

# *Euro Area Scenarios and their Economic Consequences for Slovenia and Serbia*

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Since 1999, divergences in international competitiveness led to an accumulation of current account deficits in the south and surpluses in the north of the euro area. With the aid of macroeconomic models, this paper estimates the effects of an exit of Greece or of all G11PS countries (Greece, Italy, Ireland, Portugal, Spain) on the economies of Slovenia and Serbia. An exit of one or more countries would affect other economies via the trade channel and credit constraints. Euro area members would additionally suffer from an increase of public debt due to non-performing loans of the European Stability Mechanism and devaluations of public bonds purchased by the European Central Bank. An exit of Greece alone would only marginally affect the economies of Slovenia and Serbia. An exit of all G11PS countries or a euro area break-up would have dramatic negative consequences for output, unemployment and public finances.

*Key Words:* sovereign default; euro area break-up

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## **Introduction**

After the foundation of the European Economic and Monetary Union (EMU) in 1999, the diverging competitiveness of the peripheral and the core countries resulted in the accumulation of sizeable current account imbalances. At the same time, some countries built up large stocks of public debt. The countries, which lost international price competitiveness, have now to undergo painful reforms aiming at restoring their competitiveness. During this period, domestic demand declines which spills over to other countries via the trade channel. As the deficit countries became unable to finance their public budgets via capital markets, the other euro area countries, the European Central Bank (ECB) and the International

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Monetary Fund (IMF) have established financial rescue plans and new institutions, particularly the European Stability Mechanism (ESM). While the financial assistance is conditional on painful reform programs in the recipient countries, the other EU countries have assumed large claims and guarantees. If the recipient countries fail to repay the loans, public debt in the donor countries would increase, necessitating restrictive fiscal policies with negative short-run effects on domestic demand also in these countries. Furthermore, banks are affected by a write-down on their holdings of public bonds if the yields of these bonds rise sharply due to unsound fiscal policies of the respective countries. As a result, banks may be forced to reduce their credit supply. As many banks are operating internationally, credit supply in other than the home countries of the respective banks would also be affected. Should the reform programs underway in the peripheral countries fail to restore international competitiveness and the sustainability of public finances, one or more of the respective countries might eventually have to leave the euro area in order to devalue its currency and to increase competitiveness in this way.

In this paper, the macroeconomic consequences of different scenarios regarding the future euro area development for Slovenia and Serbia are determined by means of simulations with macroeconometric models for these economies. The choice of these countries enables interesting insights. On the one hand, both countries are successor states of the former Yugoslavia; hence they share common characteristics and a common economic and political heritage. However, already in the 1980s and early 1990s they followed different reform paths which materialised in a higher degree of economic openness and stronger trade relations with the Western countries in Slovenia. For Serbia, Russia was traditionally the main trade partner. Major differences between the two countries are related to their size in terms of territory and population, as well as their level of economic and social development (GDP per capita and size of unemployment) (Mencinger 2001). On the other hand, already in 2004 Slovenia became a member of the European Union, and in 2007 it was the first country from Central and Eastern Europe to introduce the euro as legal tender. Being a euro area member state, Slovenia has assumed obligations within the ESM, and by its capital share it participates in the ECB bond purchase programmes and in the payment system Target2. However, Slovenia came itself into troubles and may be forced to ask for ESM support, as due to the bursting of a housing and real estate bubble many loans became non-performing, pushing Slovenian banks into liquidity

problems. Due to the low capitalisation, the liquidity problem turned into severe solvency problems, and ultimately the government had to inject large amounts of capital into the banking sector, which pushed public debt up. Moreover, when joining the EMU in 2007, Slovenia gained access to large amounts of finance, while a clear strategy for using these funds was missing. Serbia, on the other hand, is only a EU candidate country. Hence, Serbia is until now outside the fiscal policy and financial architecture of the EU in general and the euro area in particular. In both countries, a lax credit policy by private banks, fuelled by substantial cross-border funding in the period preceding the crisis, led to a sharp rise in the indebtedness of companies and private households. Debtors are now facing difficulties to service the loans, resulting in a sharp increase of the share of non-performing loans and debt write-offs.

### **Accumulation of Imbalances in the Euro Area**

Since the foundation of the EMU in 1999, three major imbalances built up: (i) diverging competitiveness in the euro area, which intensified during the financial crisis of 2008; (ii) a banking sector which has proven to be under-capitalised and non-resilient against adverse shocks; (iii) high indebtedness of both public and private sectors in some member countries. Due to the mutual interdependences, these three problems reinforce each other, having resulted in a widespread confidence crisis. The developments are driven by pessimistic expectations concerning the solvency of the public and private sectors, respectively, in the crisis countries. This led to high interest rates in these countries. At the same time, capital fled into those countries, which are perceived as 'safe havens,' leading to historically low interest rates there. Due to high uncertainty, exaggerated pessimism may easily become self-fulfilling. The diverging development of unit labour costs among the euro area member countries since 1999 is one of the major, if not the single most important source of the current problems. This has caused substantial current account deficits in the countries with fast growing unit labour costs, mirrored by large surpluses in the economies experiencing an improvement in their international price competitiveness. At the same time, in the Southern peripheral countries public deficits and debt levels have swollen markedly (Roubini 2011).

Over a long period, these deviating trends had not been corrected by either exchange rate or wage adjustments. For an uncompetitive economy, such an adjustment would imply either an external or an internal

devaluation, both ways making the respective country's exports cheaper and imports more expensive. While Germany went through a prolonged period of wage moderation and painful labour market reforms (Hartz reforms), Greece, Portugal, Spain, Italy (and also Ireland, although Ireland's situation is not entirely comparable to the problems of the Southern countries) have increasingly fallen behind. Rigid labour markets and nominal wage stickiness prevented the required adjustment in these economies. When wages grow faster than labour productivity, unit wage costs rise. If unit labour costs rise by more than in other countries, the trade balance of the respective economy deteriorates.

The rising unit wage costs in the Southern periphery countries have partly been driven by capital market failure. Interest rate differentials in the euro area relative to Germany largely disappeared after the introduction of the euro, eliminating risk premia and inducing real estate and investment booms in those countries with still higher wage and price inflation and thus low or even negative real interest rates. The inflow of capital and low capital costs facilitated wage increases not backed by corresponding productivity gains. As interest rate differentials have appeared again during the financial crisis, a large part of these investments is no longer profitable with increased capital costs.

The failure of capital markets to price in risk premia and the resulting allocation of capital towards uncompetitive economies and sectors is probably itself the consequence of lacking credibility of fiscal rules and regulatory failure in Europe. The Maastricht criteria were not effectively imposed and lacked credibility right from the beginning. Capital markets also seemed to conclude that the no-bailout rule would not hold up in crises since the bankruptcy of a highly indebted member country would be perceived by the EU to be even more costly. In this way, high debt creates a negative externality on other countries. Under these conditions investors were inclined to expect to get their money back in any case, making government bonds an apparently very safe investment. Under these circumstances, there was no need to include a risk premium, which would have increased interest costs in Southern countries and could have helped to impose market discipline and to restrain the tendency towards excessive debt financing.

### **Scenarios of the Future Euro Area Development**

In this section, four scenarios of the future euro area development are delineated: a baseline scenario assuming that the current problems will

be solved without the exit or default of any euro area member state, and three more pessimistic scenarios.

