How to abandon the common currency in exchange for a new national currency[1]

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FIRST VERSION; COMMENTS WELCOME

Abstract

The question how to leave a currency union has become an important economic issue during last few years. *Asymmetric shocks*, low growth and increasing federalism have left several countries of the Eurozone more open to considering whether the economic and political costs associated with

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euro membership have become too high. Having an individual currency can produce benefits to a country compared to a common currency of a monetary union, particularly if the single monetary policy proves unsuitable for the macroeconomic development of the country in question. However, uncertainty relating to the costs of an exit can discourage political leaders from taking decisive steps towards an exit. This article provides thoughts on how an exit from a modern currency union can be managed. We will show that the costs related to the exit can be controlled, but also that the process includes many uncertainties that the exiting country needs to be prepared for since they cannot be reduced.

Keywords: Monetary union, domestic currency, exchange rate

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1. Introduction

How does a country exit from a modern currency union? This question has risen as one of the big essentially undiscussed topics in economics after the financial crash of 2007-2008 transformed into a sovereign debt crisis in the Eurozone during the Spring of 2010. The closest we have gotten of finding an answer was during the Summer of 2015, when Greece was threatened with expulsion from the Eurozone.[3]

During those Summer weeks it became clear that pushing Greece out of the Eurozone, or *Grexit*, would be a highly disruptive event. The decision of the European Central Bank (ECB) to freeze the Emergency Liquidity Assistance, or ELA, led to cash withdrawal restrictions and extended bank holidays as the commercial banks of Greece experienced bank runs. Within a period of just few

[3] This idea was mostly forwarded by Wolfgang Schaüble (Spiegel 2015).

days, a modern financial system ceased to exist in Greece and the country reverted to a pure cash economy. The real economy plummeted,[4] but mostly due to the resilient and amicable ethos of the Greeks, social order prevailed. Eventually, the “renegade” government of Greece succumbed under the demands of the Troika,[5] ELA limits were raised and the Greek financial system started to recover albeit slowly.[6] The capital controls put in place were to remain well over a year with only gradual reduction of restrictions. Formal unity of the Eurozone was maintained, but the Greek crisis made it clear that euro membership certainly is not irreversible, even though The Maastricht Treaty contains no clause of exit from the single currency. Only one question remained: can it be achieved without major financial and economic disruptions induced by markets and/or euro area institutions?

The Eurozone was initiated in 1999 under the Maastricht Treaty.[7] It was not preceded by any agreement on fiscal or political union but was apparently seen by many as gradually leading to one. The Euro was, however, not adopted by all countries who signed the Maastricht Treaty. Great Britain and Denmark decided not to join, and a further seven EU countries, most notably Sweden, Poland, Hungary and Czech Republic, are more or less intentionally delaying their euro entry by choosing not to enter into ERM II.[8] Particularly since the financial crisis, institutional reform and crisis management have tended to increase the amount of centralized decision making in the euro area, some discussants stressing the need for a fiscal and a political union.[9] The “Brexit” outcome of the June 2016 referendum in the UK cancelled a number of privileges negotiated by David Cameron for

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[4] During the month of July, the GDP of Greece fell by -1.7 percent, while it was still growing in June.
[5] Troika refers to the loan providing institutions, the ECB, the EU nations and the International Monetary Fund (IMF).
[6] However, the situation in Greece cees to be far from normal (The Economist, March 12, 2016, Galbraith 2016a).
[7] Maastricht Treaty was signed in February 1992. It came in to effect in November 1993. Several members have signed the Treaty since.
[8] In ERM II, the exchange rate between currency of an EU country and euro is allowed to fluctuate only within set limits.
[9] See, e.g., http://www.bloombergview.com/articles/2015-07-27/europe-s-growing-desire-for-political-union.

the non-euro EU members, making a political or transfer union involving also non-euro countries a more realistic outcome as an alternative to the Eurozone-only union.

Historically political unity has determined the success of monetary unions (King 2016).[10] When political unity has dissolved, the monetary union has been very likely to follow (Bordo and Jonung 1999, Einaudi 2000). The circumstances that change the political will in a country can obviously have many causes and, in general, there seems to be no clear *ex ante* economic motivation for a country to exit from a MU (Rose 2007). The economic consequences of the joint currency may prove less attractive than initially expected.[11] Domestic cost adjustment may prove slow or politically contentious, forcing unemployment to rise. The monetary union (MU) itself may conduct monetary and other policies which hurt sound economic growth at least in portion of member countries. Such concerns could either manifest themselves as acute economic difficulties or as indications that future growth is threatened. This could cause confidence and trust in the joint currency to decline among the population and its parliamentary representatives, even precipitously, requiring any country wishing for a stable economic future to exit. Commitment to eventual political union may weaken, either as a consequence of domestic or foreign developments.[12] This may happen as a consequence of weak economic prospects or could arise from a lack of interest in acquiring new political masters. Furthermore, existing political or monetary unions may break up, forcing countries to consider reverting once more to domestic fiscal and monetary policies.

[10] Except the break-ups of the historical currency unions and that of Czech and Slovakia, one should mention the break-up of the peso from the currency board with the US dollar in 2002. The potential future break-ups include the Scotland from the British pound, the break-up of Catalonia from Spain and hence from euro, and Puerto Rico from the US dollar.

[11] The trade creation effect argument offered by Rose (2000, 2001) and Frankel and Rose (2002) for encouraging small European economies to initially join the euro has by now been discredited by the evidence (Havránek 2010). On the contrary, a study by the Centre for European Reform 2015 has argued that the euro was pointless. Neighboring countries outside the Eurozone have, in fact, been the subject of more trade and cross-border investment creation than the Eurozone member countries.

[12] In this respect it may be interesting to see how the treatment of Ireland and particularly Greece by euro area authorities might affect the commitment of these countries to submit to stronger union powers over domestic issues.

The break-up of the Czechoslovakian currency union in early 1993 is a recent example. Because of the political disunity that followed the breakup of the Soviet bloc, Czechoslovakia was first divided into two independent countries: the Czech and Slovakian Republics, but they retained a common currency, a custom union and a common labor market (Fidrmuc et al. 1999). However, only little over month after the political breakup, the monetary union fell apart. Despite the sudden dismantling of the single currency, the break-up of the Czechoslovakian monetary union was smooth with no major setbacks for the real economy.

The breakup of the Habsburg Empire in the 1910s is an example of a not-so-successful disintegration of a single currency. The Habsburg crown had been the legal tender of the empire and Vienna's banks had provided financial services through a network of local branches (Gross and Gummer 2014). The collapse of the empire led to the collapse to one of continents largest banks, Vienna's Creditanstalt, causing a European-wide financial crisis. The Empire had accumulated high levels of war debt, which was distributed among the member states by the physical location of the certificates after the breakup. Countries dealt with the debt through inflation and austerity. New currencies were stamped in haste and without international coordination which led to a rise in illegal notes and inflationary contagion as newly formed governments exported their inflation over new borders by illicit currencies.[13] The uncoordinated breakup of the Habsburg currency union is a prime example on how not to conduct exits from a common currency.

In this article we seek to answer the question: How can a country exit from a modern currency union without major economic disruptions? Since some disruptions can be caused by

[13] Currency stamping was uncoordinated, which opened a possibility for a form of an *inverted* carry-trade. Because countries stamped their currencies in different times (starting from Yugoslavia in January 1919 and ending to Hungary in March 1920), governments were able to export the domestic inflation created by extensive money printing to other countries of the empire by providing illicit currency of the former empire (Gross and Gummers 2014).

unforeseen MU political or market reactions to the exit, foolproof methods do not exist. Nevertheless, we believe that general rules to minimize costs can be established.

