

TWIN DEFICIT HYPOTHESIS: THE CASE OF UKRAINE

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Abstract

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Theoretical considerations of the twin deficit hypothesis are applied to investigate budget deficit and current account deficit phenomenon in Ukraine. Recent twin deficit experience of Ukraine is described. The twin deficit hypothesis is tested empirically by employing cointegration and Granger-causality tests. Investigation showed that budget deficit and current account deficit are cointegrated and a government budget deficit Granger-causes a current account deficit. The transmission mechanism between the two deficits works mainly through the exchange rate. Existence of twin deficit relationship presupposes certain policy recommendations necessary to ameliorate the situation. In particular, development of a strong financial sector of the economy and improvement of the investment climate are essential for this country's development and may serve to break the linkage between the two deficits. .

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GLOSSARY

BD – budget deficit

CAD – current account deficit

Conventional fiscal deficit or government budget deficit is the difference between total government revenue and grants on the one side and total government expenditures on the other side. The conventional definition of the government does not include the fiscal content of public enterprises, Central Bank, and public financial institutions.

Current account is the section of the balance of payments that lists the export and import of commodities, services, net factor income from abroad and unilateral transfers. **Trade balance** is a section of the current account. It equals a country's commodity and service exports to the rest of the world minus its commodity and service imports from the rest of the world.

Dolarization is a usage of dollars in domestic economy (exp. In Ukraine) as means of payment and store of value.

Foreign exchange reserves a class of Central bank assets in foreign currency (US dollars in Ukraine). They are held both as a store of value, mean of payment of the government obligations on its foreign debt and as a mean to intervene in the foreign exchange market in order to affect the value of the national currency.

FSU stands for Former Soviet Union countries.

Public sector is the broadest level of the government, which includes the general government (central and local in Ukraine) and non-financial public enterprises such as publicly owed railways and airlines, public utilities. (Quanes and Thakur, 1997, p.55)

Seigniorage is a component of government revenue because of government's exclusive right to supply fiat or paper money to the economy. Seigniorage is defined as the change in nominal money balances held by the public expressed in terms of the price level, or equivalently, the percentage growth of nominal money stock times the real money stock. (Quanes and Thakur, 1997, p.64)

Trade balance, see Current Account

Treasury bills are fixed income securities issued by the government, which have maturity of up to 1 year. In Ukraine t-bills are called **OVDP** ("obligation of internal domestic borrowing").

UEPLAC stands for Ukrainian- European Policy and Legal Advise center.

UET stands for Ukrainian Economic Trends. It is issued monthly and published by UEPLAC, usually cited as a data source.

VAR vector autoregression. An econometric model in which column vector of k different variables is modeled in term of past values of the variables in the vector.

Chapter 1

INTRODUCTION

The question about causality between the government budget balance and the current account balance of the Balance of International Payments is very important to investigate. If it is the case that an unbalanced budget causes predicted changes in current account then fiscal policy should be more prudent. During the last eight years Ukraine has been running a budget deficit as well as a current account deficit. According to the Ukrainian Ministry of Finance, during the period 1993-1999 the budget deficit existed every year, varying from 12.2 to 1.4% of GDP. The current account deficit fluctuated around 3% of GDP during the period 1995-1998. Only in 1999 did current account surplus of about 3 % of GDP take place.

According to the economic theory, a country with current account deficit is borrowing resources from the rest of the world that it will have to pay back in the future. It is worth mentioning here that current account deficit is not undisputedly a negative phenomenon for a country's economic development. In case the country's opportunities for investing the borrowed resources are more attractive than the opportunities available in the rest of the world paying back loans from foreigners poses no problem because a profitable investment will generate a return high enough to cover the interest and the principle on those loans. In this case the country will grow out of its debt in the future. But if a current account deficit is run because of increased share of consumption and no

improvement in capital stock and institutions took place the country will have less capacity to repay its debt in the future and urgent measures should be taken to ameliorate the situation.

Since Ukraine became an independent state, it has rapidly accumulated a big foreign debt. During the whole period almost no improvement in the production capacities occurred, institutional reforms did not progress much and there has been a steady decline in the country's gross domestic product. The current account deficit in Ukraine is likely to be a consequence of excessive consumption and unproductive spending of the government sector of the economy. In the existing situation it is important to investigate whether government budget deficit causes current account to deteriorate in Ukraine. And the issue of government budget deficit reduction becomes very crucial for Ukraine in case the direct causality between the two deficits exists.

The present paper investigates the relationship between the two deficits in Ukraine using logical reasoning based on economic theory and econometric techniques. Possible channels of connection between the two deficits are analyzed. The present research paper consists of six chapters. In the next chapter, the theoretical foundations of the twin deficit hypothesis are discussed and in the chapter 3 empirical results of testing the twin deficit hypothesis by various researches for different countries are presented. In chapter 4, the macroeconomic effect of budget deficits in Ukraine is discussed. Empirical investigation of twin deficit relationship in Ukraine is done in chapter 5. In particular, cointegration test and Granger-causality tests are conducted for the two deficits. That empirical investigation shows that the budget balance Granger-causes the current account balance and cointegration between the two

time series exists. The last chapter contains results discussion and possible policy recommendations.