**Baseline.** In the baseline scenario, it is assumed that the countries that are currently confronted with structural problems manage to solve their problems by implementing painful structural reforms. This implies that investor confidence is restored with the support from the ESM programs and the implicit ECB guarantees through the commitment to buy any amount of government bonds necessary to secure reasonable interest rates and risk premia. The euro area countries decide to finance a further haircut for Greece or additional re-capitalisations for the Spanish banking sector if necessary. Under these conditions, the crisis countries manage to implement structural reforms, resulting in a sustainable reduction of unit labour costs. This internal devaluation helps to restore international price competitiveness. In addition, the countries will regain the confidence of international investors, which helps to decrease public deficits and to reduce wealth losses that resulted from the financial crisis. Furthermore, the capitalisation of the banking sector will gradually be strengthened. However, since it takes time for structural reforms to become fully effective, in the crisis countries growth will remain subdued and unemployment will remain elevated for many years. The following, more pessimistic scenarios will be defined as deviations from this baseline.

**Greece exit.** In this scenario, Greece leaves the euro area, while the other countries in crisis manage to solve their problems. In this case, the new Greek currency would devaluate drastically. Due to this event the value of Greek debt, which is denominated in euro, would at the same time rise substantially. Hence, Greece would be unable to repay its debt, and a further haircut on Greek public bonds would be inevitable. Hence, Slovenia's public debt would increase, since Slovenia participates in the ESM and in the ECB bond purchase programs. Since neither Slovenian nor Serbian banks are significantly engaged in Greece, in this scenario no substantial losses of Slovenian or Serbian banks are likely. Hence, from this side there is no reason to expect reductions in credit supply in Slovenia or Serbia. However, Greek banks are engaged in Serbia with a share of 15 percent of total assets. If Greece leaves the euro area, it can be expected that Greek banks come under pressure due to the devaluation of the currency and the ensuing write-downs on their Greek sovereign bonds. Hence, it is assumed that upon Greece's exit from the euro area Greek banks will reduce their exposure abroad which could result in a

decrease of credit availability in Serbia. For Slovenia, such consequences would not occur, since Greek banks are not engaged in Slovenia. But also other Western European banks are present in Central and Eastern Europe. These banks would have to write down their Greek debt as well. This may impact upon credit availability in the countries in which they are engaged. While in Slovenia Western European banks own about 20 percent of all bank assets, in Serbia they account for more than 70 percent of the bank assets.

GIIPS exit. In a highly pessimistic and unlikely scenario, it is assumed that all peripheral countries with structural problems, i. e. the so-called GIIPS countries Greece, Ireland, Italy, Portugal and Spain leave the euro area. The remaining countries keep the common currency. In this scenario, the exit countries will be unable to repay large parts of their public debt, since their respective currencies would devalue drastically, pushing up their public debt which is denominated in euro. Investors would claim significantly higher risk premia to compensate for the increased risk of default of these countries. In Spain, the continuous fall of real estate prices aggravates the problems of the banks with non-performing loans, requiring higher public capital injections. In this scenario, also in Italy public resistance against the drastic government spending cuts and tax hikes rises, rendering it impossible for the government to implement the necessary budget consolidation measures. For this scenario, it is irrelevant whether the countries under consideration leave the euro area under their own deliberation or whether they are forced to leave because the euro area partners are no longer willing to finance the drastically increasing financial needs of these countries by additional ESM loans or ECB bond purchases. Regarding the economic consequences for Slovenia and Serbia, it is also not relevant whether each of the exiting countries introduces its own currency or whether they form a 'Southern euro area,' since the new currency or currencies would drastically devalue against the 'Northern euro' in any case. The impact of Italy and Spain leaving the euro area would be considerable for Slovenia. These two countries alone account for 80.6 percent (330.7 million euro) of the total amount of debt securities of the GIIPS countries owned by Slovenian residents. Moreover, according to the 2012 Financial Stability Review of the Bank of Slovenia, by the end of March 2012 Slovenian residents (mainly insurance companies and banks) held a total of 410.3 million euro in debt securities from Portugal, Ireland, Italy, Greece and Spain, accounting for 8.5 percent of their total investment in foreign debt securities. The share

of investment in the debt securities of Greece was low, amounting to 2.5 million euro in March 2012.

Total euro area break-up. Finally, in the fourth scenario it is assumed that the euro area breaks up altogether and all countries introduce their own currencies. This implies that Slovenia returns to the tolar, Slovenia's currency prior to its euro area accession in 2007.

### **Transmission Channels to Slovenia and Serbia**

An exit of one or more countries from the euro area would affect the economies of Slovenia and Serbia via several channels of which reduced exports and credit constraints might be considered the most important ones. The reasons for credit constraints differ between the two countries, as will be described later. Slovenia would also be confronted with additional fiscal costs, caused by write-downs on credits and guarantees given by the EU institutions to the crisis countries. Investment may in addition be affected by reducing the value of collateral available to back credits. In a business cycle expansion, the ratio of debt to asset values may rise to such a high level that a business cycle turning point sets in motion a deflation of Tobin's Q, which causes a spiralling decline in credit access and in the price and quantity of collateral assets. Output and investment then decline because the collateral constraint limits access to working capital financing (Mendoza 2008). In addition, private consumption is probably affected by negative wealth effects as in the financial crisis the value of housing and financial wealth decreased substantially. The decrease of real estate prices was particularly severe in Slovenia where a housing bubble burst which had been fuelled by very low real interest rates in the boom period prior to the outbreak of the crisis.

To keep the analysis manageable, the empirical investigations have been confined to these transmission channels, which can be regarded the quantitatively most important ones for the economies under consideration. In the following, these transmission channels, which have been accounted for in the simulations, are elaborated in more detail.

### **INTERNATIONAL TRADE**

The main cause of the current problems of several euro area economies is their loss in international price competitiveness, having resulted in an accumulation of current account deficits. Hence, upon a euro area exit of these countries, their new currencies would depreciate significantly against the euro. Based on a Meta study of existing analyses with differ-

ent methodologies, Born et al. (2012) conclude that most studies estimate the depreciation, which is necessary to induce a sizeable improvement of Greece's current account to 20 to 30 percent. Based on historical experiences of other countries, the required real depreciation could even reach 50 percent (Alcidi, Giovannini, and Gros 2012). If Greece stays in the euro area, wages and prices would have to decrease by this amount. If Greece leaves the euro area and prices and wages remain constant, the new Greek currency would depreciate in nominal terms (Seidel 2012). Based on these considerations, in the scenario of a Greece exit from the euro area, the ensuing nominal depreciation of the new Greek currency is assumed to be 30 percent. Although the current account deficits of the other crisis countries are smaller as compared to Greece, it is assumed that their respective new currencies would also depreciate by 30 percent against the euro in the scenario of the exit of all G11PS countries. This depreciation would boost exports and decrease imports of the countries leaving the euro area, since imported goods and services would become much more expensive in the respective domestic currencies. For the trading partners this implies significantly lower exports to the exiting countries.

