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## Sustainability of the Macedonian Current Account

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**National bank of the Republic of Macedonia**  
Research Department



**Working paper**

**Sustainability of the Macedonian Current Account**

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**Abstract**

Most of the emerging European countries, including Republic of Macedonia, are faced with greater or smaller current account deficits, which raise the concern about their sustainability in the long run. This working paper examines the sustainability of the Macedonian current account deficit using the structural model of the current account. According to this model, the current account is viewed as the outcome of variations in macroeconomic "structural" determinants that influence the saving-investment balance. The results show that budget deficit, economic growth, FDI and financial intermediation are the variables that had an effect on the Macedonian current account in the period 1998-2009, and that the sustainable level of the current account deficit is in the range of 5.3%-9.1% of GDP. The current account deficit was fluctuating around this sustainable level most of the time, which indicates that external equilibrium was not jeopardized. However, in the period between the last quarter of 2007 and the first quarter of 2009, due to the two external shocks in this period (the global increase of prices and the global recession), the current account deficit was higher than the sustainable level, which suggested a violation of the external equilibrium. Although the equilibrium was restored later in 2009, this historical episode points out the need for structural reforms in the Macedonian economy in order to avoid repeating such episodes in the future.

**Key words:** current account, sustainability, structural model, saving and investment, external equilibrium, Macedonia

**JEL classification:** F32, F37

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## 1. INTRODUCTION

The current account balance is one of the most useful indicators of external imbalance and it plays important role in policymakers' analyses of economic development. Current account sustainability has also received attention in the research literature, because balance of payment crisis requires some adjustments in macroeconomic policies, since a country cannot finance the deficit constantly by borrowing abroad or by depletion of international reserves. According to this, proper assessment of current account sustainability is becoming an increasingly important issue for policymakers.

Unfortunately, there is no simple answer to the question of the sustainable level of the current account balance. According to Milesi-Ferretti and Razin (1996, p.1) "...current account deficits above 5% of GDP flash a red light..." However, they conclude that a specific threshold is not a sufficient informative indicator of sustainability. In addition, according to Roubini and Wachtel (1998, pp.3) "There is no simple rule that can help us determine when current account deficit is sustainable or not", because what is sustainable for one country, is not for other. In other words, current account sustainability depends on a country's specifics. Sustainability of the current account deficit essentially means sustainability of investment financing, in a situation of (i) growing imports, with a pace comparable to that of real GDP growth; (ii) no reduction of the normal international payments flows; (iii) no reduction in the gross reserves.

In order to assess the current account sustainability, different approaches have been developed. Most of the literature analyses the sustainability through the inter-temporal budget constrain, based on the research of Obstfeld and Rogoff (1994). Many authors follow the inter-temporal model which defines the current account balance as the difference between domestic savings and investment, where current account is viewed as the outcome of variations in structural and macroeconomic determinants that influence the saving-investment balance, known as structural current account models (Chinn and Prasad, 2000; Calderon et al, 2000; Herrmann and Winkler, 2008; Vamvakidis, 2008).

The concept of sustainability of the current account balance is becoming very important for emerging economies. Given the low rate of savings in these countries, the process of convergence toward developed countries (i.e. the catching up process) enforced the need for substantial amount of investments, which was provided by borrowing from abroad. This resulted in balance of payments imbalances that along with the global shocks (the rise in food and energy prices in 2007 and the financial crisis at the end of 2008) caused a significant deterioration of the current accounts in the emerging countries and raised concerns about the current account sustainability. Republic of Macedonia, as many of these emerging countries, is faced with current account deficit. Namely, the current account deficit during the period 1998-2009 averaged 6% of GDP. The external shocks in 2007 and 2008 increased the deficit to 7% and 13%, respectively, which raised the question about the sustainable level of the current account deficit. To assess this issue more precisely, we apply the structural model of the current account in order to analyze the current account of Republic of Macedonia. The model allows us to examine the factors that determine the current account in the analyzed period (1998-2009), to estimate the

level of current account deficit which is sustainable and to determine whether this sustainability was jeopardized in some particular periods.

This paper consists of five sections. In the next section, a literature review of the theoretical and the empirical framework for current account sustainability will be given, with short description of the determinant that have an impact on current account sustainability. The third section analyzes the dynamics of the current accounts of emerging European countries. In the fourth part, an econometric analysis for Macedonian current account sustainability is given, including discussion for the estimated results. The final section concludes the analysis.

## **2. LITERATURE REVIEW ON CURRENT ACCOUNT SUSTAINABILITY**

### **2.1. Theoretical framework for current account sustainability**

The current account balance is one of the most useful indicators of an external imbalance and it measures the change in an economy's net foreign asset position attributable to transactions between residents and non-residents. From analytical point of view, a current account deficit does not necessarily indicate need for a policy adjustment, as the deficit may be a temporary imbalance caused by, for example, drop in export prices. However, persistent current account deficit necessitates policy adjustments, since a country cannot finance the deficit constantly by borrowing abroad or by depletion of international reserves.

The concept of sustainability of the current account balance is very complex and there is no simple answer to the question – “what is the level of the current account at which it is sustainable?” Roubini and Wachtel (1998) stress out that “There is no simple rule that can help us determine when a current account deficit is sustainable or not”, because what is sustainable for one country, might not be for another. In other words, current account sustainability depends on a country's specifics. However, Lawrence Summers, the US deputy Treasury Secretary, commenting on the anniversary of the Mexican financial crisis, has said that “... close attention should be paid to any current account deficit in excess of 5% of GDP, particularly if it is financed in a way that could lead to rapid reversals”, which is cited by several authors (Roubini and Wachtel, 1998; Edwards, 2001). Similar view have Milesi-Ferretti and Razin (1996), who point out that conventional wisdom is that “...current account deficits above 5% of GDP flash a red light, particularly if the deficit is financed by short-term debt or by foreign exchange reserves, and if it reflects high consumption spending”. However, they conclude that a specific threshold is not a sufficient informative indicator of sustainability and the size of the sustainable deficit should be considered alongside with exchange rate policy and some structural factors. Still, current account deficit is a useful signal for policy makers for possible unsound macroeconomic policy and the needs for policy response, as well as the choice of appropriate policy will depend on a closer examination of the sources of such external imbalances. Consequently, policymakers should make an effort to explain current account balance movements, in order to assess their sustainable levels and to seek to induce changes to the current account balance through policy measures.

In order to assess the concept of the current account sustainability, different approaches have been developed. In addition, the views of economist about the

nature and consequences of the current account deficits have changed through time. As Edwards (2001) described, economists' views have changed: from "current account deficits matter" to "deficits are irrelevant if the public sector is in equilibrium", back to "deficit matters" to the view "current account deficit may matter". Many of these changes have resulted from important crisis situations in advanced and emerging economies.

One of the approaches analyzes the sustainability through the *inter-temporal budget constraints*, where the starting point is the view that the current account is equal to savings minus investment. Obstfeld and Rogoff (1994) have provided an extensive review of models in which consumption smoothing through time is one of the fundamental drivers of the current account. According to these models, the current account depends on deviations of the output, consumption, government spending and world interest rate from their "permanent" levels, as well as of the country's net foreign asset position.

A drawback of these models is that they failed to give a rational explanation for the current account behavior. Roubini and Wachtel (1998) noted that the intertemporal budget constraint of a country imposes very mild restrictions on the evolution of a country's current account and foreign debt. They conclude that, according to these models, one country could run very large current account deficits for a long time and remain solvent as long as there are surpluses at some time in the future.

Another approach for assessing the current account was developed by **Milesi-Ferretti and Razin (1996)**. According to this approach, which is based on a simple accounting methodology, the sustainable level of the current account is the level consistent with solvency, i.e. level at which external debt is stabilized at the observed level (should not increase), so that the country's intertemporal budget constraint is respected. The long run trade surplus that indebted country must have in order to keep the debt to output ratio constant depends on the real domestic growth, the real interest rate and the real exchange rate. Doisy and Hervé (2003) modified this view by including FDI, as considerable part of the current account deficit may be financed by FDI. Similar framework has been adopted by Reisen (1998), where the real annual import growth and the desired level of foreign exchange reserves are added. In this case, the steady state current account deficit is sustainable in the long run if the debt ratio remains constant and desired reserves rise in proportion to import growth.

It should be noted that the calculation of the sustainable current account deficit has some serious limitations. First, the steady state assumption is a strong assumption for transition countries. Furthermore, Sasin (2001) and Edwards (2001) argue that it is hard to conclude using this framework whether in the short-run the current account deficit is really excessive. However, one of the most serious limitations is that it does not take into account the transitional issues (Edwards, 2001; Aristovnik, 2006b).

The concept of current account sustainability is also connected with the *stationarity of the current account*, where non-stationarity implies a violation of the long run inter-temporal budget constraint (LRBC). The theory was developed by Trehan and Walsh (1991), Hakkio and Rush (1991), Wickens and Uctum (1993) and extended by Taylor (2002). According to Taylor (2002), in general, saving and

investment may have trends or unit roots, but sufficient condition for LRBC to hold is that the current account is stationary, which will require investment and savings to be cointegrated. Formal test to check whether the data support the LRBC condition is testing the stationarity of CA/Y. This view is improved by using the ESTAR model (Exponential Smoothing Transition Autoregressive Model), under assumption that the current account may not follow linear behavior (Christopoulos and Ledesma, 2004).

A closely related approach to the intertemporal approach for assessing sustainability of the external imbalance is through the ***structural current account model***, which is the approach that is applied in this paper. According to this concept, the current account, as the difference between saving and investment, is viewed as the outcome of variations in macroeconomic "structural" determinants that influence the saving-investment balance (Debelle and Faruqee, 1996; Chinn and Prasad, 2000; Calderon et al, 2002; Aristovnik, 2006b, 2007; Herrmann and Winkler, 2008; Vamvakidis, 2008). This literature has indicated the role played by demographic factors, the stage of development, the fiscal policy, the real exchange rate, the output gap, the terms of trade, as well as world economy conditions (global growth and interest rate) etc. The results of the empirical model allow us to estimate the structural, i.e. sustainable current account level.

The structural current account model is implemented by the International Monetary Fund as part of the methodology for quantitative measure of sustainability, known as the Macroeconomic Balance approach, which at the same time provides an indication of exchange rate misalignment<sup>1</sup>. This approach consists of three steps. The first one refers to estimation of current account equation using panel econometric techniques. Next, for each country, equilibrium current accounts ("CA norm") are computed, applying the coefficients from the equation to the medium-term values of independent variables. Second, the "underlying" current account is calculated, which is done by taking the medium-term current account projections. Third, the "underlying" measure of the current accounts is then compared with a measure of "sustainable" balance, and the gap between them will be closed by the real exchange rate adjustment.

## **2.2. Variables of the current account sustainability**

In this section, some of the variables that affect the sustainability of the current account, that the literature has suggested, will be discussed (Milesi-Ferretti and Razin, 1996, Roubini and Wachtel, 1998, Calderon et al, 2000, Chinn and Prasad, 2002). Before explaining each of the variables and their expected sign, it is important to emphasize that the dependent variable is defined as current account balance as a percent of GDP, and the positive relationship means improvement in the current account, while negative relationship – deterioration (Appendix 1).

**Foreign direct investment (FDI):** A current account financed by large inflows of foreign direct investment (FDI) is more sustainable than a deficit financed by short-term flows. Short-term flows can be reversed easily if market conditions change, while FDI is less volatile as it cannot leave the country on short notice. Moreover, FDI serves as an important vehicle for the transfer of technology and new

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<sup>1</sup> In the literature, this approach is known as CGER methodology, according to IMF Consultative Group on Exchange Rate Issues.

knowledge for the host country, which is related with import of capital goods and higher investment. Thus, in empirical analyses, increasing net inflows of FDI have a negative effect on the current account balance in developing countries. The relevance of FDI for current account sustainability is particularly important for developing countries (Roubini and Wachtel, 1998).