Chapter 2

THEORETICAL BASIS FOR THE TWIN DEFICIT HYPOTHESIS

Economic reasoning for connection between budget deficit and current account balance may be traced from the national income identity.

$$Y = C + I + G + (EX - IM), \quad (2.1.)$$

where Y stands for national income, C- private consumption, I- real investment spending in the economy such as spending on building, plant, equipment etc., G- government expenditure on final goods and services, EX – export goods and services and IM – import goods and services.

We define current account (CA) as

$$CA = EX - IM + Net, \quad (2.2)$$

where “Net” stands for net income and transfer flows. So, in addition to goods and services balance, the current account includes also income received from abroad or paid abroad and unilateral transfers. For simplicity, here we assume that unilateral transfers and net income from abroad are not large items in the current account. Although it is worth mentioning here, that if country has big foreign debt and high debt servicing payments, its income paid abroad is a large negative item.

The current account shows the size and direction of international borrowing. When a country imports more than its exports, it has CA deficit, which is financed by borrowing from foreigners. Such borrowing may be done by government (credits from the other governments, the international institutions

or from private lenders) or by private sector of the economy. Private firms may borrow by selling equity, land or physical assets. So, a country with current account deficit must be increasing its net foreign debt (or running down its net foreign wealth) by the amount of the deficit. A country with CA deficit is importing present consumption and/or investment (if investment goods are imported) and exporting future consumption and/or investment spending.

According to the national income identity, national saving in the open economy equals:

$$S = Y - C - G + CA \quad (2.3),$$

Where $Y - C - G = I$ and I - stands for investment, so in an open economy we have:

$$S = I + CA \quad (2.4)$$

It is worth to look at national saving more closely and distinguish between saving decisions made by the private sector and saving decisions made by the government. We have:

$$S = S^{pr} + S^{gov} \quad (2.5)$$

Where S^{pr} is defined as the part of disposable income or income, after taxes, that is saved rather than consumed. In general we have:

$$S^{pr} = Y - T - C \quad (2.6)$$

Where “T” stands for taxes collected by the government. Government saving is defined as difference between government revenue and expenditures which is done in form of government purchases, G , and government transfers, Tr ,

$$S^{gov} = T - G - Tr \quad (2.7)$$

From definition of national saving we have:

$$S = Y - C - G = (Y - T - C) + (T - G - Tr) = S^{pr} + S^{gov} = I + CA \quad (2.8)$$

We can rewrite identity (2.8) in a form, which is useful for analyzing the effects of government saving decisions on an open economy.

$$S^{pr} = I + CA - S^{gov} = I + CA - (T - G - Tr) \quad (2.9)$$

And rearranging (2.9), we have:

$$CA = S^{pr} - I - (G + Tr - T) \quad (2.10)$$

Where an expression $(G + Tr - T)$ is consolidated public sector¹ budget deficit (BD), that is, as government saving preceded by a minus sign. The government deficit measures the extent to which the government is borrowing to finance its expenditures. Equation (2.9) states that a country's private saving can take three forms: investment in domestic capital (I), purchases of wealth from foreigners (CA), and purchases of the domestic government's newly issued debt $(G + Tr - T)$.

Looking at the macroeconomic identity (2.10), we can see that two extreme cases are possible. If we assume that difference between private savings and investment is stable over time, the fluctuations in the public sector deficit will be fully translated to current account and twin deficit hypothesis will hold. The

¹ Public sector includes general government (local and central) and non-financial public enterprises (state enterprises like railroads, public utility and other nationalized industries)

second extreme case is known as Ricardian Equivalence Hypothesis (REH), which assumes that change in the budget deficit will be fully offset by change in savings. The real world is more complex than these two cases and to identify the circumstances in which the twin deficit hypothesis may hold one has to look at the channels by which government deficit influences the economy.

According to economic theory, the budget deficit itself influences private saving, investment and current account balance. The final impact of budget deficit on saving, investment and current account depends, in part, on how the deficit is financed. There are several possible ways of financing budget deficit:

1. by increasing money supply and collecting seigniorage;
2. by domestic borrowing;
3. by using foreign exchange reserves;
4. by foreign borrowing;
5. by receipts from privatization of state enterprises;
6. by running government budget arrears (not payment of government obligations as a specific way of borrowing, so called forced borrowing). It may be considered as a specific case of domestic borrowing to finance budget deficit in the transition economy.

Examining the first four ways of budget deficit financing brings to light the different kinds of macroeconomic imbalances the deficit can cause in the economy.