The implementation of the reduced import demand on Slovenia and Serbia in the simulations takes account of the different international economic ties of the two countries. Slovenia has traditionally been closely linked to the German economy, while Russia and the other countries from the former Yugoslavia still account for the highest share in Serbia's trade. Common to both economies is the fact that exports to Greece only account for a small share of their total exports. An isolated euro area exit of Greece would thus only have a negligible direct impact on Slovenia's or Serbia's external trade. Greece accounts for just 0.26 percent of Slovenia's and 1.7 percent of Serbia's exports, respectively. Even if indirect effects are taken into account, Slovenia's and Serbia's exports would be only marginally affected when only Greece leaves the euro area. Indirect effects would be due to the fact that other economies would also be negatively affected by Greece's euro area exit, resulting in lower import demand. The picture would change if all G11PS countries, i. e. Greece, Ireland, Italy, Portugal, and Spain would leave the euro area. These countries absorb 13.6 percent of both Slovenia's and Serbia's exports. Italy alone accounts for about 12 and 11 percent of Slovenia's and Serbia's exports, respectively. Furthermore, an exit of these five countries, including the two large economies of Italy and Spain, would cause significant drops in

economic activity and hence import demand in several other countries (Colijn and van Ark 2012).

#### CREDIT CONSTRAINTS

Banks from Slovenia or Serbia with a substantial exposure in one or more of the crisis countries would incur large negative wealth effects (Petersen and Böhmer 2012). In the models for Slovenia and Serbia, which have been used for the simulations the banking sectors are not explicitly modelled. It has been assumed that Slovenian or Serbian banks confronted with write-downs on public bonds of the countries leaving the euro area would not be able to bear these losses without reducing their balance sheets. Hence, these banks would have to be re-capitalised by the government, similar to the re-capitalisations that have already been necessary in Slovenia. These injections of public capital raise public debt further. This would require additional restrictive fiscal policy measures (Eichengreen 2007). Furthermore, the banks would react to the negative equity effects by reducing their credit supply, with negative consequences for the financing of investment.

Since neither Slovenian nor Serbian banks are significantly engaged in Greece, in this scenario no substantial losses of Slovenian or Serbian banks are likely. Hence, from this side there is no reason to expect reductions in credit supply in Slovenia or Serbia. However, Greek banks are engaged in Serbia, and if Greece leaves the euro area it can be expected that Greek banks come under pressure due to the devaluation of the currency and the ensuing write-downs on their Greek sovereign bonds. Hence, it is assumed that upon Greece's exit from the euro area Greek banks reduce their exposure abroad, which could result in a decrease of credit availability in Serbia. For Slovenia, such consequences would not occur, since Greek banks are not engaged in Slovenia.

In the scenario with a euro area exit of Italy, Ireland, Portugal, and Spain in addition to Greece, much more adverse effects on credit supply would have to be expected. In particular, Italy has large banks with significant assets in Slovenia and Serbia. These banks, such as UniCredit and Intesa Sanpaolo, have an especially high GIIPS exposure. Upon an exit of Italy and other countries their banks would incur losses on their equities, mainly due to the ensuing devaluation of the new domestic currencies. Hence, it is assumed that these banks would reduce their activities abroad, which for this paper would imply decreasing credit supply in Slovenia and Serbia. The banks under majority foreign ownership rely to

a large extent on the coverage of loans through their parent bank funding, e. g. in Slovenia this ratio amounts to about 50 percent. In addition, as far as Slovenian or Serbian banks are engaged in the countries leaving the euro area, they would also be confronted with losses on their assets, which would induce them to reduce their balance sheets, implying a drop in credit supply. Slovenian residents' investment in debt securities (mainly bank and government bonds) of Portugal, Ireland, Italy, Greece and Spain is concentrated in the insurance and banking sectors. Government bonds from the periphery countries account for 6 percent of the Slovenian banking system's portfolio of debt securities, while bank bonds account for slightly less than 10 percent. The equivalent figures for the insurance sector are about 10 percent for government bonds and 11.5 percent for bank bonds, respectively. Already in 2011, the worsening situation on the euro area interbank market was mirrored by a drop of 36 percent in the stock of new loans, raised by Slovenian banks from banks in the rest of the world. This sharp fall shows Slovenian banks' limited access to the international financial markets coupled with lower credit availability in the economy.

#### ADDITIONAL PUBLIC DEBT (SLOVENIA)

As a euro area member state that participates in the European Stability Mechanism and via its capital subscriptions in the ECB bond purchase programs, Slovenia would suffer from irrecoverable loans and guarantees given to the crisis countries (Alcidi, Giovannini, and Gros 2012). Since it is reasonable to assume that countries leaving the euro area would at least partly default, the creditors would have to write down their loans. Hence, public debt would increase. Slovenia itself struggles with problems in the banking sector, since the financial crisis caused a bursting of a housing bubble, and many banks are now confronted with bad loans and debt write-offs. For this reason, the public sector had to inject considerable amounts into some large banks so as to strengthen their capital basis. This has already considerably driven up public debt in Slovenia. The debt ratio rose from 22 percent in 2008 to 54 percent in 2012. Public debt in Slovenia increased also due to the centre-left government decision to considerably increase social transfers in order to cushion the impact of the crisis, which reached Slovenia with some delay (e. g. Institute of Macroeconomic Analysis and Development 2012). From 2009 to 2011, the general government realised a budget deficit of around 6 percent in relation to GDP, followed by only a slight improvement to 4 percent in 2012. Due

to declining real GDP in 2012 and 2013 and only a sluggish recovery afterwards, the European Commission (2013) expects that the budget deficit widens again, and as a result the debt ratio could rise further to more than 66 percent of GDP in 2014, even without any additional debt accumulation due to write-downs on ESM loans or additional capital subscriptions to the ECB.

### **The Macroeconomic Models for Slovenia and Serbia**

The simulations of the macroeconomic consequences of different scenarios of the future euro area development for Slovenia and Serbia have been performed with macroeconometric models for these two countries. Both models have similar structures and will be verbally described in this section. A detailed description of a previous version of the model for Serbia may be found in Weyerstrass and Grozea-Helmenstein (2013). Earlier versions of the model for Slovenia have been described in e. g. Weyerstrass and Neck (2008) and Weyerstrass (2011). The model for Serbia has been used several times to generate forecasts for the Serbian economy (e. g. Grozea-Helmenstein et al. 2012). The model for Slovenia has been applied in several studies to analyse various aspects of Slovenia's continuous European integration process. In a recent paper, Neck, Haber, and Weyerstrass (2012) analyse the design of macroeconomic policies for Slovenia on its way into the euro area.