**Economic growth:** Economic growth can affect current account through savings and investment. The effect to savings can go in both directions depending on perceptions of households regarding their permanent income change. Thus, if current high growth rates of GDP are interpreted as a signal for increase in the permanent income, then saving rates as a proportion of current income could, according to the life cycle permanent income hypothesis, actually decline. On the other hand, increases in GDP growth rates that are viewed as being transitory, would tend to rise saving rates. From investment point of view, high rates of GDP growth are related with high rates of productivity growth and would, therefore, be expected to be associated with higher levels of investment, which indicates higher level of sustainable current account. Thus, the net effect of GDP growth on current account balances is not clear-cut, although most of the analyses expect and find negative relationship (Chinn and Prasad, 2000).

**Relative GDP per capita (the stage of development):** Relative GDP per capita is measured usually as the ratio of domestic and foreign GDP per capita. The stage of development hypothesis for the balance of payments suggests that as countries move from low to intermediate stage of development, they usually import capital and, consequently, run a current account deficit. However, as they reach an advanced level of development, countries run current account surplus in order to pay off accumulated external liabilities. According to this hypothesis (which follows the logic of the permanent income hypothesis), it is expected that the larger the income gap of an emerging economy from the advanced economies, the larger its current account deficit (Chinn and Prasad, 2000).

**Fiscal balance:** A higher government budget balance rises national saving and increases the current account balance in the absence of full Ricardian equivalence<sup>2</sup>. The significant positive relationship between the government budget balance and the current account provide some evidence in favor of the so-called twin deficits hypothesis (Aristovnik, 2006b, 2007). The intensity of the relationship between fiscal balance and the current account will depend on the degree of financial system development, which means that countries with less developed financial markets have stronger fiscal balance effect to current account balance (Rahman, 2008, Medina et al, 2010)

**Trade openness:** The openness variable could be indicative of attributes such as liberalized trade and receptiveness to technology transfers, and, consequently, it leads to higher investment. This suggests a negative relationship between the openness ratio and current account. However, a more open economy is more vulnerable to external shocks such as fluctuations in terms of trade or reductions in foreign demand. (Chinn and Prasad, 2000; Aristovnik, 2006b and Aristovnik, 2007).

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<sup>2</sup> In case of full Ricardian equivalence, private saving fully offsets changes in public saving and therefore there would be no relationship between government budget balance and current account balance (IMF, 2006).

**Real exchange rate appreciation:** Real exchange rate appreciation can be driven by “fundamental” factors, such as high productivity growth in the tradable sector or favorable terms of trade shocks, but may be also caused by large capital inflows from abroad. Nevertheless, a real exchange rate appreciation may lead to a loss in competitiveness and worsening of the trade balance, which makes the current account deficit less sustainable. Thus, the relationship between the real exchange rate (REER) and the current account deficit is positive (Roubini and Wachtel, 1998).

**Terms of trade (the ratio of export and import prices):** Transitory worsening of the terms of trade produce a greater decrease in the current income than in the permanent income, and, consequently, the saving is decreased, too. This is the so-called Harberger-Lauresen-Metzler effect. Thus, worsening in the terms of trade implies higher deficit in the current account (Calderon et al, 2000; Aristovnik, 2006b).

**Financial intermediation:** The ratio of private credit to GDP and M2 to GDP, i.e. the financial deepening variables, capture the quantity and quality of financial intermediation. The traditional interpretation of the financial deepening variable (M2/GDP) suggests that financial deepening could induce more savings, which will have positive influence on the current account. However, this variable could be seen as a proxy for borrowing constraints and therefore could be associated with lower levels of private savings (Chinn and Prasad, 2000). From investment point of view, higher degree of financial intermediation should be associated with higher current account deficits (lower surpluses), as the financial sector is assumed to take a more active and facilitating role in encouraging the national investment (Herrmann and Winkler, 2008). Generally, one should expect a negative relationship between financial intermediation and the current account balance.

**Net foreign asset position (NFA):** The level of NFA or wealth of the country can affect the current account balance in two opposite directions. On the one hand, according to the intertemporal approach, economies with relatively high NFA can afford a higher current account deficit and still be solvent, which leads to conclusion that NFA to GDP ratio would be expected to have negative relationship with the current account balance. On the other hand, higher NFA implies a higher net foreign inflow from abroad in terms of asset income for keeping foreign assets, which tends to create a positive relationship between NFA and current account balance. Accordingly, the impact on the current account would depend on the relative importance of these two effects. Standard open economy macroeconomic models predict that this second effect should be stronger (Chinn and Prasad, 2000; Isard et al, 2001; IMF, 2006; Rahman, 2008, Ca’ Zorzi et al, 2009). This variable is always included in the econometrics analysis with lags (or as an initial stock), not with current values, to avoid the problem of endogeneity.

**Demographic factors:** An important structural determinant of domestic saving is the demographic profile of the population (age dependency ratio and population growth). Age dependency ratio is usually defined as the ratio between the number of people younger than 15 and older than 65 years, and the number of people between 16 and 64 (working age population). Higher share of economically inactive, i.e. dependent population, reduces national saving and decreases current account balance (Chinn and Prasad, 2000; Aristovnik, 2006b, 2007; IMF, 2006; Rahman 2008; Herrmann and Winkler, 2008; Vamvakidis, 2008; Morsy, 2009). Negative relationship is expected between population growth and current account, as



higher population growth means more labor force in the future and accordingly higher income, which will contribute for lower saving and higher current account deficit today (Medina et al, 2010).

**Oil balance:** Higher oil prices increase the current account balance of oil exporters and decrease the balance of oil-importers (IMF, 2006, Rahman, 2008, Morsy, 2009).

**Developed economies growth rate:** Increase in the growth rate of advanced economies (different authors use different set of countries, such as industrialized countries, EU-15 countries, OECD countries) leads to a reduction in the current account deficits of transition countries. This can be explained by both a rise in the demand for transition country exports and the increased capital flows between developed countries at the expense of flows to developing countries (Chinn and Prasad, 2000; Aristovnik, 2006b, 2007).

### **2.3. Empirical framework on current account sustainability**

Structural models of the current account are the most used in the empirical literature. Most of the literature on structural current account models is built upon the work of Debelle and Faruqee (1996), Calderon, Chong and Loayza (2000) and Chinn and Prasad (2000). Also, the methodology of Milesi-Ferretti and Razin (1996) is used very often for assessing current account sustainability. Most of the literature about current account sustainability refers to the US and Asian countries, while transition countries in Europe have started attracting attention of the researchers only recently.

Debelle and Faruqee (1996) use a cross-section and panel estimation to assess the current account determinants on a sample of 34 industrial and developing countries. They find that the stage of development and the demographic factors are the most important factors for current account in the cross-section analysis. In the panel estimation, changes in the fiscal policy, real exchange rate, business cycle and movements in terms of trade affect the current account balance in the short-run, while the fiscal deficit, the stage of development and demographic factors have influence in the long run.

Calderon et al (2000), on a sample of 44 developing countries, confirm that there is a moderate persistence in the current account (measured through the lagged value of dependent variable). Domestic output growth rate has a positive effect on the current account deficit, the growth rate of industrial countries reduces current account deficit, while private and public saving rates either have moderate negative contribution to current account deficit or they do not affect it at all. Increase in export of a given country lowers the current account deficit, but appreciation of the real exchange rate or worsening of the terms of trade contribute to current account deterioration, just as the reduction in the international interest rate.

Chinn and Prasad (2000), using a panel of 89 industrial and developing countries, conclude that government budget balance, initial foreign asset position and indicators of financial deepening are positively correlated with current accounts, while the demographic variables have a strong negative impact on the current

accounts. Terms of trade volatility (used as a proxy for macroeconomic uncertainty) is positively correlated with external balances in developing countries, while variables that measure capital controls as well as the average GDP growth are found to have a little systematic relationship with current account balances.

Bussiere et al (2004) develop an intertemporal model of the current account in order to derive structural current account positions for 10, in that time EU accession countries applying within, IV and GMM panel estimations. They found that fiscal balance, relative income and relative investment positions determine current account deficits. Regarding sustainability, they conclude that actual current account developments for the period 1995-2002 are in line with structural current account positions.

Zanghieri (2004) analyzes the current account sustainability in the medium run of the new ten EU members of emerging Europe, using first a simple accounting framework of Milesi-Ferretti and Razin, and then, as an alternative, a simple theoretical model of current account, developed for empirical estimation of the determinants of the current account (estimated using panel techniques). The main conclusions are that no country seems to have unsustainable positions, according to the standard accounting methods, while long term solvency on external debt seems to be assured given the bright growth prospects. Zanghieri argued that during the catching up process imbalances are likely to widen for a while, as a natural outcome of convergence. However, current account deficits must be carefully monitored, taking into account whether the main driving force is the dynamic of savings or investment.

Aristovnik (2006a) implements the Milesi-Ferretti and Razin accounting framework and Reisen methodology on CEE, SEE and CIS countries. Final conclusions of the empirical analysis are that the current account deficits of transition economies in excess of 5% of GDP generally pose external sustainability problems and need further promotion of FDI (especially Greenfield investments) in order to strengthen the external position, as well as that prudent fiscal policy should become a necessary element of economic policy created in the region. Aristovnik (2006b) improves the previous analysis by analyzing the short-term current account determinants, using LSDV, FGLS, OLS-PCSE and GMM-IV estimators (panel estimation). The results confirm that actual balances in the period 2000-2003 are generally close to their estimated levels, which suggests that most of transition countries are justified in running relatively high current account.

Vamvakidis (2008) estimates a model of intertemporal optimization during regional convergence, where current account balances of emerging Europe depend on time effect, relative income per capita, demographics factors and real growth rate. The model shows that for the period 2003-2007, deficits in emerging Europe are lower than the actual deficits for more than half of the observed countries, with larger gaps in Baltic's countries and in some SEE countries.

Rahman (2008) estimates a model based on GCER panel regression with the new EU members (without Malta and Cyprus). The results show that EU-10 as a group has a higher norm deficit comparing with other developing countries and can afford higher deficits, which is result of lower NFA position and higher share of old population. Differences in CA norms across the EU-10 countries show that Slovenia, Slovakia, Czech Republic and Poland are at lower end of norm deficit and have

smaller deviation of actual balance and sustainable level of current account deficit, which is opposite of Hungary, Latvia, Estonia, Lithuania and Bulgaria.

Ca'Zorzi et al (2009) use two methods for estimating current account benchmark for 9 new EU members, based on the Lane and Milesi-Ferretti approach (LM approach) and structural current account model (simple pooled OLS). The results from the LM approach show current account disequilibria (including and excluding FDI), while the structural current account model shows that current account deficits in Czech Republic, Slovakia, Poland and Hungary in 2007 were consistent with stable external indebtedness, contrary to the remaining countries, whose deficits in 2007 imply a deteriorating external indebtedness and point to the need for current account adjustment over the medium term.

### **3. CURRENT ACCOUNT IN THE REPUBLIC OF MACEDONIA AND IN EMERGING EUROPEAN COUNTRIES**

The current account balance in Macedonia, since the independence, has been negative, averaging 6% of GDP in the period 1998-2009. The composition of the current account points out that the negative current account balance was mostly driven by the high trade deficit, which has averaged 19.2% of GDP in the analyzed period. For a small and open country, as Macedonia, the external factors and the situation on the world markets play a key role for the country's external sector performances and for the dynamics of the trade deficit. A significant deterioration in the current account deficit was noticed in the period Q4.2007-Q1.2009 reaching 16% of GDP, when trade deficit peaked up to 27.6% of GDP. This deterioration was due to the two external shocks in this period - the high global rise in food and energy prices, which contributed to higher nominal imports, and the global recession that reduced Macedonian exports. However, with the exhaustion of the effects of these factors, given the significant contraction of the import, the trade deficit has been reduced to 23.4% of GDP at the end of 2009.

