the above argument does not presume an outright inhibition of credit expansion in Italy. The Governing Council may approve a first round of ordinary loans, ELA or ANFA measures, and maybe a second and third round. However, as each newly created euro represents a claim on the eurozone's joint domestic income, the Council will almost certainly obstruct unlimited, asymmetric money creation.

4. Departure Strategies

ECB representatives have stressed on countless occasions that a country's decision to adopt the euro is irrevocable. However, history teaches that transnational currency unions are normally dissolved after some time. The Latin and the Scandinavian monetary unions come to mind; other examples include the Ruble zone, the Yugoslavian dinar, and the Czechoslovak crona. Concerning the euro, there is even a perfectly legal route to exit: Article 50 of the Lisbon Treaty (TEU) allows EU member states to withdraw from the union, and article 3 TEU restricts the use of the common currency to EU member states. Therefore, EU

11 Italian banks pay an interest of 0% (marginal financing rate), whereas banks located in countries to which the central bank money flows have to pay a penalty of 0.4% on their reserves (deposit rate). Moreover, this process deteriorates the Basel III leverage ratios of the receiving banks.

12 As a stylized numerical example, assume that Italy's commercial banks hold 101 units of M3 deposits against 99 units of loans and 2 units of reserves. Following a money transfer of only 1 unit abroad, deposits fall to 100, and reserves plunge to the level of required reserves, one percent of deposits. Then, further payments become impossible.

exit means euro exit. A country not wishing to break completely with the union could arrange to re-enter after a legal second, with a clause (such as for Denmark) that exempts it from adopting the common currency.

If a member state were to leave the eurozone, it would redenominate all domestic claims and liabilities, as well as wages, prices, and rents, into the new national currency. However, the Lisbon Treaty does not provide the details of eurozone withdrawals. This section discusses departure strategies for a single country, assuming the rest of the eurozone remains intact. The text shows that weak and strong countries use different tactics and illustrates the findings numerically, again taking Italy and Germany as the two archetypes.

Assume that Italy leaves the eurozone and introduces New Liras, which are almost certain to devalue against the euro. While the departure raises a number of economic and legal issues, the following exposition focuses on two monetary implications. The first point concerns Italy's TARGET2 liability, which stood at 437 billion euros as of December 2017. While Italy may be morally required to settle this debt, it can point to the fact that no such obligation exists in European law. In the negotiations that are likely to follow, Italy will seek to settle part of the TARGET2 debt in the form of (redenominated) claims and securities, while the remaining eurozone member states will insist on a full settlement with gold and foreign exchange (which, by the way, is impossible because the latter items amounted to only 126 billion euros in December 2017, not even a third of Italy's TARGET2 liability).

The second point regards the treatment of euro banknotes. Balancing Italy's fictitious banknote issue and its net claims relating to the allocation of euro banknotes within the Eurosystem, Italy has incurred a respective liability of approximately 150 billion euros. After leaving the eurozone, Banca d'Italia may try to dump this amount on the remaining member states, obtaining an extraordinary profit of 150 billion euros. How would this work? To eliminate the banknote liability, Italy must only declare New Lira banknotes as its sole legal tender. Crucially, this would not hurt Italian citizens by any means because they can use their existing euro banknotes for shopping in the eurozone, or exchange them in the market at a favorable rate. Italian euro banknotes would mostly migrate to the remaining eurozone in the long run, while New Liras circulate in Italy. However, as with the TARGET2 liability, one must expect that the Eurosystem will ask for some compensation.

To sum up, Banca d'Italia's maximal profit from an exit comes to 587 billion euros. The actual profit will likely be smaller, due to negotiations, but will probably be still substantial. If Italian lawmakers thought Banca d'Italia would not need an increase in equity, they could ask it to cancel a portion of sovereign debt, perhaps enabling the government in this way to avoid an open default that would mainly hurt Italy's own citizens.

Turning to Dexit, Germany faces a different prospect. As of December 2017, the country owned a nominal TARGET2 claim of 907 billion euros whose fair value is highly uncertain for the reasons already outlined. If Germany introduced a New Deutschmark and redenominated its financial assets into the new currency, it would seem virtually impossible that the country obtained full compensation from its former euro partners. Hence, there is an asymmetry between TARGET2 debtors and creditors in that the former are likely to obtain an

exit gain, while the latter are liable to suffer a loss. On the other hand, Germany has a superior bargaining position because it is the most important contributor to the EU budget.