The exiting country faces several economic and political challenges. The most important of them are: maintaining the functioning of the payments system, re-establishing an independent central bank with a credible monetary policy, providing domestic financial institutions with sufficient capital and liquidity in the new currency and managing relations with the rest of the bloc. We will argue that with careful planning all these and other challenges can be controlled and their risks minimized. However, it will also be shown that some parts of the exit are challenging in a sense that their outcomes cannot with certainty be mitigated even by a proactive strategy. What this means is that a country planning to exit needs to be ready to take "things as they come" and react to unforeseen developments when (if) they arise.

The article is structured as follows: In Section 2 the economic advantage of flexible exchange rates is equally briefly reiterated. Section 3 presents an analysis of how a single member could leave the currency union, and Section 4 concludes.

2. Why the benefits of an exit (and flexible exchange rates) may outweigh the costs

Where do the benefits of an exit from a monetary union come from? Basically, they arise from the adjustment mechanism that the foreign exchange rate provides to the incomplete adjustment mechanisms of domestic markets. Milton Friedman (1953) has stated, "If internal prices were as flexible as exchange rates, it would make little economic difference whether adjustments were brought about by changes in exchange rates or equivalent changes in internal prices." It is widely acknowledged, however, that this condition is rarely fulfilled. In imperfect markets with unsustainable policies, the results of an inappropriate, but fixed exchange rate can be devastating.

In a fixed exchange regime, any major idiosyncratic economic shocks to the production of a country have to be met by explicit domestic policy action and adjustments in the country concerned. Such corrective policies are inevitably slow relative to the immediate adjustment a flexible exchange rate mechanism offers. The two main policy mechanisms for adjustment in a fixed exchange rate regime are adjustments in internal production costs (internal re- or devaluation) and changes to internal taxation rates (fiscal re- or devaluation). Reducing wage costs or explicitly deciding on other significant changes in the income distribution, as necessary in an internal devaluation, is politically hazardous in most countries. As a result, an internal devaluation can often be achieved only through a lengthy and painful process of wage adjustment through unemployment.[14] Even when finally achieved, the resulting increased long-term unemployment reached before the adjustment is done may, through hysteresis effects, permanently have reduced the supply of labor with its various adverse consequences (see, e.g., Machin and Manning 1999). Another drawback of the internal devaluation process is its inability to reduce the nominal value of long-term financial debt causing debt deflation, except through debt restructuring or defaults. In external depreciation, the value of most debts will go down, except for the external debt. Value of exports will also increase as will the money value of imports in domestic currency meaning that some spending that would have gone to imports will flow into the domestic sector (Galbraith 2016b).

The main benefit of a flexible exchange rate especially to a small open economy is the rapid adjustment to external shocks with a number of adverse side effects minimized. Herrmann and Jochem (2013), for example, found that the current account imbalances were restored more rapidly in

[14] Despite the high capital intensity of most advanced country exports, the share of wages in the costs of exports is not small when one takes account of the labor costs in all the various stages of the production process. To restore competitiveness by means of wage reductions could necessitate wage cuts in the magnitude of tens of percentage points. Such reductions cannot be expected to be reached rapidly or easily outside theoretical models.

non-euro-zone member countries in 1994-2011 than in the euro-member countries.[15] To maximize welfare and to control the effects of economic shocks to output and unemployment, rapid and credible adjustment is paramount. Similarly to other price mechanisms, a flexible exchange rate acts as an invisible hand, optimizing resource allocation while generating sustainable structural changes. This is particularly important for small open economies which tend to be specialized in few export industries, which makes them particularly vulnerable to external shocks. The less diversified their production is, the more vulnerable they are. Floating exchange rate is of course not a totally riskless system. There is, for example, the possibility of overshooting of the exchange rate, where the nominal exchange rate abruptly appreciates usually due to increase in the interest rate (Dornbusch 1976). This may be a problem especially in small open economies, but in general flexible exchange rate is likely to bring undisguisable and imminent macroeconomic benefits.

The benefits of a MU include reduction of exchange rate risks that mostly affects consumers and smaller firms and the access to MU wide financial markets of smaller firms.[16] These benefits can be especially palpable at the firm level, but these *microeconomic* benefits are secondary at the national level. Economic policy needs to be dictated by the few national factors, including international competitiveness and the speed which the domestic economy is able to recover from idiosyncratic economic and financial shocks. Both of these factors are crucial for the long-run economic growth potential and thus for the the debt-sustainability of a sovereign state. That is why these *macroeconomic* factors must out-weight the otherwise important microeconomic benefits if they become threatened by the MU membership.

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[15] The study by Herrmann and Jochem (2014) concluded that in non-eurozone countries, half of the potential current account imbalances were recovered within a year. The eurozone countries recovered only 24% of their imbalances during the same time frame.

[16] Larger firms can easily use different hedging methods against exchange rate risks and they may also seek funding from the international financial markets with relative ease.

3. How to leave a single currency

A sovereign state can always decide to adopt its own currency. Formally this happens, when government makes a domestic currency the only *legal tender* within a country, prompting the local businesses and citizens to settle transactions and taxes with the domestic currency. In practice, exit occurs when the national central bank announces that it will not any more exchange any MU currency and national currency (NC) accounts at a rate of 1:1 and will settle only domestic bank deposit transfers at 1:1 ratio. Implicit in this announcement is that MU banknotes will not be domestic legal tender. After this, markets will immediately start pricing domestic bank deposits differently from (unaffected) MU currency deposits, just like what happened when the ruble union and the Czechoslovakian monetary unions fell apart in 1993 (Pomfret 2002; Nordvig 2014b).

This instantaneous and potentially large change in price creates the possibility of rapid and sizable capital movements. The instantaneous nature of the change also runs the risk of the failure of the payment and domestic financial systems. These potential problems, in turn, create a need for careful and confidential planning in advance of any exit decision. While any exit requires that domestic decision-makers assert that the value of further MU membership has become negative (political will), this does not by itself guarantee low exit costs. Those civil servants and experts the current government listens to will, before any exit decision is taken, have to assure their masters that the requirements for a successful exit can be fulfilled. These requirements eventually determine the costs of an exit.

When assessing the costs, three questions rise above others:

1. Can the exiting country guarantee the functioning of the payment system during the transition and can it re-establish an independent central bank?

2. Is there a possibility of economic and political retaliation in the part of the remaining countries and/or authorities of the MU?
3. Can banks, companies and governmental entities in the exiting country remain solvent and liquid during the adjustment period?

We discuss each of these in turn. Some technical issues related to assessing and addressing these questions are discussed in section 3.4.

3.1 Payment system and the central bank

Undisturbed functioning of the payment system is crucial for a successful exit. The payment system enables both internal and external commercial exchange and the paying of wages, pensions, etc. In the ideal situation, new currency would also be at hand during the time of the exit, but this may not be a plausible scenario, because it may not be possible to legally order the new cash before Parliament has decided on the change. As long as the cash MU currency held domestically are indistinguishable from those held abroad, they will be similarly priced.

