CESifo, a Munich-based, globe-spanning economic research and policy advice institution

CESifo Forum

Winter 2016

Volume 17, No. 4

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CESifo Forum ISSN 1615-245X (print version)
ISSN 2190-717X (electronic version)
A quarterly journal on European economic issues
Publisher and distributor: Ifo Institute, Poschingerstr. 5, D-81679 Munich, Germany
Telephone ++49 89 9224-0, Telefax ++49 89 9224-98 53 69, e-mail ifo@ifo.de
Annual subscription rate: €50.00
Single subscription rate: €15.00
Shipping not included
Editors: John Whalley (jwhalley@uwo.ca) and Chang Woon Nam (nam@ifo.de)
Indexed in EconLit

www.cesifo-group.de

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Collapse of the Ruble Zone and Its Lessons

Post-Communist Transition and Monetary Disintegration

Marek Dabrowski*

Introduction

Political and economic changes in Central and Eastern Europe (CEE) and the former Soviet Union (FSU) at the end of 1980s and early 1990s resulted in just two episodes of monetary disintegration. Firstly, the end of Soviet geopolitical control over CEE led to the demise of the Council for Mutual Economic Assistance (CMEA or Comecon) and its quasi-currency – the transferable ruble (TR). Shortly afterwards, the political disintegration of the Union of Soviet Socialist Republics (USSR), Yugoslavia, and Czecho-Slovakia also caused monetary disintegrations. The newly independent successor states adopted their own currencies, however only the separation of the Czecho-Slovak crown *(koruna)* into two new currencies was conducted in and orderly manner, and without major macroeconomic turbulences and trade disruption. This was reminiscent of the monetary disintegration of the former Austro-Hungarian Empire after the World War I when Czechoslovakia was the only successor country thatavoided hyperinflation (Garber and Spencer 1994).

This essay aims to summarise the experiences of the two monetary disintegration episodes, i.e. termination of settlements in TR since 1 January 1991 and the gradual collapse of the Soviet ruble area in 1990–1993. The second section of this paper is devoted to demise of CMEA and TR. The third section describes the collapse of the ruble area in the former USSR based on my earlier publication (Dabrowski 1995). The fourth section analyses macroeconomic consequences of monetary disintegration in the former USSR; and the fifth section examines the policy lessons that can be drawn from both episodes.

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Demise of the CMEA and the end of the transferable ruble

The TR was not a real currency. Instead, it was an accounting unit for the purpose of bilateral trade-related settlements between member countries of the CMEA. This organisation existed between 1949 and 1991 and included the USSR, Bulgaria, Czechoslovakia, Cuba, German Democratic Republic, Hungary, Mongolia, Poland, Romania and Vietnam (Albania terminated its membership in 1961), as well as a number of countries with 'observer' status such as Finland, Yugoslavia, North Korea, Angola, Mozambique and Ethiopia. The TR was used as of 1964.

According to the CMEA's Complex Program of Socialist Economic Integration approved in 1971, the TR was to be also used for multilateral settlement purposes, i.e. trade surplus of country A against country B could be used for imports from country C (Smyslov 1989; Vince 1984). In addition, there was proposal to make the national currencies of CMEA countries convertible to the TR and between themselves.

However, these plans never materialised for a number of reasons. Firstly, in the 'classical' central planning system production targets and trade flows, both domestic and foreign, were determined by the government. The government also executed the state monopoly on foreign trade. Thus enterprises had very little, if any, choice as to where to sell their products and where to purchase their supplies or investment equipment. Secondly, the government administratively determined most domestic prices, which differed substantially both from international prices and between individual CMEA countries. Thirdly, communist economies suffered, to various extents, from permanent macroeconomic disequilibria, which mainly manifested themselves in the form of a physical shortage of goods in both consumer and producer markets (the so-called 'shortage' economy – see Kornai 1980), i.e. repressed inflation. Fourthly, the national currencies of CMEA member states remained unconvertible and convertibility was unrealistic as long as macroeconomic disequilibria and price distortions were in place. Fifthly, exchange rates between TR and national currencies were determined in an administrative

way and did not have any direct impact on domestic prices; differences between transaction prices in TR (or in convertible currencies in trade with non-CMEA partners) and domestic administrative prices were settled in the form of individually determined tax/quasi-tax rates or subsidies.

In short, the TR was only used as an accounting unit to determine net balances in bilateral barter transactions registered on special accounts in the International Bank of Economic Cooperation in Moscow (a CMEA institution). A deficit in one year was to be repaid by surpluses in subsequent years, and took the form of a technical credit in the meantime. It was the subject of a political decision on the inter-state level. In addition, the International Investment Bank, another CMEA institution, used the TR as an accounting unit in its operations with CMEA member countries (bilateral or multilateral investment projects). Interestingly, the TR only applied to trade transactions. Another set of bilateral exchange rates was used for non-commercial transactions and settlements such as, for example, tourist foreign currency exchanges or private transfers.

The above described system of CMEA trade was terminated at the end of 1990 as a result of political and economic changes in the region. As of 1 January 1991 CMEA member states decided to replace (i) the artificial CMEA prices with world market prices; (ii) the TR with convertible currencies; and (iii) inter-governmental trade protocols with decentralised trade decisions on the enterprise level (Rosati 1995). These changes eliminated previous differences between intra-regional trade and trade with other partners, for example, countries of the European Economic Community (EEC). In countries that had already launched market-oriented reforms and introduced the convertibility of their currencies for export and import purposes (Hungary, Poland, Czecho-Slovakia), enterprises could decide whether and whom to export to or import from.

The termination of the CMEA trade regime generated a negative output shock for CEE economies, in addition to the shock resulting from other macroeconomic, structural, and institutional changes brought about by the transition process (Rosati 1995; Gacs 1995). Its cumulative size depended on the previous exposure of a given country to CMEA trade,[1] the product and price structure of that trade and the ability to quickly reorient trade relations to other partners (in the first instance, the EEC/EU). The shock was largely related to two factors – the loss of an export market (several goods exported previously to CMEA partners proved uncompetitive on a world market) and the deterioration in terms of trade (Soviet oil and gas was sold to CMEA partners below the international price level).

It is not analytically easy to disentangle the effects of terminating the CMEA trade regime from the subsequent disintegration of the USSR, output decline in the USSR and FSU countries (which cut demand for imports from former CMEA countries), and transition-related domestic factors, so all existing estimates should be treated with caution. According to Rosati (1995), GDP losses related to collapse of trade with the USSR in 1991 varied between less than one-third of the total GDP decline in Czecho-Slovakia and over a third in Bulgaria, and were negligible in Romania.

With the benefit of hindsight, one can argue that the collapse of the CMEA trade regime was unavoidable because it was incompatible with the new political and economic realities of post-communist transformation. Furthermore, it can be seen as a kind of Schumpeterian 'creative' destruction that, despite its initial price, the CMEA trade regime allowed and speeded up trade reorientation towards EEC/EU, internal structural and institutional changes and opened the door to CEE membership in the EU in the decade to follow. Eventually, strong intra-CEE trade relations reemerged within the Single European Market and trade relations between CEE and FSU were rebuilt on a new market basis.

The TR never played an active role in intra-CMEA trade arrangements and its termination should be considered as a change of trade regime, rather than an episode of monetary disintegration.

Collapse of the Soviet ruble

Economic and political preconditions of the common currency

The rationality of a common currency for a given territory can be discussed from both an economic and a political point of view. The theory of an optimum currency area (OCA) developed by Mundell (1961) and

[1] According to Rosati (1995), Bulgaria was the most dependent on CMEA trade, Poland – the least (in terms of share of CMEA trade in total trade).

McKinnon (1963) analyses the economic conditions under which a common currency can function effectively. According to this theory, a major challenge to a common currency area (CCA) may originate from asymmetric (idiosyncratic) shocks, which affect various parts of this area in an uneven way. In the absence of exchange rate flexibility between those parts, there are two possible ways of adjustment: (i) *via* labour and capital mobility, or (ii) *via* fiscal transfers.

Looking at the former USSR through the lens of OCA theory, one can conclude that it remained very vulnerable to asymmetric shocks due its large and diversified territory and its central planning system. In particular, socialist industrialisation led to the excessive territorial specialisation of oversized and internationally uncompetitive production units. In terms of response to asymmetric shocks, the free mobility of goods, labour and capital never existed in the former Soviet economy because the allocation of resources depended on central planning and administrative decisions. Furthermore, long distances and weak transportation infrastructure made the smooth internal movement of production factors technically difficult and costly.

Thus, internal fiscal transfers were the only remaining adjustment tools in case of asymmetric shocks. For example, when international oil prices increased sharply in the 1970s the Russian Federation (RF), Turkmenistan and Kazakhstan (who were major oil and natural gas producers) stood to become the potential winners, while other Soviet republics were the potential losers. However, the Soviet authorities decided to leave domestic energy prices at their previous level. As a result, the size of inter-republican fiscal and quasi-fiscal transfers, which was already high, increased even further (see Selm and Dölle 1993; Orlowski 1993). Inter-republican transfers were continued until mid-1993 when the Government of the RF and Central Bank of the Russian Federation (CBRF) decided to stop this practice. Unsurprisingly, this decision led to the ultimate demise of the ruble area (see below).

Large inter-regional fiscal transfers require either political consensus (in democratic regimes) or coercive political power (in authoritarian regimes). Obviously, the second case applied in the USSR. Clearly, most common currency areas (CCAs) in human history have been created as result of exogenous political developments such as the formation and territorial expansion of states, colonization, political decisions to form federations, etc., rather than as a result of economic choice based on OCA theory.[2] Thus once political factors justifying the CCA disappear (for example, territorial disintegration of a state or the collapse of a colonial empire) monetary disintegration will follow. This was precisely what happened with the Soviet ruble in the early 1990s.

The first stage of monetary disintegration (1990–1991)

Mikhail Gorbachev's *glasnost* and *perestroika* brought more political freedom and less administrative and police repression in the USSR at the end of the 1980s. It led, in turn, to the renaissance of independence movements among some nations living in the USSR. The Baltic republics were the leaders in this movement. Here too the first ideas of republican economic autonomy and republican economic reforms were presented. In 1988, the pro-independence Sajudis movement in Lithuania proposed a comprehensive economic reform package oriented, among other things, towards greater republican autonomy (Samonis 1995). The future republican central bank and republican currency were an integral component of this proposal.

In 1987 and 1988 a group of Estonian economists (Lainela and Sutela 1995) proposed a similar intellectual concept described as the New Economic Mechanism (Estonian acronym IME). Both republics started to gradually build their future central banks but did not abandon republican branches of the State Bank of USSR *(Gosbank)*. However, some conflicts surrounding credit emission between both republics and the Gosbank were observed as early as 1989 and 1990. Latvia announced its plan to introduce a national currency and open its own central bank in 1990 (Lainela and Sutela 1995).

Although Mikhail Gorbachev and other Soviet leaders were not ready to accept the independence of the Baltic republics at that time, they did not openly oppose the idea of stronger republican economic autonomy, including separate republican currencies. This probably reflected a lack of understanding of the political implications of such an autonomy and, more generally, a dearth of ideas on how to reform the Soviet economy.

[2] The euro project may be seen as an exception. While political considerations played a role (advancing political integration within the EU) economic arguments such as decreasing transaction costs, increasing competition inside the Single European Market and supporting financial integration were equally important.

Insofar as striving for greater economic autonomy only concerned the Baltic republics, it did not present a real threat to the integrity of Soviet monetary and fiscal policies. It looks like a historical paradox, but the decisive attack against the Soviet economic and political unity came from Russia. In the spring of 1990 the new RF parliament elected Boris Yeltsin as its speaker and the formal head of the RF. Yeltsin, who was the former member of Politburo of the Central Committee of the Communist Party of the Soviet Union and former First Secretary of the Moscow party organisation, was seen as the main challenger to Mikhail Gorbachev at that time. He gained the support of the Russian democratic movement, which wanted to go beyond the limited *perestroika* reforms.

The declaration of sovereignty of the RF from 12 June 1990 was the first major step towards the disintegration of USSR taken by the new Russian parliament. It was followed by similar declarations on the part of other Soviet republics, and in some cases even by the lower level territorial units. Russian declaration of sovereignty also featured some general statement about its own monetary system. The declaration itself did not have an immediate impact on monetary and fiscal policies. However, the logic of political struggle between Russian and Soviet authorities had to lead to serious consequences.

The Law on the CBRF and Law on Banks and Banking Activity of December 1990 were the first concrete steps along this path. The newly created CBRF began to take personnel and administrative control over all regional branches of the Gosbank of USSR on Russian territory. Furthermore, it offered commercial banks liberal licensing conditions. As a result of this competition, most commercial banks in the RF were re-registered under the jurisdiction of CBRF over the following few months. The CBRF did not respect the Gosbank decisions in relation to credit emission, interest rate policy, reserve requirements, etc. It started to finance the republican budget deficit and Russian enterprises through fully autonomous credit emission.

The monetary and banking war was followed by the fiscal war. The RF government started to consolidate control over Union enterprises on its territory, offering them lower tax rates. The taxes collected went to the republican budget instead of the Union budget. Some other republics followed this practice. In 1991, the Union budget (especially in the second half of the year) was left without revenues and with the expenditure side only (it still financed the army and security forces, central administration, subsidies, investments, etc.). This led, of course, to uncontrolled monetary expansion, because Gosbank had to finance the huge Union budget deficit.

The Russian parliament and government also competed with Soviet authorities in the social policy field by multiplying various social privileges and benefits. This populist competition was additionally stimulated by political events – the Spring 1991 referendum on the continuation of the Soviet Union[3] and June 1991 presidential elections in Russia won by Boris Yeltsin. This last event led to the *coup d'état* in August 1991.

The Soviet government of Valentin Pavlov desperately tried to improve the macroeconomic equilibrium by the non-equivalent exchange of 50- and 100-ruble banknotes in January 1991 and by the administrative price increase in April 1991. Both steps were taken from the traditional command economy arsenal and not accompanied by more comprehensive reform measures. Additionally, the first decision was badly calculated and implemented, and only served to increase economic chaos.

The unsuccessful *coup d'état* in August 1991 organised by the communist party hardliners against Gorbachev, Yeltsin and the most nationally emancipated Soviet republics (Baltics republics and Georgia) with the aim of saving the USSR accelerated the process of political and economic disintegration. The last Soviet administration – Inter-republican Economic Committee *(Mezhrespublikanskii Ekonomicheskii Komitet* – MEK) – played the role of a liquidation committee, rather than of a real government. The Gosbank of USSR definitely lost control over monetary policy in Russia and Baltic states during this period.[4]

The last attempt to negotiate a new Treaty on Economic Union with the Soviet republics following the idea of the EU (Havrylyshyn and Williamson 1991) did not end successfully. Although the Treaty was signed in Novo-Ogarevo in October 1991 by 10 republics, but was never implemented due to a failure to agree on the political union treaty.

[3] This referendum was formally won by Mikhail Gorbachev - most of electorate voted in favour of upholding the Soviet Union. The result of referendum, however, could not stop the disintegration process.

[4] The Soviet government recognised the Baltic states' independence on 6 September 1991.

There was a referendum on 1 December 1991 in Ukraine, and the latter's independence led to the Belavezha agreements on the dissolution of the USSR and the creation of the Commonwealth of Independent States (CIS). In mid-December 1991, President Yeltsin decided to close down the Gosbank of USSR. The ruble area entered a new phase when 15 central banks jointly managed the common currency.

The second stage of monetary disintegration (1992–1993)

The common ruble area survived the USSR by almost two years. One can identify four phases of its dissolution:

1. In the first half of 1992, all 15 FSU countries (including Baltic states) continued to use the Soviet ruble. Their newly-created central banks issued non-cash rubles in the form of central bank credit to government, commercial banks, and direct credit to non-financial enterprises. In the absence of central political power, or at least of an effective coordination mechanism of national monetary policies, it led to 'competition' between central banks, who issued more non-cash rubles at the expense of their neighbours, thus exhibiting typical 'free riding' behaviour (Sachs and Lipton 1992). The National Bank of the Ukraine was particularly active on this front, being the first central bank in the former USSR to initiate (in June 1992) the multilateral clearing of inter-enterprise arrears with the help of an additional supply of credit. Although Russia retained its monopolist position in the emission of cash rubles, other FSU countries such as the Ukraine, Lithuania and Azerbaijan began to introduce parallel cash currency (coupons) to circumvent Russian constraints and 'protect' their domestic consumer markets (which continued to suffer from physical shortages of goods) against buyers from other republics. As a result, Russia was flooded with non-cash rubles issued in other FSU countries in 1992 (especially the Ukraine), which was one of the reasons why its 1992/93 macroeconomic stabilisation policies did not achieve the results expected (Dabrowski and Rostowski 1995).
2. On 1 July 1992 the CBRF introduced the requirement of a daily bilateral clearing of settlements between Russia and other FSU countries using the ruble. The CBRF accepted other countries' payments to Russia only to the amount available on their correspondent accounts. In practice, this meant the end of the ruble as a single currency in non-cash settlements and the creation of national non-cash rubles. However, until the spring of 1993 this change was softened by technical credits, abundantly provided by the CBRF to other FSU countries. As result of the daily settlement mechanism and the limited size of technical credits, FSU importers increasingly used cash rubles to pay for imports from Russia which, in turn, led to a reduction in the delivery of cash rubles by the CBRF and the further expansion of monetary substitutes (coupons) in FSU countries.
3. Between summer 1992 and spring 1993, five FSU states fully exited the ruble area by introducing their own currencies. Estonia was the first state to exit in June 1992, followed by Latvia, Lithuania, Ukraine (in the second half of 1992), and Kyrgyzstan (May 1993).
4. At the end of July 1993, the CBRF organised the exchange of ruble banknotes on the RF territory. As a result, all remaining FSU countries, except Tajikistan, introduced their own currencies in the second half of 1993 (Table 1). Technical credits were stopped and outstanding credit balances on the CBRF accounts were transformed into intergovernmental credits.

Decisions by individual FSU states to leave the ruble area (and their timing) were guided by both political and economic considerations. Baltic states and the Ukraine decided to exit in order to demonstrate their political sovereignty. However, economic arguments also played a role. The monetary policy pursued by the CBRF was too inflationary for the Baltic states and Kyrgyzstan, which wanted to stabilise their economies quickly, and too restrictive for the Ukraine and Belarus. The last group to introduce national currencies in autumn 1993 (Kazakhstan, Uzbekistan, Turkmenistan, Moldova, Armenia and Georgia) was simply pushed out from the ruble area by the exchange of ruble banknotes in July 1993.

Unsuccessful attempts to rebuild the ruble area (1992–1994)

After the dissolution of the USSR in December 1991, there were numerous attempts to prevent the disintegration of the ruble area and, once this happened, to rebuild it. They included, among others:

- The Agreement on a Uniform Monetary System and Unified Money, Credit, and Currency Policy in the States Using the Ruble as a Legal Medium of

Table 1

Timetable of introduction the new currencies by FSU countries

Country	Date of the full separation from the ruble zone	Name of currency unit	Remarks
Estonia	06/22/1992	Kroon	Currency board, with peg to the German mark
Latvia	07/20/1992	Lats	Latvian ruble *(rublis)* at the beginning, gradually replaced by *lats* (from March 1993) peg to SDR
Lithuania	10/01/1992	Litas	*Talonas* at the beginning, replaced in June 1993 by *litas*; currency board from April 1994, with peg to US $
Ukraine	11/11/1992	Karbovanets	Replaced with *hryvna* in September 1996
Belarus	November 1992	Belarusian ruble	Soviet ruble was accepted until July 1993
Kyrgyzstan	05/15/1993	Som	
Georgia	08/02/1993	Coupon	
Turkmenistan	11/01/1993	Manat	
Kazakhstan	11/15/1993	Tenge	
Uzbekistan	11/16/1993	Sum	
Armenia	11/22/1993	Dram	
Moldova	11/29/1993	Leu	Before, in July 1993 Moldovan coupon became de facto national currency
Azerbaijan	12/11/1993	Manat	
Tajikistan	May 1995	Tajik ruble	Replaced with *somoni* in October 2000

Sources: Odling-Smee and Pastor (2001); author's data.

Exchange signed in Bishkek on 9 October 1992 by Armenia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, RF, Tajikistan, and Uzbekistan. It called for maintaining the ruble as a common legal medium of exchange, although it also allowed for the continued use of monetary surrogates, and did not exclude the introduction of national currencies in the future (Gurevich 1992). It also created the Interstate Bank *(Mezhgosudarstvennyi bank)* in charge of multilateral settlements. Despite repeated political endorsements during the subsequent CIS summits, this bank never started its operations.

- The Economic Union Treaty signed during the CIS summit in Moscow on 14 May 1993 (Kozarzewski 1994) followed by the negotiations on the New Style Ruble Area (NSRA).
- The agreement on the NSRA of 7 September 1993, signed by Russia, Kazakhstan, Uzbekistan, Tajikistan, Belarus, and Armenia, which covered the coordination of monetary and fiscal policies, banking and currency regulations (in particular, maintaining stable exchange rates between national currencies and the Russian ruble). Mandatory indicators to be set by Russia included the money supply, the consolidated budget deficit, interest rates on central banks' refinancing credit, and minimum reserve requirements. The next step involved the signinature of standardised bilateral agreements between Russia and other NSRA participants. According to them, at the transition period to the NSRA (end of 1994), the ruble was to be the only legal medium of exchange in signatory countries, its exchange rate against convertible countries was to be unified and common international reserves were to be established.
- The Agreement on the Unification of the Monetary Systems of the Republic of Belarus and the RF, and on the Conditions of Functioning of a Common Monetary System of 12 April 1994. The Russian ruble was to become a common currency and the National Bank of the Republic of Belarus was *de facto* to become a branch of the CBRF. Furthermore, the economic systems of both countries were to be harmonised, including the adoption by the Belarus of Russia's import tariffs, its budget system and wage and salaries system for public employees, the elimination of tariffs and transition fees in bilateral trade, etc.

None of the above agreements were ever implemented partly because some of them were too general, lacked implementation details and were sometimes internally inconsistent; and partly because countries' economic systems started to differ (for example, Belarus and Uzbekistan were less advanced than Russia in market reforms), but largely due to the reluctance of FSU countries to surrender at least part of their newly obtained sovereignty.

In this context, the question arises as to what kind of arguments stood behind the attempts to delay dissolution of the ruble area and consequently rebuild it? Those FSU countries interested in staying in the ruble area wanted large fiscal or quasi-fiscal transfers from Russia to continue, including purchases of energy and

raw materials at below world market prices, and easy market access for their substandard manufactured products. However, these expectations were not realistic. In Kazakhstan, there was also political interest in avoiding tensions between native and Russian speaking parts of its population in case of the complete economic separation of Kazakhstan from Russia. In Belarus, this was just part of 1994 election campaign of then Prime Minister Vyachaslav Kebich, who presented monetary union as a means to achieve Russian living standards.

In Russia, political forces interested in the at least partial reconstruction of the Soviet empire (Kozarzewski 1994) supported the ruble area. Publicly they cited the need to avoid potential hardships to Russian nationals living in FSU countries and preserve economic links between enterprises on the post-Soviet territory. Obviously various industrial lobbies in Russia were also interested in continuing exports to other FSU countries financed by the unlimited credit emission of their central banks. The opponents of the CCA included leading economic reformers who understood the economic costs for Russia related to keeping the common currency.

Interestingly enough, the IMF and its major shareholders did not support the immediate dissolution of the ruble area due to concerns over potential trade and payment disruption in the FSU, partly because of fresh experience with CMEA dissolution. In the first half of 1992, before the meeting of CIS central bank governors in Tashkent on 21–22 May 1992, IMF staff invested quite a lot of effort in drafting a *'… cooperative ruble area arrangement in which all participating central banks would have a say in credit and monetary policy'* (Odling-Smee and Pastor 2001). This blueprint could not work due to macroeconomic instability, sovereignty concerns, and lack of sufficient trust between member states. The IMF did not start actively supporting the introduction of new FSU currencies until 1993 (Kyrgyzstan was the first case in May 1993).

Major IMF shareholders seemed unprepared to deal with the collapse of the USSR at such a swift pace, and its potential political and economic consequences. The former included fear of disintegration-related conflicts similar to those seen in the former Yugoslavia, while the latter included fear of regional trade disruption and uncertainty over the succession of financial claims on the former USSR (Dabrowski and Rostowski 1995).

In hindsight, attempts to maintain the ruble area in 1992/93 look naive. While the economic arguments for continuing the common currency were not all that obvious (see below), they completely failed to take into consideration the political realities of the situation. There was no political consensus among FSU countries to agree and follow joint monetary and fiscal targets, to create a common central bank, and introduce common legislation on banking, foreign exchange, budget and other related issues. Moreover, these conditions were already absent at the end of 1990 when the process of monetary disintegration really started.

Consequences of the ruble area's disintegration

This analysis of the consequences of the ruble area's disintegrationfocuses on two issues: (i) trade disruption and output losses and (ii) macroeconomic destabilisation caused by attempts to continue CCA after the dissolution of the Soviet Union.

Trade disruption and output losses

The heavy dependence of some former Soviet republics on inter-republican trade, especially on the part of Belarus and the Baltics (Selm and Wagener 1993; Orlowski 1993), suggested that monetary integration may substantially disrupt trade and result in output losses due to additional transaction costs and exchange rate uncertainty. Indeed, in the 1990s FSU countries recorded large GDP declines ranging cumulatively from 18 percent in Uzbekistan to 78 percent in Georgia and lasting from between four years in Armenia to ten years in the Ukraine (Table 2). However, only a small fraction of this decline can be attributed to the disappearance of the common currency (and is easy to detect statistically). There were other, more powerful, factors at work such as inherited structural distortions (for example, excessive militarisation of the economy), changes in relative prices, the removal of direct and indirect subsidies, the effects of trade liberalisation with the rest of the world, the effects of ownership changes, the emergence of trade barriers between FSU countries (despite the signature of a series of free trade agreements within the CIS), etc. The slow pace of market reforms, a long period of macroeconomic instability (at least until 1995 and then again as result of the 1998/99 financial crisis – see Dabrowski 2016) and violent conflicts in many parts of the FSU (Transnistria, Abkhazia, Southern Ossetia, Nagorno-Karabakh, Tajikistan) can be added to this list.

Table 2

Transition related cumulative output decline in FSU, 1990–1991, in %

FSU countries	Number of consecutive years of GDP decline	Cumulative GDP decline
Armenia	4	63
Azerbaijan	6	60
Belarus	6	35
Estonia	5	35
Georgia	5	78
Kazakhstan	6	41
Kyrgyzstan	6	50
Latvia	6	51
Lithuania	5	44
Moldova	7	63
Russia	7	40
Tajikistan	7	50
Turkmenistan	8	48
Ukraine	10	59
Uzbekistan	6	18

Source: World Bank (2002).

As in the case of CMEA trade disintegration, the partial disruption of trade between FSU enterprises was unavoidable because it was the product of arbitrary planning decisions in a closed economy and political and administrative bargaining, rather than the upshot of market-based comparative advantages.

Macroeconomic consequences of gradual monetary disintegration

The almost three year period of gradual and chaotic monetary disintegration (between end of 1990 and autumn 1993) led to disastrous macroeconomic consequences that are best illustrated by very high inflation/hyperinflation in FSU countries (Table 3). It delayed macroeconomic stabilisation in the FSU, led to high actual dollarisation and deeply rooted macroeconomic fragility, as demonstrated by a series of currency crises over the 20 years that followed (Dabrowski 2016), negatively affected microeconomic, structural and institutional reforms, and therefore made a significant contribution to output decline.

For Russia, maintaining the ruble area meant substantial transfer of its GDP to other FSU countries. In 1992, CBFR technical credits to other FSU central banks amounted to 8.4 percent of Russian GDP, while the supply of ruble banknotes accounted for another 2 percent of GDP (Granville and Lushin 1993). In 1993, CBRF credits to FSU countries amounted to 3.0 percent of Russian GDP (IEA 1995) and were concentrated in the first half of the year. Again, almost another 2 percent of GDP was transferred in the form of cash supply. Technical credits to FSU central banks amounted to 22.3 percent of the overall CBRF credit increase in 1992 and 21.6 percent in 1993 (IEA 1995).

For some FSU countries, and particularly Uzbekistan, Turkmenistan, Armenia, Tajikistan and Kazakhstan, CBFR financial transfers amounted a substantial portion of their GDP in 1992/93 (Illarionov 1993). However, continuation of monetary union with poorly controlled money supply did not allow them to conduct macroeconomic stabilization (even if part of inflationary pressures was 'exported' to Russia). It also slowed down the structural adjustment of their economies and market-oriented reforms.

Table 3

End-of-year CPI inflation in FSU, in %, 1993–1997

Country	1993	1994	1995	1996	1997
Armenia	10,896.2	1,884.5	31.9	5.8	21.9
Azerbaijan	1,350.0	1,792.1	84.6	6.7	0.4
Belarus	1,996.6	1,959.7	244.0	39.3	63.1
Estonia	n/a	– 6.8	28.9	14.8	12.5
Georgia	n/a	n/a	57.4	13.7	7.2
Kazakhstan	2,165.0	854.6	60.4	28.6	11.3
Kyrgyzstan	929.9	62.1	32.1	34.8	13.0
Latvia	34.8	26.4	23.1	13.1	6.4
Lithuania	n/a	n/a	n/a	11.7	8.5
Moldova	837.0	116.1	23.8	15.1	11.1
Russia	839.9	215.1	131.3	21.8	11.0
Tajikistan	7,344.0	1.1	2,144.2	40.5	163.6
Turkmenistan	n/a	1,327.9	1,261.5	445.8	21.5
Ukraine	10,155.0	401.1	181.7	39.7	10.1
Uzbekistan	884.8	1,281.4	116.9	64.4	50.2

Source: IMF World Economic Outlook Database.

Policy lessons

The history of the ruble area and its collapse highlights the role played by the political determinants of monetary union, whether this be a centralised political power on a given territory (as in case of the former USSR); or a political agreement between

largely sovereign states (as in case of the euro area). Once such political foundations disappear, a common currency does not have any chance of surviving. In such situations, monetary disintegration becomes inevitable. This should take place as quickly as possible in an orderly and collaborative manner (the case of the separation of the former Czecho-Slovak crown in February 1993 serves as good example to follow).

If the narrow time window for fast and collaborative disintegration is lost or politically implausible, monetary and, more broadly, macroeconomic management tends to slip out of control and those who leave the 'sinking ship' first suffer less from macroeconomic instability than those who stay in the CCA to the end. The relative advantages of fast unilateral exit (together with ability to establish prudent monetary regime on its own) are illustrated here through closer analysis of Czechoslovakia after collapse of the Austro-Hungarian Empire, Slovenia after collapse of Yugoslav federation and the Baltic states after collapse of the USSR.

Unfortunately, after political dissolution of the USSR most politicians and economists in FSU countries failed to make accurate assessments of their monetary arrangements; nor did they receive adequate technical assistance to solve this problem from the IMF and other Western donors.

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Lessons from the Collapse of the Ruble Zone

Anders Åslund*

When the Soviet Union collapsed in December 1991, one single economic institution survived, namely the common currency, the ruble.[1] The most radical Russian reformers wanted to break it up, but they were defeated by a multitude of opposing interest groups. As a result, fifteen independent central banks started issuing ever larger ruble credits, which resulted in general hyperinflation in 1992 and 1993, with annual inflation rates varying from 1,000–10,000 percent.[2] In the fall of 1993, most countries left the ruble zone that ceased to exist when Russian departed. The countries that exited the ruble the earliest, namely the Baltic states, performed the best, while the laggards suffered the most.

Many conditions at the end of ruble zone were peculiar, but its collapse also displayed general features of a currency area. This extreme event can help us to discern the mechanisms at work during the collapse of a currency zone, especially when comparing with other similar events. Some of these developments are relevant for the Eurozone.

The first section of this article offers a brief presentation of how the ruble zone collapsed. The second section analyzes how the collapse of the ruble zone compares with other currency zone failures. The third section draws overall lessons and specifically highlights points that matter for the Economic and Monetary Union (EMU). Finally, what would happen if a debtor country were to leave the Eurozone in distress?

What happened when the ruble zone collapsed?

In December 1991, the Soviet Union broke up into twelve independent countries. The three Baltic countries, Estonia, Latvia, and Lithuania, had already departed in August 1991. The formal division of the Soviet Union occurred on 25 December 1991. It was clear-cut and rapid. Each new country kept all union assets on its territory. The existing borders were recognized and maintained. Russia accepted responsibility for the Soviet Union's substantial foreign debt, and assumed ownership of the far smaller foreign assets. Only two union institutions persisted, various Soviet military assets and the common currency, the ruble.