Regarding banknotes, circumstances are more favorable for Germany in that the Bundesbank's liability from banknote issues amounted to a massive 635 billion euros at the end of 2017. Unlike Italy, however, Germany could not simply dump this debt on the remaining eurozone members but had to follow a more sophisticated strategy to avoid internal uproars. Because the New Deutschmark will almost certainly appreciate against the euro, individuals would perceive a Bundesbank default on euro banknotes as a partial confiscation. To overcome this problem, German lawmakers could stipulate a free initial endowment of, say, 100 New Deutschmarks for each domestic individual. Assuming a New Deutschmark appreciation of 20%, domestic individuals whose initial banknote holdings fell short of 500 euros would benefit from the conversion, and only those with higher holdings would suffer. By an appropriate choice of the initial endowment, lawmakers could ensure that the median voter makes a profit. The Bundesbank's balance sheet would be relieved by 635 billion euros, minus the total initial endowment that amounts to 8 billion New Deutschmark in the preceding calculation. Therefore, the Bundesbank could avoid an exit loss if it managed to save approximately one-third of its TARGET2 claim.

Accepting euro banknotes at par would not be a viable strategy because such an offer would effectively burden the Bundesbank's balance sheet with the eurozone's total banknote liability of over 1 trillion euros—and even more, because printing additional euro notes and converting them into New Deutschmarks at par would be profitable for other member states. As explained in the previous section, serial numbers no longer indicate the country of origin, and with Europe's open border policy, banknote smuggling can hardly be inhibited. Even if the Bundesbank restricted the exchange to German residents, the latter would find relatives and "friends" abroad that endowed them with additional euro banknotes.

Before concluding this section, an important qualification needs to be made. The above line of reasoning relates to scenarios where a single country, or a small group of countries, withdraws from the eurozone. In the case of a simultaneous eurozone collapse, the TARGET2 arguments are still valid. The banknote arguments, however, are not; there is simply no remaining eurozone on which the banknote liability could be dumped. All former eurozone member states would need to compensate their citizens for the loss of euro banknotes, and the banknote gains outlined above would disappear. Therefore, eurozone departures come with a first mover advantage, a point that may accelerate the currency union's dissolution.

5. Conclusion

The present paper made tentative steps toward an analysis of eurozone collapse and departure scenarios. This venture was motivated by increasing economic and political tensions within the currency union and also by a shortage of relevant papers. While central bankers probably have departure plans in their desks (and emergency banknotes in their cellars),

there exists a gap in the academic literature regarding the dissolution of and departure from the eurozone. Two main results emerged, which may be summarized as follows.

First, as the TARGET2 mechanism protects only central bank assets but not central bank money, it is unsuited for inhibiting speculative attacks. In the final stage of a run on a eurozone member state, banks in that state will not get central bank money through the interbank market, and the ECB Governing Council is essentially confronted with the same choice as was the Bundesbank in 1992: either they give up control of the monetary base, or the attacked country must depart and devalue. In this respect, there is no difference between the eurozone and the former ERM. An alternative would be reintroducing capital controls. Such a measure, admittedly, would enhance incentives to withdraw from the eurozone, break the single market, and set Europe's capital markets back to the 1980s.

Second, NCB exit gains and losses are associated with five balance sheet items, namely, TARGET2 claims and liabilities, banknote claims and liabilities, and banknotes in circulation. An NCB's overall gain, positive or negative, equals the sum of its TARGET2 liability, its banknote liability, and banknotes in circulation, minus the sum of its TARGET2 claim and its banknote claim. However, the banknote component produces a gain only if a country departs from the eurozone and dumps its respective liability on the remaining member states. Such a country realizes a first-mover advantage.

Combining the two previous findings suggests a novel interpretation of TARGET2 as not effectively deterring speculative attacks but determining the bargaining positions of withdrawing countries. The mechanism discourages strong eurozone members from departing, but encourages weak members to do so.

In the preferable scenario of an organized eurozone dissolution, the first-mover advantage disappears, and the member states will hopefully negotiate a fair settlement that takes account of TARGET2 and banknote balances, because both items are covered by NCB assets. Assuming partial compensation, strong eurozone members would exchange one-shot losses for permanent crisis assistance through the existing bailout schemes and the ever closer debt and banking union (EDIS), whereas weak members could obtain start-up assistance. Dissolving the eurozone means recognizing that its design contradicts the "impossible trinity", an undisputed concept in international economics. With heterogeneous states and disparate fiscal policies, free movement of capital, fixed exchange rates, and unified short-term interest rates do not fit together.

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