On the other hand, Macedonia receives a large amount of private transfers, averaging 13.3% of GDP in the period 1998-2009, which finance around 70% of the trade deficit. Albeit their positive contribution for the current account, there is a high level of uncertainty regarding the volume and sustainability of the private transfers in the future period (taking into account that the cash in foreign currency also includes the "money under the mattress", inflows from gray economy and other unregistered inflows, which are expected to decrease over time).

From the financial account perspective, the current account deficit was financed mostly by FDI net-inflows and loans. FDI are dominant source of financing (particularly from 2005 onward), they are 5.2% of GDP on average in the period 1998-2009 and their coverage of the current account deficit is around 85% in the same period. The loans are the second source of financing, and most of them refer to long term liabilities. The long term loan's disbursements are 5% of GDP in the period 1998-2009, while on net base (disbursements less amortizations), the external borrowing is 1% of GDP.

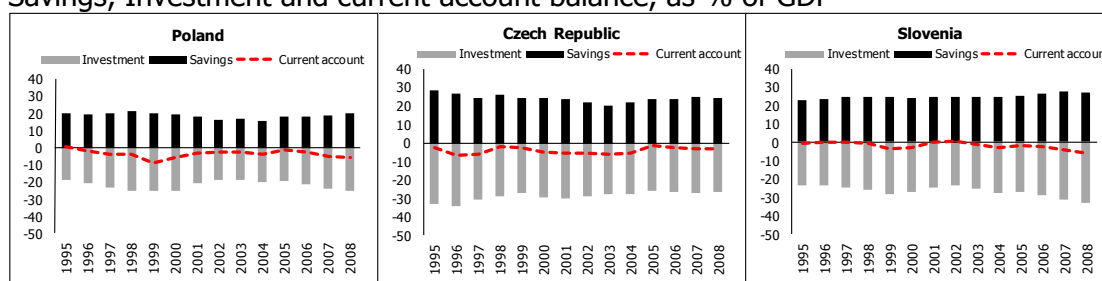
From a national accounting perspective, changes in the current account deficit are explained mostly by changes in the savings. Namely, the investment ratio to GDP was more or less stable in the period 1995-2008, averaging 21.4%, but has

increased in the last two years up to 25% of GDP. On the other hand, national saving ratio to GDP is much lower, 15.9% of GDP on average in the period 1997-2008<sup>3</sup>, and is much more volatile. Consequently, the deterioration of the current account in the period from the end 2007 to the beginning of 2009 is mostly due to the reduction in savings and to smaller extent due to the higher investment. In addition, sectorial analysis shows that higher difference between national savings and investment derives from the private sector, not from the public sector (Kadievská-Vojnovik, 2009).

Similar movements are present in the current accounts of the other emerging economies. Generally speaking, all emerging economies are faced with deficits in the current account. However, there are significant differences among the countries regarding the size of the deficit, the factors that drive that deficit and the source of its financing.

The first group of countries, consisting of Czech Republic, Poland and Slovenia, are characterized by high national saving and investment ratios and their current account deficit is relatively low (below 4% of GDP)

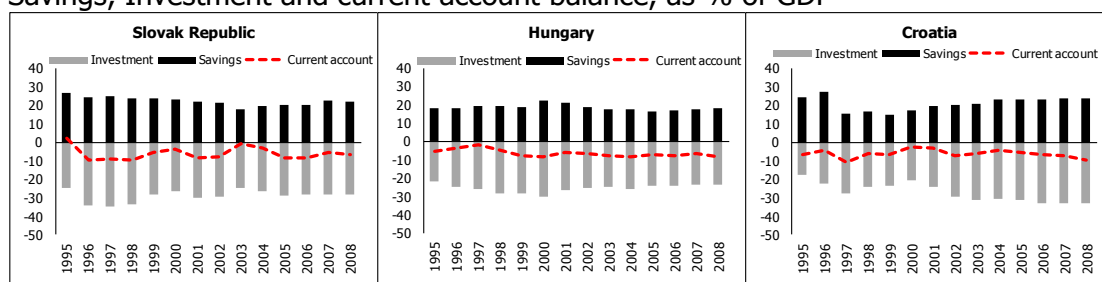
Figure 1  
Savings, Investment and current account balance, as % of GDP



Source: European Commission, AMECO database.

In the second group of countries, which includes Hungary, Slovak Republic and Croatia, investment are at similar level as in the previous group, but the national savings are little bit lower, which contribute to a higher current account deficit (about 6% of GDP). In addition, changes in the current account deficit of these countries come mostly from movements in investment.

Figure 2  
Savings, Investment and current account balance, as % of GDP



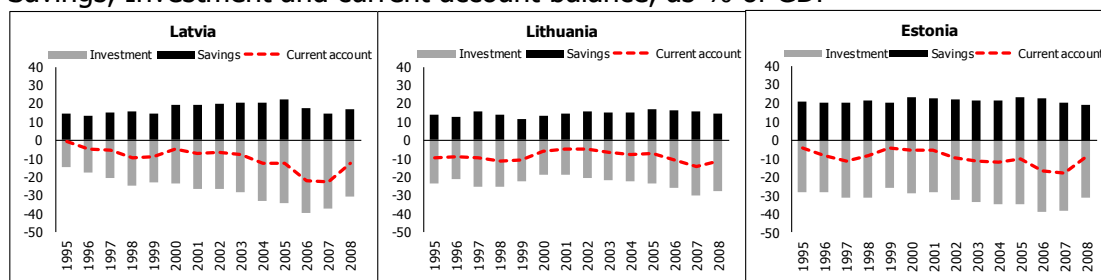
Source: European Commission, AMECO database.

The third group of countries refers to the Baltic countries (Latvia, Estonia, and Lithuania), which register higher current account deficits stemming from

<sup>3</sup> The data for national investments are available starting from 1995 and for savings - from 1997.

relatively lower level of national saving and particularly high level of investment. Their deficits deteriorated significantly in the last few years both due to the increased investments and the reduced savings.

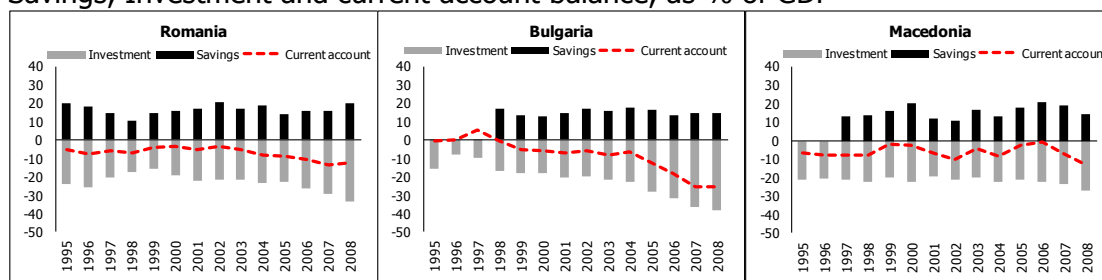
Figure 3  
Savings, Investment and current account balance, as % of GDP



Source: European Commission, AMECO database.

The last group of countries, consisting of Romania, Bulgaria and Macedonia, has the lowest level of savings from all transition economies, along with relatively low level of investment and according to that, moderate high deficits in their current accounts. In addition, the deficits of Romania and Bulgaria are generally driven by changes in investment, which is opposite of Macedonia, where changes in the deficit are due to shifts in savings. However, significant increase in investment is noticed in the last few years in all three countries, leading to record-high current account deficits.

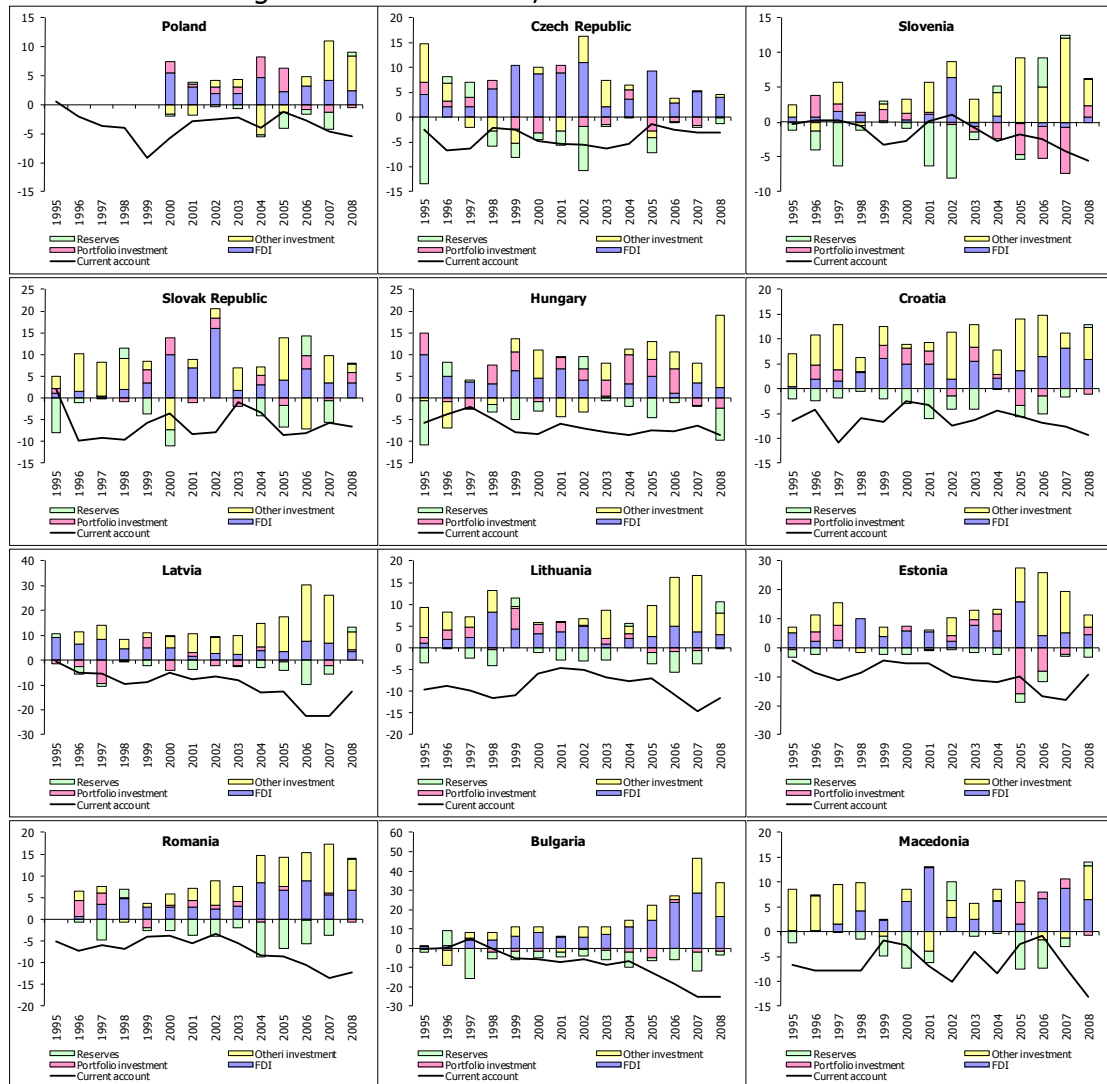
Figure 4  
Savings, Investment and current account balance, as % of GDP



Source: European Commission, AMECO database.