The Soviet economy had been out of control since the fourth quarter of 1990, as the Soviet economic system was falling apart. The economy suffered from all perceivable ailments. Shortages of all goods and services were pervasive, because of low state-regulated prices, while the government had lost control of both public expenditure and wages. Inflation was triple-digit, in spite of largely regulated prices and rationing was wide. The Soviet budget deficit in 1991 was probably 34 percent of GDP, but the Soviet national accounts were not completed that year. The international currency reserves were literally depleted, and the USSR had lost access to international financial markets because of excessive public debt and large arrears. The Soviet economic system was collapsing, and GDP was falling by about 10 percent in 1991 (Åslund 1995 and 2002). The situation was further complicated by the eleven newly-independent countries lacked central state institutions, notably central banks and ministries of finance. The main problem, however, was probably a nearly complete dearth of economic knowledge everywhere apart from in Moscow and St. Petersburg.

The curse of the ruble zone was that each of the 15 new republics had its own central bank that could issue ruble credits. They had started doing so at the end of 1990, when the increasingly sovereign Soviet republics established their central banks, but they were caught in a prisoner's dilemma. They would all be better off, if all of them restricted their issue of money, but since they knew that the other central banks would emit vast credits, none had a reason to hold back.

* The Atlantic Council, Wahington DC.
[1] I discussed this topic four years ago in Åslund (2012).
[2] Hyperinflation is defined as inflation exceeding 50 percent a month for one month and the economy subsequently remaining in hyperinflation for one year.

An observer could have expected responsible politicians to stand up and call for an end to this hyperinflationary ruble zone, but its supporters overwhelmed its opponents. The only people who really wanted to stop the ruble zone were the Russian reformers around First Deputy Prime Minister Yegor Gaidar and the Baltic leaders. In the fall of 1991, Gaidar (1993) had advocated a Russian 'nationalisation of the ruble'. The Western advisors of the Russian government concurred, favouring a quick breakup of the ruble zone (Lipton and Sachs 1993). This was also true of the leading Western macroeconomists on this topic (Sargent 1986) and Dornbusch (1992).

The post-Soviet republican leaders were painfully aware of their ignorance of monetary policy. The countries most friendly to Russia – Belarus, Kazakhstan, Armenia, and Tajikistan – hoped for the survival of the ruble zone and were prepared to submit to the Russian central bank. The less friendly countries – Ukraine, Moldova, Georgia, Azerbaijan, Turkmenistan, and Uzbekistan – wanted to establish their own currencies, but after some time. In the meantime, they wanted to benefit from cheap credit and raw materials from Russia. The Balts took exception. They wanted to establish their own national currencies and leave the ruble zone as fast as possible, even if it would cost them greatly. Their saying went: "a national currency is our best border fence to Russia" (Hansson 1993). Throughout the region, the old establishment favoured maintaining the ruble zone. The big state enterprises wanted to sell without competition and be paid by the state through central bank credits.

Disappointingly, the international agencies involved also preferred to keep the ruble zone. At this time, the European Union (EU) was preparing for EMU, elaborating on the Maastricht Treaty. Therefore, it supported a joint currency zone. European interests dominated the IMF, which sought a middle road of jointly agreed monetary policy without central control, but that option was never viable. Monetary discipline could only be ascertained if there was only one central bank solely responsible for issuing the ruble. (Sachs and Lipton 1993; Åslund 2002)

The newly minted central bankers realised that the more credits they issued, the larger a share of the common GDP they would extract. But presumably it was more convincing that friendly private bankers and commodity traders were delighted to give them a commission on the money that the central bankers lent them.

All of the former Soviet republics ended up on a treadmill of rapid monetary expansion boosting inflation. As prices surged, the velocity of money rose, so that inflation increased more than monetary emission. Inflation in the post-Soviet economies ranged from 640–3,000 percent in 1992, while in those economies remaining in the ruble zone it ranged from 840–11,000 percent in 1993. As hyperinflation caught on, GDP fell by 3–45 percent in 1992 alone. The Baltic countries departed from the ruble zone in the summer of 1992, enabling them to restrain their credit issue. Even so, they faced inflation of around 1,000 percent in 1992, although that figure was much lower in 1993 (Åslund 2002).

Not well-versed in monetary economics, post-Soviet officials insisted that credits were not money, holding back the printing of currency to impede inflation. The printing presses were located only in Russia, which started printing Russian rubles soon after independence. The other republics had to make do with their old Soviet ruble notes. Given that their printing had ended and prices skyrocket, cash was desperately short in supply. Several republics and regions started printing their own coupons as a substitute currency. While this was a great popular irritant, it was a side issue that did not have any great impact on monetary policy.

In the fall of 1992, the only one of the twelve countries remaining in the ruble zone to hold back somewhat was the Central Bank of Russia (CBR). Russia had current account surpluses with all of the other former Soviet republics, meaning that Russia provided financing to all of the other republics, which merely repaid this with ruble credits issued by their central banks. The IMF (1994) statistics for Russian financing of the other former Soviet republics in 1992 are quite extraordinary. Russia financed 91 percent of Tajikistan's GDP, 70 percent of Uzbekistan's GDP and about 50 percent of the GDP of Turkmenistan, Georgia, and Armenia. Belarus and Moldova received 'only' 10 percent of their GDP. This cost Russia 11.7 percent of its GDP of only 80 billion US dollars at the exchange rate of 1992. Impoverished Russia could not possibly continue this financing.

The Soviet Union had a highly centralised payments system, in which all payments went through the Central Bank, which examined every single payment. A handful of state banks had managed all payments. The number of payments was limited because the

number of state enterprises was not large, but as the number of enterprises multiplied, payment delays surged. Nor did enterprises have any incentive to pay. Since they did not pay one another, they were all short of money. The arrears crisis was exacerbated by a breakdown of settlement clearing between enterprises in different post-Soviet republics, where settlements could take months (Sachs and Lipton 1993; Rostowski 1994). The old state enterprises were confident that they would be able to extract money for their supplies from the government or central bank, so they did not really care about being paid. They continued delivering for a few years even without payment, or their goods were not even desired by their purported clients.

The arrears were formed for a purpose, namely to extract money from the government, and the easiest way of doing so was to ask the central bank for monetary emission. A common argument was to call for 'an indexation of the working capital'. The essence was that chains of inter-enterprise arrears were to be resolved through monetary expansion. Most post-Soviet countries carried out such emissions, which instantly boosted inflation, while the non-payments were quickly recreated since they had turned out to be such a successful tactic (Rostowski 1994).

The ultimate blow to the ruble zone was the irresponsible monetary policy of the CBR. In the first half of 1992, its governor Georgy Matiukhin favoured a 'moderate' monetary expansion of 10 percent a month, which turned both reformers and their opponents against him. For the next two years, Soviet stalwart Viktor Gerashchenko was governor, and his policy aim was to expand monetary emission to keep the money supply constant as a ratio to GDP, which was impossible given increasing velocity. In effect, the central bank financed the arrears, which encouraged enterprises to accumulate more arrears (Åslund 1995; Granville 1995).

Yet, the CBR could not afford to continue financing the other eleven post-Soviet countries. From July 1992, the Russian government tried to restrict credits to those states, although CBR governor Gerashchenko resisted and even accelerated the expansion of credits. In April 1993, the Russian parliament decided to stop any technical credits to other former Soviet republics and allowed only intergovernmental credits from the Russian state budget, but this measure did not suffice to end the ruble zone. Finally, Gerashchenko ended the ruble zone by suddenly and independently declaring all Soviet banknotes null and void at the end of July 1993. Panic broke out throughout the former Soviet Union as people queued up outside banks to use their old Soviet ruble banknotes. By the end of 1993, all former Soviet republics apart from war-ridden Tajikistan had established their own currencies. Thanks to the competitive emission and monetary chaos in 1993, seven of the twelve former Soviet republics had even higher inflation rates in 1993 than in 1992. Inflation abated gradually in 1994/5 (Åslund 1995 and 2002). It was good that the ruble zone ended, but this was the worst way of ending it: too late and chaotic.

The combination of hyperinflation and non-payments arising from the collapsing ruble zone devastated the economy. Statistics from the years 1991-1994 are highly unreliable and probably exaggerate the decline, but officially, the average total GDP fall in the twelve former Soviet republics was 53 percent, while the Baltic states that managed to exit the ruble zone one year earlier experienced a fall of 44 percent (UNECE 2000). Trade among the former Soviet republics plummeted by 70 percent from 1991 to 1994 (Michalopoulos and Tarr 1997). This was a major economic disaster. Compared to the poorly performing post-communist countries Bulgaria and Romania outside of the ruble zone, that factor alone might have cost these countries 20–25 percent of additional output fall. The superior economic performance of the Baltic states illustrates that it was better to get out early. Indeed, an instant end to the ruble zone on 1 January, 1992, would have saved the world a lot of suffering.

How the collapse of the ruble zone compares with other currency zone failures

Contrary to current perceptions in the EU, currency zones have been quite common. Indeed, it is the post-Bretton Woods system of many more or less freely-floating national currencies that is an anomaly. Traditionally, monetary systems were based on gold or silver. By and large, in order to escape unnecessary currency volatility small economies prefer to link their currency to a big economy, which can be done through a peg, a currency board, or a currency union.

During the golden half century of high economic growth before World War I, two monetary unions, the Latin Monetary Union and the Scandinavian Mone-

tary Union dominated Europe. The Latin Monetary Union lasted from 1865 to 1927. Initially, it included France, Belgium, Italy and Switzerland, and it expanded to Spain, Greece, Romania, Bulgaria, Serbia and Venezuela. The Scandinavian Monetary Union existed from 1873 to 1914. Its members were Sweden, Denmark and Norway. It survived without problems when Norway broke away from Sweden in 1905. Both monetary unions fell apart because one member devalued (Sweden and Greece, respectively).

Yet, we must not confuse these currency unions with the EMU. Their monetary cooperation was quite limited because the common currency was based on an external norm, the gold standard. Each country had its independent central bank and they did not have a common payment system, which are the key features of a real currency union.

Currency unions are particularly popular among small countries. At present, three large currency unions exist among small countries in the developing world. One is the East Caribbean Currency Union, which was set up in 1983. It includes nine small Caribbean states. Its currency, the East Caribbean dollar, is pegged to the US dollar and it has a common East Caribbean Central Bank, which is a monetary authority, not meant to pursue any monetary policy, but rather to act as a currency board.[3]

The two other examples are African: the West African Economic and Monetary Union, which consists of eight West African countries, and the Central African Economic and Monetary Community with six member states. Almost all of these countries have been French colonies and they have used their African franc since 1945. Each has a common central bank, Central Bank of the West African States[4] and Bank of Central African States,[5] which control the two currencies that maintain parity. Their *franc* was originally pegged to the French franc, and is now tied to the euro. This currency has been devalued twice, in 1948 and 1994. While the membership has changed little, it has varied, and the original common currency area split into two. These two African franc zones are effectively pursuing a currency board regime attached to the euro, and the French Treasury maintains supervision. Thus, currency unions are common, but all of the currency unions discussed above hinge on an external standard: the gold standard, the US dollar, or the euro.

The situation is very different in an integrated multinational currency union based on fiat money. The three outstanding examples of such currency unions that have broken up are the Austro-Hungarian Empire in 1918, Yugoslavia in 1990, and the Soviet Union in 1991–93.

At the end of World War I, the Austro-Hungarian Empire was collapsing, without clear leadership or strategy. The last vestiges of the central government were already financing themselves with monetary emission towards the end of the war. The Austrian government continued to do so after the November 1918 armistice. During the brief communist rule starting at the end of October 1918, the Hungarian government did so to an even greater degree. These bodies quickly developed the competitive issue of the same fiat currency. One single successor state had a clear concept, namely Czechoslovakia. Over two weeks in February-March 1919, its government closed the borders and stamped all the Austro-Hungarian *krone* banknotes circulating within its borders. The new Czechoslovak central bank pursued a very conservative monetary policy form the outset and its new koruna was convertible. All the other successor states, by contrast, had no clear policy, leading to very high inflation. Austria, Hungary, and Poland all suffered from hyperinflation (Pasvolsky 1928; Sargent 1986; Dornbusch 1992).

After the death of President Josip Broz Tito in 1980, Yugoslavia started to disintegrate in a process that took several years and its economic system was unstable. The two wealthy northern republics, Slovenia and Croatia, had large current account surpluses with Serbia. In the first half of 1991, the National Bank of Yugoslavia, controlled by the Serbian government, started issuing excessive amounts of money to the benefit of Serbia. This dealt a decisive blow to both Yugoslavia and its *dinar*. In late June 1991, Slovenia declared independence, not least to defend its finances. The Yugoslav army attacked Slovenia, but the war lasted only ten days, and Slovenia was able to exit Yugoslavia both politically and monetarily, becoming the most successful successor state (Pleskovic and Sachs 1994). Croatia followed suit, but ended up in a much more bloody war with Serbia. Hyperinflation

[3] East Caribbean Central Bank, see http://www.eccb-centralbank.org/.
[4] Central Bank of the West African States, see http://www.bceao.int/.
[5] Bank of Central African States, see http://www.investopedia.com/terms/b/bank-of-central-african-states.asp.

persisted in the remaining states of Yugoslavia, Bosnia and Herzegovina, and Serbia.

The collapse of the ruble zone, the breakup of the Austro-Hungarian Empire, and of Yugoslavia resulted in 28 instances of hyperinflation (Austria-Hungary 3, Yugoslavia 4, and USSR 21) out of a total of 56 recorded in world history since the French revolution (Hanke and Krus 2012). This showed that the breakup of a tightly integrated multinational currency zone is a very dangerous event.

Lessons for the Economic and Monetary Union (EMU)

The collapse of the Austro-Hungarian Empire, Yugoslavia, and the former Soviet Union may appear to be extreme events of little relevance to the current, more ordinary economic situation, but on closer consideration, this is hardly the case. Each of these collapses came as a great surprise to most of the people involved, and they all became far more radical in their essence than anybody had anticipated. These three currency zones had substantial similarities with the EMU. They were real currency zones with a common central bank and payments system without any external anchor. They were also truly multinational. They offer lessons of relevance for the EMU.

A real currency zone is not only an exchange rate arrangement, but a joint central bank and payment system. If either fails, the economies in question will face a major monetary and economic calamity. The payments system is likely to stop functioning, which will bring about a liquidity freeze, as the world saw with the Lehman Brothers bankruptcy on 15 September 2008. Great uncertainty will arise because nobody has an overview of all the effects, or can assess the new value of assets, and that emotion will arouse general panic.

A currency zone fails if it does not have a central bank that is the sole issuer of money. Whenever competitive issue of money arises, a currency zone is doomed. Politically, centralised control of monetary emission must be acceptable. Otherwise a currency union is bound to fail. At present, the ECB has those powers, but given all demands for loose monetary policy, the ECB might lose its monopoly of monetary emission.

In the three cases of currency zone failure, the main central banks abandoned their duties and pursued irresponsible inflationary policies. Then more responsible countries will depart and establish their own currencies. Since they are acting in self-defence, it would be wrong to blame the countries to depart first for the demise of a monetary union. Therefore, the greatest danger to the EMU would be if it opted for soft monetary policy. Thus, the central bank of the monetary union must pursue a conservative monetary policy.

The debate over the possible collapse of the EMU in 2012 divided the discussants in two big camps. One camp claimed that this was only a change in exchange rate.[6] Another group of predominantly European economists argued that the breakup of the euro would be a major disaster.[7]

Apart from its monetary policy, the essence of the EMU is its payments system called Target2, through which cross-border central bank money is transferred between the national central banks within the currency union (Weidmann 2012). Until the euro crisis, the Target2 balances were more or less offset or settled through the private interbank market. From 2011, the private interbank funding dried up, so that large positive Target2 balances arose in the four northern EMU countries with strong finances, and large negative balances in eight southern countries. Hans-Werner Sinn (2011a) raised this issue in 2011, arguing that the Eurozone payments system has been operating as a hidden bailout whereby the Bundesbank has been lending money to the crisis-stricken Eurozone members *via* the Target system. He concluded that these claims would probably be lost should the euro collapse (Sinn 2011b).

Sinn's crucial insight was that a collapse of the EMU when Target2 balances were large would be a major disaster. He noticed that these balances would probably be lost by the creditor countries at great cost to those nations. Like the Austro-Hungarian Empire, Yugoslavia and the ruble zone, the EMU lacks rules and procedures for exit. Debts would be disputed and cause major conflicts. Russia has claimed its large ruble zone credits arising accidentally to the other former Soviet republics in 1992/93, which has led to onerous debt negotiations and repeated debt restructurings. Nor is there any reason to believe that any exit from the EMU would be easily accepted by all parties

[6] For example, Roubini (2011); Das and Roubini (2012); Stiglitz (2016).
[7] Eichengreen (2007); Åslund (2012); Bindseil, Cour-Thimann and König (2012). Blejer and Levy-Yeyati (2010); Buiter (2011); Cliffe *et al.* (2010); Dabrowski (2012); Normand and Sandilya (2011).

concerned, as long as there are large debts outstanding. If Target2 balances were to be cleared, an exit would be much easier.

Target2 is reminiscent of the post-Soviet Russian *Kartoteka II*, which was an internal payments system that registered all payments in the order of their entry. In 1992, large arrears accumulated in *Kartoteka II*. One reason was practical that this manual system could not manage the vastly expanded payments volume. The more important reason, however, was that enterprises no longer wanted to pay if they could avoid doing so. Thus, they delayed their payments and used their arrears as another argument for more monetary emission, which eventually succeeded and resulted in high inflation (Rostowski 1994). This is a threat to the EMU, which it avoided during the crisis thanks to strong resistance among monetary conservatives.

The pattern of the early departures is clear: the countries that tend to leave a monetary union first are small, wealthy, and well-managed countries on the periphery. In the case of the Austria-Hungary union, the first to depart was Czechoslovakia, in Yugoslavia's case it was Slovenia, and in the USSR it was Estonia, followed by Latvia and Lithuania. In hindsight, it is abundantly clear that these countries greatly benefited from leaving the common currency zone early. It helped them to pursue far better economic policies than the rest. The logic for the EMU is obvious, but poorly understood. The country most likely to leave the EMU is not Greece or any other beneficiary of significant EU financial assistance, but Finland, a rich country on the northern periphery that is paying for, rather than benefiting from EU largesse.

If the EMU were to be dissolved under stress, the first country to depart would probably fare the best. And the earlier and faster that country were to leave, the better off it would be. The conclusion is that all member countries of the EMU should leave at the same time, if dissolution can no longer be avoided.

In the dissolution of the three major real currency areas, the issues of exchange rates and competitiveness are not all that important, since major financial issues so obviously took precedence. The key issue was price stability, and the second most important issue was financial costs. The Scandinavian and Latin Monetary Unions fell apart because of devaluation in one country or another. The insight is that conservative monetary policies and strict fiscal rules are crucial to the survival of a monetary union.

Fundamentally, there are two main reasons why currency unions tend to collapse: ignorance and irresponsibility. The critical misconception in the three failing monetary unions was that fiscal discipline did not matter; and that loose monetary policy could be beneficial, even at a time of high inflation. Given the current state of Anglo-American economic discussion, Nobel Prize laureates Joseph Stiglitz (2016) and Paul Krugman (2015) would happily repeat the mistakes of Viktor Gerashchenko. Krugman has most spectacularly advocated and predicted the dissolution of the Eurozone. As Niall Ferguson has noted, Krugman wrote about the imminent break-up of the euro at least eleven times between April 2010 and July 2012. Well, that did not happen, which might suggest that his analysis was less than stringent.

What would happen if a debtor country were to leave the EMU in distress?

The euro crisis has abated, and the Target2 balances have moderated. From 2010 to 2012, Greece's possible departure from the Eurozone was much discussed, but it did not happen. While that risk currently seems to have passed, it is useful to consider the chain of events that such an act may have entailed.

If the ECB had capped the Target2 balances of one country in crisis (Greece), this would have triggered a bank run both in Greece and in other countries with large Target2 deficits. The centralised EMU payments system would subsequently have ceased to function. Facing the combination of a multi-country bank run and a petrified EMU payments system, all people and businesses would have transferred their money abroad, which would have required the introduction of currency controls, as in Cyprus in 2013. With the payments system, the European interbank market would have ground to a standstill, which would have presumably led to a global liquidity freeze worse than the freeze seen after the Lehman Brothers bankruptcy in September 2008. If the drachma were to have been reintroduced in the midst of such a crisis, its exchange rate would have plummeted. Excessive depreciation would have caused high inflation, possible in triple digit figures. As companies would have suffered from the liquidity freeze, they would have sharply reduced their output, which would have plunged. Countries

with a large public debt and plunging currencies would presumably have defaulted (Åslund 2012).

Fortunately, no country departed in euro distress, and this must not happen in the future. If any country were to leave the EMU, it should do so after the period of acute stress has passed. The best way of avoiding a breakup of the EMU is to maintain strict monetary and fiscal policies, because if any country is to depart in such a scenario, it is unlikely to be an indebted country with a large current account deficit, and more likely to be a wealthy nation that feels it could manage better without the currency zone.

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Lessons from the Collapse of the Ruble Zone and the Transferable Ruble System

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Introduction

The history of the short-lived ruble zone (RZ) from late 1991 to early 1994 throws many of the fundamental problems of monetary unions between sovereign states into sharp relief. This paper attempts to draw out those lessons, which involves recalling the circumstances of the collapse of the USSR and the monetary and fiscal legacy of Soviet-style central planning – circumstances that, it may be supposed, are so specific and remote as to very considerably limit the episode's wider relevance. This paper aims to show that, on the contrary, and for all its specificity, the monetary experience of the first tumultuous years of post-Soviet Russia and the other Former Soviet Republics (FSRs) provides an interesting case history from the standpoint of present-day concerns.

The first peculiar feature of the RS is that it did not come into existence by design. As the Soviet Union melted down in the period between the failed coup in Moscow against Mikhail Gorbachev on 19–21 August 1991 and Gorbachev's resignation on 25 December, the fifteen new independent states that emerged from its ruins inherited the ruble as a common currency.

This passivity was camouflaged by a semblance of decision making. By October of that year, a draft *Treaty on Economic Union* prepared by a group headed by the Russian economic reformer Grigory Yavlinsky was adopted by the State Council of the USSR as the basis for discussions with the FSRs. This led to the *Treaty on Economic Community* signed on 18 October 1991 by eight republics (the exceptions were the Baltic states, Ukraine, Moldova, Georgia and Azerbaijan). The hope was that the policy coordination required to form a common market would help to overcome the economic crisis (Mashits 1993). The specific monetary component of this 'economic community' was only introduced in the aftermath of the 8 December meeting between the leaders of Russia, Ukraine and Belarus in Belovezhskaya Pushcha (Belarus) at which it was decided to dissolve the USSR. This led to the creation of the Commonwealth of Independent States (CIS) in Alma Aty on 21 December, and the CIS's founding document included a provision that the participating states (all the FSRs bar the Baltic states) would share the ruble as a common currency.

To some extent, the passive acceptance of monetary union by all the FSRs was no more than a pragmatic recognition of necessity and therefore without deeper significance. It would have been a practical impossibility to introduce national currencies virtually overnight in December 1991 (Odling-Smee and Pastor 2002). Even the Baltic states, which did not join the CIS and the RZ, had to continue using the ruble for a few months before launching their own currencies in mid-1992.

The contrast between the Baltic states and the other FSRs is instructive. Important as it is to record that the RZ was not very actively willed into existence, neither was the RZ willed *out* of existence by those other FSRs, which could have followed the example of the Baltic states, but chose not to. This applied to FSRs like Ukraine with strong national aspirations as much as to others for which the decision to embrace the RZ might seem more natural since political independence had not been a prior goal and fell into their laps as the USSR ceased to exist (Brzezinski 1997). It is also important to note that even those FSRs that unexpectedly found themselves endowed with sovereignty took little time to become protective of this political windfall. The asymmetric nature of the CIS given the relative dominance of Russia and the memory associated with the former Soviet rule made all the FSRs ambivalent about post-Soviet integration. In some areas, integration was rejected by all FSRs from the outset. The best example here is the military. In January 1992, the

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Yeltsin administration – apparently concerned about unrest in the ranks of the former Red Army where the end of the USSR was widely deplored – made clear its preference for preserving military links between the republics. This was ignored, as the personnel and (non-nuclear) equipment of the Soviet armed forces physically present in each of the FSRs were unceremoniously nationalized. But all the (non-Baltic) FSRs preferred not to 'nationalize' their money as soon as practically possible in the way that the Baltic States did. The FSRs must therefore have had strong reasons for favouring the RZ, despite the (for them) distasteful political symbolism of the common currency as 'the last Soviet institution' (Åslund 2002).

Lesson one: monetary union to extract rent and avoid painful reform

A good starting point for understanding the attractions of the RZ for FSRs is to recall another of their instant nationalizations – and one that, unlike the military, is directly relevant to our theme: that is, central bank nationalization.

The State Bank of the USSR ('Gosbank') was the sole cash, credit and settlement centre of the Soviet economy up until 1988 (Garvy 1977).[1] Financial flows were assigned by Gosbank as directed by the credit plan to governments and enterprises, and by the cash plan to households (Goldberg, Ickes and Ryterman 1994). Each Soviet Republic had its own branch of Gosbank. When the FSRs declared their independence/sovereignty (1990/91), they each took over the Gosbank branch and made it their national central bank (IMF, IBRD, OECD and EBRD 1990).[2] These so-called central banks could issue credits (non-cash rubles), but the emission of cash rubles remained the monopoly of the Central Bank of Russia (CBR), which, Russia (then formally still the Russian Soviet Federative Socialist Republic (RSFSR)) had also taken over from the Soviet Gosbank in the six months following its June 1990 declaration of sovereignty *vis à vis* the USSR. The reason for the Russian monopoly on cash was simply that all the Gosznak banknote printing plants were located on the territory of the former RSFSR.

The RZ thus inherited the monetary system of the Soviet Union and the divide between cash and non-cash rubles contained the seeds of the challenge for the control of monetary policy (Goldberg, Ickes and Ryterman 1994). This dichotomy between cash and non-cash rubles led to a situation whereby there was a single currency – the cash ruble whose emission was controlled by the CBR on the one side, and as many non-cash rubles as FSR central banks over which the CBR had no control on the other (Dornbusch 1992b).

At this point, we must step back to take a fix on what was involved in this Soviet practice of non-cash ruble credits to enterprises. Under Soviet central planning, money was primarily an accounting tool for the planning authorities ensuring that "the purchases and sales of goods by each enterprise conformed with the plan" (McKinnon 1991, 63). In this 'passive' monetary system, Gosbank made loans – at a zero or very low interest rate – to enable enterprises to buy the inputs they needed to fulfil the approved plan. Gosbank was thus 'the government's fiscal agent' (Spulber 2003) – and its directed credits were accordingly termed (by the IMF and others) 'quasi-fiscal' operations. Under the 'soft budget constraint' (Kornai 1979) of the passive monetary system, "enterprises had no incentive to economize on inputs" and "were not subject to effective quality control through market discipline" (McKinnon 1991, 69).

Alongside this 'credit plan' for governments and enterprises, the Gosbank also managed the 'cash plan' for households (Goldberg, Ickes and Ryterman 1994). Two means of payments therefore coexisted: cash for household, agricultural and small private business sectors and non-cash to the state enterprise sector. The two sides were linked through wages and social security payments and through retail sales (Williamson 1993; Granville 1994).

As far as credits to government budgets and quasi-fiscal transfers to enterprises were concerned, the central banks of the newly independent FSR therefore had unlimited access to the printing press of the common central bank, and an incentive to run budget deficits that were as large as possible (Bofinger 1993). For as long as the CBR was unable to control the monetary

[1] A reform in 1988 established five 'specialized' banks mandated to deal with certain sectors (such as Promstroybank for lending to industry and construction, and Sberbank for taking household deposits); but the primacy of Gosbank was upheld. In March 1989, the transfer of the specialized banks to full cost-accounting and self-financing required Gosbank to provide them with targets for the amount of credit to be extended, household savings taken on deposit, and the share of foreign-currency receipts and payments in total banking operations. So Gosbank's control remained in practice untrammelled.

[2] According to the 1977 Soviet constitution, the 15 republics had the right to secede and to enter into relations with foreign states. By December 1990, all 15 republics had declared their independence or the sovereignty of their laws over those of the union.

policy of the FSRs, the latter were free riders motivated by the desire to acquire a share of seigniorage, as the inflationary impact of FSR budget deficits was shared with the other RZ members through the issue of ruble credits which, given the absence of non-monetary financial assets, were necessarily financed out of money created by the CBR (Goldberg, Ickes and Ryterman 1994; Conway 1995). From the outset of the RZ, Russia strove to assert some control over the FSRs' monetary policy. As far as cash was concerned, this was easier to achieve.

The price liberalization launched in January 1992 in Russia triggered a surge in inflation: producer prices by 382 percent that month as measured by the urban price change and consumer prices by 296 percent and 245 percent as measured by the so-called hybrid CPI (Koen and Phillips 1993; Granville and Shapiro 1994). This was very largely the result of the monetary overhang and high inflationary expectations. The CBR responded by restricting liquidity by controlling the cash money supply. Given the importance of cash in the absence of a well-developed monetary and banking system (Mashits 1993), this cash shortage made a strong impact on the FSRs. The problem had already become apparent in 1991, leading various FSRs – notably Ukraine – to respond by issuing coupons, ration cards, and other money surrogates as additional money to pay for wages, pensions and consumer goods.

Russia attempted to discipline transactions with the FSRs across the board by introducing on 1 January 1992 correspondent accounts held by FSRs central banks with the CBR (Granville 1994). Under this system, RZ members could only increase cash rubles by running a balance of payments surplus with Russia, or paying an interest set at 20 percent for any overdraft required to obtain additional rubles (IMF 1994). FSRs trade deficits with Russia were settled in the corresponding accounts, but only to the limit of the credit allocated by the CBR. However, given the lack of enforcement mechanism, other FSRs did not respect overdraft limits (Goldberg, Ickes and Ryterman 1994). On 12 June 1992, Ukraine proceeded to a massive increase in credit, approximately doubling its money supply to clear inter-enterprise arrears without consulting the Russian government. The Russian government, to limit further credit increase by other FSRs and inflationary effects, responded by 21 June decree effective from 1 July limiting FSRs correspondent accounts' growth: FSR's central banks could only withdraw credits from correspondent accounts held at the CBR on condition that they had the necessary deposit to cover the transaction. All National Banks were notified of this measure on 29 June 1992 (Granville 1994). A new line of credit called 'technical credits' was opened for trade. These credits were subject to negotiations. The rate of interest charged was the current CBR refinance rate. The CBR encouraged FSR commercial banks to clear payments by establishing correspondent accounts with each other and without recourse to the CBR (Granville 1994).

This step aimed to limit the impact of an increase in credit in a FSR to that same FSR, thereby containing access to additional cash and seigniorage and hence the wider inflationary consequences. It thereby brought about the first serious fracture in the RZ, as non-cash rubles FSRs became separate and non-convertible (IMF 1994). This led to non-uniform discounts on the FSRs non-cash (deposit) rubles depending on the extent of their ruble excess demand. This effectively made their deposits mutually inconvertible. With growth limits on each correspondent account of the FSRs, the price of the non-cash ruble started to vary from FSR to FSR. The price depended on differentials between FSR deposit demand, which itself depended on the possibility of converting this deposit into either purchasing power in Russia or cash. The determining factor, therefore, was the availability of credit and cash in the correspondent account of the FSR concerned.

But no sooner had the CBR imposed this level of control than it became extremely liberal in its credit policies as regards both domestic enterprises (with high monthly inflation rates resulting from monetary-financed fiscal and quasi-fiscal expenditure) and the FSRs. This reversal of policy was instigated by the end of August 1992 by Viktor Gerashchenko, former head of the Soviet Gosbank, who had succeeded Georgy Matyukhin as CBR chairman on 17 July.

Following the Ukrainian example, Gerashchenko set about providing credit to clear inter-enterprise arrears and to support production and employment (Ferguson and Granville 2000). The CBR was constitutionally subordinate to the parliament as Russia inherited the 1977 constitution, which remained in force until late 1993, meaning that most matters were under the authority of Congress of People's Deputies elected in February 1990 (Ferguson and Granville 2000) where the big employers' lobby – the 'Union of Russian Industrialists and Entrepreneurs' – was strong. The

Russian government's fear of unemployment allowed powerful industrial interests to pay wages for activities, which were either useless or non-existent (Granville 1995).

Mirroring this monetization of inter-enterprise arrears – which fell from 66 percent of GDP in June to 5 percent in September (Granville 1993a and 1995) – Gerashchenko openly favoured maintaining commercial ties with the other FSRs. The result was a jump in the stock of technical credits to FSRs (i.e. excluding cash deliveries) increasing from 325 billion rubles at the end of June 1992 to 1,545 billion rubles (8.5 percent of Russian GDP) at the end of 1992 – despite the Russian government having agreed with the IMF on limiting this increase during the second half of 1992 to 215 billion rubles. Additional financing for the FSRs in the form of arrears and commercial bank lending amounted to another 0.8 percent of Russian GDP (IMF 1994, Table 2). The main beneficiaries of these credits were Ukraine with 56 percent, Kazakhstan with 15 percent, Uzbekistan with 7.6 percent and Turkmenistan with 7 percent (Granville 1994). These credits were free of interest and penalty and therefore 'represented an attractive source of finance in a high inflation environment' for the FSRs (Conway 1995).