As described in detail in Weyerstrass (2011), weak exogeneity of the right-hand side variables of a structural econometric model is required for efficient estimation and hypothesis testing. Weak exogeneity means that no useful information is lost when other variables are made conditional on these variables without specifying their generating process. Strong exogeneity is the combination of weak exogeneity and Granger non-causality. It ensures valid forecasting of the endogenous variables, conditional on assumptions about the explanatory variables. Finally, super exogeneity requires weak exogeneity of the model variables and structural invariance. A conditional model is structurally invariant if all parameters are invariant to changes in the distribution of the conditioning variables. Super exogeneity is required for policy analyses, since such analyses assume that the parameters of the model do not change when the policy regime changes. The super-exogeneity condition may be investigated using a test for weak exogeneity combined with a test for parameter invariance. The CUSUM test and a Chow breakpoint test were performed to test the Slovenian model for parameter stability. For almost

all behavioural equations, the tests indicate that the parameters have been stable over time. Granger causality tests indicate that in almost all equations the right-hand side variables, i. e. the explanatory variables, are indeed not directly influenced by the endogenous variables. Based on the Granger causality and parameter stability tests, the model for Slovenia can be viewed as being appropriate for both forecasting and policy analysis, although it cannot be excluded that future changes in the policy regimes might induce private agents to change their behaviour in a different way than they did in the past (see Weyerstrass 2011). For the model for Serbia, only parts of these tests have been performed. Model evaluations based on the mean absolute percentage error and Theil's inequality coefficient, indicate that the ability of the macroeconomic model for Serbia to replicate the endogenous variables can be regarded as satisfactory (Weyerstrass and Grozea-Helmenstein 2013). Due to the shortness of the time series, particularly for Serbia, formal tests for Heteroscedasticity were refrained from, since they are designed for large samples. In addition, the estimated coefficients are valid even under heteroscedasticity, and any methods for dealing with heteroscedasticity like instrumental variables would also require longer time series without structural breaks. Finally, when setting up the equations, theoretical considerations have been given priority over statistical properties when choosing the variables and functional form of the equations.

Unit root tests identify most variables as integrated of order one, i. e. the variables are non-stationary in levels, but the first differences are stationary. In many cases, the results of the unit root tests are inconclusive. This problem is caused by the shortness of the time series and by the fact that some quarterly time series had to be derived from the respective annual figures. Based on the results of the unit root test, for almost all behavioural equations error correction models (ECM) were chosen as the most appropriate modelling technique for both country models, despite the short history of reliable time series especially for Serbian macroeconomic data.

The macroeconomic models for Slovenia and Serbia combine Keynesian and neoclassical elements. The former determine the short and medium run solutions in the sense that the models are demand-driven and persistent disequilibria in the goods and labour markets are possible. The supply side incorporates neoclassical features. The models are based on the conventional aggregate supply / aggregate demand (AS-AD) framework, where the long-run relationships have mainly been chosen on the

basis of theoretical considerations. The wage-price system is based on a bargaining model between employers and trade unions (Layard, Nickell, and Jackman 1991). In this labour market model, prices are set as mark-up over marginal costs. The wage-setting rule is based on a Nash bargaining process that produces an expected real wage that varies inversely with the unemployment rate. As unemployment falls, insiders know that, should they be laid off, they could quickly find work elsewhere. This raises the value of their fall-back point. The econometric estimations are based on quarterly data for the period 1997q1 to 2011q4 (Serbia), and 1995q1 until 2011q4 (Slovenia), respectively. However, for some variables the time series for Serbia start later. In particular, for this country quarterly time series for the public sector are only available from 2003q1 onwards. Furthermore, for some macroeconomic aggregates quarterly data are not available for Serbia. In these cases, quarterly data were derived from the respective annual aggregates by recurrence to related variables for which higher-frequency data have been available.

In the supply blocks of the models, potential GDP is determined. The estimation of potential output is based on a Cobb-Douglas production function with constant returns to scale and with the production factors labour, capital and autonomous technical progress. Since potential GDP is a measure of the long-run production possibilities of an economy, it is the long-run trends rather than the actual realisations of the production factors that enter the production function. Autonomous technical progress is defined as total factor productivity (TFP). Trend employment is calculated by subtracting natural or structural unemployment from the labour force. Since structural unemployment is non-observable, this variable has to be approximated. In the models for Slovenia and for Serbia, this is done by applying a Hodrick-Prescott (HP) filter to the actual unemployment rate in order to extract the trend. Structural unemployment is then defined as the long-run trend in actual unemployment. In order to endogenise the NAIRU, it is modelled as a moving average (MA) process. Total factor productivity (TFP) is calculated as the Solow residual, i. e. that part of the change in real GDP that is not due to increased labour and capital input, where both production factors are weighted with their production elasticities, i. e. 0.35 for the capital stock and 0.65 for labour, respectively. The actual TFP series is smoothed by applying the Hodrick-Prescott filter so as to remove short-run fluctuations that are caused by the business cycle or by any short-run shocks.

On the demand side, the models comprise the labour, goods, mone-

tary and foreign exchange markets. Hence, the models are made up of equations for the GDP expenditure components (private and public consumption, capital formation, exports, and imports), prices, wages, employment, unemployment, interest rates, and exchange rates. In addition, the most important revenue and expenditure items of the Serbian and the Slovenian general governments, respectively, are modelled. Consumption of private households depends on current real disposable income (the Keynesian consumption theory), and on the real long-term interest rate. The latter incorporates the permanent income hypothesis according to which it is the expected future rather than current income, which is relevant for private consumption. Discounted future income may be approximated by wealth. Lacking reliable data on private wealth in Slovenia and in Serbia, in the models wealth effects are approximated by the real long-term interest rate. The interest rate as a determinant of consumption accounts also for the fact that some households finance part of their consumption via bank credits, and for the intertemporal decision on the allocation of income to consumption in the present period and in the future. Gross fixed capital formation is undertaken to renew the capital stock and to adjust it to changes in final demand. Hence, the accelerator theory stipulates that changes in demand determine fixed capital formation. According to theories focussing on the profitability of investment projects, the value of the capital stock equals the discounted future income that can be generated by employing the capital stock. Therefore, the interest rate, which is used to discount future income, is crucial for the profitability of an investment project. The market interest rate is formed on the basis of the time preferences of the individual investors. According to this strand of theories, investment is a function of the real interest rate. The neoclassical investment theory combines the investment determinants according to the accelerator hypothesis and profitability considerations. In this case, the optimal capital stock equalises the marginal revenue product of capital and the user cost of capital. In the models for Slovenia and for Serbia, due to data availability as well as significance and sign of the estimated coefficients, the user cost of capital is approximated solely by the real long-term interest rate. In particular time series of company taxation, which would be relevant for investment decisions, are lacking. Exports of goods and services depend on international demand and on the relative price of domestic exports on the world market. Worldwide demand is approximated by world trade, while the real effective exchange rate accounts for price effects. Imports of goods and services depend on total

demand in Serbia and in Slovenia, respectively, and on relative prices. Similar to exports, relative prices are approximated by the real effective exchange rates of Serbia and of Slovenia, respectively. Labour demand by companies (i. e. actual employment) is influenced by the production level (real GDP) and by labour costs. In the models, labour costs consist of the average gross wage per employee. Due to the limited availability of reliable data, in the model for Serbia labour supply by private households is exogenous. In contrast, in the Slovenian model labour supply is made endogenous via the labour force participation rate, which depends on the real net wage, implying that the substitution effect of higher wages dominates over the income effect. The consumer price index (CPI) is related to internal and external determinants. The most important internal cost-push factors are wages. In addition, rising capacity utilisation exerts upward pressure on prices. Moreover, in the long run the CPI in Serbia is positively influenced by the money stock, supporting the Monetarist view according to which inflation is ultimately a monetary phenomenon. As an important external cost factor, the oil price in dinar enters the consumer price equation in the Serbian model. In the model for Slovenia, total import prices are included as the external cost component. The GDP deflator and other deflators are linked to the development of the consumer price index. In an extended Phillips curve equation, the wage rate is negatively influenced by the difference between the actual unemployment rate and the non-accelerating inflation rate of unemployment, or the NAIRU. In addition, wages are positively influenced by consumer prices and by labour productivity. On the financial market, interest rates and exchange rates are determined. Since the National Bank of Serbia (NBS) runs an independent monetary policy, the NBS interest rate for open market operations has been included in the Serbian model as the relevant monetary policy instrument. The model contains a Taylor rule type equation, i. e. the NBS interest rate depends positively on the inflation rate and on the output gap in Serbia. This approach implies that the National Bank of Serbia follows both an inflation and an output target. Real money demand is positively influenced by real GDP and negatively by the long-term interest rate. Since Slovenia as a euro area member state cannot pursue an independent monetary policy, in the model for Slovenia the short-term interest rate is solely determined by the three months EURIBOR. In term structure equations, in both models the respective long-term interest rates depend on the short-term interest rates. The long-term market interest rates then determine the respective implicit interest rates