Although from a financing point of view there is emphatic heterogeneity among the analyzed countries, still some general characteristics can be identified. Thus, FDI can be seen as important source for financing the current account deficits in all transition countries. Also, debt creating inflows from abroad are also important sources of financing the current account. This form of financing is present in some countries throughout the whole period (Croatia, Slovenia, Romania, Latvia), whereas in some other countries it becomes particularly important in the last years (Poland, Hungary, Lithuania, Estonia, Bulgaria).

Figure 5  
Sources of financing the current account, as % of GDP



Source: European Commission, AMECO database.

## 4. ECONOMETRIC ANALYSIS OF THE CURRENT ACCOUNT SUSTAINABILITY OF THE REPUBLIC OF MACEDONIA

### 4.1. Model and methodology

The econometric analysis of the Macedonian current account is based on the structural current account model, which assumes inter-temporal optimization through time. These models define the current account balance as difference between domestic savings and investment, which are represented as a function of different variables (Debelle and Faruqee, 1996; Chinn and Prasad, 2000; Calderon et al, 2002; Aristovnik, 2006, 2007; Herrmann and Winkler, 2008; Vamvakidis, 2008). The general empirical model is specified as following:

$$CA_{it} = \alpha + \beta X_{it} + \varepsilon_t \quad (1)$$

where  $CA_t$  is current account deficit as a ratio to GDP, and  $X_t$  is a vector of independent macroeconomic variables that affect the saving-investment balance. The variables that determine the current account were explained above, in part 2.3. It should be stressed out that in some analyses, lagged value of the dependent variable is included as explanatory variable, as well (Calderon et al, 2002; Bussiere, et al, 2004; Aristovnik, 2006, 2007; Ca' Zorzi et al, 2009), which captures the effect of the persistence of the current account, without providing formal argument for its existence (Bussiere, et al, 2004).

The structural current account model allows us to determine the factors that affect the current account, as well as to estimate its sustainable level. The factors are determined through the results of econometrics model, more precisely, on the grounds of the significance of the variables and the size of their coefficients. The sustainability is assessed by comparing the actual current account balances to those obtained by the model. The model's current account can be obtained in two ways: (i) through the fitted values for current account from the regression and (ii) by including medium term values for the selected variables (i.e. multiplying the medium term values with the estimated coefficients in the model). According to the first approach, which is present in most of the panel analyses, the residuals from the regression are actually the deviation of the current account from its sustainable level, and accordingly to that, assessing the sustainability of the current account is done by residual analysis. However, this approach is inconvenient in our case because our method of estimation (ARDL) provides white noise residuals in most of the cases, eliminating any irregularity in the behavior of the residuals. This is the reason why we decided to implemented the second approach, which means that sustainability of the Macedonian current account was analyzed through medium terms values of the variables in the model.

The econometric analysis can be separated in three parts. First, the most appropriate model for current account is selected, which is a model that best explains the dynamics of the current account in the analyzed period. Next, medium term values for the independent variables in the model are determined, which are the factors that were significant for the current account dynamics. Finally, the sustainable level of the current account deficit is calculated and is compared to the actual current account deficit, in order to assess whether the current account was sustainable in the analyzed period.

Most of the analyses use panel techniques to analyze the structural current account balance<sup>4</sup>. In some analyses (Debelle and Faruqee, 1996, Chinn and Prasad, 2000, Zanghieri, 2004) Ordinary least squares (OLS) are employed, while others use methods that correct for endogeneity, such as Instrumental variable (IV) estimation in first differences and Generalized method of moments (GMM) (Calderon et al, 2002; Bussiere, et al, 2004; Aristovnik, 2006, 2007; Ca' Zorzi et al, 2009; Morsy, 2009). In this analysis, we applied the Autoregressive distributed lag (ARDL) method of estimation. This method is actually a dynamic version of the OLS method, i.e., the regression, which is estimated using the OLS technique, includes lagged values of the independent and the dependent variables. Distributed lags methods of estimation belong to the group of older estimation techniques and are not used very often in the literature today; nevertheless, Pesaran and Shin (1997) revive these methods, showing how they can be implemented in cointegration analysis. One of their advantages, as these authors claim, is the fact that the variables that are included in the model can be both stationary and non-stationary. This is the main reason why we have decided to apply this method of estimation, as some of our variables are stationary, while the others are non-stationary.

In our case, the independent variable (current account) was stationary, and because of that we did not examine whether there is a cointegration between the independent variables, but we just assumed that non-stationary variables are cointegrated between themselves, and that their relationship results in stationary current account. However, the biggest disadvantage of such approach is that we limit the number of cointegration vectors at one, in case when there might be more than one cointegrating relationships<sup>5</sup>.

ARDL method provides estimation of the long run and the short run relationship between the variables. The analysis of the current account and the estimation of its sustainable level are based on the long-run coefficients.

## **4.2. Data and variables**

The database which was used in this analysis consists of 15 variables. The period of the analysis is Q1.1998-Q3.2009 (47 observations). The data with seasonal effects were seasonally adjusted using the Census X-12 method. The variables and the data sources are shown in Appendix 1. Each of the variables has been tested for stationarity. The results of these tests are shown in the following table.

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<sup>4</sup> There are analyses that do not use panel estimation, but estimation that refers to only one country, for example Okojie (2005).

<sup>5</sup> The more sophisticated Johansen technique, which allows estimation of more cointegration vectors, was also applied, but it didn't give a satisfactory results.



Table 1  
Stationarity tests

Variable	ADF test	DF-GLS test	PP test	NG-Peron test	Decision
Current account	p<0.01	p>0.10	p<0.01	p>0.10	Stationary
Budget	p<0.01	p<0.01	p<0.01	p>0.10	Stationary
GDP	p<0.10	p<0.01	p<0.05	p>0.10	Stationary
FDI	p<0.01	p<0.01	p<0.01	p>0.10	Stationary
Credits	p>0.10	p<0.10	p>0.10	p>0.10	Non stationary
New credits	p<0.01	p<0.01	p<0.01	p<0.05	Stationary
M2	p>0.10	p>0.10	p>0.10	p>0.10	Non stationary
NFA	p>0.10	p>0.10	p>0.10	p>0.10	Non stationary
Foreign GDP	p<0.01	p<0.01	p<0.01	p<0.01	Stationary
Relative income	p>0.10	p<0.05	p>0.10	p>0.10	Non stationary
Terms of trade	p>0.10	p<0.10	p>0.10	p<0.10	Non stationary
REER	p<0.10	p>0.10	p<0.10	p>0.10	Non stationary
Openness	p>0.10	p>0.10	p>0.10	p>0.10	Non stationary
Population growth	p>0.10	p>0.10	p>0.10	p>0.10	Non stationary
Age dependency	p>0.10	p>0.10	p>0.10	p>0.10	Non stationary

H<sub>0</sub>: The series is no stationary. The text in the table shows whether p-value of the test is higher or lower compared to the level of significance. For example, <0.01 means that p-value is lower than 0.01, which indicates that H<sub>0</sub> can not be rejected at 1% level of significance.

### 4.3. Econometric analysis

#### *Selection of the model of the current account*

The maximum order of the ARDL model was limited at 2, because of the short sample and the relatively high number of explanatory variables. The number of lagged values for each of the variables was determined by maximization of the Akaike Information Criteria (AIC); more precisely, the specification with the highest value of the criteria was selected. The selection of the most appropriate specification was done in the usual way, by adding and excluding variables depending of their coefficients' significance and economical interpretation. Alternative models were compared according to the adjusted coefficient of determination (adjusted R<sup>2</sup>)<sup>6</sup>, the residual diagnostics and the economical justification. What might be a possible problem in the analysis is the high correlation between some variables (Appendix 3), which may cause inability for correct estimation of the individual effects of each of the variables<sup>7</sup>. Because of this, we take the results with a dose of precaution and we examine the robustness of the coefficients. The economic explanation for including each of the variables into the model is given in part 2.2. The whole procedure of selecting the most appropriate specification of the model is shown in the following table, with short explanation later in the text.

<sup>6</sup> The difference between coefficient of determination (R<sup>2</sup>) and adjusted coefficient of determination (adj R<sup>2</sup>) is that the last one includes a correction for the number of the explanatory variables in the equation. Consequently, the models with different number of independent variables are comparable according to adjusted R<sup>2</sup>.

<sup>7</sup> The variables: credits, M2, NFA, REER and age dependency are highly correlated, probably due to trend component which is present in each of them.

Table 2  
Results of the different specifications

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Budget</b>	0.57	1.01	1.50	1.62	<b>1.66</b>	1.50	1.50	1.72	0.79	1.52	1.41	1.65	1.92	1.73
		**	***	***	***	***	***	***	*	***	***	***	***	***
<b>GDP</b>		-0.85	-1.26	-1.21	<b>-1.03</b>	-1.13	-1.01	-1.19		-0.88	-0.73	-0.97	-1.65	-1.06
		*	**	**	**	**	**	**		**	*	**	***	**
<b>FDI(-1)</b>			-0.45	-0.43	<b>-0.36</b>	-0.32	-0.36	-0.32	-0.30	-0.31	-0.31	-0.35	-0.33	-0.37
			**	**	*	*	*	*		*	*	*	*	*
<b>Credits</b>					-0									
<b>New credits</b>					<b>-0.54</b>		-0.48	-0.42	-0.70	-0.37	-0.99	-0.46	-0.33	-0.64
					*				*		*			
<b>M2</b>						-0.06								
<b>NFA</b>							-0.06							
<b>Foreign GDP</b>								-0.1						
<b>Relative income</b>									-0					
<b>Terms of trade</b>										-0.2				
<b>REER</b>											-0.2			
<b>Openness</b>												-0		
<b>Population growth</b>													0.05	*
<b>Age dependency</b>														-0.3
<b>C</b>	-0.06	-0.03	0.01	0.03	<b>0.02</b>	0.01	0.04	0.03	0.06	1.09	1.01	0.07	0.02	0.16
<b>adjusted R<sup>2</sup></b>	0.28	0.33	0.41	0.42	<b>0.43</b>	0.49	0.41	0.43	0.36	0.47	0.45	0.41	0.45	0.41
<b>LM serial correlation test</b>	0.76	0.51	0.67	0.57	<b>0.65</b>	0.74	0.69	0.51	0.45	0.28	0.94	0.67	0.97	0.48
<b>Ramsey RESET test</b>	0.71	0.09	0.13	0.22	<b>0.27</b>	0.15	0.27	0.35	0.03	0.24	0.35	0.33	0.32	0.28
<b>Jarque-Bera normality test</b>	0.41	0.51	0.41	0.29	<b>0.35</b>	0.48	0.33	0.40	0.31	0.49	0.65	0.38	0.60	0.42
<b>Koenker Bassett heteroscedasity test</b>	0.05	0.69	0.48	0.19	<b>0.19</b>	0.33	0.17	0.22	0.71	0.25	0.84	0.18	0.52	0.18

The dependent variable is current account in all specifications. Explanatory variables are given in the first column.

The p value of residual tests is the value at which the null hypothesis is satisfied.

The symbol \*, \*\* and \*\*\* indicates statistical significance at 10%, 5%, and 1%, respectively.