This part of the story may be summed up as follows: the RZ periphery (FSRs) tapped the core (Russia) for inflationary bailouts and thereby avoided painful reform. Russia's natural response of trying to establish a rules-based transfer union was compromised by its own unwillingness to grasp the nettle of reform.

Lesson two: economic rationales for monetary union are often spurious

The RZ was supported by the West. In the case of what was about to become the EU, this support had a political sub-text. The USSR collapsed within days of the signing of the Maastricht Treaty: so precisely at this the moment when Europe had agreed to launch a monetary union between sovereign states, the last thing European officials wanted was the awkward spectacle of the failure of a similarly constituted monetary union on Europe's doorstep. The IMF (hence also the US government) also began to support the RZ.

A popular economic argument was that since the FSRs would have no use for each other's new national currencies, payments in the absence of a RZ would be made in hard currency, thus draining already meagre reserves. This line of reasoning naturally led to consideration of a payments union (Gros 1991), while ignoring the risks entailed by such an approach, including postponing the introduction of convertibility and delaying the exposure of the FSRs economies to world market. This approach encouraged trade on a passive basis, relying on the same supports as under the old regime of central planning, and delayed the development of comparative advantage (Granville 1993 and 2002). The argument based on protecting trade links among the FSRs was flawed on several counts:

Trade links were not based on comparative advantage
All commercial relations within the Former Soviet Union (FSU) were fixed by the Soviet central planners, resulting in the share of inter-republican trade in total trade ranging from 31 percent (Kazakhstan) to about 70 percent for Belarus (Havrylyshyn and Williamson 1991). Intraregional trade before price liberalization was mispriced and mostly done on a barter basis, leading to hoarding, black markets and shortages (Dornbusch 1992a). Most of the Soviet trade was based on products for which there was no demand. FSRs state enterprises acted under a 'soft budget constraint' (Kornai 1979) free of competitive market constraint, they supplied goods to other republics, regardless of their needs, capacity to pay, banking on the CBR credits to settle the transaction. They "survive *despite* their performance rather than because of it" (Gaddy and Ickes 2002, 3). To argue like the Western powers did in 1991 and 1992 that the RZ had to protect Soviet-era trade relations to avoid short-term supply disruptions therefore amounted to telling the FSRs to maintain the Soviet Union and the artificial economic mechanisms on which it was based.

FSRs have no use for each other's national currencies
This reasoning was fallacious as the degree of intra-regional dependency in trade among FSRs and the introduction of national currencies was misleading. In intra-regional trade, the key was free trade at free prices, as "price reform is the only absolute prerequisite to maintain trade […] without price reform goods will not move, at least not in official hands" (Dornbusch 1992a, 7) and introducing convertibility. Once FSRs introduced their own national convertible currencies and let their currencies float (Sachs 1993a), their exchange rates could move to a level eliminating both internal and external imbalances. Nor did FSR national currencies threaten supply chains in Soviet-era industries anchored in Russia: as long as these currencies were

convertible for trade transactions, payments could be made in rubles (Granville 1992; Michalopoulos and Tarr 1992; Sachs and Lipton 1992).

While there was a gravity argument based on the distance between the FSRs (Dornbusch 1992a), once national currencies were introduced and prices liberalized, FSRs' inter-republican trade decreased (from 57 percent in 1992 to 33 percent in 1997) (Åslund 2002). Resource allocation improved when trade started to be valued at world prices and barter diminished (Michalopoulos and Tarr 1992).

Russia should provide cheap energy to other FSRs

As stressed by Michalopoulos and Tarr (1992), introducing international prices for trade was essential to improve resource allocation, but this meant that raw materials and energy exporters such as Russia and Turkmenistan would see huge terms of trade gains, while importers like Belarus, Moldova and the Baltics would suffer losses estimated at anything between 10 and 20 percent of GDP. The solution for Western powers was that, given that these FSRs could not afford raw material and energy imports from Russia at world prices, Russia should shoulder the burden.

Direct budgetary transfers were thus complemented by implicit trade subsidies to the other FSRs in the form of underpriced oil and raw materials (IMF 1994). Russia, Kazakhstan, Turkmenia, and Azerbaijan provided implicit trade subsidies to the other FSRs in the form of underpriced oil and gas (IMF 1994), while Russia, as well as Ukraine, Uzbekistan, Kyrgyzstan and Kazakhstan, provided transfers by accepting overpriced imports of non-oil and gas goods (Orlowski 1993). Orlowski (1993, 3) estimated that "in 1990 the oil and gas sector accounted for almost 61.5 percent of total transfers through underpriced exports". In the chaos of the early 1990s these republics were able to exploit the price differential with world prices and to re-export cheap energy and raw materials to the world market, making a substantial profit.

Åslund (2002) compares the estimates of Orlowski (1993) and Tarr (1994) showing how close these estimates were, but also reveals the burden of these implicit transfers on Russia (Table 1).

Western countries restricted trade access

While trade was essential to the FSRs in this period of transition, access to western markets was restricted,

Table 1

Interrepublican implicit transfers of GDP, 1990 (% of GDP)

	Tarr (1994)	Orlowski (1993)
Armenia	– 11.1	– 9.2
Azerbaidjan	– 6.7	– 10.1
Belarus	– 11.4	– 8.9
Estonia	– 13.5	– 12.1
Latvia	– 11.6	– 10.4
Lithuania	– 15.6	– 17.1
Georgia	– 12.1	– 16
Kazakhstan	3.4	– 0.5
Kyrgyzstan	– 1.3	– .7
Moldova	– 18.8	– 24.1
Russia	4.5	3.7
Tajikistan	– 6.9	– 6.1
Turkmenistan	15.9	10.8
Ukraine	– 6.9	– 3.6
Uzbekistan	– 1.9	– 1.3

Sources: Åslund (2002) compiled with data from Tarr (1994) and Orlowski (1993).

contributing to an almost 10 percent decline in FSU exports to OECD countries from 1991 to 1992 (Teplukin 1993). Partnership and Co-operation Agreements (PCA) between the EC and Russia and Ukraine were postponed. Russian demands for a free trade agreement (beyond the Most Favorable Nation – MFN - and Generalized System of Preferences conditions provided by the Agreement) ended up with the inclusion of an explicit statement in the PCA that a free trade area was its aim.

Restrictions on market access were imposed on textiles, steel, aluminum, coal, uranium and high-tech goods. In 1992, about twenty anti-dumping cases were filed by both the United States and the EC. The cost of these protectionist measures against Russia is estimated by the IMF to be equivalent to 1 billion US dollars, which is broadly equivalent to the amount of bilateral credits provided by the West in that year (IMF 1993; Granville 1995).

Lesson three: monetary unions may dissolve when economic realism prevails in the core

A warning signal that deserves attention is a division of opinion between the IMF staff and the Fund's major Western government shareholders. By the end of 1992, Russia was on the brink of hyperinflation owing to the actions of the CBR under Gerashchenko. The late Boris Fyodorov (1958-2008) was appointed Deputy Prime Minister and Minister of Finance. Fyodorov prioritised the fight against inflation and credits to FSRs were a major target. The incentive to

limit the cost of the RZ was strengthened by negotiations with the IMF on a new credit line facility especially designed for Russia (the Systemic Transformation Facility - STF). By this time, the IMF had recognised the need for each of the FSRs to introduce their own national currencies (Granville 2002).

Most of Russia's negotiated technical credits to the FSRs had reached their limits; it was therefore easy not to renew them. In April 1993, the government and Supreme Soviet of Russia in agreement with the IMF decided to abolish technical credits; and all previous credits to FSRs accumulated over 1992/93 were transformed into state debts (denominated in US dollars and with an interest expressed in Libor) and all new credits were channelled through the budget in accordance with government agreements. This gave Fyodorov direct control over the level of financial transfers to the FSRs. The total credit lines opened to FSRs in 1993 were limited to 895 billion rubles, but in fact never exceeded 595 billion rubles (Ministry of Finance report, 'Russian Finances in 1993' quoted in *Voprosy Ekonomiki* 1994, 1, 76). In addition, unlike the previous technical credits, these new credit lines were tied to purchases of specific Russian goods.

The only remaining loophole for the FSRs seeking rents from the RZ was cash. From the end of 1992 onwards, cash supply became less regulated than non-cash rubles – reaching 3.1 percent of Russian GDP by the start of 1993 compared to 2.1 percent of GDP during the first nine months of 1992 (Granville 1994). Cash shortages in the RZ during the first half of 1992 had been eliminated in the third quarter of 1992 by the printing of bank notes with larger denominations. The CBR provided cash rubles on demand, with the restriction that only bank notes issued between 1961 and early 1992 (with a denomination of less than 10,000 rubles) were delivered to FSRs. The FSRs' demand for cash increased sharply in the second half of 1992 and continued to rise in 1993 in the face of the tightening of credit policy to FSRs described above (IMF 1994). In the second quarter of 1993, cash issued to non-Russian members of the RZ increased by Rb674 billion compared with Rb97 billion during the first three months of that year. With non-cash rubles under control, cash rubles now became the main danger for Russian monetary policy. With the tightening of credits, most of the RZ members introduced coupons as a complement to cash ruble, freeing up some of the liquidity to be spend in Russia.

In the end, the CBR itself took the initiative to put a stop to this situation by unilaterally announcing the withdrawal of pre-1993 ruble notes from circulation on 24 July. This final blow to the RZ was thus inflicted by its staunch defender – Victor Geraschenko – although his motives were unclear (Åslund 1995). The FSRs of the ruble area still using these notes found themselves in a situation where their money ceased to be legal tender in Russia. The 1993 banknotes were therefore only distributed in Russia to withdraw the circulation of the pre-1993 notes meant to introduce a Russian national currency. The FSRs were forced to choose between: introducing their own currencies; or opening negotiations with Russia on a 'new style ruble zone' (NSRZ).

A NSRZ agreement was signed on 7 September 1993 by representatives of Russia, Kazakhstan, Uzbekistan, Tajikistan, Belarus and Armenia (Granville and Lushin 1993). The next step was the signing of standardised bilateral agreements on the harmonisation of economic policy and legislation between Russia and the above mentioned states. Kazakhstan signed such an agreement on 23 September 1993.

The Russian motivation for exploring the possibility of a soundly-based monetary union was partly political – to do with the fate of the large minorities in the FSRs, which were ethnic Russian or simply thought of themselves in national terms as Russian - and weigh considerably on the decision to create the NSRZ. The motive of the FSRs was to avoid any abrupt interruption of their source of easy credit, even if the price to be paid was some loss of control to Moscow.

From the start, it was clear that the fixed deadline of end-1994 to achieve the targeted convergence of legislation and regulatory mechanisms was unrealistic. During the transition the future members of the NSRZ were supposed to unify their economic legislation with Russia and demonstrate that their monetary and fiscal policies were in line with those of Russia. If this and only if this was successful, Russia would replace cash money with 'new' rubles and transfer the bank account balances from national currencies into rubles.

Fyodorov succeeded in rallying considerable support from all parts of the government and from the President's office, further isolating Gerashchenko in his desire to revive the RZ. It became clear to all parties that macro-stabilisation could not take place in

Table 2

Introduction of FSRs national currencies

	Coupons	New currencies
Armenia		dram: 22 November 1993
Azerbaijan	manat: 15 August 1992	manat: 1 January 1994
Belarus	rubel: 25 August 1992 'Zaichik'	Belarusian ruble, 1 January 1994
Estonia		kroon: 20 June 1992
Georgia	coupons: 5 April 1993	lari: 2 October 1995
Kazakhstan		tenge: 15 November 1993
Kyrgyzstan		som: 10 may 1993
Latvia	rublis: 7 May 1992 lats: 28 June 1993	rublis: 20 July 1992 lats: October 1993
Lithuania	talonas: 1 May 1992	talonas: 1 October 1992 litas: 15 June 1993
Moldova	coupons: June 1992	leu: 29 November 1993
Tajikistan		pre-1993 ruble: 8 January 1994 somoni: 30 October 2000
Turkmenistan		manat: 1 November 1993
Ukraine	karbovanets: November 1991	karbovanets: November 1992; hryvnia: 2–16 September 1996
Uzbekistan	coupons: 16 November 1993	som: 1 January 1994

Sources: Press reports; Interfax; IMF (1994), Annex 3; national banks.

Russia in the face of a disorderly arrangement with the FSRs. The position of the Russian government hardened after the violence that followed Yeltsin's decision to dissolve the Supreme Soviet on 21 September 1993. During the visit of Russian negotiators to Alma Aty and Tashkent on 22–24 October, the Russian side declared that the mere unification of economic legislation was not enough; and that real economic convergence was necessary. It was stated that this should be achieved by the FSRs first introducing their own national currencies and demonstrating over a period that monetary convergence could be achieved.

The controversy between the members of the NSRZ culminated on 26-28 October 1993 when the Russians responded to pressure from the Uzbek and Kazakh governments to deliver cash in new ruble bank notes by issuing the following conditions (Lushin 1993): cash would be provided on credit for half a year with 210 percent annual interest payments (the CBR refinance rate); one half of the cash delivery should be backed by gold and hard currency as collateral; countries receiving Russian cash should commit themselves not to introduce their own currency for five years; if after 6 months the Russian conditions for monetary integration were not met, the whole credit should be paid back in hard currency or precious metals. If integration proved possible, state debt should be designated as non-interest state credit.

In the face of such tough conditions Kazakhstan and Uzbekistan decided to introduce their own currencies on 15 November 1993. By early 1994, all other RZ countries followed this lead, with Belarus bringing up the rear. The only exception (until 2000) was Tajikistan, which decided from the start to remain in the NSRZ, whatever the conditions (and thus effectively confirming its status as a Russian protectorate).

Lesson four: the mirror image of lesson three

What this story of the abortive NSRZ shows is that, when confronted with the reality that monetary union to avoid intolerable economic consequences must entail political union, countries on the periphery of the currency zone preferred to opt out of the monetary union rather than sacrifice their sovereignty. An authoritative body of economic literature supports this conclusion: "political unity is the glue that holds a monetary union together. Once it dissolves, it is most likely that the monetary union will dissolve" (Bordo and Jonung 1999, 25). Similarly, Bela Balassa's theory of economic integration (1961) also stresses that monetary unions do not work without political integration. The viability of monetary unions depends on the participating countries acting like the good citizen imagined by John Stuart Mill in *On Liberty* – that is, that they are willing:

> "to be guided, in case of conflicting claims, by another rule than his private partialities; to apply at every turn, principles and maxims which have for their reason of existence the common good" (Mill 1946[1861], 150).

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Lessons from Trade and Payments between Centrally-Managed Economies

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All grand schemes to change the world tend to be far better at pointing out the failings of the *status quo* than at providing detailed plans on how to improve the situation, and particularly at showing – or even at outlining – how to achieve this ideal state. The catastrophically murderous utopias of the twentieth century proved no exception to this rule, but also managed to wreak devastation on a massive scale. It is worth recalling the background to these utopias, which can teach us lessons that can – and should – be generalised.

A society of the future without blueprints

The founders of Marxism made a virtue out of a necessity. In contrast with the numerous so-called utopians of the 19th century, they considered themselves superior – or 'scientific' – because they did not 'draw maps of the future', or certainly not in any detail. Instead, they stuck to the broadest of outlines. Their vision of tomorrow's society would be a continuation of the grand trends of the 19th century Western Europe, and at the same time a dialectical negation of them. Friedrich Engels, in particular, lived to see the first phase of the technological revolution of the late 19th – early 20th centuries. He saw many of the seeds of the future in this revolution, which would bring about huge productivity gains and goods in abundance as a result. Crucially, Karl Marx had already highlighted the Coasian contrast between hierarchically structured industrial organisations and supply and demand-based markets. In the society of the future, and the former would win over the latter – on an economy-wide and international scale.

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This remained a fundamental pillar of pre-World War I socialist thought. German and Austrian theoreticians added little to what they had adopted from Karl Marx and Friedrich Engels. The argument remained unchanged, despite challenges from the Austrian School of theoretical political economy, which should perhaps more aptly be called social philosophy. It was never answered in any way before Oskar Lange, the general equilibrium economist at Chicago University, provided a neat argument for market socialism in the 1930s. Lange returned to his native Poland after World War II, but there is no evidence that he intended the market socialist solution to be implemented in practice. In Poland, as in many other Central European societies taken over by the Soviet Union and its local subordinates, the only solution available was to adapt the Stalinist Soviet model of central management and – over time and across countries to a varying degree – the model of dictatorial political regimes too.

This was a huge paradox. Not only had there been no 'map of the future' available. In addition, towards the end of their lives, both Marx and Engels spent a great deal of time pondering whether their historical schemes were at all applicable to Russia. Early in his life Marx had argued that Russia was little more than a peculiar example of the oriental despotism most pronounced in China. The country nevertheless had vibrant revolutionary movements with what the Marxists would call a utopian world-view. Over time self-defined Marxists also emerged. Marx died in 1883 before these movements arose and Engels, who lived until 1895, was also unable to provide an answer to Russian 'scientific socialist' dilemmas.

As late as 1917 Vladimir Lenin, an emerging Russian Marxist theoretician and aspiring revolutionary leader, had resigned himself to the thought that 'we, the Revolutionary elders' would not live to see socialism in Russia. He was 46 years of age at the time. In fact, the Tsarist regime collapsed speedily under the pressures of World War I, industrial development and political protests. After a civil war the mortally ill Lenin and his comrades found themselves leading a huge country ranging from the borders of Poland and Finland to the Pacific Ocean, from the Arctic to

Central Asia. Russia was an agrarian country, where industries and cities had grown fast, but peasants accounted for the overwhelming majority of population. They had only been freed from serfdom in the 1860s. As a key political concession, the peasants had been promised land-rights by the Bolsheviks or Communists, as the Left-wing Russian Social Democrats called themselves after the revolution. This promise was to be revoked in dictatorial fashion and with deadly consequences within less than just ten years.

As is sometimes the case in history, the total collapse of the Tsarist regime gave way to revolutionaries who had not expected to reach power, and had little idea of what to do with it. The Socialist revolution was supposed to take place in highly developed Germany, which would somehow then show the way and provide the models for Russia and other less developed societies. Having gained power, however, the Russian communists were not about to give it away. In their view, the hierarchical ways in which war economies had been organised in Germany and elsewhere, and the ruthlessly military organisation of the Russian society fighting a Civil War proved important glimpses of the Socialism-in-One-Country solution to be built in time.

It is somewhat incredible – and another lesson to be learned – that despite all this, the Soviet centrally-managed system was established in just a few years, basically between 1928 and 1932. More strangely still, and against all the odds, it survived until 1990/1991. Even then there was no fundamental economic reason for it to collapse, or at least not in the absence of basic policy mistakes committed by the Gorbachev leadership, which was advised by the best Soviet reform economists of the time.

Before the system could be established, however, Russia had to take a breather and recover. It also had to re-organise itself, and consider what to do next. The years from 1921 to about 1927 were a peculiar period. The foundations of centralised political dictatorship were laid, but at the same time, some liberties were allowed in the economy. The Golden Age of Russian arts, literature and sciences is usually considered to span several decades prior to 1914. A Silver Age followed in the 1920s.

Several key economists of the 20th century had a Russian background, but they or their parents left the Soviet Union early. Mathematical economics had been introduced in Russia by V. K. Dmitriev at the turn of the century. He was also an early precursor of the input-output–thinking further nurtured in the 1920s and refined by Wassily Leontief, who left the Soviet Union in 1931. Key issues of economic development were later addressed by Alexander Gerschenkron, who, however, left Ukraine as a teenager in 1920, and was educated in Austrian Economics in Vienna. Evsey Domar, originally Domashevitsky, was born in Lodz, Russian Poland, and raised in Harbin, Manchuria, where many Russian emigrants resided at the time. He moved to the United States in 1936.

The post-revolutionary brain drain deprived the Soviet Union of a generation of high-class economists. It is true that some economists educated during Tsarist rule had key roles in the development of Soviet economics, even until the 1960s and early 1970s. Often in disguise, and with varying degrees of public acceptance, people like V. V. Novozhilov and Stanislav Strumilin were carriers of earlier traditions, and to the expert eye, especially since the death of Josef Stalin in 1953. The most important Soviet economist, however, was Leonid Kantorovich, born in 1912. He was the sole recipient ever of the Nobel memorial prize in economics born and living in a centrally-managed communist-dominated country, and originally a Leningrad mathematician. An early developer of linear optimisation and optimal planning theory, he proposed his methods for application to Soviet planning authorities in 1940. They, however, probably did not understand what Kantorovich had written about, and had other, more pressing worries to think about. In all events, they lacked the computing capabilities and credible statistics that would have been needed to back up Kantorovich's ideas. Optimal planning theory later rose to be the prominent challenger of Marxist-Leninist – as it was by then called – orthodoxy. It provided useful tools, but failed to modernise Soviet central planning in the way that Kantorovich and others wished.

The USSR was the first country ever to announce, publicly and with a lot of fanfares, high growth as the overwhelming economic policy target, and this happened with the first five-year plan in 1928. The Soviet economic debates of the Silver Age had little, if any, direct impact on the plan. The planning apparatus in existence until the collapse of the Soviet Union was developed over just a few years. It is true that Soviet economic planning and management probably did not have the degree of consistency in practice that they did on paper, which is so evident now to economists and economic historians, who have taken a thorough

backward look at the turbulent years from 1928 to about 1963. Statistics were mixed with propaganda, errors and lies. Given the speed and turbulence of change, what actually happened is uncertain at best. There is, in any case, little doubt that the Soviet economy grew rapidly in the 1930s and also, with the recovery from the war, in the 1950s.

Its growth performance had two roots. The country's investment ratio rose from its traditional level of around 10 percent to 30+ percent in the course of just a few years. Deciding on the allocation of investment was something that the Communist leaders always wanted to retain as their prerogative. There was never a clear-cut dividing line between political and economic decision-making. In the beginning, as the existing dictatorship – some would even call it despotism – made it possible to keep the list of priorities short, it included investment goods and military equipment. Karl Marx had already argued with numerical examples in his often neglected *Das Kapital,* volume 2, that a growth economy needed to increase the production of investment goods faster than that of consumer goods. The Soviet system first made this an inviolable dogma, but as despotism gave way to dictatorship, and finally to a tough form of authoritarianism, consumption could no longer be neglected. This fact was driven home first in Eastern Germany in 1953, then in Hungary, in the Soviet Union (in Novocherkassk in 1962) and finally in Czechoslovakia in 1968. Priorities proliferated, but the political leadership still wanted to have the final say on investment allocation. Work for them, however, was getting more complicated. Economic advice was called for, but it was never allowed to question the fundamentals of the system.

As a result, there was always little for the plants to decide. This was in contradiction with the proliferation of priorities. Here was a key reason for the slowdown in growth culminating in economic stagnation in the early 1970s. Political stagnation also set in that was to continue until the perestroika policies of Mikhail Gorbachev as of 1985.

Tinkering at the margins, not reforming

The situation was deeply paradoxical. Proposals to improve the system had been called for and delivered ever since the early 1930s. They could never, however, come even close to addressing the fundamentals of the system. There was, over the decades, only one important proposal for radical economic reform. In 1970 and 1971 Nikolai Petrakov, a prominent Soviet economist, proposed for the Soviet Union what was actually to be the original Chinese economic reform concept of 1978. He was rewarded with a publishing ban of four years. The Soviet model had proven incapable of reform, at least outside of China. Petrakov was born in 1937. As one of the chief economic advisors of Mikhail Gorbachev, Petrakov belonged to the last Soviet generation who still hoped and worked for an improved, more efficient and humane centrally-managed society. Later generations would not share such illusions.

The Soviet high investment share growth model was formalised as the Domar–Harrod model in the 1950s, but Soviet economic growth can also be seen from another angle. Like in 19th century Britain, labour was moving from low productivity farms to higher productivity factories, from the countryside to cities and towns. The scale of movement was huge in the Soviet Union, and its speed unprecedented. Only a dictatorship combining coercion with incentives like access to better housing and improved access to food could implement it. Several millions of peasants perished.

One more lesson emerges. The Soviet model itself was not planned. No blueprint for it ever existed. Economists were encouraged to tinker at the margins, but attempting to offer proposals on deep reform was highly risky. The system, as it emerged, nevertheless had a logic of its own: resource mobilisation with ensuing excess demand in key sectors, priority-based planning and soft budget constraints. The fact that it did follow some logic, so it must be concluded, also provided the system with a survival capability. This and much more was scrutinised by Janos Kornai in the 1970s and 1980s.

Foreign trade and investment

Until 1945 this was Socialism in One Country, not by choice but by necessity. Foreign trade and investment had been important for Tsarist Russia. A simple structure of flows had emerged. Russia had become the major grain exporter of Europe. Investment goods and luxuries for the elites were imported. Foreign investment, both direct and financial, was important too. The Swedish Nobel brothers established the first modern oil industry in the world in Baku, today's Azerbaijan. They also built the first-ever commercial

oil pipeline, from the Caspian to the Black Sea. Siemens and many others followed suit.

The reform-minded civil servants of late Tsarist decades like Sergey Witte and Pyotr Stolypin detected a colonial trade pattern here. Exchanging grain and wood for technologies and luxury goods was not a matter of rational division of labour for them, but somehow humiliating. This complaint was prominent all through the Soviet decades, and is still heard. One must ask, however, what might – in addition to large domestic markets – be the relative advantage of Russia without the blessing of rich natural resources. Without them, Russia would be badly squeezed between low-cost Asia and high-technology Western Europe.

These Tsarist-era foreign investments, however, were lost in the Communist revolution. The Soviet Union had a large domestic market, and while some potential investors were tempted in the 1920s, after 1928 the Soviet Union essentially became closed territory. Technology imports for industrialisation, however, played an important role. In propaganda films, rows of tractors plough the black earth of Ukraine. Looking carefully one sees Fordson written on their sides. A Ford plant had been imported, using money earned from grain and wood exports, and established in Leningrad. There are many other such examples, but only for the priority industries. A large share of technology imports were negotiated, while others were, and still remain, non-negotiated, and are based on scientific and industrial espionage and related activities.

To simplify a complex picture, the Soviet economists of the 1920s were debating paths of economic development. Stalin and his colleagues chose a ruthless dictatorial path that had been previously proposed by nobody. Since the 1930s most people calling themselves political economists engaged in propaganda and scholasticism. There were a few proponents of planning rationalization, like Kantorovich mentioned above. The post-Stalinist generation included genuine reformers like Petrakov. But all through the decades, as far as we know, little if any scholarly attention at all was devoted to the foreign economic relations of the Soviet Union. Ideologically, the country was supposed to be the model of a bright revolutionary future, but what the economic relations of future communist and aligned countries were to be like was not discussed. Perhaps that was all supposed to be the Soviet Union magnified, but by the 1950s and 1960s that simply was not a credible image of future by any stretch of the imagination. It is true that there were economists specialising in developments in Eastern and Central Europe, but they were scarce, severely constrained by political orthodoxies that changed over time, and had little impact on Soviet domestic discussions. Ignorance of China, India, Cuba and Vietnam was wide and deep.

The Second World War brought about three unforeseen additional inflows of foreign technology. The first one was lend–lease assistance provided by the United States. It was particularly important to the mobility of the Soviet military from Moscow to Berlin. Small Studebaker trucks are legendary in Soviet war novels, and the aggregate figures are imposing: 375,833 trucks, 51,503 jeeps, 14,795 airplanes and 185,000 telephones, as well as almost half of the tyres used and half of the trails built during the war. The scale of the support received by the Soviet Union is about one third of the assistance received by Britain.

The second inflow was imbedded in war reparations. The allied powers had agreed in 1943 that the ancient tradition of imposing a burden on the losers in war would also be observed in the case of the Second World War. The Versailles Treaty had imposed a probably non-excessive burden on Germany, but unfortunately stipulated that the reparations should be paid in currency, which Germany was actually largely unable to earn. After 1943 the value of war reparations for countries like Bulgaria, Romania and Finland was established in dollars, based on what were supposed to be 1938 prices. Fortunately, the reparations were to be paid in commodities, not in currency. In the case of Finland, for example, most reparations were paid in engineering industry products like vessels and steam locomotives for trains. They were a useful contribution to the excess demand economy that the Soviet Union was at that time, particularly as the country had become a truly Baltic Sea state by taking over the Baltic countries, and its stock of locomotives had suffered badly at war.

Crucially, the Soviet leadership was thinking deeply in terms of geopolitics. One main current of Russian 19th century thinking had defined enlargement as the Russian national idea. A victory in the Second World War offered the possibility to once again pursue both direct and indirect enlargement. The Baltic countries were annexed and Poland was geographically shifted westwards. In 1945/46 the Soviet occupation zone of Germany was essentially looted. Based on an agree-

ment between the Allied powers, the Soviet Union took over German property in occupied lands. In Austria, property held by the Jewish population had been taken over by Germany after 1938. Some 300 companies were turned into Soviet property in eastern parts of Austria as a result.

According to current, very uncertain estimates, the value of property transferred from Hungary may have been 1.5 billion dollars, while that from Austria may have amounted to 1.4 billion, 1.5 billion from Romania and property from the German occupation zone was worth 10–19 billion dollars.[1] These figures are in dollars for that period. Adjusted for inflation, today's values may be ten times larger, in other words simply huge. These were not promising starting points for relations during the years to follow.

Transporting the Soviet model

Soviet geopolitical thinking argued that after war, victorious states would change occupied states according to their own models. A communist political take-over was complete in states ranging from eastern parts of Germany to Bulgaria by 1948. Yugoslavia was a different story, and Finland was never occupied and always remained a democracy with a market economy.

The American approach to preventing a repetition of the Second World War was not totally different. A new constitution was established in Japan. After the original idea – also supported by the Soviet Union – of making Germany a militarily weak agrarian-industrial state was abandoned, the Western Allied states helped West Germany to stabilise its economy and embark on the *Wirtschaftswunder*. The Marshall Plan is remembered for the monetary aid that it provided, but more importantly it was, as Barry Eichengreen and others have noted, the largest scale technical assistance programme of all times. It is inconceivable that the transformation of Western Europe would have been as fast as it proved without the guiding hand of the United States. In just ten years Western Germany was being integrated into military cooperation between democratic states, the spaghetti bowl of some two hundred European bilateral trade agreements was replaced by the beginnings of economic integration, welfare levels were rising, and there was no probability of Communist or any other extreme left – or right – domination in any of the countries involved.

The availability of democratic alternative political leaderships in key countries like Western Germany and Italy, but not in Spain and Portugal, was naturally also of central importance. These countries knew that the future belonged to Atlantic cooperation, which was also the safeguard against possible Soviet Communist aggression.

None of this was true in what came to be called Eastern Europe. There was at least some support for the adoption of the Soviet model in all countries involved, but it did not represent the free will of the population anywhere. Although prominent economists from Oskar Lange through Michal Kalecki to – somewhat later – Janos Kornai emerged in Poland and Hungary, none of them had pondered the characteristics of the Soviet-type economy, none had planned how it could – or why it should – be established in their respective countries, and none had thought about the rules and institutions of trade and other economic relations between Communist-ruled centrally-managed economies.

The only model available was that of the Soviet Union, but it had been developed as a mobilisation economy, in response to the growth, industrialisation and urbanisation needs of a predominantly peasant-dominated poor country. That was not an apt characterisation of all the Eastern European countries. By the late 1980s some of these countries were to boast that they had once been normal European countries – whatever that might have meant – and they were now returning to Europe. In fact, agriculture was never socialised in Poland, and the country had a power center in the Catholic church that acted as a kind of an alternative to the Communist rule.

The second major problem was that the Soviet Union was not a truly monetised economy. Although labour power was managed by administrative methods and there were non-market routes of access to consumer goods, households basically lived in a monetised economy. They reacted to wage differences and some consumer goods markets – the so-called *kolkhoz* markets – fundamentally had flexible prices. This was in contrast with the state sector of plants, ministries, planning and management agencies and the monobank. The planning and management of production and distribution was fundamentally in physical terms. Prices

[1] See articles in Gertrude Enderle-Burcel *et al.* (eds. 2006), *Zarte Bande,* Mitteilungen des Österreichischen Staatarchives, Special Issue 9, Vienna.

of some kind were needed for planning, control and statistics of heterogeneous items like 'steel'. Furthermore, this was not a true command economy: plants and their employees were given incentives for 'fulfilling and over-fulfilling' plans from the outset. Therefore, even monetary values used nominally for reasons purely of aggregation had an impact on economic behaviour. Some planned targets were always more advantageous than others.

In view of all this, a key issue in all proposals to modernise or reform the Soviet economic system was about finding the proper basis for prices and incentive schemes. Whatever the proposals, they always moved on the cost plus–basis and did not aim to balance supply and demand.

This was not a good starting point for international economic relations. The ruble exchange rate was one of the arbitrary prices. This was addressed by establishing so called foreign trade coefficients. In the case of the Soviet Union in its later decades, several thousands of these coefficients effectively amounted to commodity, country and time specific exchange rates. This was a true jungle mastered by nobody.