on outstanding public debt. The nominal effective exchange rate of the Serbian dinar is determined by important bilateral exchange rates. Since the countries of the euro area are Serbia's most important trading partners, the nominal effective exchange rate of the Serbian dinar is mainly determined by the exchange rate vis-à-vis the euro. The real effective exchange rate is influenced by the nominal effective exchange rate and by price developments. In the Serbian model, the latter are approximated by the inflation rate in Serbia. In theory, it is the inflation differential rather than exclusively inflation in Serbia that matters. However, it would have been difficult to construct an international inflation rate consistent with the regional pattern of Serbia's external trade as reflected in the effective exchange rate. Therefore, in the real effective exchange rate equation only inflation in Serbia has been included in addition to the nominal effective exchange rate. In the model for Slovenia, the foreign exchange market is modelled by an equation for the real effective exchange rate against a group of 41 countries. To take developments before Slovenia's euro area accession in 2007 into account, the bilateral exchange rate between the Slovenian tolar and the euro is included as an explanatory variable. In addition, the exchange rate between the euro and the US dollar, the consumer price index (CPI) in Slovenia and the inflation rate are considered as further explanatory variables. In the public sector blocks, the models contain behavioural equations for the most important revenue and expenditure items of the consolidated general governments of Slovenia and Serbia, respectively.

### **Assumptions for the Simulations and Their Implementation in the Macromodels**

This section presents the implementation of the scenarios and transmission channels to Slovenia and Serbia, respectively, for the model simulations, which run over the period 2013 to 2017. The unprecedented nature of the different scenarios of the possible future of the euro area implies that the error margins of the calibrations are necessarily wide; they involve a larger than usual element of art rather than science. Nevertheless, we believe that what follows gives some guidance of the broad orders of magnitude of the macroeconomic consequences in the different scenarios. The same qualification was also made by Cliffe (2011) and Cliffe et al. (2010) in their attempt to quantify the economic costs of a Greek exit from the euro area or a complete euro area break-up. Cliffe et al. (2010) estimate the cumulative loss of output in the first two years at close to

10 percent of euro area output. In a revised assessment, Cliffe (2011) estimates this cumulative loss in the first two years at over 12 percent of euro area GDP.

For all simulations, it is assumed that the parameters of the macroeconomic models remain stable. This implies the supposition that consumers and companies do not change their fundamental behaviour (e. g. the marginal propensity to consume or the interest rate elasticity of investment) in response to the crisis. While it may be possible that some consumers or companies change their behaviour as a response to such an economic shock, the direction and magnitude of these possible changes are impossible to gauge *ex ante*. Hence, it is common in model simulation studies to assume parameter stability, even in simulations of large adjustments like deleveraging in the Spanish economy (In 't Veld et al. 2012), or in simulations of structural reforms (e. g. Vogel 2012) which by their nature should have long-lasting effects.

The most obvious transmission channel is international trade, resulting in lower exports from Slovenia and Serbia to the countries leaving the euro area. In addition, banks might have to reduce their credit supply so as to deleverage as they would incur losses on their holdings of public bonds. This reduced credit availability would negatively affect gross fixed capital formation. Slovenia would in addition be confronted with an increase of public debt as the countries leaving the euro area would be unable to repay their financial assistance in part or in full. Hence, the Slovenian government would have to write-down its loans and guarantees which implies an increase in public debt. As Slovenia's public indebtedness has already increased sharply during the economic and financial crisis, this additional debt would necessitate further fiscal consolidation efforts. This consolidation is implemented by a reduction of public consumption.

Table 1 shows Slovenia's exposure to the euro area peripheral countries. The calculations are based on those undertaken by the German ifo Institute for Germany. Slovenia's exposure is derived from the potential bail-out funds plus Target2 claims within the Eurosystem.

The calculation of the Slovenian share in the exposure is different for the various items. For the Target2 liabilities of the crisis countries, Slovenia's exposure is based on the country's share of 0.47 percent of the ECB capital. However, should one or more of the crisis countries become insolvent and leave the euro area, only the remaining euro area countries would be exposed to the Target liabilities. In this case, Slovenia would

TABLE 1 Slovenia's public exposure for the euro area scenarios in billion euro

Item	Greece exit	GIIPS exit	Euro area break-up
ESM capital	0.34	0.34	0.34
ESM guarantees	2.65	2.65	2.65
Greece 1	0.27	0.27	0.27
Greece 2	0.62	0.62	0.62
Ireland	—	0.18	0.18
Portugal	—	0.24	0.24
IMF not yet disbursed	0.22	0.22	0.22
ECB Target2	0.52	7.03	7.03
ECM SMP	0.98	0.98	0.98
Total	5.60	12.53	12.53

NOTES Authors' calculations based on data from <http://www.cesifo-group.de/ifoHome/policy/Haftungspegel.html>.

be liable for 0.48 percent of the total exposure if only Greece leaves the euro area. Should in addition to Greece also Portugal, Ireland, Italy and Spain exit the euro area, Slovenia's share would rise to 0.74 percent. Since the central banks of all euro area countries, including those of the crisis countries themselves, are involved in the ECB public bond purchases, Slovenia's share is also calculated on the basis of the general ECB capital key and consequently totals around 0.47 percent. To the first bailout program for Greece, Slovenia contributed bilateral loans amounting to 243.5 million euro. Regarding the second programme for Greece, Slovenia would be liable for around 0.5 percent of the European Financial Stability Fund (EFSF) loans. This again represents Slovenia's share according to the capital key of the euro area countries excluding the crisis countries. Slovenia's part of the two International Monetary Fund (IMF) bailout packages granted at the same time is in line with its contribution to the IMF's capital of 0.12 percent. The EFSF and the IMF contributed the same share of bail-out funds for Ireland and Portugal as they did to Greece. Slovenia contributed about 0.3 percent to the funds already made available by the ESM since this corresponds to Slovenia's current share of the revenues in the EU budget. Since the ESM does not provide for any specific liability on the part of member countries for concrete financial assistance, the Slovenian share in the programme to re-capitalise Spanish banks is included in Slovenia's overall exposure to the ESM. The ESM permanent bail-out fund has a capital of 700 billion euro. Slovenia's ex-