A very basic requirement for exit to be low-cost is that country has its own domestic payment system, that is, a real-time gross settlement payment system (RTGS). In the vast majority of cases, sovereign nations, whether in a currency union or not, maintain a domestic payment system, because it enhances sovereignty especially during international financial crises and/or during severe political, economic or financial crises within the MU. If, however, country does not possess a domestic payment/clearing system, changing to a new currency could lead to a situation where payments could not be made, at least within the electronic payment system (as there would be none). In this case, the country planning to exit would face two primary options: it could either start to use another existing currency with an existing payments system or create a parallel currency system that includes the MU currency and the new currency to be created. The latter option would require active planning with the MU authorities and (very likely) capital controls. If these alternatives are unavailable or politically infeasible, domestic banks will have to construct a new settlement system, interim handling domestic payments in less efficient ways.

There are few historical examples of countries that have managed without functional payment/clearing system for an extended periods of time. A fairly recent example from a developed economy is the banking dispute in Ireland in the year 1970, when the Irish economy operated without commercial banks for a period of six and a half months (Murphy 1978, Martin 2014). The commerce and transactions were conducted using cash and (primarily) cheques. Local publicans and retailers assessed the creditworthiness of citizens. Bank of Ireland provided credit lines for importers and exporters directly. Although some disputes did arise, especially among insurers and pension funds, the bankless period surprisingly did not lead any major disruptions and the Irish economy actually grew during this period (Murphy 1978). Example of Ireland shows that it may be possible to operate a modern economy without a functional banking system, at least at the very basic level and for a limited period of time. This extreme option should, however, be the absolute last option as it poses several threats for the sufficient operation of any national economy.

Relying on cash and/or scrip during exit requires that they are at hand or at least can be manufactured quickly after the decision to exit. As mentioned above, it may be legally impossible to obtain new currency notes before formal decision to exit. If, in this case the government wishes to use domestically held MU cash as (temporary) domestic cash, it will have to be immediately stamped to ensure its re-pricing to the national currency rate. However, stamping may become a problem for three reasons:

1) notes are likely to be property of the central bank of the MU,

2) stamps need to be both easily recognizable and difficult to forge, especially if new (stamped) scrip is issued or if the new currency is expected to appreciate against the MU currency, and
3) stamped MU notes could still hold nominal value in the MU (outside the leaving MU country)

The first condition can be somewhat relaxed, if some portion of the MU notes will have been allocated to the exiting country through its central bank. In this case, it can be argued that this portion of MU notes is under the sovereignty of that country, and can be converted through stamping to the new currency. Still, there is no guarantees that MU authorities will view stamping as a mean to convert legal tenders of the MU of legal tenders of other countries (condition 3). If they do, MU authorities are likely to demand for the imbursement of the nominal value of the stamped notes. The second condition basically requires that the stamps are designed and ordered beforehand. If temporary new scrip is issued as a medium of exchange, it should also be stamped to avoid forgery. Stamping could create a logistical problem, because modern cash dispensers do not work if they do not recognize the bills. Thus, even with stamping, cash dispensers would need to be reprogrammed. This is a task that is likely to require some weeks. In the meantime, other forms of disbursing the cash to public should be used. In addition to commercial banks, retailers and, e.g., post offices could be used to disperse the newly printed scrip against IOU:s of citizens and firms, which would be backed by the central bank (for example withdrawal of fixed amount of scrip per person per month) to ensure that distributors do not suffer losses from uncovered scrip. The third condition requires that capital and currency controls are issued.

The seriousness of the problem of obtaining the cash notes during an exit will vary between countries depending on the extent to which retail payments are made using cash and on the ability of the banks and financial authorities to operate a payment system under the new currency. In an increasing number of countries even retail payments are made using cards and electronic payments. In any case, the new currency notes need to be ordered at latest immediately after the Parliament has decided on the change of currency. This process can be shortened, if the appearance of the new currency can be planned beforehand.

Exit requires that banks are legally forced to redenominate, with immediate effect, at least parts of their balance sheet from the MU currency into the new national currency. The redenomination will be at the initial formal exchange rate which probably will be one MU currency unit for one new national currency unit or 1:1.[17] This determines the new values of the bank balance sheet items (for instance, the amount of deposits available). The structure of the IBAN (International Bank Account Number) is not related to the currency used, so the account numbers of citizens and firms of the exiting MU member could be used after the exit. However, a swift redenomination of domestic deposits and assets held in electronic form to a newly invented currency could prove to be time consuming. How easy the redenomination is, depends on how idiosyncratic the software banks use is. There may not be a system in place that could do the redenomination automatically, in which case the value of each deposit would need to be changed manually. This would be likely to take some weeks or months and would require extended bank holidays. In the worst case manual redenomination is not possible requiring a systemic change, which could take several months to over a year. In this case, exiting country should consider of temporarily implementing an existing currency, which is used by a country or a group of countries whose economic and institutional features are closer to those of the exiter than of the MU.

The new currency needs to be backed by a central bank that is independent from the system of central banks of the MU. At a minimum, this requires changes in legislation and in the leadership

[17] Since any other ratio would imply public commitment and legal backup for either a devalued or revalued NC.

of the central bank. However, it may be the case that the national central bank is an integral part of the system of MU central banks, and separating it quickly from the system of MU central banks may be impossible. In this case a new central bank is needed. It may include a majority of the staff from the old central bank as long as this does not cause problems for it to function independently from the MU system.

Regardless of the level of institutional changes, some level of cooperation is necessary between all central banks, thus also between the departing national central bank and the remaining central banks in the currency union as well as with the hub central bank of the MU, such as the ECB or the FED. In cases where MU membership is primarily economically and not politically motivated, such cooperation would no doubt be seen to be in the best interest of all parties concerned. In the Eurozone and in the USA, the system has been built with a hub and spoke structure (see Figure 1), where the local central banks are responsible for settling bank transfers, currency circulation and monetary operations with the banks, companies and citizens of their own hub area (member country in the Eurozone, local FED area in the USA). The monetary union hub central bank in turn is responsible for transactions that transfer money from one spoke to another via systems such as TARGET2 in the Eurozone and Fedwire in the USA.