Joint central management and multilateral trade – alternative illusions

If sub-national planning had existed, this may not have been an unsurmountable problem. But no such planning existed, even if the Soviet Union was the dominant centrally-managed economy in Europe. The scale of the exercise would have been excessive, the Soviet Union could not simply dictate its will over the other countries, and the political crises starting with Eastern Germany in 1953 showed what a touchy issue was at stake.

Joint central management was aired as the preferred alternative by the Soviet Union in late 1950s and early 1960s, but that was not a feasible alternative. The uneven distribution of country size, economic potential and political goals condemned any such ideas with the same degree of realism as the propaganda on reaching full communism and an abundance of commodities in the Soviet Union in the foreseeable future. This is an obvious lesson for European integration.

Finally, the commodities produced and consumed in these economies can be divided somewhat neatly into 'hard' and 'soft' commodities. Hard commodities had relevant world market prices. Soviet oil and gas, Romanian oil products, Polish coal and to a degree Czechoslovak cars and machinery were examples of hard commodities. Many other commodities were more or less hopelessly soft. The key problem was that the distribution of produce into hard and soft commodities differed between countries, and devising somewhat efficient and equitable exchange relations was impossible in principle, though inevitably tried in practice.

Just as the Soviet Union was never an autarchy, the group of European centrally-managed economies could never become one either. Moreover, whatever the official goals set for 'socialist economic integration', trade inside SEV (or Comecon, as the integration arrangement established in 1949 was usually called in English) always remained a huge network of bilateral agreements between countries. This naturally had also been the case in Western Europe until about the mid-1950s, but the lack of joint management on one hand, and the absence of congruent market economies on the other, made this an inevitable outcome.

Bilateral trade relations were executed using equally bilateral clearing payment arrangements nominated in Soviet rubles. There were some mostly project-tied multilateral arrangements, but they were few and did not – usually at least – involve all the SEV-countries. With the advance of Western European integration the goal was also set for SEV to become a truly multilateral arrangement, with the 'convertible ruble' taking over the role that the Soviet ruble had played. It is totally unclear how a centrally-managed economy might have a convertible currency, and the discussion above has provided many reasons why a convertible rule never actually emerged. The name existed, but that did not hide the fact that what existed behind the name was the same old Soviet ruble. Pretensions of ruble convertibility were, in fact, abandoned within a few years.

The prices used in intra-SEV trade were supposed to be cost-based. In the case of hard commodities, world market prices had to be taken into account. According to an agreement, the oil price was to follow the world market price of the five previous years. This implied that when the world market price rose, the Soviet Union suffered major book-keeping losses. The other countries, naturally, had suffered and continued to suffer hugely from their forced transformation into

Soviet–type economies. In 1938 the income level in independent Estonia was at least as high as in Finland. By 1990 the income gap on the Gulf of Finland was huge. The people of Northern Estonia could usually follow Finnish TV, and Soviet authorities interpreted advertisements for meat shops as seriously harmful anti-Soviet propaganda.

In practice, prices in intra-SEV trade varied hugely. Information on Hungarian trade in the mid-1960s is available.[2] Hungary exported 1,020 commodities to at least two SEV-countries. For 293 commodities price differences exceeded 25 percent. For 45 commodities the variation was 100 percent or more. As could be expected, variation was particularly widespread for machinery and equipment, as well as industrial consumer goods.

Bilateralism was an issue for those market economies willing – for one reason or another – to pursue major trade with centrally-managed economies. Finland was a case in point. Exports to the Soviet Union averaged from 1952, when war reparations were finalised, to 1990 as fifteen percent of total exports. There was a peak in 1982/83, when the Soviet share was about a quarter. Due to particularities the 1953 share was even higher. This figure is a couple of percentage points higher if the smaller centrally-managed economies are included.

Finnish exporters liked bilateral trade, especially when the price of oil increased, providing additional room for Finnish exports on the clearing account. Until about the 1980s Finnish export industries had competitiveness problems in Western markets, while, although trade was supposed to be priced at world market levels, exports to the Soviet Union were assumed to be of above-average profitability. There were, however, limits to the amount of oil Finland could absorb, and finding new goods to import was next to impossible. Therefore, early in the 1950s, trade policy came up with triangles. Finland would import coal from nearby Poland. In the statistics, this was accounted for as Finnish imports from the Soviet Union, and Finnish profitable exports could be increased. How the accounts were written between Moscow and Warsaw was not a matter worried about in Helsinki. In 1957, however, Poland and other Eastern European countries declined to continue triangle trade. There was obviously a joint decision behind this unwillingness.

Given the small volume of Finnish trade with centrally-managed economies other than the Soviet Union, it is no surprise that some hopes were placed on SEV–integration. Perhaps it would create a common market. These hopes, as we now know, were misplaced. Bilateralism was decided on in 1957 and 1963, but never implemented. As late as in 1974 Finland traded with the Soviet Union bilaterally, using the ruble as the clearing currency. There was also bilateral trade with Eastern Germany, Hungary, Romania and Bulgaria. The US dollar was usually used as clearing currency, with the exception of Romania, with whom the ruble was used. Annually renewed dollar–based trade was pursued with Poland and Czechoslovakia on an 'experimental' basis as of 1970 (the impact on trade flows was subject to debate.) As centrally-managed economies started joining the IMF, bilateral trade between any two IMF member countries was naturally ended. To complicate matters further, trade with China was bilateral, but used Finnish *markka* as the trading currency. Very low volumes of trade with Cuba and Yugoslavia were based on dollars.

An afterword

The reasons why the ruble zone between former Soviet republics was not a feasible alternative after the collapse of the Soviet Union are mostly clear from the discussion above. In addition, some new or re-constituted states wanted little to do with the others. Other states had been effectively forced into independence. Institutional and economic policy competence was not only in short supply everywhere, it was also very unevenly distributed.

[2] Sandor Ausch cited in Michael Ellman (2014), *Socialist Planning*, 3rd edition, Cambridge: Cambridge University Press.

To Be or Not to Be in the Ruble Zone: Lessons from the Baltic States

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To be or not to be, that is the question!
Shakespeare, 1604

Introduction

This paper discusses the experiences of the Baltic states in using the ruble before and after the break-up of the Soviet Union in 1991 and their subsequent decisions to leave the ruble zone and introduce national currencies. Estonia was the first country to introduce its own currency in 1992, with Latvia and Lithuania following shortly afterwards. The decisions of the Baltic states to leave the ruble zone were partly the result of political considerations, but the uncertainty and instability of the ruble after the Soviet break-up also made it practically infeasible for the Baltic states to continue using the ruble.

The collapse of communism in Central and Eastern Europe and the break-up of the Soviet Union after the coup in August 1991 are momentous historical events. These political processes were accompanied by similarly dramatic changes in the economic environment, including changes in the arrangements of international trade and investment. Trade between the CMEA countries, the socialist countries in Eastern Europe and elsewhere, had taken place using the transferable ruble, but this system started losing importance as of the end of the 1980s and ceased to operate altogether at the beginning of 1991 (Smith 2000).

The Baltic states were under occupation by the Soviet Union until August 1991. They were fully integrated in the Soviet economic system, which included the use of the ruble and participation in the external relations of the Soviet Union with CMEA and non-CMEA countries. When the Baltic states began the process of reforming their economies, the question was essentially whether they should continue to use the ruble and if not, then how it should be replaced. Such decisions involve economic, administrative and political considerations and typically entail thorny trade-offs. Moreover, the decisions had to be taken at a time when the Baltic states were experiencing a myriad of other economic and political challenges.

The rest of the paper is organised as follows: the second section provides a brief review of the literature on the choice of exchange rate system. The third section recounts the plans for separate currencies in the Baltic states before they regained independence. The fourth section discusses the developments in the period once the Baltic states had regained independence, but still continued to use the ruble. The fifth section describes the introduction of national currencies in these countries. Finally, the sixth section distils some lessons from the break-up of the ruble zone and the introduction of new currencies in the Baltic states.

Exchange rate systems

The use of money or currency is a key feature of the economy in all civilised countries including the communist planned economies. Money functions as a medium of exchange, a measure of value and a store of value. Money played a lesser role in the planned economies because the allocation of resources was partly determined by various plans, but households nevertheless used money in roughly the same way as households in market economies.

The exchange rate is the rate at which one currency can be exchanged for another. The exchange rate system refers to the arrangements or rules governing how the exchange rate is determined and managed. The choice of exchange rate system involves economic, administrative and political considerations and typically implies complex trade-offs (Staehr 2015a).

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The *impossible trinity* captures some key economic trade-offs. It posits that a country cannot have a fixed exchange rate, an independent monetary policy and free capital movement all at the same time, but must choose two of them. If the authorities cannot or do not wish to place effective restrictions on capital flows, the only remaining options are a floating exchange rate with independent interest rate setting, or a fixed exchange rate with the domestic interest rate shadowing the interest rate of the anchor currency. A floating exchange rate might lead to excessive exchange rate fluctuations and uncertainty may hamper international trade and financial transactions. A fixed exchange rate restricts the instruments available to policymakers and also carries the risk of exchange rate misalignment.

A fixed exchange rate works by the central bank standing ready to exchange domestic currency for foreign currency and *vice versa* at the stated exchange rate. A fixed exchange rate is vulnerable to speculative attacks if a capital outflow threatens to deplete currency reserves. One way to address this credibility problem is to run the fixed exchange rate in the form of a currency board, whereby the foreign-currency value of the domestic base money never exceeds foreign currency reserves (Kopcke 1999). There will then, in principle, always be foreign currency available to honour the commitment of the fixed exchange rate.

Another way of addressing a possible credibility problem is to unilaterally adopt the currency of another country or currency area. This policy means abandoning the domestic currency completely and makes it virtually impossible to alter the exchange rate, as this would require the introduction of a new domestic currency. One drawback of the unilateral adoption of another currency is that any seigniorage revenue is relinquished.

Yet another route to full exchange rate stability presents itself if it is possible for a country to join a currency union. Unlike unilateral adoption, a currency union affords the participating countries some influence over the monetary policy of the union, and typically also allows for seigniorage revenue to be distributed to all participating countries. The nature and formal rules of currency unions make it difficult to leave; and in this sense a currency union represents an extreme form of fixed exchange rate system.

Participation in a currency union eliminates all exchange rate uncertainty against other countries in the union, which may stimulate trade and cross-border investment and lead to efficiency gains as a result. A currency union, however, also functions as a straitjacket, ruling out that a participating country devalues or lowers its interest rate. Mundell (1961) argued that the lack of exchange rate and monetary policy instruments in a currency union means that it would only be advantageous to form or join a currency union if there were typically no need for different monetary policies in the participating countries. This may be satisfied if certain conditions are met and these have a bit confusingly become known as the theory of the optimal currency area (OCA).

The key OCA criterion is that the business cycles of the participating countries should be synchronised so that the same monetary policy would be appropriate in all of the countries (Mongelli 2002; Staehr 2015a). This may be the case if the countries are mainly subjected to economic shocks that are common across the union and have economic structures that propagate the shocks in relatively similar ways. It is notable that a currency union may help bring about synchronisation of the business cycles if it stimulates trades and financial flows between the countries of the union in ways that lead the economies to become more similar (Frankel and Rose 1998). Moreover, if there are flexible labour and product markets in all of the countries, various economic shocks would have limited effects on output and unemployment and a joint monetary policy would be unproblematic.

Even if business cycles are not synchronised there may still be other circumstances under which the loss from giving up independent monetary policy is limited. If labour mobility exists between the countries in the union, unemployed persons from a country affected by an adverse economic shock may migrate to countries with a stronger cyclical position. Finally, substantial fiscal transfers between the countries in the union will make it possible to pursue strongly countercyclical fiscal policies and this would reduce the costs of countries not having an independent monetary policy. A government that considers whether or not to be a member of a currency union may start by examining how well the country satisfies the various OCA criteria.[1]

The choice of a fixed exchange rate system, including currency boards and currency unions, reduces the set

[1] Other OCA criteria that have been proposed include financial market integration, economic openness, diversification in production, similarities of inflation rates, and fiscal and political integration.

of available economic policies, but may improve predictability and facilitate cross-border trade and investment. These positive aspects rely, however, on the notion that the economic environment of the anchor country or currency union exhibits an appropriate degree of stability and predictability. This implies that the trade-off between efficiency gains from exchange rate stability and the availability of economic instruments is altered if the anchor country or currency union features monetary instability and high and unpredictable inflation.

Countries or currency unions prone to monetary instability may experience 'dollarization' or currency substitution, whereby transactions are carried out using a foreign currency, or the domestic currency value of the transactions is indexed to the exchange rate. The main argument for a fixed exchange rate dissolves if the anchor country or union is prone to instability and widespread currency substitution.[2] The attractiveness of a fixed exchange rate is evidently dependent on the anchor country or currency union affording a high degree of monetary stability and predictability.

Before 1991

The Soviet ruble was the currency of the Soviet Union and, by implication, also the currency of the Baltic states. The Soviet economy was a planned economy where resources were allocated under a complex system of plans, so the exchange rate played a secondary role. The Soviet ruble was tied to the pound sterling until the beginning of 1992 at the rate of 0.4 rubles per pound, but it was not convertible with any other currency.[3] Prices were fixed with few exceptions and open inflation was low or non-existent; stable prices were indeed touted by the Soviet authorities as one of the great achievements of the planned economy. Alongside the standard ruble used in Russia, the transferable ruble was used for trade with the CMEA countries.

For decades repression in the Soviet Union ruled out any public discussion of independent economic policies, including exchange rate policies. This changed in 1986 when General Secretary Mikhail Gorbachev began wide-ranging reforms, the best known of which were perestroika and glasnost, economic restructuring and political openness. The reforms aimed to modernise the economy, speed up innovation and productivity growth, and make producers more responsive to consumer demands. The rigid planning system was decentralised and local authorities, including those in the Baltic states, gained more autonomy. Enterprise reforms meant that the remuneration of managers and workers could be determined to a larger extent at the enterprise level.

Gorbachev's reforms had a number of unintended consequences, both politically and economically (Conway 1995). The political liberalisation meant more coverage of corruption and the abuse of power in the media, but it also meant that a popular front or independence movement could form in each of the Baltic states. The initial objective of the popular fronts was increased self-rule within the Soviet Union, including a degree of economic self-governance, but demands for outright independence started gaining momentum from around 1987.

The second unintended consequence of Gorbachev's reforms was a rapid deterioration of the economic situation in the Soviet Union. An early anti-alcohol campaign reduced the tax intake from alcohol taxes. The enterprise reform, with its greater autonomy for managers, meant that wages went up, resulting in declining profits; and this led to further deterioration in the fiscal balance because profit taxes were a major source of revenue. Meanwhile production growth did not pick up as intended and there were large increases in social spending. These and other events led to severe budget imbalances that were eventually monetarised. The results were repressed inflation in markets with fixed prices, open inflation in *Kolkhoz* markets with free price setting, and rising premiums in the black exchange markets (Dabrowski 1995a).

The political thaw and increasing economic hardship were the backdrop to plans drawn up in all three Baltic states to introduce economic self-determination and some form of independent currencies. These currencies would have symbolic significance, but they also gained economic rationale during the period of declining growth and growing open and repressed inflationary pressures.

In the autumn of 1987 a group of four government officials and economists published an economic self-

[2] Taking this to its limit, membership of a currency union with extreme inflation and widespread currency substitution would effectively imply adoption of the substitution currency.

[3] The Soviet Union had a notionally fixed exchange rate and set interest rates independently; which was made possible by very tight restrictions on capital movements in and out of the country, see the impossible trinity discussed in the previous section.

management programme known by its Estonian acronym *IME* in a leading newspaper (Kallas *et al.* 1988). The programme called for a high degree of autonomy, meaning that economic decisions in the Estonian Soviet republic were to be governed at the level of the republic, and not by the union authorities. Moreover, the economy was to be governed by the principles of supply and demand, where prices reflect relative scarcities. The programme also suggested the use of an internationally accepted convertible ruble, but the specifics were not spelled out. Overall, although some elements were hazy, the IME programme effectively called for a market economy on the territory of Estonia (Lainela and Sutela 1995; Dabrowski 1995b). The IME programme became a key landmark for the popular front and the reformed Estonian communist party.

The programme may be seen as unrealistic or utopic given that Estonia was a Soviet republic at the time whose economy was tightly integrated into the Soviet planned economy. It is worth noting, however, that Hong Kong at this point in the 1980s had become a prosperous and fast growing country, largely through its economic intermediary role functioning as a bridge between communist China and the rest of the world. Hong Kong had its own currency linked to the US dollar through a currency board; and the convertibility and stability of the Hong Kong dollar was an important component in the emergence of Hong Kong as a key trading nation.

It is also notable that the IME programme stressed that production and trade should be based on market economic principles. This might potentially have led to large changes in trade flows and production. Given the proximity of Estonia to Western European markets, Estonia may have started trading with these markets, instead of almost entirely with other parts of the Soviet Union. Such a reorientation of trade could have changed the trade-offs involved in the choice of exchange rate system. Looking forward the Soviet ruble did not necessarily have to be the first choice.

The popular front in Latvia also gained momentum during the Perestroika period, but the communist party did not support the front in the same way as it did in Estonia and Lithuania, but it split in two instead. There were also less specific proposals for future economic reforms and it was only in 1990 that a specific proposal for an independent currency was put forward (Lainela and Sutela 1995).

The Sajudis movement in Lithuania was arguably the strongest proponent of independence in the Baltic states (Dabrowski 1995b). The movement published a programme in 1988, which stressed the need for increased economic autonomy, including a Lithuanian central bank and an independent currency.

Political developments in the Baltic states advanced rapidly in the years from the political thaw in 1986 to independence in 1991. The national fronts adopted platforms of national autonomy, market economic reforms and the introduction of independent currencies. The fronts became the dominating political powers and the parliaments or supreme Soviets had all passed legislation by the middle of 1989 setting out the foundations for independent economic policymaking and market economic systems.

Starting in 1990 the Baltic states introduced important economic reforms within business establishment, price liberalisation, taxation and public administration. Estonia was a front runner in liberalisation and freed many prices in autumn 1990, while Latvia and Lithuania followed suit in 1991. The reforms introduced what was effectively a nascent or hybrid form of market economy, and they also led to stronger economic contacts between the Baltic states and countries in Western Europe. The reforms also meant the re-establishment of central banks answering to local authorities, but new currencies and an independent monetary policy were clearly outside the realm of feasible policies.

The programmes for introducing independent currencies were never realised while the Baltic states were still republics in the Soviet Union, but they were nevertheless of significance. They meant that the Baltic states had planned ahead for a time when independent policy-making would be possible. They may also have contributed to the process of political change, given their strong symbolic connotations. Evidence of this contribution is that independent currencies would have required some political anchoring, and hence would only have been feasible in a scenario where the Baltic states would have substantial political autonomy.

By 1991 the Baltic states were in many ways caught in legal and economic contradictions. They had declared independence, but were still part of the Soviet Union. They had sought to reform their economies, but remained part of the Soviet planned economy and used

the Soviet ruble as legal tender. All of this changed after the coup in Moscow in August 1991.

The early transition phase

The Baltic states regained their independence in August 1991 and in a short period afterwards all of the former Soviet republics declared independence and the Soviet Union ceased to exist at the end of 1991. The 15 countries emerging from the Soviet collapse differed considerably in size, economic development and the degree to which their economies were distorted (de Melo *et al.* 2001). They were, however, tied by their history and close economic relations, including the continued use of the Soviet ruble.

The democratically elected governments in the Baltic states moved ahead as early as the autumn of 1991 with further liberalisation of price setting, trade and production, and initiated the process of privatisation. They also embarked on programmes of structural reforms that would underpin the emerging market economies.

An aspect of key importance was the choice of exchange rate system. The countries inherited the use of the Soviet ruble, and as such, participated in what could be labelled an accidental currency area. The ruble went by a historical incident from being the currency of the Soviet Union to being the currency of a ruble zone comprised of the 15 countries emerging from the Soviet Union. The question was then whether to remain in the currency union or to stake out other solutions; the main alternative being the introduction of some form of independent currency (Dabrowski 1995a).

There were arguments for and against remaining in the ruble zone. One key argument was that the overwhelming majority of trade by the Baltic states was with countries from the Soviet Union. Retaining the joint currency would reduce transaction costs and exchange rate uncertainty; and thus reduce the disruption of trade and financial ties between ex-Soviet countries. Moreover, countries would largely be affected by the same supply and demand shocks, one of the OCA criteria.

There were also arguments for leaving the ruble zone and introducing independent currencies. A least two of the OCA criteria discussed in the second section were not satisfied. The mobility of labour between different countries in the currency area would clearly not be present between the 15 ex-Soviet countries, and it was similarly unrealistic to expect financial transfers between countries in the ruble zone to continue.

The key economic argument for leaving, however, was the instability and monetary disarray that had already started to engulf the ruble zone from the autumn of 1991. The ruble zone became a source of extreme instability and unpredictability; and possible gains from ex-Soviet countries sharing the same currency were therefore nullified (Dabrowski 1995b). Another reason was the prevailing shortage of cash, which led several ex-Soviet countries to introduce cash substitutes in the form of coupons and vouchers (Medvedev 2003).

The instability of the ruble zone was partly a result of developments that occurred before the collapse of the Soviet Union. More important, however, was the lack of virtually any institutional underpinning or common governance of the ruble zone, which made it possible for individual countries to engage in free riding. By virtue of the common currency each of the 15 central banks in the newly independent countries could issue credit to banks, firms and national government. The national authorities earned the full seigniorage from the credit provision while the inflation tax was borne by the public across the entire ruble zone. The end result was very rapid credit growth, increasing hidden and open inflation, and eventually currency substitution (Conway 1995).[4]

Table 1 shows the annual consumer price inflation in the Baltic states and Russia.[5] Inflation was already high in 1990, but it increased in the following years. The Baltic states liberalised their prices before Russia did and this was why inflation was higher in the Baltic states than in Russia in 1990 and 1991.

Interestingly, while central bank credit grew rapidly in the ruble area, the supply of bank notes changed little, simply because the printing presses were situated only in Russia. This led to a cash drought in parts of the ruble area with resulting difficulties for everyday shop-

[4] The Russian central bank tried to restrict the issuance of credit by the 14 other central banks from the middle of 1992, but the measures were not very effective because there were many exceptions (Dabrowski 1995b)

[5] Monthly rates of consumer price inflation are available for the three Baltic states in OECD (2000). The monthly inflation figures exhibit substantial variability, partly related to rounds of price liberalisation.

Table 1

Consumer price inflation in Estonia, Latvia and Lithuania, per cent, 1989–1994

	1989	1990	1991	1992	1993	1994
Estonia	6.1	23.1	210.5	1 076.0	89.8	47.7
Latvia	4.7	10.5	172.2	951.2	109.2	35.9
Lithuania	2.1	8.4	224.7	1 020.5	410.4	72.1
Russia	2.0	5.6	92.7	1 526.0	875.0	311.4

Note: Annual percentage change in the average consumer price index.

Source: EBRD (1996).

ping and other operations using cash. Foreign currencies were increasingly used in transactions at all levels in the economies of the 15 ex-Soviet countries. Meanwhile, the emergence of barter arrangements and widespread arrears equally indicated that the use of the ruble did not facilitate trade and investment across the 15 countries emerging from the Soviet Union (Abdelal 2003).

The developments after the break-up of the Soviet Union in August 1991 showed clearly that the ruble zone was prone to free riding; and hence could not even provide a modicum of credibility or stability. A key weakness was the lack of any institutions for coordinated monetary policy-making and the sharing of seigniorage (Dabrowski 1995a).[6] Moreover, the use of the ruble did not bring any major benefits in trade with CMEA countries since the old transferable ruble system had essentially ceased to function by 1991.

Many experts, including the IMF, initially recommended that the Baltic states should remain in the ruble zone regardless of the problems afflicting it (Pomfret 2002; Boughton 2012). The key worry was that leaving the ruble zone would reduce already dwindling trade volumes and exacerbate substantial GDP contractions. This argument carried less weight as the instability of the ruble zone persisted and it became clear that it was not politically possible to establish the institutional framework for a functioning currency area in the 15 ex-Soviet countries.[7]

In conclusion, there were political, economic and institutional factors all suggesting that membership of the ruble zone would only be judicious for the Baltic states for a limited period of time. This does not mean, however, that it was simple for them to leave the ruble zone, as the Baltic economies were closely integrated into the Soviet economy and were in a precarious situation. The next section discusses the process of leaving the ruble zone for each of the Baltic states.

National currencies

The introduction of a new currency is typically demanding and involves a number of complex trade-offs (Staehr 2015b). The Baltic states chose different ways of exiting the ruble zone and introducing national currencies (Staehr 2015c).

Estonia left the ruble zone in June 1992, when it introduced its new national currency, the *kroon*. The currency was pegged to the German mark at a rate of eight kroons per mark through a currency board. This meant that the central bank would always hold foreign currency reserves at or in excess of the foreign currency value of the domestic money base (see also the second section). Eesti Pank did not set interest rates and had only a limited ability to act as a lender of last resort.

There are two striking features of the Estonian currency reform. Firstly, it went directly from inadvertent membership of the ruble zone to a very tight peg to another currency, the German mark. The authorities were not averse to a pegged exchange rate, but they preferred to peg the kroon to a stable currency with a history of low inflation. Secondly, when the currency board was introduced the only major economy with such an arrangement was Hong Kong. The choice of a tight peg of the kroon to a currency much used in international trade and investment suggests that the authorities drew inspiration from the then British colony. The choice was also in line with the IME programme; see also the third section.[8]

The experiences of autumn 1992 showed that the kroon was indeed a viable currency, and foreign capital started to flow into the Estonian economy (Korhonen 2000). Eventually inflation came down and positive growth was restored. The kroon also became a potent national symbol. The Estonian presi-

[6] It might be argued that the closest institution in which to anchor a common monetary policy would be the Commonwealth of Independent States (CIS). In practice, the decision-making of the CIS was limited and the Baltic states were not members of the organisation anyway.

[7] There were some attempts to reconstruct the ruble zone in 1992–94 but they were unsuccessful (Dabrowski 1995b). By May 1995 all 15 ex-Soviet countries had introduced their own currencies.

[8] Formal currency boards were later adopted by Lithuania in 1995, Bosnia and Herzegovina in 1997, and Bulgaria in 1999.

dent declared on the first anniversary of the new currency that "[t]he kroon is the anchor of Estonia's political and economic success… It is not just a piece of paper, it is a symbol of our independence" (*The Independent* 1992).

Latvia chose a more gradual approach to currency reform. The country launched a temporary currency, the *rublis*, in May 1992, which was meant to address the shortage of cash rubles and circulated alongside the ruble at a one-to-one conversion rate. Latvia introduced its own national currency, the *lats* in March 1993.

Latvia initially chose a floating exchange rate system, partly because its foreign currency reserves were low, but the country switched to a fixed exchange rate at the beginning of 1994 after an inflow of capital led to an unexpected appreciation of the *lats*. The lats was pegged to the Special Drawing Rights (SDR), an accounting currency devised by the IMF with a value computed as a weighted average of the exchange rates of key economies. The fluctuation band was very narrow and the reserve coverage very large, so it might be argued that the country operated a de facto currency board from 1994 (Wolf 2016).

Lithuania first introduced a temporary currency, the *talonas*, in August 1991. The talonas was to be used together with the Soviet ruble for purchases in Lithuania, in effect preventing people from other countries from purchasing goods in Lithuania. A new version of the talonas was put into circulation in May 1992 and it was made the sole legal tender in Lithuania from October 1992.

The national currency, the *litas*, was launched in June 1993. The currency was floated initially, but it lacked credibility in currency markets and the exchange rate fluctuated considerably. The authorities therefore decided to adopt a currency board and to peg the litas to the US dollar from April 1994. The fixed exchange rate led to a rapid decline in inflation, but the peg to the dollar meant that the exchange rate fluctuated a great deal against many European currencies (Korhonen 2000).

The Baltic states were among the first ex-Soviet countries to introduce new national currencies. By the end of 1994 all three countries had pegged their currencies to a stable currency through an outright or *de facto* currency board. The currencies became the backbone of stability oriented policies on which the countries developed in the following years. The systems were kept in place until the countries one-by-one adopted the euro in 2011–2015.

At the time when the Baltic states introduced their national currencies the ruble zone might have appeared to constitute a better 'fit' than the Western currencies to which they eventually pegged their new currencies. This was the case from a static perspective, but perhaps less so in a dynamic context. By pegging their currencies to Western ones the policy-makers in the Baltic states effectively expressed an aspiration to reduce their dependence on trade with Russia and other countries emerging from the Soviet Union, and orient their foreign economic relations towards other countries instead. This means that although the ruble zone might have been the closest to an OCA in 1992, it was not likely to have remained so in the longer term.

Final comments

The Baltic states were at the forefront of the Soviet disintegration in the years up to 1991 and were subsequently among the most determined of the newly independent countries in taking steps to break with the Soviet past. The choice of exchange rate system and whether or not to remain in the ruble zone were among the many contentious policy items.

It was not politically feasible to use any currency other than the Soviet ruble before the Baltic states regained independence in August 1991. Misguided policies meanwhile debauched the currency, leading to an accumulation of hidden inflationary pressures and gradually to open inflation. The outbreak of extreme inflation from 1991 meant that the costs of retaining the ruble increased markedly, while the benefits faded rapidly as trade and payment volumes declined. In June 1992 Estonia became the first country to leave the ruble zone and introduce its own currency, and Latvia and Lithuania followed suit shortly afterwards. When Russia eventually introduced its own currency in 1993 the suggestion of a common currency in the ex-Soviet countries was finally put to rest.

The developments in the late 1980s and early 1990s bear lessons of historical import, but they are also relevant for the choice of exchange system in small open economies and the operation of currency unions in general. Three key lessons stand out.

The first lesson relates to the applicability of the OCA theory, the theory addressing whether a country would be better off in a currency union or with independent exchange rate and monetary policies. The theory posits that there will typically be a trade-off. Participation in a currency union will improve predictability, and hence reduce risks and the transaction costs associated with international trade and investment. Fixed exchange rates will, however, rule out the ability of the country to use monetary or exchange rate policies as tools to stabilise the economy if the country is hit by idiosyncratic or country-specific shocks. This means that there may be a trade-off between the efficiency gains likely to arise from a fixed exchange rate and the loss of instruments that can stabilise the business cycle.

The experience from the years before and after the break-up of the Soviet Union showed that these considerations take second place if the currency of the currency union is debauched and subject to monetary and financial instability. The purported gains from the absence of an exchange rate are simply overshadowed by the costs of participating in a currency union with financial instability and high, erratic inflation.

The second lesson concerns the prospect of maintaining the ruble zone for a longer period of time. The ruble zone that emerged after the collapse of the Soviet Union was essentially the result of historical events and not the result of any concerted policy measures. The events during 1991-1993, and arguably also in the period before, suggest that the prospect of an enduring ruble zone was never realistic. In retrospect it is clear that the conditions for creating a common currency area in the post-Soviet space were never present. The economic, political and institutional upheavals were so profound that it would be impossible to put in place the institutional environment and governance structures that such a currency area would need for it to provide stability and predictability. Moreover, the centrifugal political forces and the very different orientations of the 15 ex-Soviet countries would have made it unrealistic in political terms to preserve the ruble zone anyway.

The third lesson concerns the sustainability of currency areas in general, and of the euro area in particular. History shows that many currency areas have disintegrated after operating for some time. The main reason is typically political disagreement and unilateral actions that preclude the measures needed to keep the currency union together after severe economic shocks or other disruptions (Bordo and Jonung 2003). The rapid disintegration of the ruble zone is a case in point. The ruble zone was exposed to severe economic and political disruptions, and there was no political will to address these challenges.

These lessons from the collapse of the ruble zone and other currency areas were indeed acknowledged when the euro area was drawn up (Issing 2008). A currency area can only be sustainable if there are clearly specified rules for its purpose, operation and joint decision-making and the political willingness to keep it together during periods of severe strain. Moreover, membership of a currency area is only attractive if it provides stability and predictability.

Estonia joined the euro area in 2011, followed by Latvia in 2014 and Lithuania in 2015. The Baltic states have thus joined at a time when the euro area is under strain from the sovereign debt crises, banking sector problems and low rates of economic growth. The challenges have been considerable and at times have imperilled the euro project. The Baltic states have brought with them their experiences from the collapse of the Soviet Union and the disintegration of the ruble zone. These experiences point to the need for determined and concerted decision-making to sustain the euro in the face of severe economic and political challenges. The demise of the ruble zone may indeed represent a reminder of the perils of free-riding and political inaction.

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Currency Union and Disunion in Europe and the Former Soviet Union

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More or fewer currencies in Europe?

Across Europe and the former USSR, there are more currencies in use today than a quarter of a century ago. For most Europeans the central focus has been on the long-running saga of creating a single currency for the European Union (EU), a process that can be traced from the 1970 Werner Report through the Snake and European Monetary System (EMS) to the current situation whereby twenty-one European countries use the euro, which is the official unit of account of the EU.[1] Yet, dissolution of the Yugoslav, Soviet and Czechoslovak currency unions more than offset adoption of the euro, at least by the simple measure of the total number of national and common currencies in use: 27 in 1991 and 29 in 2016 (Tables 1 and 2).