posure is calculated from its share of 0.43 percent. The capital to be paid in (0.34 billion euro) and the available capital (2.65 billion euro) are represented separately. For the simulations it is assumed that upon an exit of a country from the euro area, the Slovenian government would have to write down all its claims to the respective country. According to table 1, this would push up Slovenia's public debt level by 5.6 billion euro if only Greece leaves the euro area and by 12.53 billion euro if all GIPS countries exit or if the euro area completely breaks up. It is further assumed that this would happen at the end of 2012, i. e. before the start of the simulation period. The additional public debt would then be repaid by reducing public consumption linearly by one fifth of the additional debt in each of the five simulation years. This implies that additional interest payments for this part of public debt that is repaid later and not immediately in the first year are not taken into account. Hence, in the Greek exit scenario, public consumption is reduced by 1.12 billion euro per year and by 2.51 billion euro p. a. in the other two scenarios. The reduction in public consumption would exert substantial negative macroeconomic effects. Before the outbreak of the financial and economic crisis, in the literature on fiscal policy effects it had been widely accepted that multipliers of public consumption are well below 1, in particular due to crowding out, mainly via higher interest rates, causing both a decline in investment and appreciation of the domestic currency with negative impacts on exports. However, in the current environment of substantial economic slack, monetary policy constrained by the zero lower bound, and synchronised fiscal adjustment across numerous economies, multipliers may be well above 1 (see, e. g., Auerbach and Gorodnichenko 2012; Batini, Callegari, and Melina 2012; International Monetary Fund 2012a; 2012b).

For the implementation of the export reduction, following Born et al. (2012) it is assumed that the currencies of the exiting countries would devalue by 30 percent against the euro. The same devaluation rate is assumed for the exchange rates between the exiting countries and the Serbian dinar. If the necessary adjustment of the trade balance of the crisis countries happens entirely via volumes, the imports of the respective countries would decline by 30 percent. If this is spread evenly across goods and trade partners, this implies that Slovenia's and Serbia's exports to these countries would also decrease by 30 percent. As mentioned above, Greece accounts for 0.26 percent of Slovenia's exports and for 1.7 percent of Serbia's exports. Hence, the assumed direct effect is set to an

export reduction by 30 percent of 0.26 percent for Slovenia and to 30 percent of 1.7 percent for Serbia, respectively, in the Greek exit scenario. The total export share of all GIIPS countries, i. e. Greece, Ireland, Italy, Portugal and Spain equals 13.6 percent both for Slovenia and for Serbia. Accordingly, the direct effect is set to an export reduction of 30 percent of 13.6 percent for both countries in the more extreme scenario of a euro area exit of the GIIPS countries. For the scenario of a euro area break-up, it is assumed that the direct impacts on exports are three times as large as in the GIIPS exit scenario. As other trading partners of the countries leaving the euro area would also experience a decline in economic activity, they would need less imports as well, which also affects Slovenia's and Serbia's exports. This additional indirect effect is assumed at 50 percent of the direct effects. It might be however objected that the assumption that the indirect effects make up half of the direct effect, is rather arbitrary. Of course any larger or smaller indirect effect would also be conceivable. However, a larger effect seems less likely since more distant regions of the world economy like the US or Asia would probably be affected only to a lesser extent, and hence exports to this regions would only decline slightly. It is furthermore assumed that the largest negative effect of a euro area exit of one or more countries would last for two years. For the third year of the simulation period, 75 percent of the original effect is assumed. For the fourth year, a further reduction to 50 percent of the original impact is taken, and for the final year a return to the baseline path is assumed. The final exogenous reduction of exports (as compared to the baseline simulation) in the three euro area scenarios can be summarised as follows. 2013 and 2014: Greece exit: Slovenia (SLO) 0.12%, Serbia (SRB) 0.77%. GIIPS exit: SLO and SRB 6.1%. Euro area break-up: SLO and SRB 18.4%. 2015: Greece exit: SLO 0.09%, SRB 0.57%. GIIPS exit: SLO and SRB 4.6%. Euro area break-up: SLO and SRB 13.8%. 2016: Greece exit: SLO 0.06%, SRB 0.38%. GIIPS exit: SLO and SRB 3.1%. Euro area break-up: SLO and SRB 9.2%. Finally, it is expected that in 2017 exports return to their baseline path, implying that their level is permanently lower as compared to the baseline.

Finally, it is expected that investment would be negatively affected in the scenarios involving the euro area exit of one or more countries. Clearly, companies would invest less in reaction to the decline in final demand. However, an additional negative effect can be expected. As banks incur losses of their wealth since they have to write-down on public bonds of the exiting countries, they might be forced to re-

duce their credit exposure. This lower credit availability would impair those investment projects that are financed by bank credit. According to data from the Slovenian and the Serbian National Banks, about 40 percent of all company investment is financed by bank credit. Regarding the credit supply, it is assumed that bank credit availability in Slovenia and in Serbia would decline by 5 percent and by 10 percent, respectively, if only Greece leaves the euro area. In the GIIPS exit scenario, the assumed credit rationing is set at 20 percent in Slovenia and 30 percent in Serbia, respectively. Finally, for the most dramatic scenario of a total euro area break-up, the corresponding figures are 30 percent in Slovenia and 50 percent in Serbia. For Serbia, larger impacts on credit supply are assumed so as to account for the larger engagement of banks from the crisis countries in Serbia. Following these calculations and assumptions, investment is additionally reduced by the assumed decline in credit supply, multiplied by the share of bank financing of investment (i. e. 40 percent). Similar to the implementation of the export reduction, it is assumed that the largest impact lasts for the first two years and then drops to 75 percent in the third year and to 50 percent in the fourth year. In the fifth year, the additional negative impact on investment is set to zero. The final exogenous reduction of gross fixed capital formation in the three euro area scenarios is summarised as follows: 2013 and 2014: Greece exit: Slovenia 2%, Serbia 4%. GIIPS exit: Slovenia 8%, Serbia 12%. Euro area break-up: Slovenia 12%, Serbia 20%. 2015: Greece exit: SLO 1.5%, Serbia 3 %. GIIPS exit: SLO 6%, SRB 9%. Euro area break-up: SLO 9%, SRB 15%. 2016: Greece exit: SLO 1.5%, Serbia 3%. GIIPS exit: SLO 4%, SRB 6%. Euro area break-up: SLO 6%, SRB 10%. As in the case of exports, it is expected that from 2017 onwards investment returns to its baseline path, implying that their level is permanently lower as compared to the baseline scenario of an orderly resolution of the euro area crisis.

To summarise the assumptions behind the simulations and their implementation in the macromodels for Slovenia and Serbia, real exports and real investment (which are determined endogenously in both models) are reduced via add factors. Furthermore, in the case of Slovenia the public debt level is exogenously increased once to account for the additional public debt resulting from the write down on public assistance to countries leaving the euro area and defaulting. Government consumption in the Slovenian model is then reduced so as to recover the additional public debt incurred upon defaults of the crisis countries.