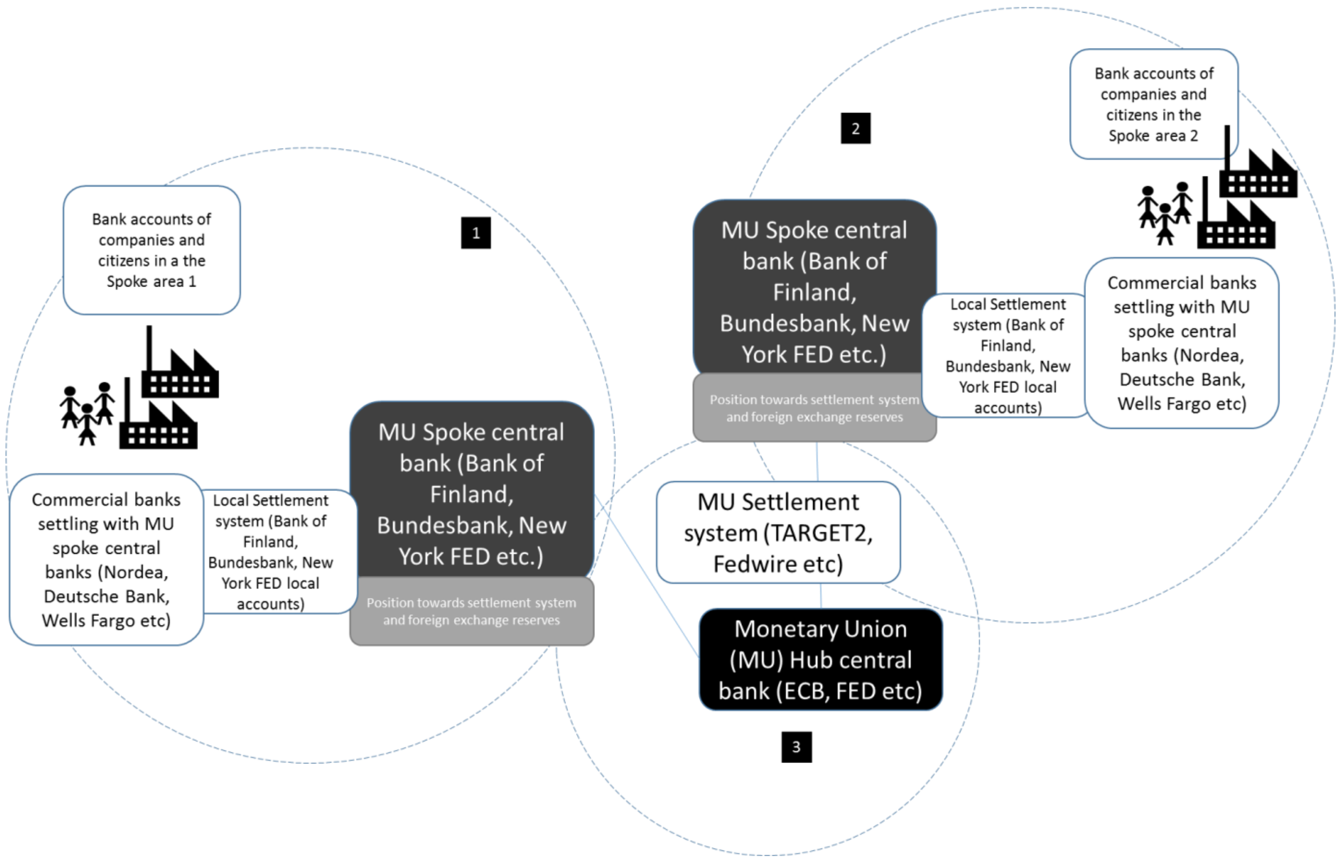

Figure 1: The settlement systems of monetary unions

In any case, central bank clearing through any joint system with other MU counterparts (in the case of euro the TARGET2 system) will need to be renegotiated by the exiting country and its central bank. The domestic central bank will have to adopt or carve out a new (actually pre-MU) clearing system, most likely based on mutually agreed balances with other central banks (both MU and outside ones).

Central bank clearing of banks' domestic transactions will continue as before with the central deposit accounts if a domestic clearing system has been retained in parallel with the MU one. If domestic systems have, unwisely, been terminated banks must be tasked with creating a new one while the central bank needs to help fund the greater float.[18] This is likely to take some time, during which interbank domestic payments clearing remains slow (and costly to both banks and customers). Clearly, involved banks and their clients have substantial economic incentives to ensure that the provision of payments services rapidly returns to normal. Banks' transactions clearing with non-MU counterparts will also continue relatively unchanged, as long their pricing can be based on a floating exchange rate and not on an artificially dictated fixed ratio. Clearing with MU counterparts will, after exit, proceed in the same manner as presently clearing with other banks not belonging to the MU, e.g., using other mutually agreed clearing arrangements than the joint MU one.

The new local currency will be technically recorded and transferred either as balances in domestic commercial banks' deposit accounts or, in the case of the commercial banks themselves, in the central bank deposits (reserves) and, alternatively, in the form of physical coins and notes (new banknotes or stamped old monetary union banknotes). The domestic banks will need to either redenominate the currency union entries to local currency at 1:1 ratio, or alternatively, establish a parallel registry for domestic units independently from the existing ones. However, the first alternative is the most likely one, as countries leaving a monetary union are likely to lose their ability to locally create and transfer monetary union currency such as euros.

3.2 The possibility of economic and political retaliation

[18] Interbank clearing difficulties may be at least partly circumvented by customers using agreed intra-bank payments in conjunction with accounts at several banks. Thus, parties to a payment may agree to settle in a mutually agreed bank where they both have accounts. As long as the accounts are provided with sufficient funds, the payment will remain internal to the bank and therefore unproblematic from a settlement point of view.

If, by leaving, a country creates a dangerous prejudice for other countries to leave a MU and/or if exit is considered to lead to a disintegration of a wider politically agreed union, the exiting country may face political and/or economic retaliation. In extreme cases, this could even take a form of military pressure from the members of MU. While such extreme measures are unlikely, at least in modern democracies, other less extreme measures are still possible. Such measures may include trade blockade or expulsion from international political contracts and/or from decision making bodies of the MU.

In general, before any exit, it lies in the interest of the MU to stress both the technical and the political difficulties encountered when leaving the MU. Such stress may include active measures to discourage leaving.[19] Both before and after an exit, the primary MU strategy is likely to stress the resilience of the remaining union as well as the advantages of remaining, that is, the disadvantages of having left. The authorities of the MU may therefore be challenging cooperation partners for the exiting country, at least for a time and especially in dealing with small member countries. They may try to obstruct or hinder the convertibility of the new currency of the exiting member. They may require that several political contracts with the remaining MU will be renegotiated with less favorable terms for the exiting country. Some contracts may also be terminated and country can be expulsed from the common market of the MU, if that is possible within the treaties of the MU.

However, this resistance is likely to be temporary as the main goal of MU authorities is to stop the possible *contagion* effects. Such effects may arise from the impact on an exit to the MU

[19] The Greek crisis during the summer of 2015 provides a recent example of this. During the crisis, ECB froze the emergency liquidity assistance (ELA) program that provided liquidity for the Greece's banking sector under a run. This led to extended bank holidays and social instability thus putting pressure on the Greek government to accept the terms of the creditors (see Wyplosz 2015). The Brexit debate, while concerning an exit from the EU and not the MU, also shows the willingness to at least consider strong pressure (abandoning cooperation on migration issues, reducing the scope of free trade with a non-EU member, etc.).

reputation for credibility, accountability and adherence to democratic principles as well as expectations of member states on the political and economic costs of remaining in the MU and the risk of a MU-wide banking crisis. As usual in relations between public authorities, resolving the technical and legal issues will crucially depend on respective political wills and the resulting guidance to professional staff.

Limits on MU sanctions will be determined both by the economic situation of the exiting country and by the consequent reputational effects on MU authorities. This has three implications:

1) Sanctions will not in practice be arbitrarily large and long since MU reputation and the perceived advantages of MU membership may be negatively affected by overly strong sanctions.
2) The exiting country can reduce the likelihood of sanctions by active communication among remaining MU members of the reasons for the decision.
3) If the exiting country can gain support from likeminded countries, for instances a Nordic group in the case of Finland, reactions of the MU may be muted.

One should expect a substantial difference between the exit process of a large and a small country. Large countries may trigger major indirect systemic exit effects, which have to be taken into account by the MU. Their exit is therefore likely to result in more cooperative solutions and balanced agreements than that of small countries. On the other hand, whilst small countries in the MU may not enjoy the same level of political power as large ones, many of their important issues (bank liquidity and solvency, sustainable economic and currency policies) could prove easier to handle even without MU cooperation.