This paper first asks why the ruble zone broke up, despite efforts by twelve of the former Soviet republics to maintain the common currency after the dissolution of the USSR in December 1991, and whether the currency break-ups in former Yugoslavia and Czechoslovakia were similar in nature. The paper then examines the currency union process within the EU to ask what lessons can be drawn for the Eurozone from the dissolution of the ruble zone, and in what ways the Eurozone is a significantly different type of currency union.

Was the ruble zone an optimum currency area?

The unanticipated dissolution of the Soviet Union in December 1991 created a dilemma for policymakers in the new independent states. While creating national institutions, they wanted to temper the inevitable economic chaos following the collapse of central planning as supply chains and demand links were disrupted in the formerly integrated Soviet economy. The desire for an anchor of stability was most apparent with respect to the common currency. Apart from the three Baltic states, the Soviet successor states continued using the ruble through 1992 and generally seemed accepting of the situation.[2] By the end of 1993, however, the ruble zone had collapsed. Why was the collapse so sudden and complete, and why was the main technical tool used by economists to analyse the common currency a poor guide?

The dissolution of the USSR was unexpected and leaders of the new independent states attempted to maintain the common currency in order to reduce economic disruption. Continuation was encouraged by the IMF, which provided technical support with analysis based on optimum currency area (OCA) theory.[3] The OCA analysis assumes effective management of the common currency, but the ruble zone's institutional framework was unstable because of the free-rider problem.[4] Failure to recognise that institutional weakness meant that the collapse of the ruble zone took two years, during which serious monetary stabilization was not really possible for countries in the ruble zone. Even as late as September 1993,

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[1] 'EU' is used here to also cover the EU's predecessor organisations since the Treaty of Rome.

[2] The three Baltic states moved quickly to establish separate currencies (the Lithuanian *talonas* in April 1992, the Latvian *ruble* in May 1992, and the Estonian *kroon* in June 1992), although it was not always clear when these transitioned from being coupons or parallel currencies to a sole legal currency, e.g. the Latvian lats and the Lithuanian litas were declared 'permanent national currencies' in May and July 1993 respectively.

[3] The paper *Integration and Trade Policy in the Former Soviet Union* prepared by Max Corden for the UNDP/World Bank Trade Expansion Program in January 1992 was particularly influential. Corden, one of the leading international economists of his generation, had been Senior Adviser to the IMF in 1986-88 and in 1992 was appointed Professor of Economics at the Johns Hopkins University School of Advanced International Studies in Washington DC. The paper was widely cited in Washington, and circulated by both the UNDP and the World Bank (Corden 1992). For a retrospective debate on the IMF's role, see Odling-Smee and Pastor (2002) and Pomfret (2002).

[4] This had been recognised in other contexts (Casella and Feinstein 1989; Flandreau 1993). Optimal currency area theory dating from Mundell (1961) and McKinnon (1963) addressed the trade-off between the microeconomic benefits of reduced transactions costs with a universal currency and the macroeconomic benefits of an independent monetary policy and exchange rate flexibility. In practice, OCA theory has been dominated by macroeconomists arguing about conditions under which independent monetary policies are effective (Kenen 2002; Alesina and Barro 2002), with few economists emphasizing the micro benefits from common currencies (Krugman 1993; Rose 2000; Rose and van Wincoop 2001).

Table 1

European and Central Asian countries' currency, January 1991

Country	Currency	Country	Currency
Belgium*	Belgian Franc	Bosnia & H	Yugoslav Dinar
France*	French Franc	Croatia	Yugoslav Dinar
Germany*	Mark	Kosovo	Yugoslav Dinar
Italy*	Lire	Macedonia	Yugoslav Dinar
Luxembourg*	Belgian Franc	Montenegro	Yugoslav Dinar
Netherlands*	Guilder	Serbia	Yugoslav Dinar
Denmark*	Danish Krone	Slovenia	Yugoslav Dinar
Ireland*	Punt		
UK*	Pound		
Greece*	Drachma	Armenia	Soviet Ruble
Portugal*	Escudo	Azerbaijan	Soviet Ruble
Spain*	Peseta	Belarus	Soviet Ruble
		Estonia	Soviet Ruble
Austria	Schilling	Georgia	Soviet Ruble
Finland	Mark	Kazakhstan	Soviet Ruble
Sweden	Swedish Krone	Kyrgyz Rep	Soviet Ruble
Cyprus	Cyprus Pound	Latvia	Soviet Ruble
Malta	Maltese Pound	Lithuania	Soviet Ruble
Iceland	Icelandic Krone	Moldova	Soviet Ruble
Norway	Norwegian Krone	Russia	Soviet Ruble
Switzerland	Swiss Franc	Tajikistan	Soviet Ruble
Liechtenstein	Swiss Franc	Turkmenistan	Soviet Ruble
		Ukraine	Soviet Ruble
Albania	Lek	Uzbekistan	Soviet Ruble
Bulgaria	Lev		
Czechoslovakia	Krona		
Hungary	Forint		
Poland	Zloty		
Romania	Lei		
Notes: * EU member. Number of independent currencies = 27.			

Source: Author's own collection from different national information.

Armenia, Belarus, Kazakhstan, Russia, Tajikistan and Uzbekistan reaffirmed their commitment to a renewed ruble zone in a Moscow summit. However, once the collapse started in November 1993, the *dénouement* was rapid. Turkmenistan abandoned the ruble on November 1, Kazakhstan and Uzbekistan on November 15, Armenia on November 22, and Moldova on November 29.

In January 1992 all fifteen Soviet successor states used the ruble, and each of the new nations was a credit-creating center. Each government gained all the seigniorage from its own credit creation, but only bore a fraction of the inflationary costs, which were spread over the whole ruble zone. This created a free-rider problem, unless one country could impose its leadership or all countries agreed on monetary policy decision-making; and neither was possible in the ruble zone.

Russia had by far the largest economy in the ruble zone and controlled the issue of banknotes, but not the creation of credit. By delivering banknotes to other countries for just a one percent service charge and by underpricing some exports to ruble zone members, notably oil, Russia encouraged retention of the ruble zone in 1992, but fretted at the size of transfers to other members (estimated at 8 percent of Russian GDP in 1992 by Schoors (2003)). Meanwhile, some members objected to the political use of the levers; Azerbaijan, for example, believing Russia to be restricting delivery of banknotes, issued *manat* as a parallel currency. Other countries issued parallel currencies or coupons, most profligately Ukraine, where the ruble ceased to circulate by November 1992. Central banks increasingly differentiated ruble credits by the issuing country, discounting those from freer spending countries.[5] In July 1993, Russia issued new banknotes featuring the Russian flag, declaring the old Soviet banknotes no longer legal tender. The currency situation became increasingly complex and chaotic, nullifying the advantage of a common currency as a means of exchange.

[5] The Latvian central bank adopted this practice in July 1992 and it was gradually followed by other ruble zone countries.

Table 2

European and Central Asian countries' currency, and status with respect to the EU and Schengen, 2016

Country	EU	Schengen[a)]	Currency	Country	Status	Schengen[a)]	Currency
Belgium	1957	1995	euro	Iceland	EFTA/EEA	2001	ISK
France	1957	1995	euro	Liechtenstein	EFTA/EEA	2011	CHF
Germany	1957	1995	euro	Norway	EFTA/EEA	2001	NOK
Italy	1957	1997	euro	Switzerland	EFTA	2008	CHF
Luxembourg	1957	1995	euro	Albania	C2014	x	ALL
Netherlands	1957	1995	euro	Bosnia & H		x	BAM
Denmark	1973	2001	DKK	Kosovo[b)]		x	euro
Ireland	1973	x	euro	Macedonia	C2005	x	MKD
UK	1973	x	GBP	Montenegro[b)]	C2010	x	euro
Greece	1981	2000	euro	Serbia	C2012	x	SRD
Portugal	1986	1995	euro				
Spain	1986	1995	euro	Armenia	x	x	AMD
Austria	1995	1997	euro	Azerbaijan	x	x	AZN
Finland	1995	2001	euro	Belarus	x	x	BYR
Sweden	1995	2001	SEK	Georgia	x	x	GEL
Cyprus	2004	x	euro	Kazakhstan	x	x	KZT
Czech Rep	2004	2007	CZK	Kyrgyz Rep	x	x	KGS
Estonia	2004	2007	euro	Moldova	x	x	MDL
Hungary	2004	2007	HUF	Russia	x	x	RUB
Latvia	2004	2007	euro	Tajikistan	x	x	TJS
Lithuania	2004	2007	euro	Turkmenistan	x	x	TMT
Malta	2004	2007	Euro	Ukraine	x	x	UAH
Poland	2004	2007	PLN	Uzbekistan	x	x	UZS
Slovakia	2004	2007	euro				
Slovenia	2004	2007	euro				
Bulgaria	2007	x	BGN				
Romania	2007	x	RON				
Croatia	2013	x	HRK				

Notes: [a)] Schengen is from date of implementation; [b)] Kosovo and Montenegro use the euro but are not members of the Eurozone (i.e. cannot issue euros or participate in Eurozone decision-making); x = non-participant; C = date when EU candidacy was accepted (Kosovo and Bosnia and Herzegovina are considered to be 'in the queue' even though the EU has not yet accepted formal candidacies). EFTA = European Free Trade Association; EEA = European Economic Area.
Number of independent currencies = 29.

Source: Author's own collection from different national information.

Between May and November 1993, the non-Baltic former Soviet republics issued their own national currencies.[6] Kyrgyzstan, the most reformist successor state, quit the ruble zone in May because it wished to control inflation in order for the market economy to function more effectively, while Ukraine was keen to issue its own currency in order to have greater freedom to support uncompetitive enterprises or to fund price subsidies.[7] Once the extent of divergence in monetary policies became apparent, the collapse of the ruble zone was rapid. The striking feature of this history was the impossibility of having a common currency with multiple centres of credit creation pursuing vastly different monetary goals.

A second striking feature was the failure of the IMF to foresee the outcome in 1992. This was largely because internal discussion was within the framework of OCA theory, which identifies optimum currency domains in terms of a trade off between the micro benefits from lower transactions costs and the macro benefits of having the exchange rate as an effective macropolicy instrument. This framework for analyzing micro and macro benefits was irrelevant with an institutional framework where the free-rider feature provided a catalyst for hyperinflation (monthly price increases over 50 percent) in 1993. OCA theory was inapplicable to a dysfunctional currency arrangement.

[6] Pomfret (1996) provides details of the breakdown and further references. The Soviet ruble continued to circulate in war-torn Tajikistan, which did not issue a national currency until 1995. Given the new Russian banknotes, Tajikistan effectively had its own currency even if it did not control the money supply.

[7] Similar differences underlay the dissolution of the Czechoslovak common currency. In Yugoslavia, money creation to finance Serbia's fisal deficits became even more confrontational as the republics fought one another.

What are the lessons for the Eurozone?

The superficial lesson for the Eurozone concerns the need for a single central bank whose policy decisions are accepted by all zone members. This lesson has been learned, and the eleven national governments forming the Eurozone had much more similar ideas of desirable monetary policy than the disparate ruble zone governments.

On a deeper level, the collapse of the ruble zone fitted in with the common observation that almost all nation states have their own currencies. The exceptions are microstates, and the francophone African and Pacific states whose currency unions benefit from French support or the rand zone, whose smaller members benefit from South African support (Pomfret 2005). Russia was no longer willing to support the ruble zone after mid-1993, and the remaining ruble-zone members were large enough to consider national currencies as a feasible option.

An even stronger law of currency areas is that nations seldom have more than a single currency. A powerful argument for the one country – one currency pattern is that it is difficult to negotiate national budgets if sub-groups have a choice of currency in which to pay taxes or receive expenditures. This argument was illustrated within the EU by the speed with which disintegration of the Snake in 1976 was followed by establishment of the EMS after high-level negotiations in 1977/78. The common agricultural policy based on free internal trade at prices agreed upon after difficult negotiations was unstable when bilateral exchange rates fluctuated; and hence the fixed prices in national currencies varied (Pomfret 1991; Basevi and Grassi 1993). The EMS existed for two decades as a system of more or less stable bilateral exchange rates until it was replaced, for most of its members, by the euro as a common currency.

The history of western European monetary integration differed from the dissolution of monetary unions in eastern Europe (in former Yugoslavia and Czechoslovakia, as well as in the ruble zone) because the EU was headed towards closer integration. For the EU members committed to this vision, a common currency was a necessary counterpart to increasing policy and institutional collaboration and to the need for public-sector price comparability across members; the OCA micro benefits from reduced private-sector transactions costs were an added bonus, but not the *raison d'être* of the euro. Some EU members with strong commitment to lower trade costs remained outside the Eurozone, because they were less enthusiastic about the goal of ever closer union.

The logic of the EU integration project is that members should adopt the euro if they want to be part of the closer union. Otherwise, countries can use the euro for its transactional convenience, but should not have equal access to the integrated EU market (as Kosovo and Macedonia currently do, and as 'dollarized' economies such as Panama or Timor-Leste do with the US dollar on other continents), or they can be part of the integrated market with no input into determining the common policies (perhaps by paying an entry fee as Norway does to the EU).[8] Neither of these options can be considered as membership of the currency zone.

Conclusions

Although the leaders of the non-Baltic Soviet successor states were keen to maintain the ruble zone, or at least postpone its demise, the collapse of the ruble zone in 1993 was rapid and complete. The proximate cause was the existence of multiple centres of money creation. The deeper cause was lack of agreement among the leaders about desirable monetary policy; Russia had no means of imposing a common policy and was ultimately unwilling to buy compliance by other ruble zone members, while the other governments had widely differing views about the desirable monetary policy (or in some cases did not have a well-formulated view). In essentials, the collapse of the ruble zone resembled the collapse of Czechoslovak and Yugoslav common currencies, albeit more wrenching than the former and less violent than the latter.

The contrast between currency area disintegration in eastern Europe and currency area formation in western Europe over the last quarter century is striking. The simple lesson is that voluntary currency union requires agreement on the conduct of monetary policy, as in the case of the establishment of the European Central Bank. More fundamentally, the global pattern of one country – one currency had few exceptions in the late twentieth century. With the dissolution of Czechoslovakia, Yugoslavia and the Soviet Union as nation states, and their replacement by successor states with disparate economic and political goals, it

[8] On dollarization see Salvatore *et al.* (2003).

was inevitable, that the successor states would adopt national currencies (as had happened in the new states created after 1918). The Eurozone breaks that pattern because the EU is moving towards deeper integration and at some stage that process is at odds with independent currencies. In 2016 nineteen of the EU's twenty-eight members have accepted the logic of deeper integration requiring a single currency, while one EU member has decided it wants no further part in the process; the other eight face a difficult, but unavoidable, decision.

A final observation

Coverage of new currencies by the financial press in 1992/93 was overwhelmingly, and misleadingly, pessimistic. The *Financial Times* (15 May 1992) described the introduction of the Latvian ruble as 'a suicidal step'. A year later the *Wall Street Journal* ran a story on the difficulty of internal acceptability of Kyrgyzstan's new currency, while the *Far Eastern Review* ('Out of Steppe') and *The Economist* ('The Battle of the Som') also ran negative headlines. The New York and London-based media have been similarly pessimistic about the euro, even although it has now lasted for almost two decades and the number of Eurozone members has increased from eleven to nineteen, with no exits. For some reason, it seems difficult for commentators to accept that any change to the *status quo* might be an improvement, despite the fact that we live in a world of rapidly evolving international economic relations and have an international financial system that can scarcely be viewed as the finished item.

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Lessons from the Collapse of the Transferable Ruble System and the Joint Currency of Former CMEA Countries for the Eurozone

Patrick Conway*

The similarities were obvious: countries linked by a free-trade area and a common currency were divided into 'haves' and 'have-nots' by their ability (or inability) to finance budget and trade deficits. The tension between the goal of convertibility at par of the common currency and the desire to reduce the sovereign indebtedness of members led to increased pressure on the 'have-nots' to exit the common currency area. In the Council for Mutual Economic Assistance (CMEA) case (referred to here as the ruble zone), the desire to reduce exposure to sovereign debt won out and the members exited the area. Are there lessons from that case for the current situation of the Eurozone?

I conclude that although there are important similarities, there are also key differences in the two cases. While exits from the ruble zone were almost inevitable given the unstable economic conditions of all its members, the Eurozone offers a more stable environment for members and stronger economic partners. Should there be an exit, the member may well claim it was forced to leave; just as in the ruble zone, such an exit will be in response to a tightening of conditions for indebted members due to a perception that the latter were using low-cost borrowing arrangements without undertaking the budgetary adjustment necessary to re-attain a responsible membership position.

The Eurozone countries following the international financial crisis

To understand the sovereign-debt crisis in the Eurozone that began in 2010, it is necessary to return to the creation of the euro in 1 January 1999. As Thomas (2014) puts it:

> "In order to join the Eurozone, each prospective member agreed to adhere to a common set of standards pertaining to budget deficits and debt levels, price level behavior, bond yields, and other key economic variables. Leaders of the euro movement implicitly assumed that characteristically divergent economic behavior and performance across Eurozone nations would thus be reduced to manageable differences.
> This optimism turned out to be unwarranted. Peripheral Eurozone nations such as Greece, Ireland, Portugal, Spain and Italy continued to experience slower productivity growth and more rapid increases in price levels after joining the currency union than did stronger, northern members like Germany, Austria, the Netherlands and Finland.
> Induced in large part by the abnormally low interest rates that financial markets made available to such traditionally high interest-rate nations upon the 1999 introduction of the euro, major bubbles in credit and house prices were inflated in Spain and Ireland. These same low borrowing rates led to government spending sprees in Greece, Italy and Portugal".

The trigger for the international financial crisis that primarily affected advanced economies as of 2008 was the downturn in housing values in US real estate markets in the mid- to late-2000s. At its base, this crisis was rooted in a speculative bubble. Kindleberger (2000) was an early expositor of speculation, and documented that it would lead to a rapid run-up in price followed by a crash. In this case the primary bubble formed in the US real-estate market. While speculators believed that their purchase of credit default swaps had hedged their risks, the failure of the American International Group (AIG), the major issuer of these swaps, appeared to return the risk to the speculators. Many of these speculators were European banks. As Blinder (2014, 410) puts it, "when the housing and bond market bubbles burst, recession quickly descended upon Europe".

The sovereign debt crisis followed the international financial crisis by two years. With the deep recession,

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Greece, Italy and Portugal found it necessary to expand their budget deficits still further as tax revenues fell and social-protection expenditure rose. Ireland and Spain chose to guarantee delinquent private debt, thus greatly increasing their sovereign debt obligations. Financial market participants began to lose faith in the GIPSI governments' ability to service their obligations, leading to higher interest rates on their debt denominated in euros than the rates demanded of fellow Eurozone members Germany or the Netherlands. Serious thought has been given to the Grexit – the possible decision by Greece to leave the Eurozone. Should this occur, the other GIPSI members would be candidates too.

The CMEA countries and the convertible ruble

The CMEA (or Comecon) was established in 1949 as an analog and counterweight to the Marshall Plan in Western Europe. Its original members were Bulgaria, Czechoslovakia, Hungary, Poland, Romania and the republics of the Soviet Union. As Europe united within the European Economic Community (EEC), CMEA also attracted new members as its socialist alternative. As of 1987 the members of CMEA were Soviet Union, Bulgaria, Czechoslovakia, the German Democratic Republic, Hungary, Romania, Poland, Cuba, the Mongolian People's Republic, and Vietnam.

The stated purpose of the organisation was to enable member states to exchange economic experiences, extend technical aid to one another, and to render mutual assistance with respect to raw materials, foodstuffs, machines, equipment, etc. (Curtis 1992). International trade between countries was arranged in terms of physical quantities for a five-year period. The price for these goods was set by averaging the world price of the product or commodity in question over the five years previous to that arrangement. Trade was 'free', in the sense of occurring without tariffs, although the economic plans on which it was based effectively set quotas on bilateral trading volumes.

The International Bank for Economic Cooperation (IBEC) was established by the CMEA members in 1963 to facilitate international transactions among CMEA members, and between CMEA members and the rest of the world. IBEC's functions included making multilateral settlements, advancing credit to members to finance temporary trade imbalances, accepting deposits of uncommitted funds, accepting gold and convertible currencies on deposit, and conducting arbitrage and other financial operations with them (Prust 1993, Appendix 3).

In 1964 the IBEC introduced its common currency for denominating transactions among members: it called this currency the transferable ruble (TR). Each member's currency was linked to TR through administratively set fixed exchange rates and comprehensive exchange controls. The TR was defined to be equal in value to 0.987412 grams of pure gold, but it was never exchanged for gold by the central banks of these countries; nor was it exchanged for banknote (i.e. cash) rubles. Transactions at IBEC were government to government; very few non-governmental entities held correspondent accounts at IBEC. (Prust 1993, Appendix 3).

Curtis (1992) states:

> "Although the bank provided a centralized mechanism of trade accounting and swing credits to cover temporary imbalances, it could not establish a system of multilateral clearing given the centrally planned nature of the members' economies and the inconvertibility of their currencies. In 1987 the transferable ruble remained an artificial currency functioning as an accounting unit and was not a common instrument for multilateral settlement. For this reason, this currency continued to be termed 'transferable' and not 'convertible'".

While the TR was called 'transferable', it was non-transferable in an important sense. As Kenen (1991, 238) puts it, "if Poland built up a credit balance with IBEC by running a trade surplus with Hungary, it could not use the credit to finance a deficit with Bulgaria. For this and other reasons, each CMEA country sought to balance its trade bilaterally with each CMEA partner". Due to the essentially bilateral nature of transactions accounting, a 1 TR credit held by Poland was worth about 0.34 US dollars in Western imports in 1989, while at the same time a 1 TR credit held by Czechoslovakia was worth about 0.66 US dollars in Western imports. At that time, the 'official exchange rate' was 1 TR = 1.60 US dollars (Kenen 1991).

Among international reserve assets, the most similar is probably the Special Drawing Right (SDR) of the International Monetary Fund. Kenen (1986) provides a short description of this reserve asset, first authorized in a 1969 amendment to the IMF Articles of Agreement. It too was an accounting asset without

physical counterpart, and it too was only used in government-to-government transactions. The SDR had the advantage of true transferability, in that a credit earned in transaction with one country could be used to offset a debit to another country. It also differed from the TR in that it was distributed to IMF members strictly in proportion to their quota. While there was discussion in the 1970s and 1980s of a 'SDR-aid link' – a distribution of newly created SDRs to developing countries – this innovation was never approved by the members. With the TR, by contrast, the Soviet Union used TR creation to offset persistent bilateral trade deficits (often in energy products) between itself as exporter and other CMEA members as importers.

The IBEC phased out its accounting for trade transactions in TR as of 1 January 1991. From that point on, the unit of account was the European Currency Unit (ECU) – and as of 1 January 1999, the euro.

The centrifugal force of the ruble zone

The last years of the Soviet Union saw increasing Soviet budget deficits. These were financed through foreign borrowing and through the seigniorage captured by the accelerated creation of money and credit. In a market economy, this demand pressure will translate into increased consumer prices. In the Soviet Union of the time, there were price controls in place. This led to shortages of goods and services and forced saving by consumers unable to find goods and services at the stated prices. This forced saving translated directly into the seigniorage captured by the government in each period through creation of both cash rubles and bank balances (Conway 1995).

The TR was discontinued on 1 January 1991, but the use of rubles among the republics of the Soviet Union continued. The central bank of the Soviet Union, Gosbank, remained the monetary authority and hosted accounts for clearing inter-republican transactions. While Gorbachev's perestroika had led to greater autonomy in productive decisions, the history of central planning resulted in substantial inter-republican trade in raw materials and semi-finished goods, as well as in final products: payments for that trade from one republic to another continued to flow through Gosbank.

With the dissolution of the Soviet Union at the end of 1991, the ruble zone was created by the new political reality. Each republic established its own central bank based on the republican office of Gosbank. The Central Bank of Russia (CBR) also assumed the responsibilities of monetary authority for issuing cash rubles and served as the clearing-house for inter-republican transactions. The ruble zone of 1 January 1992 thus included all the former republics of the Soviet Union.

The economic difficulties facing these new countries are presented in detail in Conway (2001). They can be summarised as follows:

- Hyperinflationary pressures from the ruble overhang once price controls were removed.
- Ruble cash shortages in the ruble zone, as CBR cash issuance did not keep pace with demand for liquidity.
- A large fall in output due to the breakdown of normal commercial relations between suppliers and purchasers (often in different republics).
- The loss of financial transfers from the Soviet government to the republican government. In return, the republican government had rights to turnover tax revenues on commercial transactions. However, these revenues fell substantially during the post-independence period.
- Financial repression due to the negative real interest rates offered on saving instruments.

The governmental response in these republics to the resulting recession was, in most cases, to maintain consumer subsidies and social-protection expenditure, despite the large fall in tax revenues, thus giving rise to large republican budget deficits that were financed through the republican central bank.

The republican central bank had three avenues for refinancing this deficit. Firstly, it received seigniorage from paying out any cash rubles shipped to it from the CBR. Secondly, in many republics the central bank issued its own cash supplement, or coupon, to meet the demand for liquidity. Thirdly, the republican central bank ran a deficit, or overdraft, on its correspondent account at the CBR.

These overdrafts were pervasive among ruble zone members. The CBR as the monetary authority of the ruble zone went through four stages in its response to these overdrafts. At the beginning of the crisis (in the first half of 1992) it accepted the overdrafts and extended zero-interest 'technical credits' to overdraft countries. In mid-1992 it changed its policy and imposed ceilings on the size of overdrafts. In early 1993 it

refinanced overdrafts with Russian state credits with positive real interest rate and short maturity. The evolution of this policy reflected the Russian recognition that the maintenance of the common currency required fiscal responsibility by all members: if members could not be responsible, they should exit the ruble zone. As Conway (1995) notes, this evolution in attitude was also evident at the IMF and the World Bank. They initially supported maintaining the initial membership of the ruble zone, but shifted their position by mid-1993 to encouraging the introduction of national currencies.

The Baltic republics were among the first to introduce national currencies: Estonia in June 1992 and Latvia and Lithuania in June 1993. The other former Soviet republics followed shortly after, ending with Ukraine in 1996 and Tajikistan in 2000.[1]

Lessons of the ruble zone for the Eurozone

The most important lesson of the ruble zone for the Eurozone was probably observed in real time by the Maastricht Treaty negotiators in 1991 and early 1992. A common currency area depends upon the fiscal responsibility of its members for its sustainability: the ruble zone members' inability to deliver that responsibility was the centrifugal force that spun the member countries out of the area one by one.[2] The Maastricht Treaty, which defines the roadmap for the introduction of the euro in 1999, includes limits on government debt/GDP and the fiscal deficit/GDP ratios that will, when upheld, preclude the strategic exploitation of the Eurozone observed by ruble zone members.[3]

A second lesson of the ruble zone is that a negative economic shock common to all members of the zone will put great pressure on the zone. Even with responsible fiscal policies in place in all members, the zone will either require resource transfers from the less-hard-hit to the harder-hit, or the availability of financing for a period of adjustment. The cost of these transfers, and of this financing, was too high for the newly independent Russian republic – and this led to the downfall of the ruble zone.

The Eurozone had far greater resources in place for the highly indebted countries of the Eurozone in 2010 and 2011. The Council of the European Union created the European Stabilisation Mechanism 'to present financial stability in Europe' by providing guarantees of up to 500 billion euros in sovereign borrowing from international capital markets (Europa 2010). Simultaneously, Greece reached an agreement with the IMF, the European Commission and the ECB on a focused program to stabilise its economy with the support of a 110-billion-euro financing package. Ireland and Portugal followed shortly thereafter with similar agreements.

A third lesson of the ruble zone is that the provision of no-cost overdraft privileges to the members' central banks led to overspending and strategic manipulation of the common currency (Conway 1995), as well as to the eventual demise of the ruble zone. The President of the ECB during the initial years of the debt crisis, Jean Claude Trichet, had absorbed this lesson; while the ECB bought modest amounts of GIPSI sovereign bonds in 2010 and early 2011, it eschewed larger interventions for the potential cost in inflation that they represented (Blinder 2014). The next President of the ECB, Mario Draghi, expanded these existing purchases both in size and in maturity. With the 'Outright Monetary Transactions' program the ECB expanded sovereign-debt purchases still further, so long as the benefiting member agreed to budgetary conditions defined in negotiation with the staff of the European Stability Mechanism (Blinder 2014). In this case the Eurozone, and particularly the ECB, has learned a more nuanced lesson. In the ruble zone crisis, there was a pre-existing cause of inflation that was exacerbated in its impact by strategic manipulation. The ECB has evidently concluded, based upon the Federal Reserve's experience in the United States, that the threat of inflation in the current international environment is quite low. Furthermore, the EU and ECB have negotiated carefully to obtain conditions on budget performance in the GIPSI countries that they believe will minimise the risk of such strategic deficits.

Important differences between the zones

There are a number of important differences between the situations of the ruble zone and the Eurozone that

[1] Ukraine stopped receiving cash shipments of rubles in late 1992, and from that time until 1996 relied upon its coupon, called the Karbovanets, as its currency. It remained with the *Karbovanets* until it had established rough budget balance, and then introduced the new currency, the *hryvnia*.

[2] It is important to note that the first exit from the ruble zone, by Estonia, was probably due to the fact that the Estonians were more fiscally responsible than the Russian government was prepared to be at the time. By exiting early with a budgetary balance, the Estonian economy was able to avoid most of the hyperinflation shared by ruble zone members in 1992–1993 (Conway 1995).

[3] See also http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV%3Axy0026.

will diminish the importance of any lessons drawn from the ruble zone.

- Membership of the Eurozone has greater benefits to its members in international transactions than the ruble zone offered its members. The ruble was not a convertible currency during the first few years of independence, while the euro is fully convertible. Membership of the Eurozone has led to significantly lower international borrowing costs for members, even for the GIPSI countries; no such benefit was evident in the ruble zone.
- The management of the ruble currency in 1991–1993 was not designed to maintain stability, but to accommodate inflationary pressures. Remaining in the ruble zone implied that the member would import the inflationary pressures generated by the accommodating Russian monetary policy. The management of the euro in recent years has been more focused on price stability – despite the large expansion of liquidity.
- The central members of the Eurozone have recovered from the financial crisis and thus represent a strong anchor for the zone. In the ruble zone, Russia as an anchor was itself in economic free-fall and found its ability to assist its fellow-members to be limited.
- The financial markets of the Eurozone remain in stable health. While there are large and growing holdings of sovereign GIPSI debt in European financial institutions, there is none of the financial repression or inconvertibility of the common currency evident in the former Soviet economies that led to the fragility of those financial markets.

Conclusions

Policy-makers in the Eurozone will do well to look back on the demise of the ruble zone as they ponder the way forward with their heavily indebted members in the GIPSI group. The ruble zone was a currency area of long standing and its members were comfortable with their common currency: the Soviet ruble. The break-up of the Soviet Union, however, made the maintenance of the ruble zone too costly for its members; one by one they were thrown out of the ruble 'orbit' until only Russia remained. Can such a scenario be envisaged in the Eurozone?

While the Grexit debate indicates that such an outcome is possible for at least some members of the Eurozone, there are three main reasons why the mechanism observed in the ruble zone will not be determinant in the Eurozone. In the ruble zone,

1. The benefits of remaining with the ruble were small. The ruble was non-convertible on international markets, and the currency under Russian management of the time was in the midst of a hyperinflationary period.
2. The 'anchor member' (Russia) was itself in deep recession and was unable to divert substantial resources to ruble zone members through overdraft privileges or technical credits. International resources for members (e.g. from the IMF or the World Bank) were also small in magnitude.
3. The financial repression and hyperinflation of the time led to little ongoing reliance by the population on ruble-denominated assets.

In the Eurozone, members recognise the high value of membership. They have fellow members in the EU with the ability to provide substantial funding during the period of adjustment from large fiscal deficits to fiscal balance, as well as strong support from international financial institutions. They continue to have a well-functioning banking and financial system that provides proper incentives for euro-denominated saving and investment.

There is one question on which the jury is still out: will the availability of low-cost resources from the EU, the IMF, the European Stability Mechanism and the ECB lead to the same degree of strategic exploitation of monetary authority observed in 1992 in the ruble zone? If so, the ECB is likely to respond in a similar way to the CBR in 1992 and 1993 – by tightening credit conditions, which prompted ruble zone members to exit the currency area.

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Systemic Aspects of Pension Funds and the Role of Supervision

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Introduction

Systemic risk is a subject that has started receiving a lot of attention since the financial crisis of 2007/08. Most of the discussion is on the relation between the banking system and systemic risk. In a previous article (see Beetsma and Vos 2016), we explored the relationship between systemic risk and the financial stability of pension funds, and highlighted some important issues regarding this relationship. In particular, we briefly discussed why pension funds have a number of features – including a long-term investment horizon, restrictions on borrowing and the use of derivatives – that act as a stabilising influence in the financial system. We also discussed some recent empirical evidence on the presence of these features (see, for example, EIOPA 2016; Broeders *et al.* 2016), and finished by discussing different ways in which potential systemic risks can arise from pension funds, and how proper supervision can alleviate these risks. This article delves deeper into the role that pension funds play in the financial system and how pension fund supervision may mitigate any systemic risks related to pension funds. We conclude by assessing actual supervision practice in European countries and how it may be improved from the perspective of mitigating systemic risks.