The first specification included only the ***budget deficit*** as explanatory variable for the current account. According to the theory, higher budget deficit reduces national saving and, consequently, contributes to higher current account deficit. The positive sign in the regression was in accordance with the theory, but was not significant. In the second specification, we added the ***economic growth (GDP)***, which should have a negative effect on the current account. The coefficient of the GDP growth was in line with the expectations, and both the budget and GDP growth were significant. In the third regression, we added ***foreign direct investment (FDI)***<sup>8</sup> to the previous specification, which contributes to higher

<sup>8</sup> FDI were included only with one quarter lag, because the current value of FDI was not significant, only the previous value.

national investment and according to this increase the current account deficit. The sign in front of FDI was significant and negative, as expected; in addition, the previous two variables kept their sign and significance. In the fourth model, we included the stock of *credits* as a variable that captures financial intermediation, which should have a positive effect on investment and negative effect on the current account balance. Although the coefficient had the right sign, it was not significant, so we dropped it. The fifth model included the variable *new credits*, instead of the stock of credits. It seemed that the new variable captured better the financial intermediation, as the coefficient was negative and significant. In the sixth model, we explored whether *M2* is better variable for the effect of the financial sector. The specification with M2 had higher explanatory power, but the coefficient of M2 was not statistically significant. Hence, we decided to drop it and to continue with the variable newly extended credits.

We also tried to improve the basic specification (model 5) by including other variables (NFA, foreign GDP growth, relative income, terms of trade, REER, openness, population growth and age dependency). However, these efforts did not seem to produce good results, either because of the insignificant coefficients or because of the opposite sign than the expected (Table 2).

In the selected model, Model 5, the determinants of the current account balance are: the budget balance, economic growth, FDI and newly extended credits. The coefficient in front of the budget shows a strong positive relationship between budget balance and current account balance. Thus, if the budget deficit increases by 1 percentage point, as percent of GDP, the deficit in the current account will increase by 1.7 p.p., as percent of GDP, because of reduced national savings. This strong relationship, stronger than what is usually found in the literature, has several explanations. First, due to the underdeveloped financial markets and the strong regulations in Macedonia, the private sector was constrained for higher borrowing in form of bank credits<sup>9</sup>. In such conditions, higher budget deficit (due to decreased savings or increased public investments) will have an implication of higher capturing from private sector assets in the future which will reduce their disposable income. In order to smooth the consumption, given the borrowing constraints, the private sector will reduce its savings, which will lead to deficit in the current account. Therefore, in terms of incomplete substitution of private and public sector savings, a higher positive correlation between budget balance and current account balance is expected (the explanation for higher coefficient in front of budget balance for emerging countries vis-à-vis developed countries can be found in Milesi-Ferreti and Razin, 1996; Medina et al., 2010). Second, in terms of underdeveloped financial markets and budget deficit, the deficit will be financed by borrowing from abroad, which will increase the interest, and will result in even higher current account deficit. Third, the high coefficient can be explained through the effect of multiplier. Namely, as a result of the multiplier, the higher budget deficit leads to higher income, which may increase the investments of the private sector. The economic growth coefficient points out to deterioration of the current account deficit of 1 p.p., as percent of GDP, in case of 1 p.p. increase of the GDP growth, which means that there is strong effect of GDP growth to the savings and investment. Foreign direct investments also appear to be an important factor for the national investment growth and the current account dynamics. Accordingly, if FDI increases by 1 p.p., as percent of GDP, than

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<sup>9</sup> Borrowing constraints can be confirmed by the fact that the share of bank's credits to private sector in GDP was relatively stable, averaging about 17% of GDP in the period 1999-2003.

the deficit in the current account, as percent of GDP, will increase by 0.4 p.p.. The coefficient of the new credits shows that financial intermediation has a strong effect on investment growth, which means that the rise in new credits, as percent of GDP, by 1 p.p. deteriorates the current account by 0.5 p.p., as percent of GDP.

The comparison of the coefficients between the selected model and other specifications in the Table 2 shows that coefficients are relatively robust. For example, the coefficient in front of budget varies between 0.8 and 1.9<sup>10</sup>, the GDP growth coefficient is in the range of 0.7 and 1.7, while the coefficients of FDI and credits are more stable and vary between 0.3 and 0.5, and 0.4 and 1, respectively. Additionally, there were three more checks for robustness of the coefficients. The first one was the estimation of the model with same variables, for same period, but using the Schwarz Information Criteria (SIC), instead of AIC, for selecting the lagged values of each of the variables. According to the second robustness check, the model 5 was estimated using shorter data sample: first, the first 4 quarters were dropped, then the last 4 quarters were dropped, and at the end the first 4 and the last 4 quarters were dropped. These checks failed to indicate significant instability of the coefficients. The third check for parameter stability was done by applying formal tests (CUSUM test and CUSUM of square test), which confirmed the stability of the coefficients (see Appendix 4).

A comparison between the coefficients of this research and the coefficients that are usually found in the literature is presented in Table 3. The coefficient of the budget deficit in our study is significantly higher than in the other studies, which, as already mentioned, we attribute to the underdeveloped financial market in Macedonia, in accordance with the findings of Medina et al. (2010). On the other hand, the FDI coefficient is generally in line with what is usually found in the literature. As for the economic growth, one can notice that there exist huge differences in the literature, not only regarding the intensity of this effect, but also regarding the sign of the coefficient, which makes comparison between different studies more difficult. Still, the high GDP growth coefficient that we find shows that economic agents in Macedonia perceive higher growth rates to be permanent, not temporary, which is in accord with the small changes in the rate of economic growth, i.e. with the long period of transition, marked with low economic growth. The comparison is even more difficult in the case of the financial intermediation, whose coefficient in the literature varies between -0.01 and -9. Still, despite the small differences between the findings of our study and findings of some other studies, we consider that our results are in line with the economic theory and the specificities of the Macedonian economy.

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<sup>10</sup> The first initial specifications were not considered.

Table 3

Comparison between the results of this study and some other studies

authors		Budget	GDP	FDI	credits
<b>Unevskaja and Jovanovic, 2009</b>		1,66***	-1,03**	-0,36*	-0,54*
<b>Calderon et al., 2000</b>	OLS		0,13***		
	GMM-IV		0,34***		
	System D-L GMM-IV		0,21***		
<b>Chinn and Prasad, 2000</b> Developing countries, excluding Africa	Cross-section	0,25**	-0,18		
	OLS with time dummies	0,26***	-0,09		
	Fixed effects specification with time effects	0,21***			
	Second stage of OLS with annual data	0,17***	1,3*** 0,01		
<b>Aristovnik, 2006</b>	LSDV	0,73***	-0,16***		
	FGLS	0,65***	-0,16***		
	OLS-PCSE	0,61***	-0,20***		
	GMM-IV	0,39**	-0,54**		
<b>Rahman, 2008</b>		0,39***	-0,05	-0,13*	
<b>Chinn and Ito, 2005</b> Developing countries (LDC), excluding Africa	without institutional variables	0,22***	0,30		-0,01
	with institutional variables	0,23***	0,40		-0,02
<b>Herrmann and Winkler, 2008</b>	basic model		-0,51 ***	-0,15***	
	financial model		-1,16***	-0,20***	-9,23***
<b>Medina, et al., 2010</b>	All countries	0,48***	-0,18***	-0,16	
	Excluding oil exporters	0,53***	-0,19***	-0,15	
	Basic, without oil	0,49***	-0,18***	-0,20*	
	Basic, with oil	0,49***	-0,19***	-0,15	
<b>Unevskaja , 2009</b>	Model 1		0,5	-1,1***	
	Model 2		0,8*	-1,6***	
	Model 3		0,7**	-1,1***	

### ***Selection of medium term values for the variables***

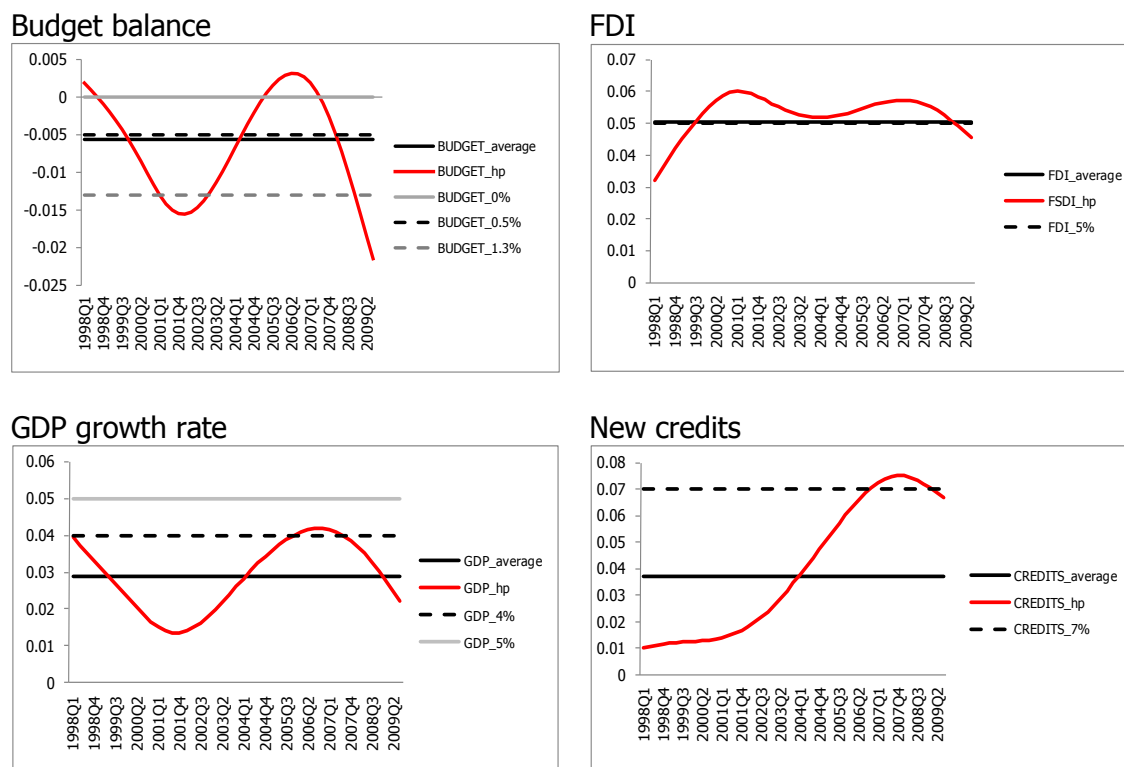
The second step of the analysis refers to the choice of the medium term values for the selected variables. The sustainable level of the current account depends largely on the assumptions for the medium term values of the variables, which cannot always be estimated with a high degree of certainty. For this reason, as well as because we wanted to examine the sensitivity of the results for the current account sustainability, we applied three alternatives for assessing the medium terms values of the variables. According to the **first alternative**, as medium term values are taken the **average values** of each variable for the period for which data are available. The **second option** takes the trend values of the variables calculated by the **Hodrick-Prescott filter** (factor 1600) for medium term values takes. Although without some strong economic support, these alternatives are often used in the literature.