In any case, exiting countries should seriously consider negotiating with the remaining MU already before any exit decision. This strategy of early transparency, however, does bear some very substantial risks. If there is no exit clause in the treaty of the MU, other members of the MU may try to block the exit. Even if there is an exit clause, member states displeased with the decision to leave may leak the information about the exit planning, which can lead to grave market reactions and to the early onset of capital controls. If MU officials are not informed beforehand, the officials of the exiting country should make very serious efforts, immediately after the public exit announcement, to both explain the reasons for their decision and offer joint efforts/working groups to handle any particular problems arising for the MU. In case of a cooperation breakdown, the exiting country will be forced to introduce stricter capital and market controls than otherwise. This would be costly.

3.3 Can banks, companies and governmental entities in the country remain solvent and liquid during an adjustment period?

Exit will inflict major economic costs, if it leads to insolvency or illiquidity of the banking sector and/or to insolvency of the corporate sector or government entities. This will naturally raise as an issue only if the new currency is expected to depreciate against the currency of the MU and other major currencies. In this case the foreign debts owed by domestic companies, banks and local government could increase in value leading to insolvencies and bankruptcies pushing the country into *balance sheet recession*. In the case of expected depreciation during an exit, the major question regarding the insolvency and illiquidity issues is do banks, government entities or corporate sector hold a large proportion of contracts which stipulate that disagreements are handled in foreign courts under the interpretation of foreign law.

The law of money, or *lex monetae,* establishes that, because a sovereign state has the right to regulate her currency under international law, the creation and substitution of the national unit of payment are entitled to recognition by other countries including their courts and official bodies (Proctor 2010). In practice this means that sovereign nations have the right to redenominate financial contracts they are party of into the currency, which is the legal tender in a country in question.

However, when a country exits from a currency union, there are two lex monetaes: the one of the departing country and the one of the MU (Proctor 2010, Nordvig 2014a). This creates a situation, where both the local law and jurisdiction are likely to determine the ability of country leaving the currency bloc to redenominate her liabilities. Nordvig (2014a, p 13-14) summarizes the extensive legal discussion around this issue to two clear-cut options:

1) If an obligation is governed by local law and under the jurisdiction of a country that is leaving the MU, then that sovereign state is likely to be able to convert the currency of her obligations from MU currency to the new local currency through a new currency law.
2) If an obligation is governed by foreign law and jurisdiction, then a country that is leaving the MU cannot change the foreign law, which makes the redenomination more problematic and considerably less likely.

Therefore, both the law and the jurisdiction of a financial contract will determine the likelihood of redenomination (for detailed analysis about controversial situations see, e.g., Proctor 2010 and Nordvig 2014a).[20] Still, even in cases where the obligation is under both foreign law and jurisdiction it can still be redenominated depending on the decision of a foreign court or through multiparty settlement. This is especially so in cases where the solvency of the other party of the contract would become questionable without redenomination. In these cases, it can be more profitable for the respondent (holder of the asset) that the obligation will be redenominated, if failing to do so could lead to major or even 100% loss of the principal. With lex monetae the first court ruling will be crucial as it will be used as the precedent for following rulings.

What the lex monetae implies is that on the liabilities side of the local banks, all deposits held at domestic banks as well as bonds emitted under the country's own law could be legally

[20] For further evidence on how markets are pricing sovereign bond risks according to the governing law of the contract see Nordvig (2015).

redenominated. Bonds or other liabilities emitted under foreign law would remain denominated in the original currency, requiring, however, a new settlement country to be chosen. On the asset side, all loans granted by domestic banks and other domestic investments under the country's own law will be redenominated. Investments and contracts agreed under foreign law would remain denominated in the original currency. Since banks finance their assets with a combination of equity, bonds, covered bonds, hybrid instruments such as CoCo bonds and deposits,[21] the net impact on bank currency mismatch is not obvious. There may be disagreement on whether redenomination in particular cases is allowed, implying that the final impact may be known only after lengthy negotiations between the parties concerned.[22]

The best way to avert the legal scuffles around redenomination is to conduct strict structural and growth-oriented fiscal policies before exit. If the economy of the exiting country is growing and if it is in excellent fiscal condition with good international reputation (no defaults, etc.), the odds of large depreciation after an exit are small. In addition, if country is able to re-establish a credible monetary and fiscal policy after an exit, the foreign value of its newly created currency could even appreciate against the MU currency improving its external funding position.

3.3.1 Solvency and liquidity of the banking sector

[21] A **contingent convertible bond (CoCo)** is a fixed-income instrument that is convertible into equity if a pre-specified trigger event occurs. The conversion improves the solvency of the bank in a crisis situation without a government bail-out, and is therefore a form of bail in bank restructuring framework.

[22] The bond and derivative classes are somewhat problematic, as they can include contracts based on foreign jurisdictions such as English law. Private parties will therefore, over time, have to agree on how they will be handled in each individual case. The settlement of the cash flows can therefore be a question to juridical system outside the country, which can either agree to settle the contracts in the new local currency or demand another local central bank monetary system as the place of the settlement. For example, in the case of a Puerto Rico currency union exit, a New York law contract payoff could be deemed to be settled under NY Fed dollars rather than in the local new currency. Getting a final decision on the places and levels of settlement can take several years. However, in most cases, the investors and lenders could and would have incentives to agree on how to settle their contracts in much quicker fashion.

The distribution of new cash to the population as well as the setting up the national currency (NC) denominated financial structure requires that the financial system remains operational (solvent and liquid) during and after the exit. If it does not, the economy will be likely to face large costs due to a banking crisis. Thus, when exiting, authorities will wish to involve domestic banks in the preparations as soon as possible, at the latest when the exit decision is formally taken and markets are closed. Ideally, banks should be involved already during the secret preparations phase though this has obvious dangers. The risk with this are leaks of the project, which can compromise the whole exit process and force the early enactment of capital controls. Regardless of when co-opted, it is unlikely that banks in the exiting country in all cases will be able to change their internal automated systems in perfect synchronization with the change of the currency regime (see Section 3.1 above). Banks may, for a time, have to manage their internal issues in any way they see fit, including temporarily reverting to manual processing where possible. Indeed, they have very strong economic incentives to rapidly adjust to the changed environment. Since bank-specific non-MU clearing arrangements already exist, the issues themselves should not prove conceptually difficult to overcome. Nevertheless, in case the exiting country has chosen to terminate all strictly domestic payments systems, adjustment to a new currency is likely to be costlier than otherwise. Replicating the systems in place in countries with major trade flows with MU countries is possibly a practical temporary solution.

Exit creates challenges for the banking system on at least three fronts:

1) Bank capital and thus solvency changes as parts of their balance sheet is redenominated in national currency (undisputed domestic law financial agreements) while other parts remain denominated in foreign currency (for instance, some foreign law correspondent account and bonds).

2) Liquidity is impacted as banks initially have only limited amounts of national currency and may be temporarily constrained in acquiring foreign currency (re)funding.
3) Technically, bank clearing and settlement systems have to be adapted to the new national currency and possible automatic transfers from domestic to foreign accounts becomes impossible.

It is therefore crucial that the national central bank ensures the liquidity of the banking system and that some of form audition of the banking sector to cope with the transformation is made before the decision to exit. The exact definition of a foreign account may also become unclear. For example, since as of 2016, there are 19 possible Eurozone countries where euro payments can be made. After the exit, the banks of the some of the countries are clearly less desirable as a destination of settlement MU payments (in the Eurozone: Southern Europe vs. Northern Europe). A typical contract does not specify a fixed country as under MU all MU payments are generally assumed to be equally acceptable for full and final settlement. If there would be a complete MU break up, the increased *redenomination risk* would make stronger member countries clearly preferable spokes for settling MU currency payments as opposed to the weaker MU members.