### **Effects of the Euro Area Scenarios on the Economies of Slovenia and Serbia**

Tables 2, 3, and 4 show the macroeconomic consequences of the different scenarios regarding the future development of the euro area. The tables depict the deviations from the baseline scenario in which no current member state leaves the euro area. For all variables, assumptions regarding the most important exogenous variables (world trade, oil price, exchange rates, fiscal policy instruments) have been chosen in such a way that the baseline simulation results come close to the most recent forecasts of the European Commission, the OECD and the IMF for the economies of Slovenia and Serbia. The baseline results themselves are not reported here since we are exclusively interested in deviations from the baseline in the different euro area scenarios.

Following the assumptions and definitions of the scenarios, the maximum effect occurs in the second simulation year, i. e. in 2014. In all scenarios, exports and investment are those demand components that decrease the most. Exports are affected directly via the trade channel. Investment is negatively affected via two channels. Firstly, the decline in demand results in lower capacity utilisation, inducing companies to cut back their investment plans. Secondly, it is assumed that private banks are forced to reduce their credit supply as a reaction to the write-down on their assets as the value of their public bonds declines. Due to the larger engagement of banks from the EU peripheral countries in Serbia as compared to Slovenia, Serbia would be affected more by a decrease in credit supply. Hence, also investment declines more in Serbia. The decline of GDP is smaller than the decrease of exports and investment since lower domestic demand reduces also imports. Slovenia is in addition affected by an increase in public debt as it is assumed that those countries that have to leave the euro area would not be able to repay their financial assistance to the other EU countries, the ESM, the IMF, and the ECB. For the simulations, it is assumed that those write-downs would push-up public debt at the end of 2012, necessitating an additional fiscal consolidation by reducing public consumption over the following years. This consolidation is implemented in such a way that at the end of the five-year simulation period the additional public debt is compensated by the lower public spending. However, in both countries public debt is higher than in the baseline simulation, both in absolute terms and in relation to GDP. This is caused by the working of the automatic stabilisers. Lower domestic demand and

employment causes declining tax revenues, while rising unemployment leads to higher spending on unemployment benefits. The debt ratio is additionally pushed up by the decrease in the denominator, i. e. in nominal GDP. Due to the working of the automatic stabilisers, also the budget balance deteriorates in both countries. However, in Slovenia the effect of the additional consolidation dominates, hence the budget balance improves over the entire simulation horizon in Slovenia.

In contrast to an isolated Greek exit (table 2), a euro area exit of Greece, Ireland, Italy, Portugal, and Spain (GIIPS) (table 3), and in particular a total euro area break-up (table 4) would have dramatic negative consequences for Slovenia and for Serbia. In the worst case, real GDP might shrink by almost 10 percent in Slovenia and by 6 percent in Serbia, respectively. This is caused by a collapse of exports by more than 18 percent and of investment by around 30 percent. Interestingly, at the end of the simulation period, fixed capital formation in Serbia is even higher than in the baseline. This recovery can be explained by the assumption that credit supply returns to the baseline in the final year of the simulation period. Hence, companies are then able to undertake investment, which they had to postpone during the crisis. Also real exports recover and exceed their baseline levels in the final year of the simulation period. This is brought about by a real devaluation of the Slovenian and Serbian currencies which results from the decline in wages and prices relative to the baseline. In the case of an exit of Greece, Ireland, Italy, Portugal, and Spain, employment would decline by up to 0.9 percent in Slovenia and 0.8 percent in Serbia, respectively, as compared to a successful resolution of the euro area crisis. As a consequence, the unemployment rate would be 0.8 and 0.5 percentage points, respectively, higher. The maximum effect of 0.8 percentage points in Slovenia would occur in the second year, while the largest effect of 0.5 percentage points in Serbia would be visible in the third year. Should the euro area break up totally, employment might decline by up to 2.6 percent in Slovenia and by 1.7 percent in Serbia, respectively. This would push up the unemployment rate by 2.1 percentage points in Slovenia and by 1.2 percentage points in Serbia. The larger effects in Slovenia as compared to Serbia are caused by the additional fiscal consolidation aiming at reducing the higher public debt incurred by the write-down on the fiscal assistance. Slovenia participates in the EU financial rescue packages for Greece, Ireland, Portugal, and Spain, and as a euro area member state also in the ECB Target2 system, while Serbia does not participate in these programs.

TABLE 2 Effects of euro area exit of Greece

Item	2013			2014			2015			2016			2017		
	SLO	SRB	SRB												
Real GDP	-0.2%	-0.4%	-0.6%	-0.2%	-0.6%	-0.6%	-0.2%	-0.2%	-0.5%	-0.1%	-0.4%	-0.4%	0.0%	0.0%	-0.1%
Nominal GDP	-0.2%	-0.4%	-0.7%	-0.3%	-0.7%	-0.7%	-0.2%	-0.2%	-0.6%	-0.2%	-0.5%	-0.5%	0.0%	0.0%	-0.3%
Real private consumption	0.0%	-0.1%	-0.2%	0.0%	-0.2%	-0.2%	0.0%	0.0%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.3%
Real gross fixed capital formation	-2.3%	-5.2%	-2.4%	-2.4%	-5.3%	-3.7%	-1.9%	-1.9%	-3.7%	-1.3%	-2.2%	-2.2%	-0.1%	-0.1%	0.6%
Real exports	-0.1%	-0.8%	-0.1%	-0.1%	-0.7%	-0.5%	-0.1%	-0.1%	-0.5%	0.0%	-0.3%	-0.3%	0.0%	0.0%	0.1%
Real imports	-0.5%	-1.7%	-0.5%	-0.5%	-1.5%	-0.8%	-0.4%	-0.4%	-0.8%	-0.2%	-0.3%	-0.3%	0.0%	0.0%	0.6%
Real personal disposable income	0.0%	-0.2%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.5%
Employment	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.2%	-0.1%	-0.2%	-0.2%	0.0%	0.0%	-0.1%
Inflation rate	0.0	-0.2	0.0	0.0	-0.2	-0.1	0.0	0.0	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0
Unemployment rate	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.1
Deficit ratio	2.4	-0.1	2.4	2.4	-0.2	-0.2	2.3	2.3	-0.2	2.3	-0.1	-0.1	2.2	2.2	0.0
Debt ratio	12.5	0.3	9.6	9.6	0.6	0.6	6.7	6.7	0.7	4.0	0.7	0.7	1.5	1.5	0.5

TABLE 3 Effects of euro area exit of Greece, Spain, Portugal, Ireland and Italy

Item	2013			2014			2015			2016			2017		
	SLO	SRB	SRB	SLO	SRB	SRB	SLO	SRB	SRB	SLO	SRB	SRB	SLO	SRB	SRB
Real GDP	-3.4%	-1.8%	-2.6%	-3.6%	-2.6%	-2.6%	-3.0%	-3.0%	-2.3%	-2.1%	-1.6%	-1.6%	-0.2%	-0.2%	-0.5%
Nominal GDP	-3.5%	-2.0%	-2.9%	-3.9%	-2.9%	-2.9%	-3.3%	-3.3%	-2.8%	-2.5%	-2.1%	-2.1%	-0.5%	-0.5%	-1.0%
Real private consumption	0.0%	-0.6%	-0.2%	-0.2%	-0.6%	-0.6%	-0.3%	-0.3%	-0.1%	-0.3%	0.5%	0.5%	-0.3%	-0.3%	1.2%
Real gross fixed capital formation	-14.1%	-16.8%	-16.0%	-16.0%	-17.0%	-11.7%	-13.6%	-11.7%	-11.7%	-10.5%	-6.5%	-6.5%	-2.7%	-2.7%	2.7%
Real exports	-6.1%	-6.1%	-6.0%	-6.0%	-6.0%	-4.4%	-4.3%	-4.3%	-4.4%	-2.6%	-2.8%	-2.8%	0.5%	0.5%	0.4%