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Pension funds and systemic risk

Following the global financial crisis of 2007/08, a substantial body of literature on systemic risk has appeared. There is no single clear-cut definition of systemic risk; Bisias *et al.* (2012) provide a broad survey of existing definitions of systemic risk, and of different proposed measures of systemic risk. However, the general perception is that systemic risk concerns the functioning of the financial system as a whole. Systemic risk is higher if a single (combination of) event(s) can lead to a chain reaction that threatens the functioning of the financial system in its entirety. An example is a financial system in which banks are interconnected, because they have liabilities to each other. If a bank fails, other banks do not get paid back, implying the potential failure of other banks with large stakes in the initial bank. These banks may go under, and a domino effect could lead to the collapse of the entire banking system. Systemic risk does not need to arise from external shocks, although the existence of severe external shocks could enhance systemic risk. It may also arise endogenously from within a financial system, e.g. through unsound management decisions that cause a bank to fail. Predicting a systemic crisis is also difficult. Nevertheless, there are potentially promising directions in this regard. Giglio *et al.* (2015) combine nineteen individual measures of systemic risk into an aggregate 'systemic risk index'. Individually, the measures do not perform particularly well in predicting a financial crisis, but combined into the index their predictive performance becomes quite strong.

Systemic risk has mostly been studied in connection with the banking and the insurance sector. However, an interest in the potential systemic risk of the pensions sector has recently emerged. EIOPA (2016) has conducted stress tests on pension funds, concluding that systemic risks associated with pension funds are low. In contrast to banks, in particular, several of their characteristics lower the potential systemic risks associated with pension funds, as they contribute to financial stability in various ways. Firstly, the average duration of their obligations is high, which makes them natural investors for the long run. Secondly, they are

only allowed to borrow to meet their short-run liquidity needs, but not for speculative purposes. Thirdly, while they can become technically insolvable, they cannot go bankrupt. Solvency issues are handled by deploying existing instruments, such as (sponsor) contributions and reduced indexation. Finally, they are only allowed to use derivatives for hedging purposes (in practice mostly to hedge interest and currency risk), and not for speculative purposes. In fact, pension funds may even contribute to the stability of the financial system through policies of rebalancing their portfolios: when adverse price movements push down the relative weight of a specific asset class in the fund's portfolio, the fund buys additional instruments in this class to restore the original share allocated to the class. An empirical analysis by Broeders *et al.* (2016) for forty large Dutch funds over the period 2009–2014 confirms this finding. This behaviour of pension funds counters the destabilising behaviour typically observed in other parts of the financial sector: when asset prices fall, equity positions deteriorate. Leveraged institutions like banks have to sell assets, thereby putting further pressure on asset prices. In addition, during distress on the financial markets, we typically observe higher margin requirements, larger haircuts and a decrease in risk appetite, which all put more pressure on asset prices (see Brunnermeier *et al.* 2009).

Macroeconomic and systemic risk when pension funds act independently

Pension funds can be the source of two types of aggregate risk. The first is macroeconomic risk: when pension funds are in financial difficulties, pension contributions may have to be raised and/or the level of the pension benefits may have to be reduced. Both types of measures depress disposable income and, thereby, aggregate demand. The second type of risk is systemic risk. Systemic risk concerns their potential effect on financial markets or segments thereof.

In the economics literature, there is a clear connection between macroeconomic and systemic risk. Macroeconomic risk may arise from a number of sources, typically aggregate demand or supply shocks that may be due to a wide-ranging set of causes. Systemic risk is seen as one possible source of macroeconomic shocks: systemic problems in the financial sector spill over to the wider economy and cause an economic downturn (see He and Krishnamurthy 2014; Brunnermeier and Sannikov 2014). Thus, systemic problems in the financial sector typically result in macroeconomic problems. The reverse is not necessarily the case. Macroeconomic problems can arise without any consequences for the financial system as a whole, although a negative feedback spiral between problems in the financial sector and a macroeconomic downturn may well be present.

Different types of pension arrangements are potentially associated with different degrees of macroeconomic risk.[1] In the case of a defined contribution (DC) plan, contributions are given and the eventual benefits depend on the investment returns on these contributions. Low asset returns and, to the extent that newly-released pension capital is annuitized, low interest rates would result in low benefits, thereby affecting macroeconomic demand. In the case of a defined-benefit (DB) plan, a pension fund that has too few financial resources to guarantee existing commitments needs to restore its financial position by raising contributions or by reducing (the growth in) pension entitlements. This also affects the macro-economy. The advantage of a DB pension fund is that the presence of asset buffers and gradual restoration may help to dampen macroeconomic demand effects and spread these effects over time. *A priori* it is difficult to rank the macroeconomic demand effects of DC and DB funded pensions.

The potential role for systemic risks seems to be larger for DB pension funds than for DC funds, because, in order to limit the chances of further deterioration of the funding ratio, i.e. the ratio of assets over liabilities, DB funds may be forced to reduce investment risk, which could lead to a sell off of risky assets and thus affect the prices of these assets. However, pension funds tend to be recognised as 'slow' market participants and will generally sell assets only after a thorough decision process accompanied by a careful execution. Alternatively, for example in Britain, the sponsoring company is obliged to make up for any funding gaps. However, in a world with mature pension funds that have become sizable relative to the sponsoring company, it is conceivable that its obligation to guarantee the pension benefits may cause serious financial problems for the sponsor, and even push the latter towards bankruptcy. The likelihood of this danger rises

[1] We focus here on pension funds. However, also non-funded pension arrangements could pose a risk to financial markets, although this risk is indirect. The generosity of many current pay-as-you-go systems is unsustainable and would lead to levels of public indebtedness that may lead to sovereign debt crises that threaten the stability of the financial system.

in the correlation with the financial health of the fund and the health of the macro-economy.

In the remainder of this section, we assume that pension funds act independently of each other. That is, we assume that the shocks that hit pension funds are independently distributed. Moreover, we assume that if a pension fund reacts in response to such a shock, then this does not affect the behaviour of other pension funds. Both assumptions are tenuous. However, we make them for now, in order to sharpen our insight into the potential sources of systemic risk.

Under these assumptions, the potential role of pension funds in generating macro-economic or systemic risk depends on at least two crucial factors. One is the size of the pension sector. The smaller this sector is relative to the economy or the financial sector, the smaller both types of risk associated with the pension sector, *ceteris paribus*. The size relative to the economy is likely to be more relevant for the macroeconomic risks associated with the pensions industry, although the two types of risk may interact with each other: recessionary effects from the restoration of pension buffers, or maybe only the anticipation of those effects, may spill over to the asset markets. The size of the pension sector relative to (segments of) the financial sector is likely to be more relevant for the systemic risk associated with the pensions sector. In this regard, it is interesting to notice that there tends to be a rather strong home bias in pension fund asset holdings (Amzallag *et al.* 2014) and that this home bias is inclined to strengthen during periods of market turbulence. This may reinforce the interaction between the macro-economy and domestic asset markets through the decisions taken by DB pension funds. In particular, a domestic asset market decline would have a relatively strong influence on funding ratios, leading to instrument adjustments that, in turn, affect the macro-economy.

A second factor concerns the size *distribution* of pension funds. Under the above assumptions and if the chances that individual pension funds run into financial difficulties are equal, then systemic risk is minimal if all of the funds are equally large. In that case, each individual fund is likely to be too small to cause systemic risk when it runs into financial trouble. When the size distribution is highly unequal, there may be funds that are so large as to cause systemic problems when they fall into financial distress.[2] Table 1 summarises the risks associated with pension funds and the role of their size (distribution). Below we provide some descriptive information about the size of the pension sector in various countries and the size distribution of pension funds according to their assets.

Table 1

Risks and size (distribution)

Measure	Macro-economic risk	Systemic risk
Risk type	Depressing domestic demand, either through higher contributions or lower entitlements	Instability in the (relevant segment of the) financial markets
Relevant size pension sector	Large relative to GDP	Large relative to financial market(s) invested in
Size distribution pension sector	Policy measures at large pension funds have higher macroeconomic impact	Concentrated pension fund investment portfolios have more potential for causing instability

Source: Authors' compilation.

Table 2, based on data from OECD (2016a), reports the top-10 countries in terms of pension fund assets at the end of 2014.[3] Worldwide, by far the largest country is the United States with 14.5 trillion US dollars of pension assets. Lagging a long way behind the United States, we find Britain (2.68 trillion US dollars),

[2] In normal circumstances, large pension funds are aware of this. They therefore diversify their investments and use many counterparties to limit this risk.

[3] We present assets under management in private pension funds. This does not include savings through public pension reserve funds, pension savings with insurance companies or in individual retirement accounts.

Table 2

Top-10 countries in terms of pension fund assets 2014

(excluding public pension reserve funds)

Country	Pension fund assets (billion US dollars)	Pension fund assets (% of GDP)
USA	14,460	83
UK	2,684	96
Australia	1,639	110
Canada	1,298	76
Netherlands	1,282	159
Japan	1,221	30
Switzerland	788	120
Brazil	251	12
Germany	236	6.7
Mexico	181	16

Source: OECD Pension Statistics (2016).

Australia (1.64 trillion) closely followed by Canada (1.30 trillion), the Netherlands (1.28 trillion) and Japan (1.22 trillion). Table 2 also reports pension assets as a fraction of GDP. The picture changes slightly – the Netherlands now moves to the top.

Table 3a

Largest public pension reserve funds

Country	Public pension reserve fund	Pension fund assets in billions of US dollars
USA	Social Security Trust Fund	2,789
Japan	Government Pension Investment	1,136
Norway	Government Pension Fund	873
South Korea	National Pension	427
China	National Social Security Fund	251

Source: OECD (2016b) and annual reports.

Table 3b

Largest private pension funds

Country	Pension fund	Pension fund assets in billions of US dollars
Netherlands	ABP Civil Servants	473
USA	Federal Retirement Thrift Savings Fund	428
USA	California Public Employees	297
Singapore	Central Provident Fund[a)]	210
Netherlands	PFZW Healthcare	196

Note: [a)] Singapore's Central Provident Fund contains private savings for pensions, housing and healthcare expenditures.

Sources: OECD (2016b) and Towers Watson (2015b) and annual reports.

Confining ourselves to the EU, EIOPA (2016) provides an overview of pension assets. DB pension funds hold around 85 percent of all the pension fund assets, and DC pension funds 15 percent. The three largest countries with DB assets are Britain with 48.1 percent of occupational DB pension assets, the Netherlands with 39.4 percent of DB pension assets and, thirdly, but trailing far behind, Germany with 6.9 percent of DB pension assets. Together, these three countries hold 95 percent of all the occupational DB pension assets in the EU. On the DC side, Britain holds by far the most assets, 65.1 percent of all DC pension assets in the EU. Italy is second with 19.6 percent and Ireland third with 7.8 percent of the DC pension assets.

Tables 3a and 3b demonstrate the worldwide top 5 public pension reserve funds, respectively of private pension funds in terms of assets under management, while Table 4 reports for each of the top 10 countries in terms of pension assets the top-3 pension funds in terms of size. Overall, by far the largest funds are the Social Security Trust Fund in the United States (2,789 billion US dollars), the Government Pension Investment fund in Japan (1,148 billion US dollars) and the Government Pension Fund in Norway (884 billion US dollars).[4] All three are public pension reserve funds. The next three funds have assets worth between 400 and 500 billion US dollars. These are two private pension plans for civil servants (Dutch ABP being the largest with 473 billion US dollars, and the US Federal Retirement Thrift second at 428 billion US dollars), and one more public pension reserve fund, the South Korean National Pension fund 427 billion US dollars). Remarkably, even although the United States is largest in terms of total private pension fund assets (see Table 2), its largest private pension fund, the Federal Retirement Thrift fund, is not the largest private pension fund worldwide. Glancing at the top-3 pension funds in each country, we observe that for Britain, Canada and Australia the landscape is in fact very 'flat', as the pension landscape is not dominated by a single or a few large pension funds. In the United States and Japan, there is one very large public pension reserve fund, followed by a relatively flat distribution of private pension funds. The Netherlands, by contrast, has about 30 percent of its overall pension assets in the ABP Civil Servants fund.

In fact, the size of ABP is more than half of the Dutch economy. Moreover, in some other countries that are not included in Table 4 – in particular, Norway, China, South Korea, Singapore – pension assets are 'strongly concentrated'. In these countries there is one large pension fund that holds a large majority (i.e. over 60 percent) of all the country's pension assets. While China's largest pension fund is small relative to its economy, this is not the case for Norway, South Korea and Singapore. A single pension fund that is large relative to the national economy and at the same time highly exposed to the national economy, for example because of a home bias in its assets, might *a priori* be

[4] The latter fund is not a pension fund in the usual sense. Its assets are derived from the sale of Norwegian oil rather than from pension contributions by employers and employees. Moreover, the fund's assets are also not intended for pensions only: up to 4 percent of the fund's value may be used for the national government's budget (Government Pension Fund Global 2016).

expected to pose a heightened risk to the financial system.

Systemic risk in the absence of independence

The former section discussed systemic risk under the assumption that the likelihood of a pension fund getting into financial distress is identically and independently distributed across pension funds. In this section, we discuss three reasons why this assumption does not hold in practice, and what the consequences are of this assumption failing to hold when there is a significant interdependence in investment actions among pension funds. Moreover, we elaborate on why recent trends in supervisory best practices and proposed legislation may actually lead to an unintended increase in systemic risk in the (global) pension fund sector, and probably the financial sector overall. We provide an explanation of and solution for three important issues: mark-to-market valuation under a risk-based capital requirements regime, the increased importance of benchmarking and the resulting herding behaviour, and (systemic) liquidity risks arising from proposed (global) banking regulation.

Mark-to-market valuation under a risk-based capital requirements regime

Over time, mark-to-market valuation of pension fund liabilities has become more prevalent. For example, to calculate pension liabilities expected pension benefits in the Netherlands are discounted against a 'risk-free' market interest rate. The benefit of the mark-to-market approach is that it provides the most recent and accurate assessment of the transfer value of the liabilities, given the information that is available. However, since (financial) markets are volatile, it may also introduce sharp movements in measured liabilities. This directly results in an unstable funding ratio, thereby potentially leading to unduly abrupt policy actions (e.g. cutting pension benefits as a result of underfunding).

This danger may be compounded by a simultaneous presence of risk-based capital requirements. It is conceivable that a sharp fall in the interest rate causes a fall in the funding ratios that force pension funds to trade risky assets for safe assets, with the purpose of limiting the risk of a further deterioration of the funding ratio. When one medium sized pension fund reacts this way, there are most likely to be no further consequences. However, a significant (downward) movement in interest rates could result in a widespread shock if a large part of the pensions sector is forced to de-risk. This will also harm the solvency of other institutions through downward pressure on risky-asset prices.

Table 4

Top 3 pension funds of countries with the largest pension sectors[a)]

Country	Pension Fund	Billions of US dollars
USA	Social Security Trust Fund	2,789
	Federal Retirement Thrift Savings Fund	428
	California Public Employees	297
UK	BT Group	68
	Universities Superannuation	65
	Lloyds Banking Group	59
Japan	Government Pension Investment	1,148
	Local Government Officials	194
	Pension Fund Association	98
Australia	Future Fund	89
	AustralianSuper	69
	QSuper	45
Canada	Canada Pension	228
	Ontario Teachers	133
	Ontario Municipal Employees	62
Netherlands	ABP Civil Servants	473
	PFZW Healthcare	196
	Metal Workers Pension Fund (PMT)	71
Switzerland	Bundes Pensionskasse	38
	BVK des Kantons Zurich	29
	Nestle	24
Brazil	Previ	63
	Petros	25
	FUNCEF	21
Germany	Bayerische Versorgungskammer	75
	BVV	30
	VBL	25
Mexico	Afore XXI Banorte	42
	Afore Banamex	28
	Afore Sura	25

Note: [a)] We followed the top 10 from Table 1. Thus, Norway, South Korea and China (which have limited pension fund savings aside from the savings in the public pension reserve funds) are not included in Table 4. Data on Singapore seem to be lacking from the OECD database. It can therefore not be considered for Table 4.

Sources: Towers Watson (2015b) and OECD (2016b).

The risks associated with imposing risk-based capital requirements may be even more significant if the same (or similar) capital requirements are imposed on the entire financial sector. This is most likely to prompt similar investment portfolios of financial parties to adhere to the universal regulatory regime. As a result, when these institutions are hit by a common shock, they will probably respond in a similar way to that shock. For example, if portfolio compositions among financial institutions become more similar, institutions may all be simultaneously faced with liquidity constraints and all try to sell assets at the same time to generate cash. These risks are real and present, particularly in the European Union, where banks subject to Basel III/CDR IV regulation, insurance companies subject to Solvency II regulation, and pension funds subject to domestic 'Solvency II-like' requirements all operate under rather similar risk-based capital requirements.

A good example of the risks associated with the *combination* of mark-to-market valuation and risk-based capital requirements concerns the Dutch pension funds' (interest rate) derivatives portfolios. Firstly, mark-to-market valuation implies that pension funds have to value the liabilities of all maturities using market interest rates. Secondly, there are risk-based capital requirements for exposure to interest rate risk. To limit these capital requirements, pension funds need to hedge at least part of their interest rate risk. If they do not hedge interest rate risk, they need to hold a substantial amount of capital, while changes in the interest rate will cause substantial swings in the market value of the liabilities and the level of pension benefits. To hedge interest rate risk for shorter maturities, pension funds can use combinations of government bonds, corporate bonds and interest rate swaps. However, for higher maturities (30+ years), only interest rate swaps (and, occasionally, government bonds) are available. Therefore, virtually all pension funds are in need of high maturity interest rate swaps. As a result, pension funds have similar (and often very substantial) positions in high maturity interest rate swaps. While this decreases their individual mark-to-market interest-rate risk and required capital buffers, it makes the sector as a whole more vulnerable to liquidity needs in case of a sudden increase in interest rates (followed by margin calls on all the interest rate swaps) or to unexpected changes in derivatives regulation such as the European Market Infrastructure Regulation (EMIR).

Peer group pressure

A second reason why the effects of shocks are unlikely to be independent is the fact that benchmarking and comparison with peers is an increasingly popular mechanism to evaluate the performance of individual pension funds along multiple dimensions. This happens, for example, with administrative and asset management costs, asset management returns (both per asset type and for the portfolio as a whole) and the funding ratio.

On the one hand, peer group comparison or 'benchmarking' may provide more useful insight into the relative performance of pension funds. On the other hand, it provides an incentive to have a policy that is comparable to that of peers. This happens because with peer group comparison, the focus may also be on whether the results of the pension fund are better or worse than those of the peers, and not only compared to the individual goals of the pension fund. Thus, having low asset returns when other funds also have low returns would not be perceived as problematic, while having the same low returns when other funds have high returns would be perceived as problematic and would single out the pension fund as a weak performer. This 'peer group comparison' mechanism provides an incentive for portfolio compositions to become more similar, which results in broad parts of the pension fund sector becoming exposed to the same shocks.

Liquidity risks arising from proposed banking regulation

Currently, European derivatives regulation is changing. Pension funds face requirements for the central clearing of derivatives under the EMIR legislation. Where previously two market parties signed and cleared derivatives contracts on a bilateral basis, under EMIR there is an intermediary (the central clearing house) that takes over the clearing activities.[5] After an interest rate change, the value of the swap contract has decreased for one party to the contract and increased for the other party. The party for which the value of the contract has decreased is required to post collateral,[6] called 'variation margin'. In the bilateral

[5] EMIR does not apply to all derivative contracts. It does not apply to many exotic and non-linear types of derivatives, but it does apply to vanilla interest rate swaps.

[6] To be more precise: when the value of the swap contract changes more than a certain specified amount between the counterparties, a margin call is triggered. Furthermore, for most derivatives contracts there is a daily exchange of Variation Margin Collateral.

market, variation margin can be posted either using cash or using liquid, high quality (government) bonds. Under central clearing, the variation margin requirement is restricted by the central clearing houses and clearing members to cash only. This produces new substantial liquidity risks for pension funds, that are generally fully invested and do not hold large cash buffers. Under the new legislation, a decrease in the market value of interest rate swaps may trigger significant cash margin calls across the board for pension funds. Especially when these margin calls are substantial due to a strong interest rate increase, this may force many pension funds to start selling assets in order to generate the required cash, potentially starting a fire sale cycle. While holding high cash reserves mitigates these liquidity risks, this would also reduce the available budget for investing. This lower budget has a negative impact on aggregate investment returns, undermining the goal of providing adequate old age pension benefits.

Moreover, the current central clearing setup entails the use of a clearing member bank next to a clearing house. The clearing member bank guarantees the transactions of the pension fund at the clearing house. However, only a limited number of clearing member banks and clearing houses are available. Access to clearing member banks in particular is perceived to be very limited for smaller pension funds. These will have to rely on so-called 'indirect client arrangements', accessing a clearing member house through another bank. This situation causes significant concentration risks, because all derivatives exposures will be concentrated in a small number of clearing houses and clearing member banks. In an ideal situation, central clearing should happen using a number of non-commercial intermediaries in order to mitigate market externalities arising from the central clearing obligation under EMIR.

Moreover, the proposed Basel III banking legislation on the Net Stable Funding Ratio (NSFR) and the Basel III Leverage Ratio framework (LR) could increase systemic risk. Pension fund use of high quality government bonds as collateral for Variation Margin in derivatives transactions is further restricted due to the fact that High Quality Liquid Assets (HQLA) are not recognised proportionally in the proposed banking legislation. Only cash is fully recognised for offsetting purposes. This has a direct implication for executing derivatives transactions, in which only cash can be posted as a variation margin. As a result, pension funds need to hold large cash buffers or rely on the repurchase (repo) market. However, both Basel III regulations (NSFR and LR) are also harmful to the functioning of the repo-market. Firstly, the collateral in repo transactions will be assigned a significant Required Stable Funding factor according to the proposed Net Stable Funding Regulation. Secondly, the Leverage Ratio Framework does not treat cash and high quality government bonds equally for netting purposes regarding the exposure measure in repo transactions. Therefore, under the currently proposed Basel III banking legislation, liquidity needs and risks in the pension fund sector – and probably the whole financial sector – will sharply increase. In order to mitigate systemic risks, it is crucial that these new legislations recognise high quality government bonds as eligible for variation margin (capital calls) in derivatives transactions, so as to ensure a proper functioning of the short term financing (repo) and derivatives market.

Scope of derivatives portfolios and impact of EMIR (central clearing)

The derivatives portfolios of pension funds are quite substantial. Table 5 is taken from DNB Statistics, the official statistics publication website of the Dutch Central Bank. This table shows the decomposition of the Dutch pension sector into different types of asset classes. While the interest rate and currency derivatives only have a total market value of 75 billion euros by the end of 2015, their notional value is much higher. Assuming that the market value of the derivatives is, for instance, 10 percent of the notional value, a rather common order of magnitude, the total amount of notional derivative exposure outstanding is 750 billion euros.

In order to give an idea of the magnitude of the liquidity risks associated with this derivatives exposure, we provide an illustrative example of an average pension fund under EMIR. The composition of the investment portfolio of this average pension fund is reported in Table 6. The table also sets out how the different derivatives and assets help to hedge against interest rate and currency risks. Total assets amount to 1 billion euros. Liabilities are 1 billion euros as well, with a duration (interest rate sensitivity) of 20 years. Consequently, the funding ratio is 100 percent, while 50 percent of the fund's interest rate risk is hedged.

From Table 6 the pension fund can also be deduced to hold the following assets:

Table 5

Total assets of Dutch pension funds

Asset type	Q4 2014 (billion euros)	Q4 2015 (billion euros)
Direct equity	154	169
Bonds and loans	322	332
Derivatives (interest rate and currency)	106	75
Participations in investment funds	620	630
Equity	246	231
Bonds and loans	233	238
Derivatives	2	2
Other/unknown	139	159
Other	50	49
Total	1,252	1,255

Source: DNB Statistics for pension funds.

- EUR 400 million in government bonds;
- EUR 300 million in European equities;
- EUR 300 million in US equities.

The pension fund also has a portfolio of Over-The-Counter (OTC) derivatives (interest rate and currency swaps), so as to increase its interest rate hedge from its original value of 25 percent (as a result of holding government bonds) to 50 percent and fully hedge the currency risk. The fund's total derivatives portfolio comprises:

- EUR 250 million in notional interest rate swaps, no market value;
- EUR 300 million in notional currency derivatives, no market value.

Initially, the pension fund made arrangements with counterparty (investment) banks in the bilateral derivatives market to exchange physical collateral to cover changes in the market value of the derivatives (high quality bonds are used for the variation margin). The fund's EUR 400 million sovereign debt portfolio is eligible as collateral in this respect. As a result, its liquidity risk is very low, as the fund has a large buffer of bonds available to meet its collateral obligations arising from changes in the value of derivatives. The chances of the fund defaulting are therefore virtually zero. With regard to the currency swaps, the fund needs to settle these trades within relatively short periods of time (on average 3 months), but payments may be spread out over time. These payment obligations can be met using 'repurchase transactions' (repos) to generate cash or by maintaining a small long-term cash buffer. The pension fund in this example uses repos and has no long-term cash buffer.

Once derivative contracts are cleared in accordance with EMIR, the pension fund's liquidity needs will change substantially. The effect is twofold. Firstly, the pension fund will need to post 'initial margin' collateral that acts as a buffer in times of crises. Physical collateral is allowed and the fund can use its government bond portfolio to this end. Initial calculations have revealed that, in practice, the initial margin requirement translates into approximately 10 percent of the nominal value of the cleared OTC derivatives. However, in times of crisis, the initial margin requirement may increase to around 20 percent, based on the average contract terms of a pension fund with a clearing member.

Secondly, the pension fund will need to deliver variation margin daily. Central clearing parties do not allow government bonds to be used for this purpose; variation margin is restricted to cash only. This means that an average pension fund, if fully invested, will have a potential liquidity problem if the fund cannot access cash in the repo markets. When derivatives develop a negative value, the full market value must be paid in cash. If a pension fund does not succeed in generating sufficient cash to meet the variation margin

Table 6

Balance sheet of the pension fund (assets side)

Asset mix	Market value (million euros)	Nominal or notional value[a)] (million euros)	Duration	Share of interest rate hedge in %	Share of currency hedge in %
Government bonds	400	400	12.5	25	0
Interest rate swaps	0	250	20	25	0
US equities	300	300	0	0	0
European equities	300	300	0	0	0
Currency swaps	0	300	0	0	100
Total	1,000			50	100

Note: [a)] 'Nominal' and 'notional' are both frequently used, and have the same meaning here. Hence, they are used interchangeably in this section.

Source: Authors' compilation.

Table 7

Liquidity needs of the pension fund in a stress scenario

Liquidity needs	Variation margin requirement (million euros)	Variation margin (% assets)	Initial margin requirement (million euros)	Initial margin (% assets)
Interest rate swaps	23	2.25	50	5.00
Currency swaps	21	2.10	60	6.00
Total	44	4.35	110	11.00

Source: Authors' compilation.

call (on a daily basis), there is a risk that the entire position is closed even although the pension fund is solvent (it has a funding ratio of over 100 percent). In such a situation, the reputation and creditworthiness of a pension fund will be seriously damaged. This may result in serious (contractual) consequences, such as the loss of the complete derivatives position with (bank) counterparties.

Table 7 shows the pension's funds liquidity needs in a stress scenario. The stress scenario includes a 0.45 percentage point (i.e. 45 basis points) rise in the interest rate and a 7 percent depreciation of the euro against the dollar. The variation margin increases. Moreover, the initial margin requirement set by the clearing member bank increases from 10 percent to 20 percent of the notional value of the cleared OTC derivatives.

The amount of cash the pension fund needs increases from zero to 44 million euros (4.4 percent of the total portfolio),[7] because only cash is eligible to fulfil the variation margin requirement. The daily exchange of variation margin could actually lead to the fund having to sell its bonds or shares directly in order to generate cash. This could even trigger fire sales in which the pension fund would have to sell its assets under pressure at high discounts in order to generate cash. If the pension fund were to fail to deliver the 44 million euros in cash, it would be in default on its derivatives contracts and would have to face the consequences, namely the loss of the entire derivatives position with (bank) counterparties. The initial margin requirement also increases from 55 million to 110 million euros, or 11 percent of total assets. Moreover, at the same time the value of the existing bond portfolio, which is used as a buffer to meet the initial margin requirement, declines by 22.5 million euros.[8]

[7] The variation margin requirement for the interest rate swaps is calculated as the interest rate increase (0.0045) times duration (20) times notional amount (250), which equals 22.5 million. The variation margin requirement for the currency swaps is calculated as deprecation (0.07) times notional amount (300).

[8] The increase in the interest rate (0.0045) times duration (12.5) times market value (400) equals 22.5 million.

Hence, while an increase in interest rates would in general have a positive effect in terms of the funding ratio, the disadvantage is that it would increase the fund's cash needs. In fact, the higher the interest rate hedge through derivatives, the smaller the improvement in the funding ratio and, at the same time, the larger the additional cash needed would be. Obviously, the fund could reduce the risk of not fulfilling the cash requirement to almost zero, by holding a very large cash buffer, but this would come at the cost of the return on the overall investment portfolio. The alternative of relying on the repo market may be risky or even impossible in view of the consequences for this market of the described changes in banking legislation.

If we were to apply the above stress scenario to the aggregate Dutch pension fund sector at the end of 2015, assuming that its investment portfolio is the same (in terms of relative weights of the various asset categories) as that of our example fund, then the increase in cash needs of the entire sector amounts to 4.35 percent times 1255 is almost 55 billion. Hence, this scenario, which is quite conceivable in view of historical movements in interest rates and exchange rates (witness the recent fall of the British pound), may have profound consequences for the pension sector, and possibly for the financial markets as a whole.

Regulatory and supervisory differences across pension sectors in the EU

Pension fund regulation and supervision differ substantially across EU countries. In this section, we briefly discuss the main differences for the countries with the top 3 amounts of DB pension assets in the EU. The descriptions of regulation and supervision are taken from EIOPA (2016).

The first major difference concerns the way in which future pension benefits are discounted. While Germany and Britain use a fixed discount rate, or the expected return to discount expected future benefits, the Netherlands uses a risk-free market discount rate (a swap-curve constructed on the basis of AAA public debt in the Eurozone).

Secondly, Britain treats inflation as part of the pension liabilities in DB pension arrangements, i.e. liabilities are calculated by discounting future pension benefits including their projected increase due to expected inflation. This reflects the fact that pension funds are obliged to raise DB entitlements with inflation. The latter is not the case for the Netherlands, nor for Germany, although indexation would often take place if it can be afforded. Liabilities in these countries are calculated by discounting benefits that are projected to stay constant in nominal terms.

Thirdly, the target funding ratio (i.e. the ratio of assets over liabilities) in Britain is 100 percent, in Germany there is a 4-percent Solvency I capital requirement, while in the Netherlands there is a capital requirement of 10–30 percent of the liabilities, depending on the overall riskiness of the asset portfolio. Since inflation indexation is part of the liabilities, the target funding ratio for Britain is set in line with the need to protect the purchasing power of the pension entitlements. In a sense, the capital requirement in the Netherlands is also in line with the aim to compensate for future inflation, because a nominal funding ratio of around 125 percent roughly corresponds to a real funding ratio (calculated by discounting the projected pension benefits against the risk-free real interest rate) of 100 percent, assuming inflation of 2 percent.

Fourthly, in Britain pension entitlements can only be cut if the sponsor (the employer) defaults or if all members agree,[9] while in the Netherlands and Germany entitlements may be cut as a measure of last resort, while the sponsor is not under any obligation to provide additional support if the fund is in financial distress. Hence, in Britain a DB pension fund may threaten the survival of the sponsor if the fund falls into financial distress, as the sponsor is obliged to indemnify the fund.

Finally, EU countries differ quite substantially regarding the way in which accumulated DC pension assets can be deployed. In Austria, Iceland and the Netherlands accumulated assets at retirement have to be converted into a life-long annuity. In Italy and Portugal part of the accumulated assets has to be converted into an annuity, while the remainder can be taken up as a lump-sum payment. Slovakia allows for annuities, temporary annuities and lump-sum payments, with the requirement that retirement income be spread over a minimum period of five years. A full lump sum take up is possible in Cyprus and Spain, which in the latter case receives a relatively favourable tax treatment compared to regular pension income. Finally, the Britain allows a wide range of variants, including taking up the entire pot in cash, a fixed annuity and flexible retirement income.

[9] There is also a fund that takes over the pension liabilities if the sponsor can no longer honor its obligations, called the Pension Protection Fund (PPF). All pension funds make annual contributions to the PPF, which can be thought of as insurance premiums.

Potential future legislation and systemic risks

Important developments, such as population ageing, increasing (labour) mobility, demands for more flexibility and unrest in financial markets, are putting legislators and pension supervisors under pressure to respond to these developments. However, changes in legislation and supervision may affect the systemic role of pension funds in a variety of ways. This section discusses the main effects.