At the moment of exit, domestic banks will have assets and liabilities to foreign entities denominated either in MU or third currencies. To the extent they are not subject to redenomination, they will create a positive or negative currency position in the banks with immediate impact on their solvency. To offset this, capital should instantly be available for banks in need of it. At the same time, national and MU funding is no more interchangeable but must be sourced in different markets. Domestic markets may, however, not be fully functional immediately on exit.

Thus, authorities need to act pre-emptively to contain any solvency problems in the banking sector. The domestic central bank should provide temporary NC funding (emergency liquidity assistance, ELA) as needed. Sufficient but limited time should be provided for banks to access additional capital, preferably from old or new private owners but, conditionally, from the public sector if necessary. In the latter case, collateralized lending or even partial state ownership could ensure that costs can be later recuperated through resale of the government stake in the bank(s). If this proves difficult, closure or public control of the weakest banks should be considered. A temporary political commitment to ensure bank external funding may be necessary. Any economic policy measure which increases investor confidence in the future health of the economy will help banks as well. If these measures prove to be either insufficient or unsuccessful, capital and currency controls need to be implemented for an extended period to stem to outflow of deposits and capital.

Any problems with short-term NC funding should relatively easily be handled by temporary central bank funding facilities at market rates. The government should nevertheless stand ready to provide domestic banks access to sufficient longer term capital, for a time. Potential emergency capital should be granted against either collateral or ownership claims. Whether existing owners will first have to cover capital losses in adverse situations, before the government steps in is partly a political issue, but investor responsibility is a cornerstone of the market economy. The solvency requirements of the domestic banking sector can also be temporarily relaxed to enable banks to access private capital

The quality of the domestic commercial banks and their clients in the departing monetary union member is of particular importance. A high quality banking system with a low level of nonperforming receivables, high solidity and strong capitalization is able to function after the exit with minimum support from the local central bank. Liquidity may further be strengthened through speculative capital imports, if such are forthcoming. In contrast, a low quality banking system would need to be hedged to a much greater extent with its public authorities, which may even have to prepare for recapitalizations and other support unpopular measures. It is to be expected that the quality of the banking system and the health of the economy are positively related, meaning that a low-growth, low-activity economy is most likely to have a low-quality banking system.[23]

3.3.2 Solvency and currency mismatch issues in the private sector

Private non-bank currency mismatch issues will have to be handled by the relevant private parties themselves. However, to the extent contracts are between domestic banks and domestic customers under domestic legislation, no problems are likely to arise for the bank or for the customer since both can be legislated to be redenominated and settled in the new currency. The largest domestic lending classes are mortgage loans for private citizens and term loans and overdrafts for corporations. These are typically agreed under local law, with local jurisdiction dispute mechanism and the cash flows have in the past be paid under the local central bank settlement area. As above, these can, as a general rule, in the future be settled with the local currency. When the above conditions do not exist, the settlement is less straightforward and may require separate ruling by, e.g., a foreign jurisdiction, potentially under foreign law interpretations. This may lead to private agreements on how and where the contracts will be settled.

Many private entities, including banks and export firms, may have hedged external position meaning that they may hold derivate instruments. Generally, the flows from derivatives tend to be substantially smaller than the flows in debt, equity and other categories, and their assets and liabilities also tend to net out to a national or even at the sectoral degree (Nordvig 2014a). As a precautionary measure, regulators and policymakers should take the possibility of substantial firm-

[23] Finland at the moment shows that such a combination is by no means necessary, only probable.

or sector-related derivative losses into account, when planning for the exit.[24] This will require to setting up domestic versions of the MU clearing and benchmark interest reference rates.

3.3.3 Solvency of the government entities

Government and local entities may have external liabilities in the form of bonds and derivatives. Before any exit decision, these needs to be audited to see under which law and jurisdiction they are, so that the ability to redenominate them is known beforehand.

3.4 Issues of public governance

There are also requirements on how preparations should proceed to help keep down the cost of an exit. These requirements depend on the nature of the exiting country's legal system as well as on the present economic and political situation in the country. The requirements are:

1. Government needs to have and retain sufficient political backing for the exit in the Parliament.
2. Government needs to have the ability to sufficiently rapidly prepare and implement any required changes in laws and regulations.
3. The preparations (preliminary planning) for the exit need to be conducted in secrecy within the government.

[24] There are no detailed database of derivate transactions and contracts as most of them are made over-the-counter (Nordvig 2014).

3.4.1 Political backing

If the government of a country does not have strong support for exit in the Parliament, its ability to push through the change in the currency is negligible. If this support weakens during exit preparations, the result is the same. While this says little about how to get there, it does indicate that there has to be a widespread and serious concern among decision makers with the domestic economic or political implications of the MU. It also indicates that decision makers consider it unlikely that MU measures and developments will improve the situation sufficiently.

While it is pointless to speculate on specific issues that may create such views, a partial dissolution of the MU would certainly require a reassessment of in all member states. Similarly, if domestic voters would come to seriously question the advantages of MU, the political survival of governments could require an exit.

3.4.2 Legal preparation

The timetable and feasibility of a monetary regime change crucially depends on the gravity of the change in laws required. If the return to the national currency requires a constitutional procedure, it often demands a larger majority in the Parliament than the government can master independently. In this case, the political support of virtually all the major parties in Parliament may become crucial. If, however, the regime change requires only a change in regular laws, the change becomes much more easily manageable.

The Parliament must also be able to adhere to the formal constitutional rules for accepting legislation. Provided that the political situation is agreeable, this means that the government has been able to produce (in secret) the required background material and proposals for Parliament.

The legal proposals are drafted by civil servants following general and, in normal cases, public governmental political guidelines. The preparation work may normally require substantial time but could, if necessary, be quite radically accelerated if politically so guided. Given the need for confidentiality, the preparation is likely to be concentrated to a small team of senior civil servants working within the shortest deadlines possible. For parliamentary approval of government proposals to be swift and unproblematic, legal proposals have to be both timely, well drafted and technically adequate. This, as well as the speed and confidentiality requirement, puts great demands on those few high-level public servants who are likely to be charged with the project. Probably the most decisive factor between smooth and trouble-ridden exit from a MU lies with speed that the parliament of a country planning to exit can approve the necessary laws.

Nevertheless, preparations may need to be under way for several days to some weeks before the Parliament is provided with the proposals. This may pose challenges to the secrecy requirement. To be sure, experience from, for example, Finland's banking crisis in the early 1990's as well as Greece's contingency preparations indicate that this is, indeed, possible at least in a situation that imposes imminent and serious economic threat.[25] The better the quality and loyalty of civil servants, the better preparations will run. The larger the majority for exit among politicians, the more likely that decisions will be rapid and temporarily confidential. Optimally this last phase of the preparations work will be done over a week-end. If the week-end is not long enough, bank holidays or capital controls may be temporarily used to buy the required time for parliamentary proceedings. Capital controls may be needed in any case, during the first phase of the adjustment.

It is likely that the exit will break some or several treaties of the MU. This will create a challenge to the exiting country, especially if there is no exit-clause in the treaties and if the country chooses to negotiate an exit agreement with the MU. However, as long as country has dominant

[25] The group working on the contingency plan of Greece, i.e. *Grexit*, also remained a secret for five months until the former Finance Minister (Janis Varoufakis) disclosed the existence of the group (Galbraith 2016b).

jurisdictional power over its own legislation, there is no way that MU can hinder country from leaving, at least through legal technicalities. After an unilateral withdrawal from the MU, sanctions and legality of the exit would be handled in the MU courts, if such exist (Proctor 2010, Galbraith 2016b). This would pose no obstacle for the exit.