According to the **third approach**, the medium term values were chosen **subjectively**, on the grounds of authors' expert judgment and. We have two alternatives for the **budget balance**. According to the first, the budget over the medium term should be in equilibrium, meaning that medium-term budget balance should be 0% of GDP. However, there is no strong reason why the budget should be in equilibrium in the medium run, as Macedonia is a developing country, with low level of indebtedness and strong need for investment in the infrastructure. Accordingly, for the second option we assume a low level of budget deficit as a

sustainable level, i.e. we set the medium term of budget deficit at 0.5% of GDP, which is actually very close to the average value in the analyzed period. As additional alternative is considered the primary budget deficit of 1.3% of GDP, estimated by IMF, as deficit that corresponds with the sustainable level of public debt (for more, see IMF Country Report No. 09/60). For the **GDP growth rate** we also assume two alternatives – growth rate of 4% and of 5%. The growth rate of 5% correspond to the realized rates in the period 2007-2008, when a few reforms were implemented in the Macedonian economy, because of what the slow growth of the transitional period was outperformed. Nevertheless, these two years can be viewed as years of economic expansion, which is always followed by a slow down, so the assumption for 5% medium term growth rate might seem too high and because of that we set another option for GDP growth rate of 4%. This growth rate of 4% is much closer to the Macedonian average growth rate in the analyzed period. The medium term value of 5% of GDP is assumed for the **FDI**, as one small open developing economy can expect a significant amount of FDI inflows. This assumption is close to the average FDI for the whole period (which is biased upwards by some big privatizations in this period), but is also close to the average for the last three years, which can be considered as equilibrium period. For the **new credits**, we assume amount of 7% of GDP, taking into account that this value corresponds to the value in the period when financial system was closest to some equilibrium state (2006). This value of 7% is much higher than the average for the data available period (4%). However, the lower average is due to lower level of the new credits in the beginning of the analyzed period (2% in the period 1998-2005), which is a period of underdeveloped financial market. On the other hand, the assumption of 7% of GDP for the medium term of new credits is lower than the value realized in 2007 and 2008 (10%), when the financial system was in expansion, which cannot be assumed as sustainable on medium term. The different values are shown in the figure below.

Obviously, each of the three approaches has disadvantages. Generally speaking, the first two approaches have serious disadvantage as they are purely statistical and do not take economic factors into consideration. At the same time, they cannot take into account the structural changes in the economy, and correspondingly they are valid only in case when the variables fluctuate around the equilibrium state, but not in case when the variables converge to the equilibrium. Additional disadvantage of the first approach is that the average, as a measurement of the central tendency, does not consider the variation in the variables, i.e. the existence of different sub-periods or trends. The disadvantages of the second approach refer to the critiques for statistical filters as a technique for calculating the trend values, particularly to the results' dependency on the sample length and to the "end of the sample" problem, which means that the results can differ substantially depending on whether a shorter period is used (for example 1998-2005) or a longer (for example 1998-2007) (for more, see French, 2001). The disadvantage of the last approach is that it is based on subjective opinions. Its biggest advantage is, however, that it is based on economic considerations. That is exactly the reason why we think that this option is the most appropriate one.

Figure 6  
Alternative medium term values for the variables



### ***Estimation of the sustainable level***

Having a reasonable economic model of the current account and plausible assumption for the medium term values of the variables, the calculation of the sustainable level of the current account becomes actually a simple mathematic exercise: the values of the variables are multiplied with the coefficients obtained by the model, and the calculated current account represents the equilibrium sustainable current account.

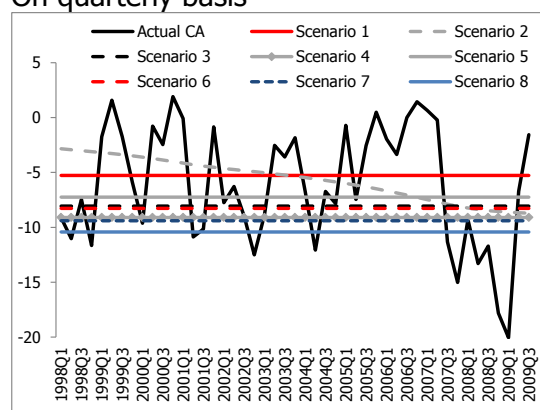
Nevertheless, we decided to calculate several alternative scenarios, taking into consideration the uncertainty about the medium term values of the variables. The scenarios differ regarding the assumptions for the medium term values that are included in the calculation. The number of all potential scenarios is actually very high (180), as we have 3 options for two of the variables and 4 and 5 options for the other two ( $3 \times 3 \times 4 \times 5 = 180$ ). However, the calculation of all the possible scenarios will not be very useful, as the differences between most of the scenarios will be very small. That is why we decided to present only six scenarios, which are considered as sufficiently representative of all the possible situations<sup>11</sup>. The scenarios are shown in Table 4, while the sustainable levels of the current account obtained by each of these 6 scenarios are shown in Figure 7.

<sup>11</sup> Additionally, it was examined whether different assumptions for the size of the model's coefficients change the results for the sustainable level of the current account (for example coefficients obtained with Schwarz Information Criteria). As the results differed only insignificantly, we do not show these results.

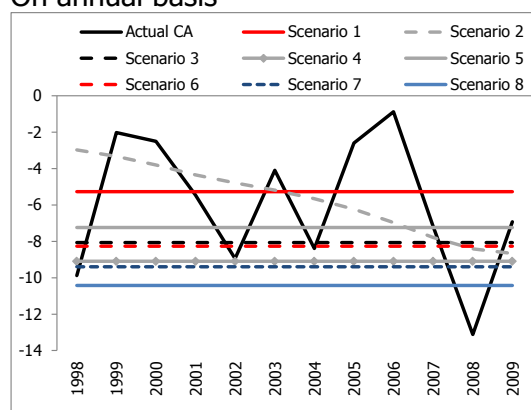
Table 4  
Assumptions and results of the alternative scenarios

	Budget	GDP growth	FDI	Credits	Sustainable CA
<b>Scenario 1</b>	average (-0,4% of GDP)	average (3,2%)	average (5,3% of GDP)	average (4% of GDP)	<b>-5.3% of GDP</b>
<b>Scenario 2</b>	HP filter	HP filter	HP filter	HP filter	<b>-3% at the beginning, -8.5% at the end, on average, -5.6% of GDP</b>
<b>Scenario 3</b>	-0.5% of GDP	4% of GDP	5% of GDP	7% of GDP	<b>-8.1% of GDP</b>
<b>Scenario 4</b>	-0.5% of GDP	5% of GDP	5% of GDP	7% of GDP	<b>-9.1% of GDP</b>
<b>Scenario 5</b>	0% of GDP	4% of GDP	5% of GDP	7% of GDP	<b>-7.2% of GDP</b>
<b>Scenario 6</b>	0% of GDP	5% of GDP	5% of GDP	7% of GDP	<b>-8.3% of GDP</b>
<b>Scenario 7</b>	-1.3% of GDP	4% of GDP	5% of GDP	7% of GDP	<b>-9.4% of GDP</b>
<b>Scenario 8</b>	-1.3% of GDP	5% of GDP	5% of GDP	7% of GDP	<b>-10.4% of GDP</b>

Figure 7  
Comparison between actual and sustainable current account  
(current account balance, as % of GDP)  
On quarterly basis



On annual basis

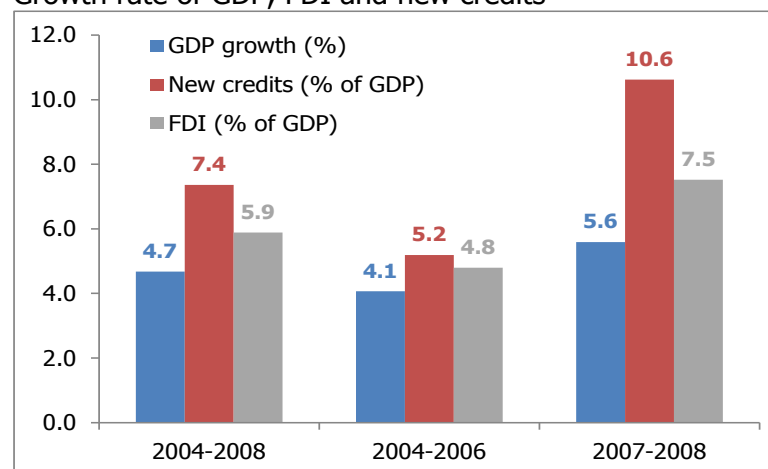


Although there are some differences in the sustainable levels of the current account obtained by the different scenarios, it seems that these differences are not so big: the lowest value is 5.3% of GDP, while the highest is 9.1%. The first scenario, which is based on average values of the variables, yields sustainable level of 5.3% of GDP, and this low estimate is a result of the relatively low values for the variables in the beginning of the analyzed period, as this period was characterized by underdeveloped financial markets and low growth rates due to transitional problems. Because of that, we consider that this scenario does not correspond with the state of the medium term equilibrium and gives too low value for the sustainable level of the current account deficit. According to the second scenario, which is based on the HP-filtered-values for the fundamentals, the sustainable level is not constant in the analyzed period, but has a downward trend, falling from 3% of GDP in the beginning, to 8.5% of GDP in the end. Although this corresponds to the observation that Macedonian economy in the observed period was converging to the equilibrium, instead of fluctuating around it, the analytical value of this scenario is devaluated



from the fact that one cannot say whether this downward trend will continue in the future or will stabilize around some value. The remaining four scenarios that are based on subjective expert estimates for the medium term values of the fundamentals, give relatively close values for sustainable deficit, which are in the range of 7.2% and 9.1% of GDP. The scenarios with primary budget deficit that stabilize the level of public debt show the highest sustainable level of the current account. We select Scenario 3 as our baseline scenario or scenario that is the most probable, because we consider that the budget balance is not necessary to be in equilibrium, that it can be slightly negative, and that the assumption of 4% GDP growth in the medium run is more appropriate than the assumption of 5% growth rate, which we think is too high. Additionally, the assumptions for new credits of 7% of GDP and for FDI of 5% of GDP are consistent with the economic growth rate of 4-5% (Figure 8). Consequently, the current account deficit estimated with this scenario (8.1% of GDP) can be considered as basic and the values of deficit obtained by scenarios 4-6 can be taken as confidence interval for the basic scenario. It should be also stressed out that the current account deficit for the period after 2006, calculated by using HP values of the variables, matches the values of this confidence interval.

Figure 8  
Growth rate of GDP, FDI and new credits



Source: SSO, NBRM and author's calculations..

The results of this study for the sustainable level of the Macedonian current account are generally in accordance with the results of other studies, although the sustainable level here is little higher than elsewhere (see Appendix 5). The estimation for the sustainable level of the Macedonian current account can be found in four other research studies - Vamvakidis (2008), Aristovnik (2006a and 2006b) and Unevska (2009). According to Vamvakidis (2008), the sustainable deficit for Macedonia was 5.1% of GDP estimated for the period 2003-2007, while according to Aristovnik (2006b) which analyses capture the period 2000-2003, the sustainable level of deficit is in the range of 5.1% and 7.1% of GDP, or in the range of 2.3% and 6.8% of GDP according to Aristovnik (2006a) for the same period. The IMF analysis shows similar results, in which the estimated primary current account that stabilize the level of external debt is 6% of GDP. According to Unevska (2009), the sustainable deficit of the current account is in the interval from 5.6% to 8.3% of GDP

for the period 1997-2009, whereas the analysis for the sub-period 2007-2009 shows that the sustainable deficit in this period is in the range of 12% to 12.4% of GDP<sup>12</sup>.

The comparison of the interval for the estimated sustainable level of current account with the actual current account, for the period 1998-2009, shows that the actual current account fluctuates around the sustainable deficit until mid 2007, when the deficit was 4.7% of GDP, on average. However, since the second half of 2007, until the first quarter of 2009, the average current account deficit averages 14.1% of GDP and is much below the lower limit of the sustainable level (9.1% of GDP). Actually, this is the period when two big external shocks "hit" the Macedonian economy (the global rise in prices in 2007 and 2008 and "the great recession" in 2008 and 2009), that resulted in substantial deterioration of the external sector performances in very short time. On the other hand, 2007 and 2008 were the years with the highest growth rates of the domestic economy, as result of high domestic demand, particularly for investments and household consumption. The high domestic absorption, which was supported by strong credit activity, had a negative effect on private sector savings, which was recording downward trend in the period 2007-2009. At the same time, there was a significant increase of the budget deficit in 2008 and 2009 (on average, 2.6% of GDP), due to the reduced savings<sup>13</sup>, as well as the higher public investments. Consequently, the substantial deepening of the current account gap in period 2007-2009 was an effect of reduced savings and increased investments in same time. These negative economic episodes emphasized the sensitivity of the Macedonian economy to external shocks, given the high degree of import dependence of the exports, the concentration of the exports in several groups of products (with high price elasticity of supply and high income-elasticity of demand), as well as the high importance of the private transfers for the trade deficit coverage. Nevertheless, with the exhaustion of the effects of these shocks, in the second and in the third quarter of 2009, the external equilibrium is restored again, when the average deficit is 0% of GDP.