Firstly, the importance of designing proper restoration policies is becoming more important with rising pressure on pension funding ratios resulting from ageing and low asset returns and interest rates. Close monitoring of pension funds combined with rules that require them to recover quickly already from small degrees of underfunding, can *a priori* be expected to have a stabilising influence on financial markets, because it limits the danger that the degree of underfunding gets so severe that it is beyond repair, calling for large-scale entitlement cuts that could potentially cause economic unrest. However, this conclusion comes with qualifications. Forcing pension funds to restore fast may destabilise an already feeble macroeconomy further, because of the demand effects from higher contributions and/or reduced benefits. Obviously, this is only a relevant concern if the size of the pension sector is substantial relative to the economy. To judge what would be the appropriate approach in this respect, it is important to ask whether the underfunding is the result of idiosyncratic (i.e. fund-specific) events, or whether it is the result of some common shock. In the latter case, a large fraction of all pension funds is likely to flow into underfunding at the same time, which would be an argument to make the restoration trajectory a function of the state of economy, i.e. to force pension funds to restore at a slower pace when the economy is particularly feeble. Otherwise, micro-based supervision, while effective at the level of individual institutions, could become harmful at the macroeconomic level. While this contribution is con-

cerned with the potential systemic relevance of pension funds for the financial sector and not specifically with their macroeconomic role, as already noted above, it is conceivable that the adverse macroeconomic consequences of pension policy spill over to the financial sector.

Calls for enhancing flexibility in pension arrangements can be frequently heard. Countries differ in the degree to which pension savings can be accessed during working life, as well as during retirement. In many countries, participation in some given pension arrangement is mandatory, while in some countries pension savings can be taken up as a lump-sum as of a specific age. For example, in Britain a pension reform in 2015 made it possible for participants aged 55 or older in a DC-scheme to take out their pension savings as a lump-sum (Work and Pensions Committee 2015). It is frequently pointed out that this opportunity may trap individuals into frontloading consumption, so that once pension savings have been depleted, these individuals would turn to the government for help. However, initial anecdotal evidence seems to suggest that participants generally constrain themselves taking up their DC pension savings. Similarly, in Australia there are no restrictions during retirement on taking up accumulated pension savings as a lump sum. A substantial fraction of the retired make use of this possibility, and many of them use these lump-sums to pay off other debts or spend them (Deloitte 2013).

It is conceivable that relaxing participation restrictions, for example by giving individuals the opportunity to switch between pension funds or to take up at least part of their pension savings, could create risks similar to those associated with a bank run. The risks resemble those associated with the open-ended investment funds that have been on the rise since the start of this century – see ESRB (2016). They seem highest in the case of an abrupt alleviation of initial restrictions or if a fund threatens to go into underfunding. A sudden loss of confidence for some reason may trigger participants to withdraw their pension savings. If the threat of a large-scale withdrawal were to materialise, this could become self-fulfilling, as large groups of participants would rationally rush to the fund to recover their savings for fear that nothing will be left if they wait too long. A large-scale withdrawal of accumulated savings would force the pension fund to sell its assets for cash. If a single fund finds itself in this position, the effect on the financial market as a whole is likely to be small, unless the fund is very large. However, a loss of confidence could also be caused by some common shock and force the entire pension sector into fire sales at the same time, thereby causing a substantial drop in asset prices, leading to domino effects throughout the entire financial sector.

Hence, policies to withdraw pension savings should be carefully designed, especially when accumulated savings are large and unevenly distributed across institutional investors. Examples of sensible design are the introduction of limits on the amount that may be withdrawn at a given moment; or the introduction of a penalty for early withdrawal. Even if the danger of a bank run is ruled out, there are consequences of allowing early withdrawal. The pension fund must prepare itself, potentially forced by the supervisor, for the possibility of a substantial withdrawal of savings by holding more liquidity than it would otherwise do. This means that it has to forego the higher expected returns associated with illiquid, long-term investment. The lower expected return on the overall investment portfolio will eventually lower the pension benefits.

Supervisory policies that limit home bias and concentration risks in asset portfolios will generally be conducive to the stability of the financial sector. Home bias in pension portfolios can strengthen the feedback effects between the macro-economy and the financial health of the pension fund. With a substantial home bias, an impending weakening of the macro-economy may have relatively strong negative consequences for the value of the pension assets, which could in turn have relatively adverse feedback effects on the macro-economy if the financial position of the fund needs to be restored. Limiting concentration risks yields diversification benefits at the micro level and can *a priori* be expected to be stabilising for the financial markets as a whole. The impact of a fire sale is less likely to be concentrated on a specific asset or asset category, but more thinly spread over a wider range of assets or asset categories. Specific attention is warranted for policies that stimulate the hedging of interest risks, as is the case in the Netherlands. Again, such policies can be sensible at the micro level, but dangerous at the aggregate level. Concretely, a large fraction of long-run interest risk is hedged through interest rate swaps. These contracts may be concentrated on specific segments, because there are no alternatives to hedging interest rate risk in those segments (see our previous discussion in the fourth section).

Policy implications and concluding remarks

Authorities have recently started paying some attention to the potentially systemic role of pension funds. There are a number of reasons related to their characteristics and their regulation that explain why pension funds pose less of a risk to the financial system than banks and insurance companies. In fact, there is mild evidence that pension funds may have a stabilising influence on asset markets, because they try to rebalance their investment portfolios if price movements drive the portfolio weights of specific asset classes too far from their strategic values. Furthermore, there seems to be a trend towards pension funds taking over some of the traditional activities of commercial banks. In particular, Dutch pension funds are getting involved in mortgage financing, an activity that banks are trying to reduce their exposure to, in order to fulfil supervisory requirements. While this increases the exposure of pension funds to housing market risks, we expect this development to exert an overall stabilising effect on financial markets. The reason is that pension funds are better placed to take on these risks, because they are less leveraged than banks and invest for the long run. A similar argument can be made for pension funds investing in infrastructure and other illiquid asset categories. Obviously, the larger the investments in those illiquid assets, the harder it will be for the fund to free up cash when needed.

Nevertheless, it is conceivable that a large pension sector or extremely large individual pension funds pose a systemic risk, either directly in certain segments of the asset markets in which they are particularly active, or indirectly through their influence on the macro-economy and the potential knock-on effects into the asset markets. Recent developments, such as mark-to-market valuation of both assets and liabilities, and risk-based capital requirements – that are common in large parts of the assets markets – make sense from a micro point of view, but may create systemic dangers. Relaxation of pension participation requirements and opportunities to take up pension savings carry a danger of 'bank runs' on pension funds if not accompanied by appropriate restrictions.

The preceding discussion makes clear that there exists an important role for appropriate legal and supervision design to ensure that pension funds can fulfil their useful socio-economic role at a minimal risk to the financial system as a whole. An important question in this regard is which elements of fund supervision should be transferred to the European level. The latter should, in principle, be confined to aspects of pension fund policy that have cross-border consequences.

Firstly, the fact that capital markets have become highly integrated in Europe creates a potential case for European level supervision on pension fund investment policies. The conclusion of EIOPA was that the pension fund sector as a whole exerted a mildly stabilising influence on the financial markets during the global financial crisis, but that this influence varied significantly across countries. Dutch pension funds are particularly active in rebalancing their asset portfolio, possibly stimulated by strategic investment plans based on stable portfolio weights on the various asset categories (for a long as the current plan applies). Stimulating Eurozone-wide adoption of such strategic investment plans would be conducive to the stability of the Eurozone capital market.

Secondly, pension fund regulation and supervision are still largely a national affair, resulting in substantial differences in these areas across EU countries. This certainly hampers the integration of the market for pension services. However, occupational pension provision is currently organised in very different ways in EU countries. A number of countries have even made fundamentally differing choices, such as providing occupational pensions through pay-as-you-go or through funded arrangements; or not providing occupational pensions at all. It is therefore not clear if European regulation should take place at the level of pension funds (excluding non-funded and non-occupational pensions), occupational pensions (including both pay-as-you-go and funded pension arrangements, but excluding non-occupational pensions), or pension provision in general.

In the meantime, the absence of European regulation and supervision also makes it less likely that pension funds all react simultaneously and in the same way to shocks, thereby limiting their influence on the capital markets. Further centralisation of regulation and supervision at the European level may be quite likely, which carries the risk that the pension sector becomes a source of larger fluctuations in asset markets. An important example concerns the rules for calculating pension liabilities. Mark-to-market valuation has become increasingly popular over time. Future yields are largely unpredictable, hence the best predictor of future yields is the current yield curve. This limits the

chance of large long-run deviations of a pension fund's assets from its liabilities. The disadvantage, however, is that the yield curve is subject to short-run market fluctuations. An EU-wide application of the identical mark-to-market valuation of pension liabilities could cause substantial volatility in aggregate (total EU) pension liabilities, adding to macroeconomic and asset market volatility if across the entire EU pension funds have to respond simultaneously and on short notice to a rise in pension liabilities by, for example, raising pension contributions or reducing portfolio risk. Coordinating the speed at which pension funding ratios are to be restored at the supranational level may alleviate the aforementioned externalities. Similarly, coordination of the rules regarding the take up of pension assets may alleviate financial market volatility. An example could be a common rule that a lump-sum take up should be confined to some specific use, such as the purchase of a house. In other words, shifting parts of pension fund supervision to the EU level may require complementary coordination.

Thirdly, the choice has been made to centrally clear derivatives transactions. A new public institution could have been entrusted with this task, but the choice has been made to leave this task to the private sector. This has placed a limited number of private parties in an oligopoly-like position to impose conditions on institutions trading in derivatives. We see this happening in the conditions for posting collateral: collateral that is eligible according to legislation is in practice, however, not accepted by central clearing parties. Imposing a Eurozone-level requirement on clearing houses to accept government bonds of sufficient quality as collateral would correct a situation that is probably the result of insufficient competition among the clearing houses, and would mitigate liquidity risk in the pension fund sector. Under the alternative, pension funds run the risk that they cannot fulfil their cash requirements, particularly due to new Basel III regulations (Net Stable Funding Ratio and Leverage Ratio Framework), which increases the chances of the repo market drying up. Eventually, the ECB may end up as a lender of last resort for troubled pension funds; or pension funds might be forced into fire sales to meet (contractual) cash requirements.

Finally, the *interaction* between risk-based capital requirements and mark-to-market valuation seems to lead to increasingly similar portfolio compositions of financial institutions and pension funds. This makes their exposure increasingly similar, and means that a shock that hits them may be amplified much more strongly, because all affected institutions react in the same way. One way to partially break this link could be to introduce simple capital requirements that are related to the amount of leverage an institution has on its balance sheet, but not to the specific investments (see Brunnermeier *et al.* 2009).

Another effect of risk-based capital requirements seems to be pro-cyclical mismeasurement: after a period of low volatility and asset price growth, backward looking risk measures will provide the signal that risk is very low, while often after such a phase (that could be identified as 'the build-up of a bubble') a strong decrease in asset prices occurs. After this crash, risk indicators will provide the signal 'very risky', when the crash has effectively already occurred and risk has fallen once again. To address this flaw in signalling, momentum-based indicators could be used. These provide information on how long asset prices have gone in the same direction, and may therefore provide a warning as to how likely a future crash actually is.

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Brexit – Theory and Empirics

Till Nikolka* and Panu Poutvaara**

Introduction

Article 50 of the Treaty on European Union states that: "any Member State may withdraw from the European Union in accordance with its own constitutional requirements". On the 23rd of June the British government held a referendum on whether Britain should exit the European Union and 52 percent of the electorate voted in favour of the so-called Brexit. There was substantial difference in vote shares for 'leave' between different regions of the country. While in London and in Scotland, for example, there was a large majority in favour of 'remain', other regions voted more clearly for 'leave' than the average referendum results suggest. Polls conducted shortly before the election had still predicted a majority of votes for 'remain'.[1] The unexpected results were followed by a 3-percent drop in the FTSE 100 index, the British Pound lost 9 percent of its value against the US dollar and 7 percent against the euro on June 24th.[2] The IMF (2016) and the OECD (2016) project that, in the long run, secession from the EU is likely to weaken economic growth in Britain substantially due to factors like trade barriers with EU countries, for example. So far, however, it is not clear what Brexit actually means and which conditions will apply to future relations to EU countries. To date, the British government has not even made a formal request for Britain to exit the EU.[3] The expectation of Brexit and uncertainty about future economic and political development have nevertheless already led to a decrease or a postponement of private investments in Britain worth 65.5 billion pounds, according to a survey among 1,015 companies conducted in October.[4]

This article begins by presenting the theoretical arguments related to how a referendum on whether or not to leave the European Union should have taken place, and goes on to provide an empirical analysis of the actual Brexit vote and a summary of the swiftly growing body of literature on this topic.

Theory on why citizens should vote on secession

Stubborn politicians and strategic delegation

What is currently known as Article 50 of the Lisbon Treaty initially appeared as Article 59 in the draft Treaty establishing a Constitution for Europe, on which the member states agreed in June 2004. The Lisbon Treaty replaced the Constitutional Treaty, which was rejected in referenda in 2005 by French and Dutch voters.

Introducing the possibility of leaving the European Union changes the threat points in intergovernmental bargaining. Eerola, Määttänen and Poutvaara raised the concern back in 2004 that letting governments decide on withdrawal, even without popular consent, could lead into an increased use of the threat of withdrawal to extract concessions in intergovernmental negotiations. In their model on inter-governmental bargaining, there is uncertainty over which member state gets an opportunity to make an ultimatum to demand concessions from other member states. An ultimatum is modelled as a required concession and a threat to withdraw from the European Union if the other member states do not accept it. If other member states do not accept the demanded concession, the politician who has made the ultimatum has to decide whether to pursue withdrawal or move on. Politicians differ in their abilities to manage public resources, and in the psychological cost they would suffer if they were first to make an ultimatum, and then not to carry it out. Only leaders who have the credibility that they will

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[1] See, for example, *The Financial Times,* "EU referendum poll of polls", https://ig.ft.com/sites/brexit-polling/.

[2] https://www.theguardian.com/business/2016/jun/23/british-pound-given-boost-by-projected-remain-win-in-eu-referendum.

[3] On November 3rd the High Court ruled that the parliament has to approve government negotiations for exiting the EU; the majority of MPs oppose the referendum decision.

[4] https://www.welt.de/newsticker/bloomberg/article159477481/Brexit-kostet-Grossbritannien-76-Mrd-an-Investitionen-Studie.html.

carry out a threat find it optimal to make threats. If a politician who is not credible were to threaten withdrawal, other leaders would simply call his/her bluff. Those politicians for whom the psychological costs of losing face by not carrying out the threat they made would be so severe that they would be willing to leave the European Union if they were not to obtain the transfers they require are called stubborn. In each period, that can be interpreted to be sufficiently long so that each leader plays the game only once, one of the leaders is randomly selected to be in a position of making an ultimatum to others.

Eerola *et al.* (2004) suggested that the possibility of stubborn politicians blackmailing concessions by threatening withdrawal would give national electorates an incentive to elect more stubborn politicians. This would increase the amount of confrontations and also reduce the average ability of elected politicians, if electorates proved willing to elect less competent, but more stubborn politicians whom they expect to be able to extract more concessions from other member states.

Referendum as a safeguard

Eerola *et al.* (2004) also suggested a remedy to avoid strategic delegation to stubborn politicians: EU constitution should require that withdrawal from EU membership must be approved by the voters of the withdrawing member state in a binding referendum. If a national electorate was bound to approve withdrawal in a referendum, this would mean that even stubborn politicians should have no incentive to make an ultimatum, if they expect their voters to prefer membership. Crucially, the referendum should be binding and take place to ratify or reject the political decision to withdraw from the EU membership. If voters accept withdrawal after the elected politicians have decided that they would like to withdraw, the government should no longer have a possibility to reverse withdrawal. This requirement of not being able to turn back is needed to avoid a situation in which voters tactically approve withdrawal, to improve their government's bargaining position and expect that withdrawal will finally not be implemented when other member states offer additional concessions.

Is the concept of stubborn politicians empirically relevant? There are several historical examples of a stubborn politician blocking decision-making in the European Union to get his or her way. In 1965, President de Gaulle was of the view that the European Commission had exceeded its powers. France refused to participate in the European Community institutions for six months, pursuing a so-called empty chair policy. In the end, other member states gave in and agreed to give member states a veto power when they believe that their fundamental interests were under threat. In 1984, Prime Minister Margaret Thatcher demanded a considerable rebate on UK membership fees. She threatened to veto any further expansion of spending, unless the other countries accepted her demand. In the end, she secured massive cost savings to Britain. As a third example, in 2003 Italy's then-Prime Minister Silvio Berlusconi linked fines to Italian farmers for exceeding Common Agriculture Policy milk production quotas and a tax package on a cross-border savings levy and a code of conduct for corporate taxation. When the other member states refused Berlusconi's demands, Italy vetoed the proposed package.

What went wrong in the Brexit referendum?

To link the theoretical results by Eerola *et al.* (2004) to the Brexit debate, the mistake in Britain was that the referendum took place without there being a parliamentary majority for leaving the EU. There should only have been a referendum once a parliamentary majority had already voted in favour of leaving. The government should also have specified what type of withdrawal it wanted. Current debate over what type of mandate the British government has to withdraw, and whether Britain should stay in the common market or not, testifies that the policy choice put to voters was unclear. Strikingly, the British government has even questioned whether parliament has to approve the momentous decision of invoking Article 50, with several ministers arguing that the government should be able to do so without a parliamentary vote or mandate on what type of withdrawal to pursue.

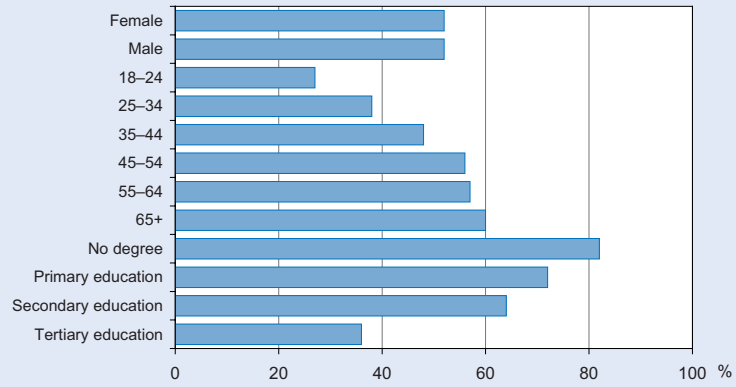
Empirical analysis of the referendum results

Without having defined the conditions of a potential Brexit, the British government held a referendum on whether or not Britain should exit the EU. The political debate ahead of the elections mainly focused on two issues: firstly, Britain's costs and benefits from EU membership with respect to public finances and, secondly, free labour mobility within the EU. Supporters of the 'leave' campaign argued that the British taxpay-

er would lose by transferring fiscal funds to the EU instead of spending them domestically. Furthermore, unrestricted immigration of EU citizens would increase competition and unemployment in the labour market and impose an additional fiscal burden.[5] Thus, 'leave' supporters proclaimed that Britain would be better off exiting the EU, spending the government budget domestically and restricting access for EU citizens to its national labour market. Given that the aggregate economic effects of Brexit are perceived as being negative, it remains unclear at first sight why these arguments apparently convinced a majority to vote for 'leave'.

Figure 1

Percent 'leave' votes among voters in selected groups



Source: lordashcroftpolls.com.

Analysis of individual voter preferences

Pollsters analysed the results in the aftermath of the referendum in search of possible explanations for voting behaviour. Relating the voting decision to demographic characteristics, exit polls like Ashcroft (2016) revealed big divisions in society, as illustrated in Figure 1.[6] Young voters were mostly against Britain leaving the EU, while older generations voted for 'leave'. Among the 18 to 24 year olds, for example, only around 27 percent voted for leave, while among those aged 65 and above, the corresponding share was over 60 percent. Moreover, those with higher levels of education voted against leaving, while those with lower levels of education in favour of 'leave'. While 72 percent of voters with only primary education and 64 percent of those with only secondary education voted for Brexit, the corresponding vote share was 36 percent among university graduates. Surveys also revealed major regional differences in voting behaviour: the probability of voting for Brexit, as well as voter turnout, was higher in rural areas compared to large metropolitan areas.[7] Apparently, the perceived distribution of gains from an EU membership was very differently within Britain. The estimated average costs and benefits at the aggregate level alone do not enable us to understand voting behaviour. Instead, one must take into account the heterogeneity of (perceived) gains and losses within the society.

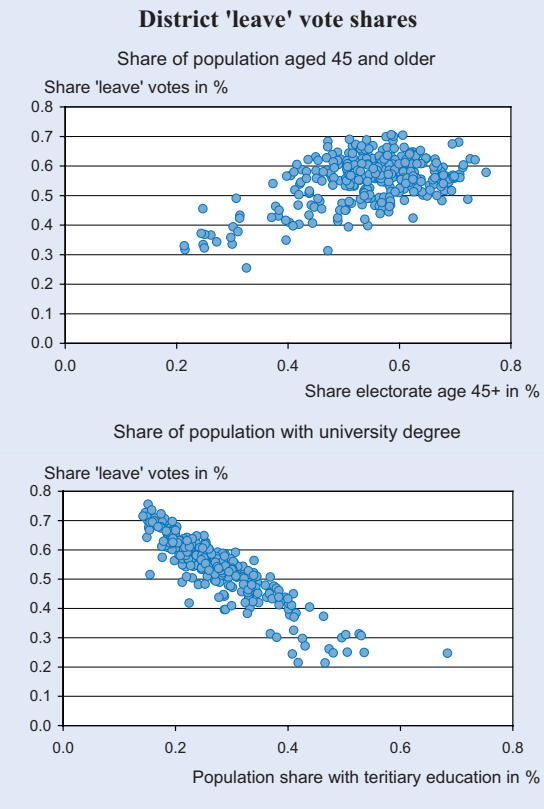
Vote shares and socio-demographic characteristics on the district level

Understanding how the heterogeneity in voting behaviour is related to the economic platforms announced by the 'leave' and the 'remain' campaigns is crucial to identifying explanatory factors of voters' preferences. For the following analysis we are going to use data on the level of local authority districts. We correlate the referendum 'leave' vote shares published by the Electoral Commission with socio-economic and demographic variables from the Office for National Statistics (ONS). The ONS provides data from the 2011 Census, as well as from the 2014 UK business register and employment survey. We only compare voting behaviour between districts within England, as some of the census data that we use is not available for Scotland on a district level. This restriction biases our sample towards districts with a higher share of 'leave' votes. In Scotland, over 60 percent voted for remain (Ashcroft 2016).

Figure 2 shows that there is substantial heterogeneity in the 'leave' vote shares across districts. Relationships on the aggregate level confirm the heterogeneity described above with respect to individual characteristics: districts with a higher share of the electorate aged 45 or older have a higher 'leave' vote share. Districts with a higher share of the population with some tertiary education, on the other hand, tend to have lower 'leave' vote shares. The relationship between vote shares and population share with tertiary education

[5] See e.g. https://www.theguardian.com/politics/2016/jun/27/eu-referendum-reality-check-leave-campaign-promises.
[6] See e.g. http://lordashcroftpolls.com/2016/06/how-the-united-kingdom-voted-and-why/, and http://blogs.ft.com/ftdata/2016/06/24/brexit-demographic-divide-eu-referendum-results/, for further results of exit poll analysis.
[7] http://cityobservatory.org/cities-and-brexit/.

Figure 2



Sources: Office for National Statistics; Electoral Commission.

appears to be very strong. Using similar data, other studies have already documented this (see Becker *et al.* 2016; Darvas 2016; Goodwin and Heath 2016; Langella and Manning 2016): Goodwin and Heath (2016) show that fifteen out of the twenty 'least educated' areas voted to leave the EU, while every single one of the twenty 'most educated' areas voted to remain. Moreover, of the twenty 'youngest' authority areas, sixteen voted to remain. By contrast, the 'leave' vote was much stronger in authorities with a larger number of pensioners. Of the twenty 'oldest' local authorities, nineteen voted to leave. This correlation pattern between election outcomes and the educational distribution of the electorate can still be observed between districts with similar age composition.

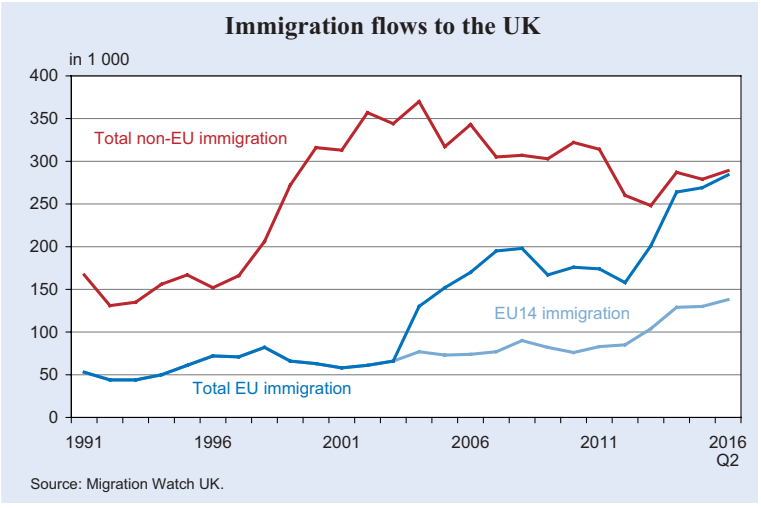
Immigration and Brexit?

A central argument made by the 'leave' campaign was that unrestricted immigration from other EU member states to Britain increases wage competition and imposes additional burden to the social security system.[8] Britain was among the first EU15 countries to open its labour market to immigrants from the countries that joined the Union in 2004. Since then, Britain has experienced an increased inflow of labour migrants from Eastern European countries. While immigration from other EU countries to Britain was 15,000 prior to 2003, it increased to 87,000 in 2004 after the EU enlargement (Migration Watch UK 2016). This large increase in immigration flows after the EU enlargement is illustrated in Figure 3. Using data from the UK Household Longitudinal Study, Altorjai (2013) shows that employed immigrants from the new EU member countries hold relatively low levels of formal labour market qualification compared with employed immigrants from the remaining EU countries. Moreover, compared with other EU immigrants, they are more than proportionally formally overqualified, given the skill requirements for their employment in Britain.

Economic theory suggests that migration is efficient if it is based on productivity differences, and not on differences in taxes and transfers. However, migration can have large distributional effects for the native population. Figure 4a) illustrates the potential economic effects of immigration on natives in a simple model of the labour market. The figure illustrates a labour market experiencing an inflow of foreign workers, which leads to a decrease in wages among natives who compete with immigrants for similar jobs. Here, L denotes the pre-migration stock of workers and L' the after-migration stock of workers, with L'-L corresponding to net immigration. The gross income of the owners of the fixed factor of production, including workers

[8] https://www.theguardian.com/politics/2016/jun/27/eu-referendum-reality-check-leave-campaign-promises.

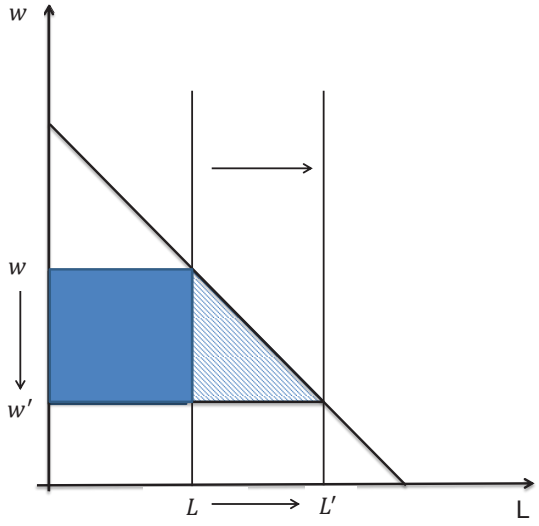
Figure 3



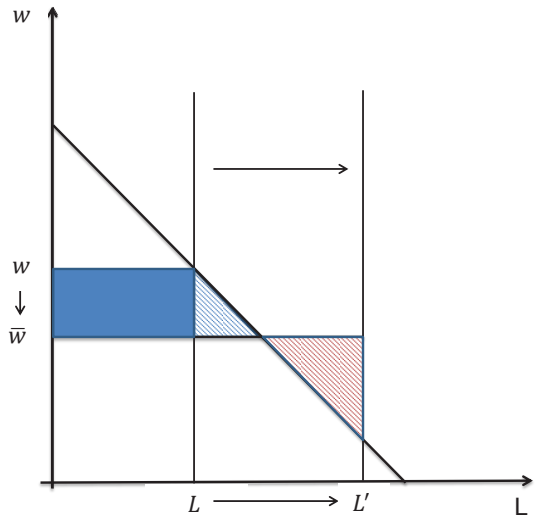
Source: Migration Watch UK.

Figure 4
Wage effects of immigration on labour market

a) without minimum wage



b) with minimum wage



Source: Authors' conception.

with different skills than immigrants, is captured by the triangle above the wage line. Overall migration is welfare improving, but the group of natives with the same skills in the host country loses and would oppose free mobility. On the other hand, migrants as well as natives with complementary skills and owners of other production factors will gain.

Figure 4b) illustrates a case in which natives might lose out due to immigration, even if they are complements to immigrant labour. These groups might lose out due to immigration if there is a minimum wage and a welfare state that pays unemployment benefits. In this case, wages might not be able to adjust in response to immigration. Compared to Figure 4a) wage loss is smaller for those who compete with immigrants on the labour market. However, unemployment goes up, and the burden on a redistributive welfare system also increases. If social security contributions are taken from the incomes of the working population, there might be net losses from immigration, even among groups gaining from immigration in terms of gross income.

Can opposition to immigration related to these channels provide an explanation for the Brexit referendum results? Regarding the fiscal contribution of immigrants in Britain, Dustmann and Frattini (2014) argue that immigrants make a positive net contribution to public finances, with above average contributions by those coming from the new EU member countries after 2004. Alfano *et al.* (2016) do not find evidence for increased unemployment rates due to recent immigration in Britain. Battisti *et al.* (2015), on the other hand, calculate the welfare effects from immigration using a labour market model with unemployment and a welfare state that redistributes income through unemployment benefits. In their numerical simulations they compute the welfare effects from different immigration scenarios on low and high skilled natives in 20 OECD countries. Comparing the *status quo* in 2011 with the autarky situation, they find that net welfare in Britain increased due to immigration by 0.35 percent. However, low skilled individuals lost, on average, 0.22 percent of income, while high skilled individuals gained 1.10 percent. In a further numerical exercise they calculate the welfare effects of an inflow of low skilled immigrants increasing the migrant stock by 6 percent. Results for Britain yield an overall net welfare loss of 0.02 percent compared with the status quo. As previously, the net effect on the highly-skilled native population is positive (0.2 percent), while it is negative for the low-skilled native population (– 0.19 percent).

Regression analysis at a district level

The following analysis assesses the joint relationships between the referendum vote shares and potential explanatory variables on the level of districts. We address the question whether higher immigrant shares in a district are potentially related to higher 'leave' vote shares when controlling at the same time for the age and education composition in the population. We estimate a simple linear regression model explaining the 'leave' vote share with a district's aggregate characteristics. Results from the estimations of different specifi-

cations of the empirical model are presented in Table 1. First of all, regressions confirm that the composition of the electorate with respect to age and education are important explanatory factors for vote shares on the district level. Column 1 shows that, in districts with a higher share of voters who are 45 years or older, there was higher support for Britain exiting the EU, as seen in Figure 2. We do not analyse the heterogeneity of the results with respect to shares of different age groups in more detail, as multicollinearity between different age shares in a district is a potential concern, as pointed out by Darvas (2016).

Our results reveal that a 10 percentage point increase in the share of those 45 or older increases the 'leave' vote share by around 6 percentage points. Most importantly, column 2 shows that a higher population share with tertiary education in the district is related to a lower 'leave' share, as seen in Figure 2. This estimate indicates that an increase with the population share with tertiary education by 10 percentage points reduces the 'leave' vote share by 11 percentage points. The R-squared measure indicates that this variable can already explain 80 percent of the variation in the vote shares. The results show that insights from the exit poll survey data presented above can also be confirmed at the aggregate level of districts. Column 3 includes both variables jointly into the model. The statistical significance of the results remains robust, but absolute coefficient sizes reduce considerably. This stresses that correlation between explanatory variables can confound inference from univariate analysis, as presented in Figure 2 above.

In order to address the question of whether immigration might be related to the outcome of the referendum, we regress the share of 'leave' votes on the population shares of different immigrant groups in 2011 in the district in column 4. While the population share of EU15 and non-EU immigrants in a district is related to a lower leave vote share, the share of immigrants from the new EU member countries in a district is associated with a higher share of leave votes. However, the R-squared measure reveals that the explained variation in this model is lower compared to the previous specifications. Column 5 includes immigrant shares together with controls for the education and age composition of the population in the regression. Now, the coefficient estimates for the foreigner share from the EU15 countries and for the non-European sending countries are not statistically significant. The estimate for the immigrant share from the EU accession countries, on the other hand, remains statistically significant and positive. According to this specification, an increase in the migrant share from these countries in the district population by 10 percent is associated with a 7 percent increase in the 'leave' vote share. These results indicate that in districts that experienced an increase in immigration from new EU member countries, the number of 'leave' votes was higher. However, comparing the explained variation to the model specifications in column 1 to 3 suggests that individual socio-demographic characteristics seem to explain the largest part of the overall variation in the heterogeneity of vote shares between districts. The empirical results nevertheless indicate that immigration might have played a role for the election outcome. The theoretical considerations above provide an explanatory channel for these considerations.