3.4.3 Secrecy

Since the value of a new currency is almost certain to change at exit, secrecy is crucial for the planning. The new national currency may be anticipated to initially depreciate for several reasons having to do with the reasons for exit. The domestic economy may be in bad shape, causing lack of trust in the domestic banking system. There may be a generally realized competitiveness problem over the medium term. The government may be seen as unable to correct a longer-term indebtedness problem. If, under such circumstances, there is any suspicion of exit planning, private funds will start flowing to safe havens abroad, causing liquidity problems in the banking systems.

This process is rapid, since transferring money in electronic form only requires a foreign bank account, which at present is normal for all companies with foreign activities. The sums corporations can transfer abroad are also typically relatively large. For individuals, it usually requires that he lives abroad, owns property abroad, is involved in some business abroad or is able to deposit with foreign banks (using, e.g., the FX accounts) or to buy gold. Those individuals who would be able to transfer their funds abroad anticipating an exit tend to be rich. The less-fortunate, comprising the largest part of the population, will try to convert their funds to physical MU currency. Contrary to electronic transfers, which are large but hidden from view, popular bank runs involve individually modest amounts but tend to be very visible.[26]

[26] This was painfully visible during the Greek crisis in Summer of 2015 (Hope 2015). However, it should be noted that Greece is unusually underdeveloped in phasing out bank notes in favor of electronic transactions, but also that the

Because of the risk of anticipated depreciation, it is therefore particularly important that the preliminary planning process is kept strictly secret. This even in the case, when there exists an exit clause in the MU treaties. This may be hard but confidential preparation is a stock in trade of governments (see the examples above). If secret preliminary planning is not possible, preventive capital controls may be the only way to keep the banking system afloat, and capital outflows could also trigger a sovereign debt crisis, if the country has a high initial level of public debt (Kriwoluzky *et al.* 2015). This would render any kind of 'smooth' or low-cost exit from the MU basically impossible. Controls would be needed during the whole planning process, raising exit costs and keeping speculation alive. Bank support measures to ensure the continued functioning of the banking system may also be needed. Market reactions to an exit are usually likely to be difficult to assess precisely and may change with time. Secrecy throughout the planning process is therefore necessary in order to contain market uncertainty.

Conducting open planning for an exit would also contain several other risks, especially if there is no legally accepted way to exit within the MU treaties. Non-confidential preparations would provide the authorities of the MU with ample opportunity to influence, complicate and eventually to terminate any exit planning. For instance, the central bank of the MU could easily issue liquidity restrictions for the banking sector of the exiting country well in advance of any exit.[27] There could also be a strong political and public domestic and foreign pressure against any government considering such an exit option.

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process was well underway as banks started to issue their own debit cards after the closing of the ELA (Galbraith 2016b). Nordic countries, in contrast, have the highest proportion of electronic payments in relation to banknotes in the world and can therefore less vulnerable to bank runs. The possible plans to phase out high denomination bank notes, such as the eventual withdrawal of 500 EUR banknotes initiated in the Eurozone in 2016, will also reduce the likelihood and severity of bank note withdrawal based bank runs.

[27] During the recent Greek crisis, ECB froze the emergency liquidity assistance (ELA) program that provided liquidity for the Greece's banking sector under a run. This led to extended bank holidays and social instability thus putting pressure on the Greek government to accept the terms of the creditors (see Wyplosz 2015). Even long after the renegotiated bail-out III in the Fall of 2015, the cash withdrawal and foreign bank transfer restrictions remained in place.

Exit may also lead to an anticipated appreciation of the national currency if the exiting country has a strong and competitive economy with a current account surplus, a solvent and liquid banking system and good growth prospects. In this case lack of secrecy would lead to possibly large capital inflows, further increasing bank liquidity, pressing interest rates and overheating the economy. Funds could be withdrawn from other member countries of MU increasing political pressure.

Regardless of whether the consequences of speculation are seen as problematic or unproblematic, secrecy of the planning process should be viewed as the primary or first option. If there is an exit clause in the MU treaties that does not ensure a secret planning process enforced by rigorous and heavy sanctions, the country would be better off by preparing the exit unilaterally. Negotiating on the terms of exit openly with the MU members is of course also possible, but in that case capital and currency controls need to be implemented when the negotiations are initiated. Even if there would not be an imminent threat of capital outflows, market reactions are not constant and may change over time for unforeseeable reasons. While economic problems may not emerge, political ones may surprise investors and lead to changes in perceptions.

3.5 International experience

Rose (2007) analyzed the macroeconomic performance of 69 countries or territorial entities that exited from a currency union between 1946 and 2005. He found that there is very little macroeconomic volatility before and after countries exit from currency union. This shows that currency union exits have tended to be that of low economic costs, at least in the short-run. In the light of this only study on currency exits we could find, arguments against exit because of its "massive economic costs" seem completely over-blown. If there are no statistically measurable macroeconomic fluctuations around the time of an exit, there cannot be any massive costs either. However, exits may still lead to political costs, which may also have long-term economic repercussions.

4 Conclusions

The ever-continuing crises haunting the Eurozone have raised the possibility of an exit of one or several countries from the monetary union. In this article we have outlined the challenges that a country considering of leaving Eurozone or some other modern currency union would face. While the challenges faced by a country exiting are large, they certainly are not insurmountable.

The main concern in the exit would be to ensure the functioning of the payment system. Possible retaliatory measures from other members of the MU are likely to be temporary and the possible liquidity problems of domestic banks and corporations can be handled, if system for transferring funds and money can be maintained. If the new currency is expected to depreciate, the ability of the nation to convert loans to the new currency under lex monetae should be checked beforehand. In many cases, the need for secrecy surrounding exit is paramount. This is not to say that exit from a MU could not be done with open discussion, but this would require capital and currency controls raising the costs of an exit.

We have not provided any estimates on the costs of an exit, as they are highly case dependent, uncertain and should be calculated in a country-by-country basis. However, there are many ways to limit the costs both in the MU level and in the country exiting, which we have drafted throughout the text.

In the modern financial system, exit of any country from a MU should not be done lightly. Economic, financial and political interactions between nations are tight causing the possibility of large economic disruptions during and immediately after an exit. These uncertainties can only be diminished, not removed through careful planning outlined in this paper. Despite the relatively large uncertainty related to costs of an exit form a MU, there is also no point staying in a dysfunctional currency union, especially if it threatens the macroeconomic development of a country. In the words of Joseph Stiglitz (2016): “Good currency arrangements cannot ensure prosperity; flawed ones lead to recessions and depressions”. When considering the long-run well-being of citizens of a country, a currency arrangement where a country cannot be prosperous should be abandoned, virtually whatever the cost.

REFERENCES

Athanassiou, P. (2009). Withdrawal and expulsion from the EU and EMU. European Central Bank Legal Working Paper Series no. 10.

Barroso, José Manuel Durão (2012): Speech by President Barroso (of the European Commission) to European Union Heads of Delegation. Annual Conference of EU Heads of Delegation, EUSR and Chargés d'Affaires /Brussels, 4 September 2012.

Bootle, R. (2012). Leaving the euro: a practical guide. Capital Economics, submission for the Wolfson Economics Prize MMXII.

Bordo, M.D. and H. James (2008). A long term perspective on the euro. NBER working paper no 13815.