Real imports	-6.6%	-7.3%	-7.1%	-6.1%	-5.4%	-3.3%	-3.6%	-1.1%	2.8%
Real personal disposable income	-0.1%	-0.7%	-0.3%	-0.5%	-0.4%	0.2%	-0.4%	1.0%	2.0%
Employment	-0.7%	-0.1%	-0.9%	-0.5%	-0.9%	-0.8%	-0.8%	-0.7%	-0.5%
Inflation rate	-0.1	-1.1	-0.2	-1.0	-0.1	-0.5	0.0	-0.3	0.2
Unemployment rate	0.6	0.1	0.8	0.4	0.6	0.5	0.4	0.4	0.3
Deficit ratio	4.7	-0.6	4.5	-1.0	4.5	-0.8	4.6	-0.5	4.8
Debt ratio	31.2	1.6	25.6	2.8	19.3	3.3	13.0	3.0	6.3

TABLE 4 Effects of euro area break-up

Item	2013			2014			2015			2016			2017		
	SLO	SRB	SRB	SLO	SRB	SRB	SLO	SRB	SRB	SLO	SRB	SLO	SRB	SLO	SRB
Real GDP	-9.1%	-4.4%	-9.8%	-5.7%	-8.0%	-4.7%	-5.7%	-2.7%	-0.4%	-5.7%	-2.7%	-0.7%	-0.4%	-0.7%	-0.4%
Nominal GDP	-9.3%	-4.9%	-10.4%	-6.5%	-8.9%	-5.9%	-6.7%	-4.0%	-1.7%	-6.7%	-4.0%	-1.4%	-1.7%	-1.4%	-1.7%
Real private consumption	-0.1%	-1.6%	-0.4%	-1.2%	-0.7%	0.2%	-0.8%	1.8%	3.2%	-0.8%	1.8%	-0.7%	3.2%	-0.7%	3.2%
Real gross fixed capital formation	-27.8%	-30.1%	-31.9%	-25.2%	-28.4%	-14.8%	-22.9%	1.7%	7.0%	-22.9%	1.7%	-8.1%	7.0%	-8.1%	7.0%
Real exports	-18.4%	-18.3%	-18.1%	-18.1%	-13.1%	-13.2%	-8.0%	-8.5%	0.8%	-13.1%	-13.2%	1.5%	-8.5%	1.5%	0.8%
Real imports	-17.4%	-16.7%	-18.5%	-12.4%	-14.2%	-6.0%	-9.4%	0.7%	6.3%	-14.2%	-6.0%	0.4%	6.3%	0.4%	6.3%
Real personal disposable income	-0.4%	-1.6%	-0.9%	-0.6%	-1.1%	1.2%	-1.2%	3.1%	4.9%	-1.1%	1.2%	-1.1%	3.1%	-1.1%	4.9%
Employment	-2.0%	-0.3%	-2.6%	-1.3%	-2.5%	-1.7%	-2.2%	-1.4%	-0.8%	-1.3%	-1.7%	-1.2%	-1.4%	-1.2%	-0.8%
Inflation rate	-0.4	-2.8	-0.6	-2.2	-0.3	-1.1	0.1	-0.3	0.2	-0.6	-1.1	0.5	-0.3	0.5	0.2
Unemployment rate	1.8	0.2	2.1	0.9	1.7	1.2	1.2	0.9	0.6	0.9	1.2	0.2	0.9	0.2	0.6
Deficit ratio	3.2	-1.6	2.7	-2.3	3.0	-1.8	3.4	-0.8	0.2	-2.3	-1.8	4.5	-0.8	4.5	0.2
Debt ratio	38.0	4.0	34.6	6.7	28.5	7.4	21.7	6.3	4.1	6.7	28.5	12.5	6.3	12.5	4.1

NOTES Deviations from the baseline in percent or percentage points.

The fact that Slovenia as an EU and euro area member state participates in the European assistance programs for the peripheral countries, while Serbia as a non-EU member country does not, leads to considerable effects of the different euro area scenarios for the public finances of the two countries. In both countries the debt ratio is higher than in the baseline of a successful crisis resolution, but in Serbia this deterioration is solely caused by the working of the automatic stabilisers, i. e. lower tax revenues due to the lower demand and employment and higher expenditures for unemployment assistance. These mechanisms result in a deterioration of the fiscal balance and in a corresponding increase of the debt level. For Slovenia, it has been assumed that upon a euro area exit the respective countries are not able to repay the financial assistance. The write-down of these loans and guarantees pushes up public debt in the creditor countries. For the simulations it is assumed that Slovenia incurs this additional debt at the end of 2012, and the Slovenian government fully compensates for this higher debt by reducing public consumption accordingly over the simulation horizon. Hence, while in Serbia the budget balance deteriorates due to the working of the automatic stabilisers, in Slovenia it improves due to the additional fiscal consolidation. However, as in Slovenia the automatic stabilisers also result in lower public revenues and in higher expenditures, in line with the deteriorating macroeconomic situation, at the end of the five-year simulation period public debt is still higher than in the baseline. This happens despite the fact that the additional debt from the write-down of the loans and guarantees is totally recovered by the reduced public consumption.

### **Conclusions**

The simulations in this paper show that a euro area exit of Greece alone would only have marginal effects on the economies of Slovenia and Serbia. In contrast, if in addition to Greece also Italy, Ireland, Portugal and Spain leave the euro area or if the euro area even breaks completely up, the negative economic impacts on Slovenia and on Serbia would be dramatic. It is obvious that the scenario of a successful resolution of the current problems would be preferable to any scenario involving the exit of one or more countries from the euro area. If the financial assistance by the euro area countries and international institutions indeed helps the peripheral countries to restore their international competitiveness by implementing painful structural reforms aiming at redirecting capital and

labour away from the public and import sectors towards the export industries, the countries will be able to fulfil their financial obligations. In this case, the loans given by the international community will be fully repaid, and the guarantees will not become due. In this sense, the ESM loans and ECB interventions with their strict conditionality on structural reforms in the beneficiary countries may be viewed as an investment into the ability of the countries to repay their loans. If the reform processes result in an adjustment of labour markets with more flexible wage bargaining processes which take the international competitiveness with a single currency into account, this can at least partly compensate for the loss of independent exchange rates as adjustment mechanisms. Such reforms help to avoid new imbalances in the future. The ESM as a new European institution as well as the new macroeconomic imbalance procedure support these reform and adjustment programs. Should, on the other hand, the crisis countries fail to successfully implement the necessary structural reforms then they will continue to accumulate external deficits. The impaired economic growth and the very high unemployment would make fiscal consolidation impossible. In such a scenario, the countries would permanently need financial assistance from the international community and eventually be forced to leave the euro area so as to devalue externally. In this case, the countries would also not be able to repay large parts of their loans. As our simulations have shown, this would have dramatic consequences for the trade partners and the creditor countries like Slovenia and Serbia.

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