Other research presents findings that are in line with our results. For analysis in empirically richer

Table 1

Regression analysis for 'leave' vote share in 326 local authority districts in England.

	(1)	(2)	(3)	(4)	(5)
Electorate share age 45 and over	0.635***		0.315***		0.353***
	(0.0603)		(0.0279)		(0.0457)
Some tertiary education		– 1.129***	– 1.031***		– 1.096***
		(0.0313)	(0.0279)		(0.0407)
Population share immigrants, EU15 countries				– 0.469***	– 0.0330
				(0.0866)	(0.0581)
Population share immigrants, 2004 EU accession countries				1.242***	0.660***
				(0.320)	(0.250)
Population share immigrants, non-EU countries				– 3.377***	0.0769
				(0.361)	(0.187)
Constant	0.193***	0.853***	0.651***	0.611***	0.639***
	(0.0337)	(0.00889)	(0.0193)	(0.00629)	(0.0282)
Observations	326	326	326	325	325
R-squared	0.255	0.800	0.857	0.539	0.860

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' own calculation.

set-ups including more control variables see e.g. Becker *et al.* (2016); Darvas (2016); Clarke and Whittaker (2016); and Langella and Manning (2016). The Economist (2016); Becker *et al.* (2016) as well as Clarke and Whittaker (2016) find that the increase in immigration after EU enlargement is particularly related to higher 'leave' vote shares. Becker and Fetzer (2016) find that immigration has a similar effect on the vote shares for UKIP in the European Parliamentary elections 2004. For Italy, Barone *et al.* (2016) show that a high inflow of immigrants is related to vote gains for centre-right coalitions in elections at a municipal level. McCarty *et al.* (2006) suggest that political polarisation in the United States is also related to immigration.

However, there are more potential explanatory factors that might have played a role in the Brexit referendum. Becker *et al.* (2016) use a comprehensive collection of different data sources to investigate a variety of potential explanatory channels for the referendum outcome. Related to the economic structure of a district, they find that a high employment share in retail, manufacturing, mining and construction in the district is associated with a higher share of 'leave' votes. This is also true of districts with higher unemployment rates. The effects of structural change probably play an important role in this context. Moreover, variations in public policies, like fiscal expenditure, also seem to have a significant explanatory power for the heterogeneity in the voting outcomes. Fiscal cuts in a given district are related to more 'leave' votes. Moreover, high trade dependence of a district is also found to be significant and positively correlated with the share of 'leave' votes in a district (Becker *et al.* 2016; Coyle 2016).[9] According to Bell and Machin (2016) and Darvas (2016), wages and wage inequality matter too. Regions with higher median wages were less likely and regions with higher poverty rate more likely to vote for 'leave'. A higher share of 'leave' votes was also related to higher wage inequality as measured by the Gini coefficient.

Goodwin and Heath (2016) argue that the strong divide in society along the lines of age and education, together with the role of the factors mentioned above, reflect an increased fraction of voters feeling 'left behind' by the economic and social dynamics of the country. In this context, worries about immigration might also be unrelated to economic consideration, even if correlations suggest a direct link. Poutvaara and Steinhardt (2015) show that 'bitterness in life' is associated with major concerns over immigration. This effect cannot merely be explained by concerns that immigrants represent competition in the labour market, as the link between bitterness in life and worries about immigration holds even after controlling for job security, and when analysing different education or skill categories separately. Instead, it appears that people who feel that they have not got what they deserve in life oppose immigration for spiteful reasons. An intriguing topic for future research would be whether a similar relationship prevailed in the Brexit referendum.

[9] For the United States, Autor *et al.* (2016) have shown that increasing trade exposure with China has increased political polarization.

Conclusion

On June 23rd a majority of British voters decided that Britain should leave the European Union. The British government held a referendum on British EU membership without specifying the conditions for a Brexit and without a majority in parliament backing the vote to leave the EU. We argued that citizens should, in general, have the possibility to vote on secession in a referendum. However, in our view, the Brexit referendum did not meet the conditions for an informed voter decision on secession. Until today, the implications of the referendum are not clear as the government still has not formally requested to invoke Article 50 starting negotiations for leaving the EU.

We analysed voting behaviour in the referendum empirically to understand potential explanatory factors for the voter decision. Data on vote shares reveal a big divide in society along the lines of education and age, as well as between different regions in the country. The less educated and the old were more likely to vote for 'leave'. On the district level, the socio-demographic characteristics of the population explain a large part of inter-regional heterogeneity in vote shares. In particular, the relationship between education and 'leave' votes appears to be very strong. We analysed how immigration, which was a central argument in the political debate ahead of the elections, is related to 'leave votes'. Districts that experienced a recent influx of immigrants from the 2004 EU accession countries were more likely to exhibit a higher leave vote share, even after controlling for socio-demographic characteristics of the population. Concerns over increased competition in the labour market might be an explanation for this.

On the other hand, the presented literature has shown that other factors related to economic and social dynamics are also linked to the 'leave' vote shares. However, the relationship between low levels of education and Brexit votes provides the most robust result across the lines of other potential explanatory factors. In this context, worries about immigration might also project general discontent without being directly related to considerations over personal income or job security.

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Climate Notes on the Development and Future of the World's Forests

Jana Lippelt*

The preservation and expansion of the global forest areas as well as their sustainable management have found their way into a large number of agreements over recent years. Among them are the new 17 UN Sustainability Goals adopted by the UN General Assembly in 2015. By 2020, it is above all to restore damaged forests and to strengthen afforestation and reforestation all over the world in order to counteract problems such as climate change, species fading and poverty. These targets are to be achieved by means of resources from all available sources and can provide incentives for sustainable use in developing countries (Sustainable Development Knowledge Platform 2016).

For more than 1.6 billion people around the world, forests provide a livelihood by providing food, water as well as fuels and medicine (UNDP 2016). The conversion of forest land into agricultural land for the production of products such as soya, palm oil and meat as well as paper and wood products continues to be the main cause of global deforestation. While deforestation in the 19th century took place mainly in the temperate latitudes, it has been shifting over the last decades mainly to the tropics and subtropics. In the period from 2000–2010, the annual loss of forest areas there amounted to 7 million hectares (FAO 2016).

Figure 1 shows the percentage change in forest area in the period 2005–2015 and annual absolute change in 1,000 hectares (lower picture). Both figures show that deforestation mainly affects tropical and subtropical regions. Countries such as Brazil, Indonesia, Nigeria and Zimbabwe as well as Argentina and Honduras have seen enormous deforestation rates, although a slight slowdown in deforestation rates has been observed in Brazil since 2005. In more than 70 percent, agriculture and forestry are the main cause in these countries, which in turn is attributable to factors such as population growth and the creation of secure land ownership (FAO 2016). But also in industrialized countries such as Canada and Australia 50,000 or 290,000 hectares of forest area disappear annually by mining and the extraction of oil sands (see Figure 1). Overall, the global forest area decreased by over 3 percent and 130 million hectares respectively between 1990 and 2015.

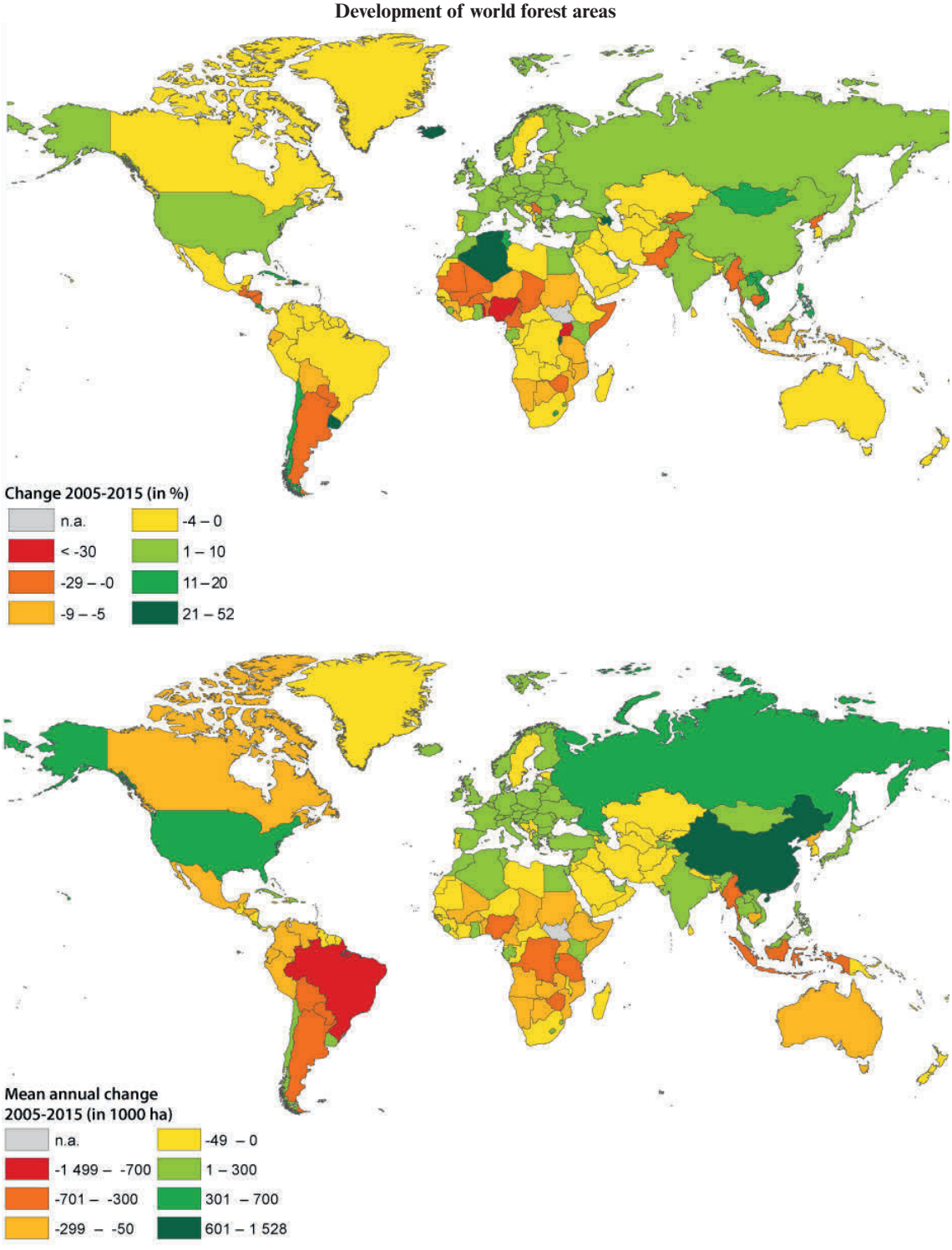
Deforestation, however, also has success in afforestation, as seen, for example, in Russia, the United States and large parts of Central Europe (see also Figure 1). The increase in forest areas is thus particularly evident in areas with a declining rural population and improved agricultural productivity as well as effective legislation for the preservation of forests (FAO 2016). Other countries such as Chile, Paraguay, Iceland, Costa Rica, Rwanda and Burundi are also experiencing significant progress. Above all, China stands out among the afforestation rates. These figures are due to a forestry program ('Grain for Green Program'), which was initiated in 1999 to stem mainly the progress of soil erosion (Hua *et al.* 2016). The program uses cash payments to the rural population as an incentive for the restoration of forests as well as bush or grassland. By 2013, 27.8 million hectares of forest have been afforested in China. The majority of the forests are used mainly for the production of wood, fruits and other products, while the restoration of biodiversity is only second. A major problem here is that the newly created forests are mainly monocultures and simple, poorly mixed forests.

In Rwanda, parts of the country were already being reforested in the seventies, but especially after the civil war in 1994 and the massive deforestation wave in this context. Here atypical, but rapidly growing species such as eucalyptus trees and pine trees are used. At the present time, the forest area accounts for 29.3 percent, which means that the 2011 target of 30 percent (or 2 million hectares) was almost reached by the year 2020 (Ministry of Natural Resources 2015). Rwanda's self-commitment is part of the so-called Bonn Challenge (2011), in which around 150 million hectares of destroyed forests are to be reforested on a voluntary

* Ifo Institute.

Figure 1

Development of world forest areas



Source: FAO Stat 2016.

basis by 2020. In 2014, the target was expanded to 350 million hectares by the year 2030. 36 countries, organizations and firms are now part of this platform. In addition to forest areas, degraded agricultural areas as well as areas which are a natural protection against erosion or flooding are to be afforested and transferred to sustainable management (Bonn Challenge 2016). To date, around 112 million hectares have been afforested, representing 75 percent of the original 2020 target. The Bonn Challenge Barometer of Progress was launched in October 2016 in order to demonstrate the measures implemented and the quantifiability of progress.

In the same year, the New York Declaration on Forests was adopted at the UN Special Summit on Climate Protection. 189 countries, governments, businesses and civil society and indigenous groups have been supporting this initiative since 2014 (UNDP 2016). The aim of the non-binding agreement is, among others, the halving of global deforestation and its complete cessation by 2030. Within the framework of these objectives, the private sector will be involved in the prevention of deforestation by the production of palm oil, soybeans, beef and paper (see Climate Focus 2015). Of the nearly 60 private companies and financial service providers supporting the Declaration, 41 have committed themselves to comprehensive commitments to curb deforestation. However, most companies had already adopted such measures before the agreement, and little is known about the methods for evaluating and reporting on implemented measures and their successes (Supply Change 2015). Nevertheless, the New York Declaration is given a promising role in announcing additional self-commitments.

The protection and restoration of the world's forest areas had a further success last year. The protection of forests and their importance in the framework of the climate conference in Paris were formally fixed for the first time in a climate agreement. Article 5 explicitly invites States Parties to "take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1(d), of the Convention, including forests" (UNFCCC 2015). It encourages countries to create policies to preserve existing forests, as well as stimulating sustainable management. However, the REDD+ mechanism for the reduction of emissions by deforestation and forest degradation, which is meant to be used, has been avoided in this way, and the contracting states are not subject to any obligations within the framework of forest protection.

It is also criticized in this context that no concrete plans exist for the general funding of the REDD instrument (Heinrich Böll Stiftung 2016). Furthermore, the lack of protection of the indigenous population and the extensive restriction on the forest as a pure CO2 sink or to achieve negative emissions are still being criticized. In addition, the lack of evidence for an actual forest protection also plays an important role. Furthermore, the focus of the programs is still too small on the actual large deforestation causes such as oil production, mining and infrastructure development, but too often accuses indigenous populations of their natural way of life, forest destruction (Action Solidarité Tiers Monde 2016). The future success for the sustainable protection of forests and the species living there therefore continue to depend on a clear financing of the projects and implemented initiatives, the involvement of local actors, international obligations as well as strict rules on the verifiability of the measures.

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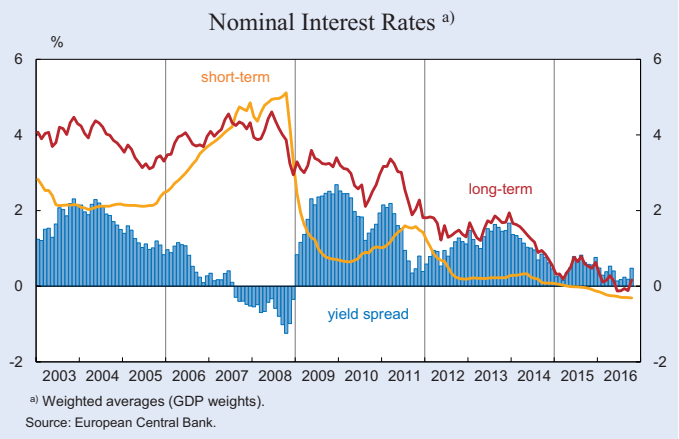
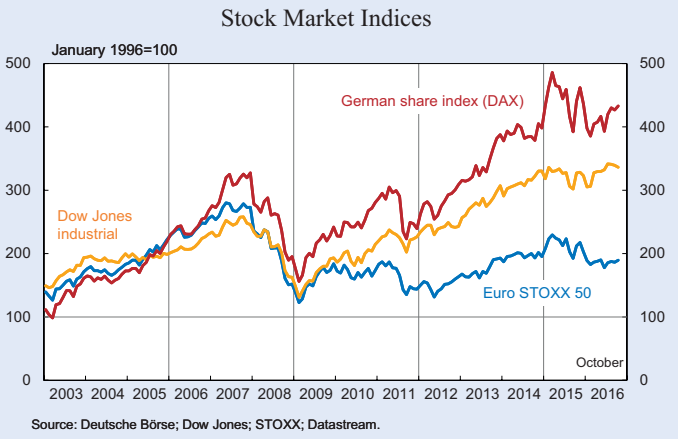
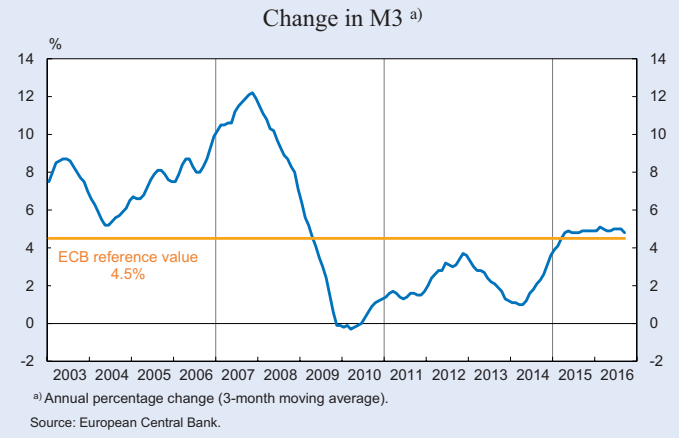
Financial conditions in the euro area



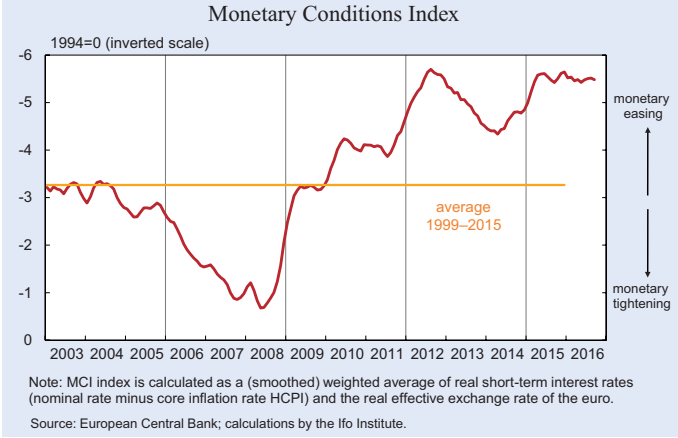
In the three-month period from August 2016 to October 2016 short-term interest rates remained rather constant: the three-month EURIBOR rate stood – 0.31% in October 2016 compared to – 0.30% in August 2016. Yet the ten-year bond yields increased from – 0.06% to 0.17% in the same period. The yield spread reached 0.48% in October 2016, up from 0.24% in August 2016.



The German stock index DAX increased in October 2016, averaging 10,665 points compared to 10,593 points in August 2016. The Euro STOXX also grew from 3,023 to 3,055 in the same period of time. Yet the Dow Jones International decreased, averaging 18,142 points in October 2016, compared to 18,400 points in August 2016.

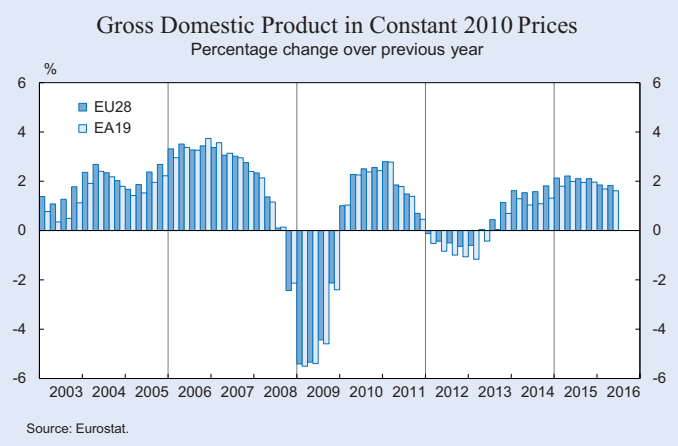


The annual growth rate of M3 decreased to 4.4% in October 2016, from 5.1% in September 2016. The three-month average of the annual growth rate of M3 over the period from August 2016 to October 2016 reached 4.8%.

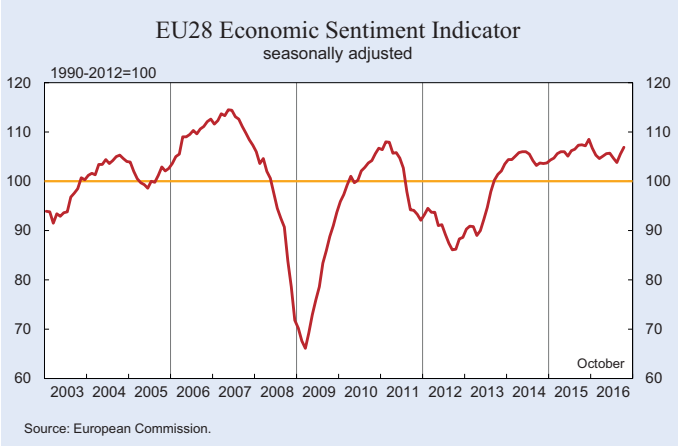


Between April 2010 and July 2011 the monetary conditions index remained rather stable. This index then continued its fast upward trend since August 2011 and reached its peak in July 2012, signalling greater monetary easing. In particular, this was the result of decreasing real short-term interest rates. In September 2016 the index started to decline while some minor fluctuations have been observed in last months on a high level, comparable to that of July 2012.

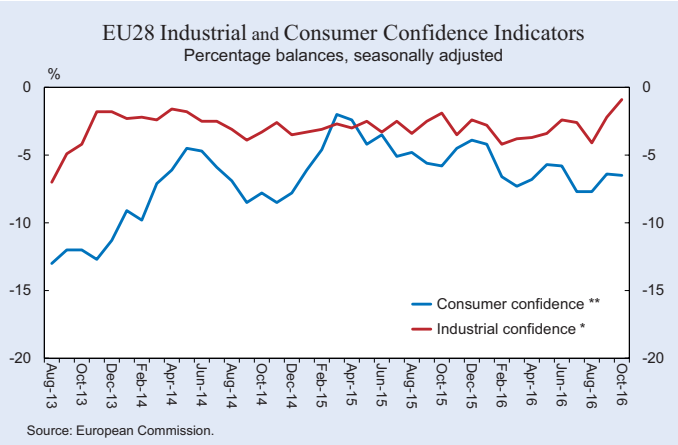
EU SURVEY RESULTS



According to the Eurostat estimates, GDP grew by 0.3% in the euro area (EA19) and by 0.4% in the EU28 during the third quarter of 2016, compared to the previous quarter. In the second quarter of 2016 the GDP grew also by 0.3% and 0.4%, respectively. Compared to the third quarter of 2015, i.e. year over year, seasonally adjusted GDP rose by 1.6% in the EA19 and by 1.8% in the EU28 in the third quarter of 2016.

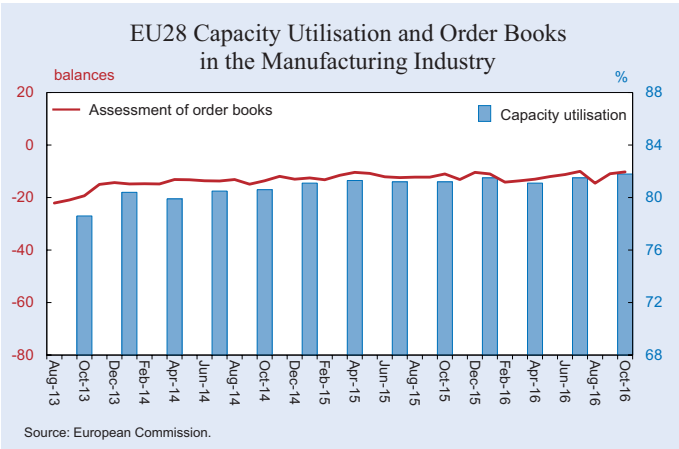


In October 2016 the Economic Sentiment Indicator (ESI) increased by 1.4 points in both the euro area (to 106.3) and the EU28 (to 106.9). In both the EU28 and the EA19 the ESI stands above its long-term average.



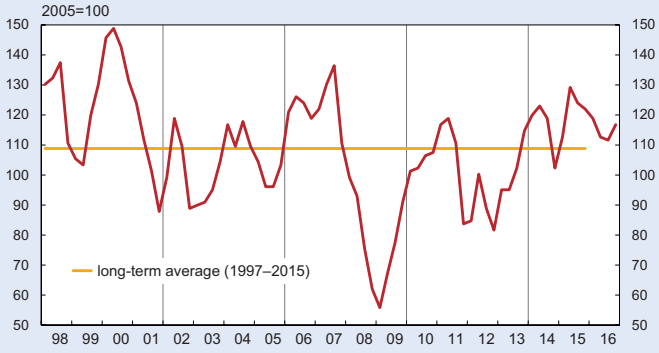
* The industrial confidence indicator is an average of responses (balances) to the questions on production expectations, order-books and stocks (the latter with inverted sign).
** New consumer confidence indicators, calculated as an arithmetic average of the following questions: financial and general economic situation (over the next 12 months), unemployment expectations (over the next 12 months) and savings (over the next 12 months). Seasonally adjusted data.

In October 2016, the *industrial confidence indicator* increased by 1.3 in the EU28 and by 1.2 in the euro area (EA19). The *consumer confidence indicator* decreased by 0.1 in the EU28 but increased by 0.2 in the EA19.

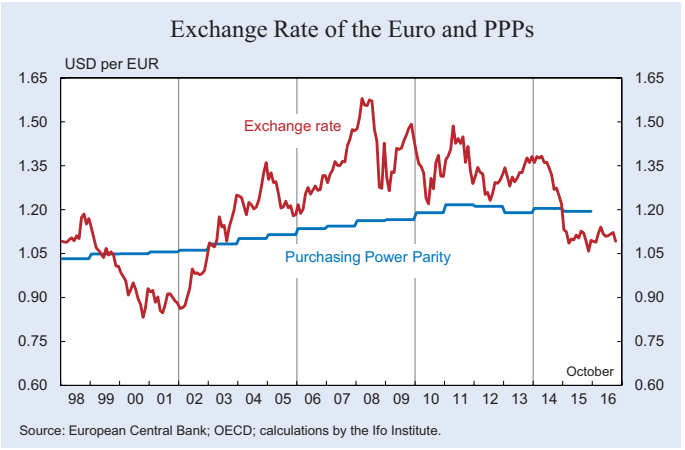


Managers' assessment of *order books* reached – 10.2 in October 2016, compared to – 10.9 in September 2016. In August 2016 the indicator had amounted to – 14.5. *Capacity utilisation* reached 81.8 in the fourth quarter of 2016, up from 81.5 in the third quarter of 2016.

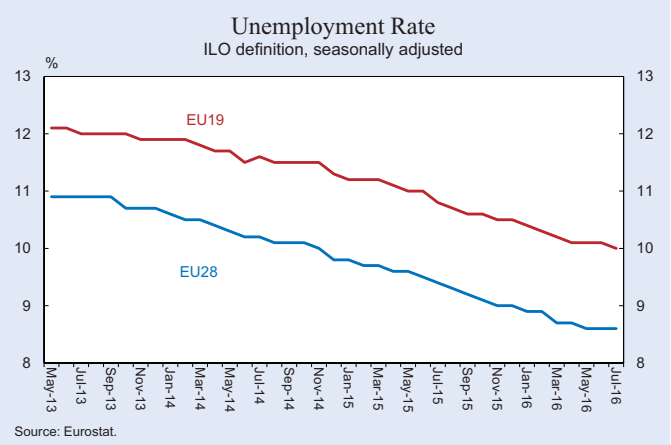
Euro area indicators



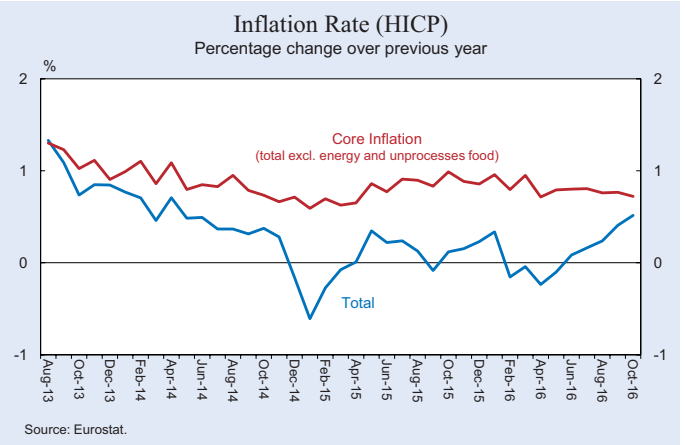
The Ifo Economic Climate Indicator for the euro area (EA19) rose from 111.6 points to 116.8 points in the fourth quarter of 2016. The current economic situation remains unchanged and the improved economic climate was entirely due to more positive expectations. The economic recovery in the euro area is expected to continue at a sluggish pace.



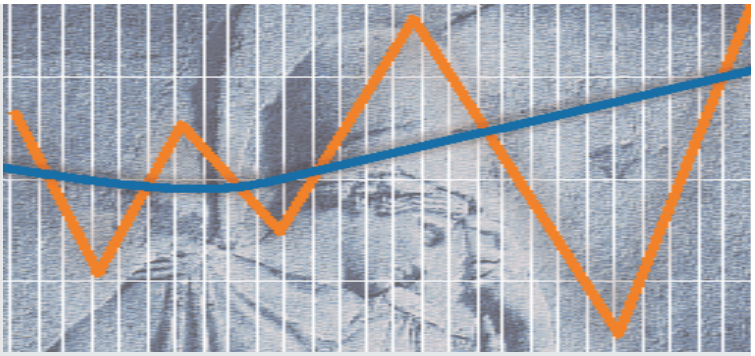
The exchange rate of the euro against the US dollar averaged approximately 1.11 $/€ between August 2016 and October 2016. (In July 2016 the rate had also amounted to around 1.11 $/€.)



Euro area (EA19) unemployment (seasonally adjusted) amounted to 10.0% in September 2016, stable compared to that of August 2016. EU28 unemployment rate was 8.5% in September 2016, again stable compared to that of August 2016. In September 2016 the lowest unemployment rate was recorded in the Czech Republic (4.0%) and Germany (4.1%), while the rate was highest in Greece (23.2%) and Spain (19.3%).



Euro area annual inflation (HICP) was 0.5% in October 2016, up from 0.4% in September 2016. A year earlier the rate had amounted to 0.1%. Year-on-year EA19 core inflation (excluding energy and unprocessed foods) amounted to 0.7% in October 2016, down from 0.8% in September 2016.



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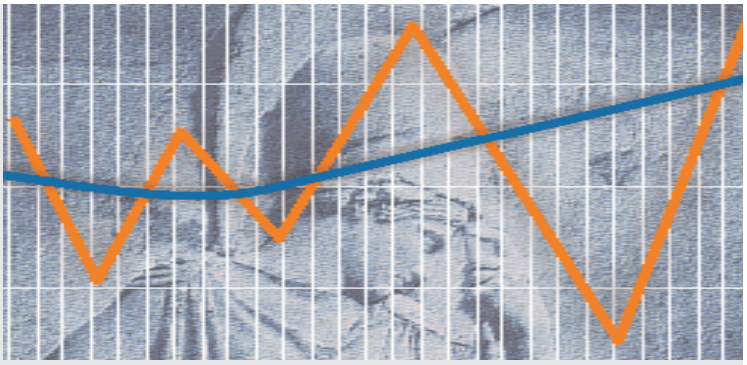

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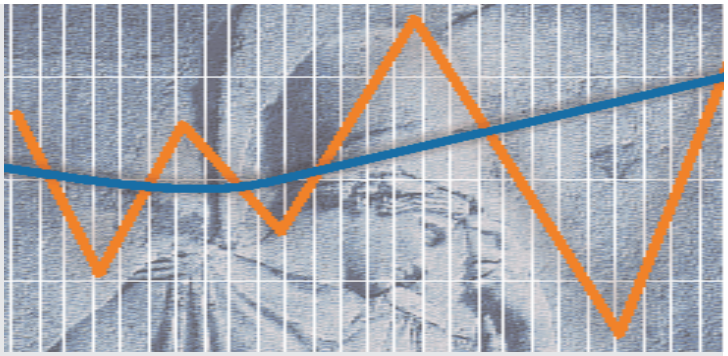

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