Bordo, M.D. and L. Jonung (1999). The future of EMU: what does the history of monetary unions tell us? NBER working paper no. 7365.

Capie, F. (1998). Monetary unions in historical perspective: what future for the euro in the international financial system. *Open Economies Review,* 9: 447-465.

Centre for European Reform (2015). Conference report: Has the euro been a failure? Ditchely Park, Oxfordshire, 6-7 November.

Constitution of Finland 11 June 1999 (including amendments up to 1112 / 2011). Unofficial transcript. http://www.finlex.fi/fi/laki/kaannokset/1999/en19990731.pdf.

Dornbusch, R. (1976). Expectations and the exchange rate dynamics. *Journal of Political Economy*, 84(6): 1161 – 1176.

Engler, P., G. Ganelli, J. Tervala and S. Voigts (2014). Fiscal devaluation in a monetary union. IMF Working Paper no. 14/201.

Einaudi, L. (2000). 'The generous utopia of yesterday can become the practical achievement of tomorrow: 1000 years of monetary union in Europe. *National Institute Economic Review,* 172: 90-104.

EuroThinkTank (2015). Suomen eurovaihtoehdot: jäsenyys liittovaltiossa tai Fixit. http://eurothinktank.fi/wp-content/uploads/2015/10/Suomen-Eurovaihtoehdot-J%C3%A4senyys-euroliittovaltiossa-tai-Fixit.pdf.

EuroThinkTank (2014). *The Future of the EMU – The Options for Finland*. Helsinki: Libera.

Farhi, E., G. Gopinath and O. Istkhoki (2011). Fiscal devaluations. NBER Working Paper no. 17662.

Fidrmuc, J., J. Horvath and J. Fidrmuc (1999). The stability of monetary unions: lessons from the breakup of Czechoslovakia. *Journal of Comparative Economics,* 27: 753-781.

Feldstein, M. (1997). EMU and the international conflict. *Foreign Affairs,* November/December 1997.

FFI, Federation of Finnish Financial Services (2008). "Maksaminen Suomessa ja Euroopassa".

Financial Times (2014): How the Euro Was Saved. Big Read, Parts 1-3, May 13th – 15th, 2014.

Frankel, J. and A. Rose, (2002). An estimate of the effect of common currencies on trade and income. *Quarterly Journal of Economics*, Oxford University Press, vol. 117(2), pages 437-466.

Friedman, M. (1997). The euro: monetary unity to political disunity? Project Syndicate, August 28. http://www.project-syndicate.org/commentary/the-euro--monetary-unity-to-political-disunity.

Friedman, Milton (1953). *The Case for Flexible Exchange Rates, published in Friedman's* Essays in Positive Economics, University of Chicago Press, 1953.

Galbraith, J.K. (2016a). The Greek catastrophe after one year. *The European Financial Review*, August 21, 2016.

Galbraith, J.K. (2016b). *Welcome to the Poisoned Chalice: The Destruction of Greece and the Future of Europe*. Yale University Press

Glynn-Jones O. and N. Pryor (2015). Mitigating the risks implications of Grexit. Berwin, Leighton and Paisner LLP, 1.7.2015. https://www.blplaw.com/expert-legal-insights/articles/mitigating-risk-implications-grexit.

Gross, S.G and S.C. Gummer (2014). Ghosts of the Habsburg Empire: Collapsing currency unions and lessons for the Eurozone. *East European Politics and Societies and Cultures*, 28(1): 252:265.

Havránek, T. (2010). "Rose effect and the euro: is the magic gone?" *Review of World Economics* (Weltwirtschaftliches Archiv), Springer, vol. 146(2), pages 241-261, June.

Herrmann, Sabine ja Axel Jochem (2013). Current account adjustment in EU countries: Does euro-area membership make a difference? Discussion Paper, Deutsche Bundesbank 49/2013. http://www.econstor.eu/handle/10419/88441.

Hope, K. (2015). Anxious Greeks pull money from banks amid fears of capital controls. *Financial Times*, June 10, http://www.ft.com/cms/s/0/3d1ad87c-0f76-11e5-897e-00144feabdc0.html#axzz415J4wdtQ.

Keynes, John Maynard (1931), Addendum I to: Great Britain. *Committee on Finance and Industry. Report* (Macmillan Report) (London: His Majesty's Stationery Office, 1931), 190 – 209. Reprinted in Donald Moggridge, *The Collected Writings of John Maynard Keynes*, Vol. XX (London: Macmillan, and Cambridge: Cambridge University Press, for the Royal Economic Society, 1981), 283 – 309.

King, Mervyn (2016). The End of Alchemy: Money, Banking and the Future of the Global Economy. W.W. Norton: New York.

Kriwoluzky, A., G.J. Müller and M. Wolf (2015). Exit expectations and debt crises in currency unions. IWH Discussion Papers no. 18.

Leinonen, H. (2007). Muovista biteiksi – maksutavat murroksessa. Euro ja Talous 4: 27-35.

Mann-Quirici, F. (2005). The endogeneity of optimum currency area criteria – lessons from history of European monetary union. *Journal of Economic Studies,* 32: 387-405.

Machin, Stephen & Alan Manning (1999): Handbook of Labor Economics, Volume 3, Part C, 1999, Pages 3085–3139: Chapter 47 The causes and consequences of longterm unemployment in Europe.
Monnet. Jean (1976), Mémoires, Paris: Fayard.

Meyer, D. (2012). Currency disintegration: Two scenarios of withdrawal. *Applied Economics Quarterly*, 58(3): 171-191.

Murphy, A.E. (1978). Money in an economy without banks: the case of Ireland. *The Manchester School*, 46(1): 41-50.

Nordvig, J. (2015). Legal risk premia during the euro-crisis: the of role credit and redenomination risk. SSRN working paper no. 2608852.

Nordvig, J. (2014a). Currency redenomination and balance sheet effects. http://jensnordvig.com/paper-on-redenomination-risk/.

Nordvig, J. (2014b). *The Fall of the Euro: Reinventing the Eurozone and the Future of Global Investing*. New York: McGraw-Hill.

Rockoff, H. (2000). How long did it take the United States to become an optimal currency area? NBER working paper series, Historical paper 124.

Rose, A.K. (2007). Checking out: Exits from currency unions. *Journal of Financial Transformation*. CEPR Discussion Paper 6254.

Rose, A.K. (2001). Currency unions and trade: the effect is large, Economic Policy, CEPR; CES;MSH, vol. 16(33), pages 449-461, October.

Rose, A.K. (2000). "One money, one market: the effect of common currencies on trade," Economic Policy, CEPR; CES;MSH, vol. 15(30), pages 7-46, 04.

Pomfret, R. (2002). IMF and the ruble zone. *Comparative Economic Studies,* 44(4): 37-47.

Proctor, C. (2010). The euro – fragmentation and the financial markets. *Capital Markets Law Journal,* 6(1): 5-28.

Sinn, H-W. (2014). *The Euro Trap. On Bursting Bubbles, Budgets and Beliefs*. Oxford University Press: Oxford.

SPIEGEL interview with Wolfgan Schaüble – There is no German dominance. July 17, 2015.

Stiglitz, J. (2016). A split euro is the solution for Europe’s single currency. *Financial Times*, August 17.

Takala, K. (2015). Katsaus käteisen käyttöön ja virtuaalivaluuttoihin. Bank of Finland, Payments Council, 17.4.2015.

Wyplosz, C. (2015). The staggering cost of central bank dependence. VoxEU column, 29 June.