## 5. CONCLUSIONS

Republic of Macedonia, as part of emerging Europe, shares same problems with other countries of this group. The data show that since 1995, the current account balance in Macedonia has been negative all these years (6% of GDP on average in the period 1998-2009). The current account deficit was mostly due to the high trade deficit, which is only partially offset by the high level of remittances. From financing point of view, FDI are the main source for financing the current account deficit, which is usually considered as a more stable source of financing. Given this, the issue of the sustainability of the current account deficit is one of the most important economic issues, and its importance was further magnified by the record-high current account deficits in 2007 and 2008.

The concept of sustainability of the current account is very complex and the literature does not give a clear answer to the question "what is the level of the current account deficit that sustainable?" Several different approaches for analyzing

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<sup>12</sup> Unevska (2009) estimates the sustainable current account through the fitted values for current account from the regression, not by including medium term values for the estimated variables.

<sup>13</sup> The reduced public savings in the period 2008-2009 is result only because of decreased revenues, especially in 2009 when fiscal measures for mitigating the negative effects of the global crisis were effective.

external sustainability of one country have been developed, starting from the intertemporal budget constraints models of Obstfeld and Rogoff (1994), through the simple accounting framework of Milesi-Feretti and Razin (1996) based on the concept of solvency, to the structural current account models, that are the most often used nowadays and which analyze the current account as the outcome of different "structural" macroeconomic determinants that influence the saving-investment balance.

In this paper we applied the structural model in order to estimate the sustainable level of the Macedonian current account in the period 1998-2009. Empirical results show that Macedonian current account is determined by the budget balance, GDP growth rate, foreign direct investment and new credits (financial intermediation). The sustainable level of the current account was estimated by including medium term values for the fundamental variables. Three different approaches were applied for calibration of medium term values – an average of each variable for the analyzed period, HP filter and subjective estimate by expert judgment. According to the estimated model, six scenarios for the sustainable level of the current account were calculated, which showed that the sustainable deficit is in the range of 5.3% to 9.1% of GDP.

The comparison of the actual and the sustainable level of the current account indicate that there was no significant deviation of the current account from its sustainable level in the period till mid 2007. However, since the second half of 2007, until the first quarter of 2009, the external equilibrium was jeopardized seriously, mostly because of the two external shocks in this period: the global growth of prices in 2007 and 2008 and the global recession in 2008 and 2009, and to some extent because of increased domestic absorption in 2007 and 2008. The high domestic demand in this period has contributed to higher investments, but at the same time the higher household consumption over their disposable income had a negative effect to the private sector savings. Thus, from the aspect of saving-investment ratio, the substantial increase of the gap in the current account in the period 2007-2009 is mostly due to decreased savings, and to smaller extent to increased investments. Analyzing ex post, the persistent deviation of the current account from its sustainable level in the period from mid-2007 to beginning of 2009 might be interpreted as indication for the external equilibrium disturbance. Also, the two external shocks reveal the biggest weaknesses of the Macedonian external sector – the high import dependence of the exports, the high degree of concentration of exports in groups of products that are very sensitive to the market conditions and the big importance of the private transfers for financing the trade deficit.

Although the estimates indicate that external equilibrium was restored in 2009, partially as a result of the monetary authorities' measures, still the record levels of the current account deficit in the period end-of-2007 – beginning-of-2009 must not be forgotten. In order to avoid such episodes in the future, which cannot always be improved by the measures of the macroeconomic management, **structural reforms** are necessary. Put differently, macroeconomic policies should be focused towards improving the structure of the economy. Given the low level of savings, there is strong need for measures that will stimulate the domestic savings. Additionally, more favorable conditions for new investments should be created, as the level of investments in Macedonia is the lowest in the region. Taking into account the main weaknesses in the external trade, it is necessary to extend the export supply (export variety) to goods with higher value-added, i.e. to final products. In

addition, measures should be undertaken that reduce the import dependence, which means that the production of non-import dependent products, based on exploitation of the domestic resources, should be stimulated. As it is already stressed out in Kadievska-Vojnovik and Unevskaja (2007), in order to be competitive on the foreign markets, efforts should be put towards improvement of the non-price competitiveness of the domestic products, i.e. the products should be characterized with high quality, successful promotion, timely delivery etc.

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## APPENDICES

### Appendix 1: Current accounts determinants and their theoretical expected sign

<b>dependent variable: current account balance</b>	
Variable	theoretically expected sign
<i>internal economic conditions</i>	
growth rate	+/-
relative income per capita	-
budget balance	+
financial intermediation	+/-
demographics	-
<i>external sector</i>	
FDI	-
trade openness	+/-
apreciation of REER	-
terms of trade	+
net foreign active	+/-
energy balance (oil importers)	-
<i>evolution of the World economy</i>	
developed countries growth rate	+

"+" means improvement, "-" means deterioration of current account balance.

## Appendix 2: Description of the variables used in the analysis and the data sources

<b>Variable</b>	<b>Description</b>	<b>Source</b>
<b>Current account</b>	Current account balance, as a % of GDP	Current account - NBRM, GDP - SSORM
<b>Budget</b>	Budget balance of the central government, as a % of GDP	Budget - Ministry of finance, GDP - SSORM
<b>GDP</b>	Real year-on-year growth rates of the GDP	SSORM
<b>FDI</b>	Foreign direct investment, net, % of GDP	SDI - NBRM, GDP - SSORM
<b>Credits</b>	Total credits, % of GDP	Credits - NBRM, GDP - SSORM
<b>New credits</b>	Difference between two consecutive stocks of the credits, % of GDP	Credits - NBRM, GDP - SSORM
<b>M2</b>	Monetary aggregate M2, % of GDP	M2 - NBRM, GDP - SSORM
<b>NFA</b>	Net foreign assets of the whole banking sector, % of GDP	Net foreign assets - NBRM, GDP - SSORM
<b>Foreign GDP</b>	Real annual growth rates of the foreign effective demand	NBRM calculation, data from the Eurostat and the state statistical offices
<b>Relative income</b>	Ratio between real GDP of Macedonia and real foreign effective demand	NBRM calculation, data from the Eurostat and the state statistical offices
<b>Terms of trade</b>	Terms of trade (export prices/import prices), 1997=100	NBRM calculation
<b>REER</b>	Real effective exchange rate, 2003=100, increase indicating appreciation	NBRM
<b>Openness</b>	Ratio between sum of exports and imports, and the GDP	SSORM
<b>Population growth</b>	Annual growth rate of the population	Quarterly data are obtained by extrapolating the annual data from the AMECCO database, by the NBRM
<b>Dependency rate</b>	Ratio between population aged 0-14 and over 65, and population aged 15-64	Quarterly data are obtained by extrapolating the annual data from the AMECCO database, by the NBRM

### Appendix 3: Matrix of correlation of the variables

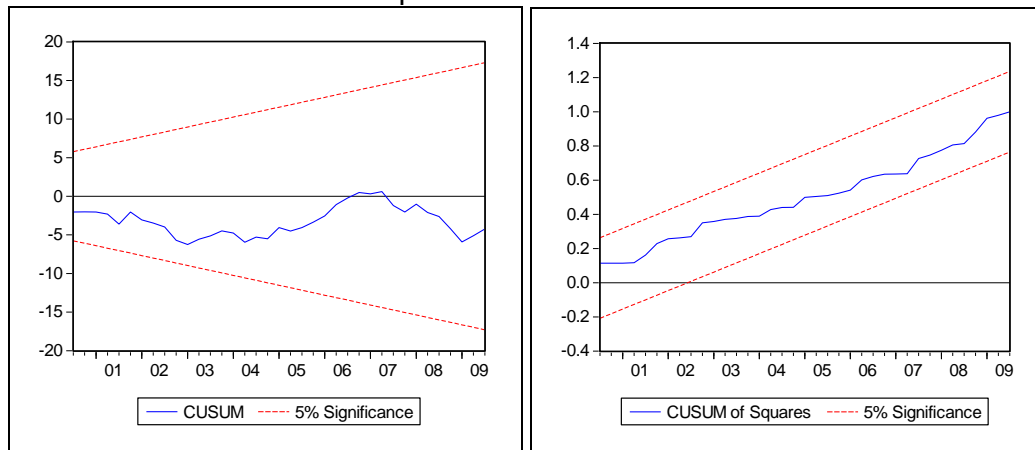
	Current account	Budget	GDP	FDI	Credits	New credits	M2	NFA	Foreign GDP growth	Relative income	Terms of trade	REER	Openness	Population growth	Age dependency
Current account	1.00	0.28	-0.09	0.12	-0.30	-0.16	-0.15	-0.18	0.21	-0.16	-0.01	0.19	-0.18	0.12	0.17
GDP	0.28	1.00	0.53	0.11	-0.05	0.33	0.02	-0.08	0.44	0.15	0.15	0.05	0.26	0.10	-0.01
BDP	-0.09	0.53	1.00	-0.13	0.07	0.37	0.16	0.01	0.37	0.34	0.20	-0.14	0.49	0.06	-0.14
FDI	0.12	0.11	-0.13	1.00	0.02	0.17	0.01	-0.03	0.24	-0.03	0.03	0.05	0.12	0.18	0.00
Credits	-0.30	-0.05	0.07	0.02	1.00	0.51	<b>0.87</b>	0.59	-0.40	0.55	0.50	<b>-0.79</b>	0.60	-0.01	<b>-0.91</b>
New credits	-0.16	0.33	0.37	0.17	0.51	1.00	0.56	0.40	0.23	0.15	0.38	-0.50	0.64	0.01	-0.54
M2	-0.15	0.02	0.16	0.01	<b>0.87</b>	0.56	1.00	<b>0.85</b>	-0.13	0.20	0.41	<b>-0.87</b>	0.62	-0.23	<b>-0.99</b>
NFA	-0.18	-0.08	0.01	-0.03	0.59	0.40	<b>0.85</b>	1.00	-0.01	-0.18	0.27	<b>-0.72</b>	0.44	-0.53	<b>-0.80</b>
Foreign GDP growth	0.21	0.44	0.37	0.24	-0.40	0.23	-0.13	-0.01	1.00	-0.41	0.04	0.16	0.29	-0.04	0.20
Relative income	-0.16	0.15	0.34	-0.03	0.55	0.15	0.20	-0.18	-0.41	1.00	0.45	-0.11	0.39	0.39	-0.29
Terms of trade	-0.01	0.15	0.20	0.03	0.50	0.38	0.41	0.27	0.04	0.45	1.00	-0.30	0.65	-0.10	-0.41
REER	0.19	0.05	-0.14	0.05	<b>-0.79</b>	-0.50	<b>-0.87</b>	<b>-0.72</b>	0.16	-0.11	-0.30	1.00	-0.53	0.17	<b>0.87</b>
Openness	-0.18	0.26	0.49	0.12	0.60	0.64	0.62	0.44	0.29	0.39	0.65	-0.53	1.00	0.02	-0.62
Population growth	0.12	0.10	0.06	0.18	-0.01	0.01	-0.23	-0.53	-0.04	0.39	-0.10	0.17	0.02	1.00	0.15
Age dependency	0.17	-0.01	-0.14	0.00	<b>-0.91</b>	-0.54	<b>-0.99</b>	<b>-0.80</b>	0.20	-0.29	-0.41	<b>0.87</b>	-0.62	0.15	1.00

## Appendix 4: Checks for robustness of the results

	Model 5 (Akaike)	Model 5 (Schwarz)	Without the first 4 quarters	Without the last 4 quarters	Without the first and the last 4 quarters
<b>Budget</b>	1.66 ***	1.11 **	1.67 ***	1.20 **	1.18 **
<b>GDP</b>	-1.03 **	-0.79	-1.12 **	-0.91 **	-1.01 **
<b>FDI(-1)</b>	-0.36 *	-0.36	0.42	-0.35 **	-0.38 **
<b>New credits</b>	-0.54 *	-0.56	-0.42	-0.30	-0.13
<b>C</b>	0.02	0.02	0.02	0.01	0.01

The dependent variable is current account in all specifications. Explanatory variables are given in the first column. The symbol \*, \*\* and \*\*\* indicates statistical significance at 10%, 5%, and 1%, respectively.

### CUSUM Test and CUSUM of Squares Test



## Appendix 5: Comparison of the sustainable current account balance according different analyses

	Actual CA	fixed effect	Structural CA	
			LSDV'	Between
Cyprus	-5.5	-2.5	-4.6	-0.3
Czech Republic	-6.5	0.2	-4.8	-4.5
Estonia	-12.4	-1.0	-9.5	-5.8
Hungary	-4.0	0.5	-3.5	-6.1
Latvia	-7.8	-0.3	-9.7	-8.5
Lithuania	-5.2	-0.2	-5.5	-6.0
Malta	-3.8	0.0	-4.4	-4.6
Poland	-3.5	0.2	-2.4	-5.2
Slovak Republic	-8.1	1.4	-7.8	-9.2
Slovenia	1.7	1.5	0.3	-2.8

Source: Bussiere at al (2004).

	Average (2000-2002)	Milesi-Ferretti Razin methodology		
		No FDI	Stable FDI	Baseline
Bulgaria	-5.5	-5.7	-9.7	-11.3
Czech Republic	-5.5	-1.9	-5.9	-15.6
Estonia	-8.0	-2.4	-6.4	-11.4
Hungary	-3.0	-2.9	-6.9	-8.2
Latvia	-5.1	-5.0	-9.0	-11.4
Lithuania	-8.1	-2.5	-6.5	-8.5
Poland	-4.3	-4.3	-8.3	-10.7
Romania	-4.3	-2.4	-6.4	-6.4
Slovakia	-7.0	-2.9	-6.9	-18.6
Slovenia	-0.4	-2.7	-6.7	-8.8

Source: Zanghieri (2004).

	Actual f ('MFR' Methodology)			Constant f (45 % GDP) and FX (0.5 import) ('Reisen's' Methodology)			Actual CA	
	No FDI	Stable FDI	Baseline	No FDI (Transitional CA)*	Stable FDI	Baseline (Transitional CA)*	Non-interest CA average (2000-2003)	CA average (2000-2003)
<b>CEE (average)</b>	<b>-0.7</b>	<b>-4.7</b>	<b>-5.4</b>	<b>0.2 (-4.6)</b>	<b>-3.8</b>	<b>-4.5 (-0.1)</b>	<b>-3.3</b>	<b>-5.7</b>
Czech Republic	-0.4	-4.4	-8.9	1.3 (-2.5)	-2.7	-7.2 (-5.9)	-1.4	-5.9
Estonia	-1.6	-5.6	-7.4	1.9 (-11.5)	-2.1	-3.9 (-5.7)	-4.0	-8.8
Hungary	-1.2	-5.2	-2.6	0.8 (-6.7)	-3.2	-0.7 (-5.3)	-2.2	-7.7
Latvia	-0.2	-4.2	-4.0	-1.6 (-8.1)	-5.6	-5.4 (-4.3)	-8.4	-8.4
Lithuania	-0.8	-4.8	-4.5	-0.1(-3.9)	-3.9	-3.5 (-0.3)	-3.9	-5.6
Poland	-1.0	-5.0	-4.1	-1.0 (-0.9)	-5.0	-4.1 (-4.0)	-2.3	-3.4
Slovakia	-1.1	-5.1	-9.9	0.5 (-5.0)	-3.5	-8.3 (-3.8)	-3.8	-5.2
Slovenia	0.5	-3.5	-1.9	-0.7 (-0.2)	-4.7	-3.2 (-2.3)	-0.2	-0.2
<b>SEE (average)</b>	<b>-0.6</b>	<b>-4.6</b>	<b>-5.5</b>	<b>0.5 (-4.1)</b>	<b>-3.5</b>	<b>-4.5 (-0.9)</b>	<b>-3.9</b>	<b>-5.7</b>
Bulgaria	-1.7	-5.7	-7.9	1.8 (-8.5)	-2.2	-4.5 (-2.3)	-4.4	-6.6
Croatia	-1.6	-5.6	-7.3	-0.2 (-5.3)	-4.2	-5.9 (-0.5)	-2.7	-5.5
<b>Macedonia</b>	<b>1.7</b>	<b>-2.3</b>	<b>-3.5</b>	<b>-1.6 (-1.0)</b>	<b>-5.6</b>	<b>-6.8 (-4.2)</b>	<b>-4.9</b>	<b>-5.9</b>
Romania	-0.6	-4.6	-3.1	2.1 (-1.7)	-1.9	-0.6 (-1.0)	-3.7	-4.6
<b>CIS (average)</b>	<b>-1.5</b>	<b>-5.5</b>	<b>-5.4</b>	<b>-1.6 (-6.3)</b>	<b>-5.6</b>	<b>-6.3 (-1.7)</b>	<b>0.8</b>	<b>2.0</b>
Kazakhstan	-4.5	-8.5	-13.6	-4.3 (-5.7)	-8.3	-13.4 (-3.4)	-4.3	-1.1
Moldova	-2.0	-6.0	-9.4	4.5 (-16.7)	0.5	-2.8 (-9.4)	-17.2	-7.4
Russia	-1.4	-5.4	-1.3	-0.8 (-0.8)	-4.8	-0.8 (-0.8)	13.7	11.4
Ukraine	-0.6	-4.6	-2.7	-5.9 (-1.9)	-9.9	-8.0 (-0.2)	7.3	5.5
Uzbekistan	0.9	-3.1	0.0	n.a.	n.a.	n.a.	4.3	1.7

\* 'Transitional' current account balances are in parentheses (hypothetical adjustment of the current external debt to GDP ratio to 45 percent (F\*) and of foreign exchange reserves to a targeted level of half the import to GDP ratio (FX\*)).

Source: Aristovnik (2006a).

	Estimated CA (avg. 2000-03) <i>model A</i>	Estimated CA (avg. 2000-03) <i>model B</i>	Actual CA (avg. 2000-03)
<b>CEE</b>			
Czech Republic	-7.7	-6.0	-5.9
Estonia	-6.3	-7.1	-8.8
Hungary	-9.3	-7.8	-7.7
Latvia	-5.3	-	-8.4
Lithuania	-7.7	-7.7	-5.6
Poland	-4.5	-4.1	-3.4
Slovakia	-6.3	-5.5	-5.2
Slovenia	-0.9	0.0	-0.2
<b>SEE</b>			
Albania	-4.4	-	-6.6
Bulgaria	-3.9	-3.3	-6.6
BH	-15.2	-	-16.0
Croatia	-6.8	-6.7	-5.5
<b>Macedonia</b>	<b>-7.1</b>	<b>-5.1</b>	<b>-5.9</b>
Romania	-5.3	-4.7	-4.6
<b>CIS</b>			
Armenia	-11.5	-	-9.8
Azerbaijan	-13.4	-	-11.3
Belarus	-3.3	-	-3.2
Georgia	-5.9	-	-6.9
Kazakhstan	-0.2	-0.5	-1.1
Kyrgyz	-6.2	-	-3.1
Moldavia	-7.9	-8.4	-7.4
Russia	11.3	10.3	11.4
Tajikistan	-3.9	-	-4.7
Turkmenistan	-8.4	-	6.3
Ukraine	3.9	-	5.5
Uzbekistan	1.0	-	1.7

Note: (-) calculation is impossible due to a lack of data.

Source: Aristovnik (2006b).

	Actual balance 2003-2007	Prediction 2003-2007
Albania	-6.0	-6.0
Belarus	-3.4	-5.3
BH	-15.0	-5.3
Bulgaria	-12.2	-5.1
Croatia	-6.7	-4.5
Czech Republic	-3.8	-3.0
Estonia	-13.0	-4.3
Hungary	-7.0	-3.6
Latvia	-15.8	-4.9
Lithuania	-9.1	-4.7
<b>Macedonia</b>	<b>-3.1</b>	<b>-5.1</b>
Moldova	-8.2	-6.0
Poland	-3.0	-4.1
Romania	-9.5	-5.0
Russia	9.0	-4.6
Serbia	-11.2	-5.3
Slovak Republic	-6.9	-3.8
Turkey	-4.6	-5.2
Ukraine	2.7	-5.8

Source: Vamvakidis (2008).

	Pooled Estimate with Full Sample	Fixed Effect Estimate with Full Sample	Pooled Estimate, EUR (FDI)	Pooled Estimate, EUR (Investment Climate)
	CA norm	CA norm	CA norm	CA norm
Bulgaria	-5.6%	-8.5%	-7.4%	-8.0%
Estonia	-6.3%	-13.6%	-7.1%	-8.0%
Latvia	-5.5%	-10.8%	-6.7%	-7.0%
Lithuania	-4.3%	-8.4%	-5.1%	-6.0%
Romania	-3.5%	-7.8%	-5.2%	-7.0%
Czech Republic	-2.7%	-5.1%	-5.9%	-6.0%
Hungary	-7.1%	-7.9%	-8.3%	-9.0%
Poland	-3.7%	-2.0%	-5.9%	-6.0%
Slovakia	-2.6%	-6.2%	-5.2%	-7.0%
Slovenia	-1.9%	-2.0%	-4.7%	-6.0%
EU-10	-4.3%			
EU-5 <sup>1</sup>	-3.6%			
EU-5 <sup>2</sup>	-5.0%			

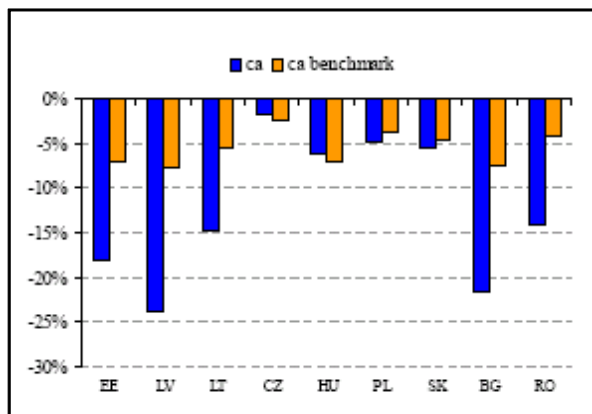
1/ Includes Czech Republic, Hungary, Poland, Slovakia and Slovenia.

2/ Includes Bulgaria, Estonia, Latvia, Lithuania and Romania.

Source: Rahman (2008).

average	Actual	Model 1	Model 2	Model 3
2007-2009	-11.3	-12.4	-12.4	-12.0
1997-2009	-6.7	-8.0	-8.3	-5.6

Source: Unevskaa (2009).



Source: Ca'Zorzi et al (2009).