Printing money excessively shows up as inflation. By printing money, the government collects seigniorage. Seigniorage can be decomposed into a “pure seigniorage” component and an “inflation tax” component. (Quanes and Thakur, 1997, p.64). The pure seigniorage component is the change in real cash balances. It comes about because of real growth of the economy or a favorable shift in the demand for money. The inflation tax component is equal to the inflation rate that acts in this case as the “tax rate” times the stock of real cash balances held by the public (which constitutes the tax base). In the absence of inflation, the inflation tax will obviously be zero, but seigniorage is still being collected unless there is no growth in real cash balances. As a way of budget deficit financing seigniorage revenue has a certain limit. As inflation becomes very high, households may use foreign currency for transactions and dollarization occurs. In such a situation seigniorage collection becomes impossible any more.

Domestic borrowing is considered to be a non-monetary way of BD financing only if borrowings from the banking system are not financed by central bank rediscounts. In general, government borrowing reduces the credit that would otherwise be available to the private sector, putting pressure on domestic

interest rates. Even if interest rates are controlled, domestic borrowing leads to credit rationing and crowding out of private sector investment. If the economy is well integrated with international capital markets, government domestic borrowing will tend to push the private sector into borrowing more abroad. In this case the composition of public borrowing between foreign and domestic sources does not have much macroeconomic effect. The link between fiscal and external deficits will also be especially close when the capital account is highly open.

The connection between budget deficit and current account deficit is closer if running down foreign exchange reserves and foreign borrowing are used to finance budget deficit. Excessive use of foreign reserve leads to a crisis in the balance of international payments in an economy with a fixed exchange rate regime. In case of using foreign exchange reserves for budget deficit financing, appreciation of exchange rate takes place. This option has a clear limit: capital flight and balance of payment crisis follows, since exhaustion of reserves will be associated with currency devaluation in case of fixed exchange rate regime.

In order to understand what effects on the economy foreign borrowing as a way of budget deficit financing may have, we will analyze effects of financing a budget deficit by foreign borrowing in the small open economy with different exchange rate arrangements and different degrees of capital mobility.

It is interesting to look at budget deficit in the light of the Mundell- Fleming model. This model was developed at the 1960-s by Robert Mundell and J. Marcus Fleming². The model presupposes a small open economy with full international capital mobility. The main assumption is that capital flows move faster than trade flows because international investors arbitrage differences in interest rates across countries to take advantage of unrealized profit opportunities. Thus, differences in interest rates between two countries generate massive flows of capital that tend to reduce or eliminate the differences. In contrast, trade flows respond much more slowly to changes in underlying economic conditions. So, the key assumption of Mundell- Fleming model is that interest rate is the same in the world economy, except in cases where capital controls exist. In fact, interest rates may not be equal throughout the world because of expectations of exchange rate movement. And Mundell- Fleming assumption about interest rate may not hold in reality because of political risk of the country, macroeconomic instability, capital controls and so on.

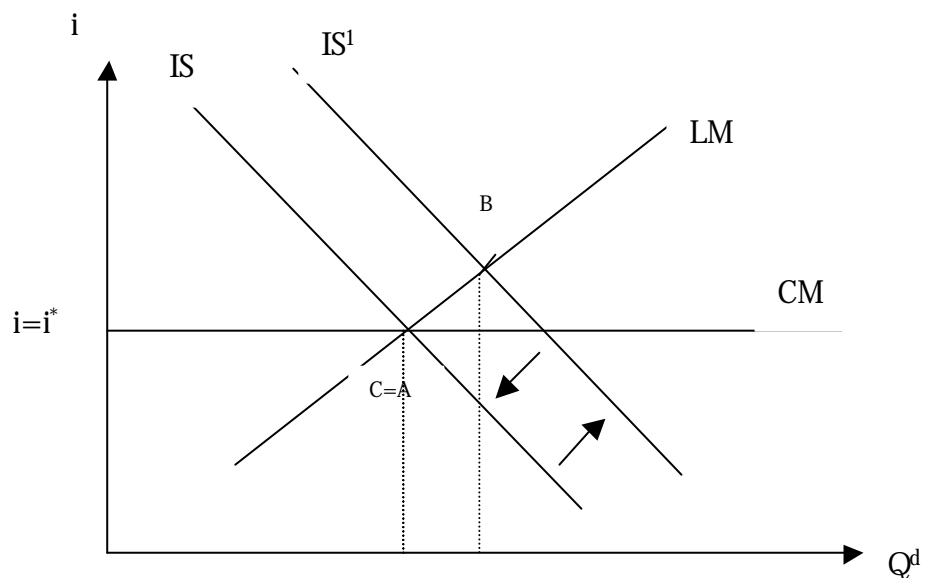
Let us look at an increase in government spending (budget deficit increase) using three simple models of a small open economy with floating and fixed exchange rate and full capital mobility³ and with very limited capital mobility in case of fixed exchange rate.

² Mundell, R. (1963) Capital Mobility and Stabilization under Fixed and Flexible Exchange Rates. Canadian Journal of Economics and Political Science. November, 1963 and Fleming J. Marcus (1962). Domestic Financial Policies under Floating Exchange Rates. International Monetary Fund Staff Papers, November 1962.

³ Sachs, Jeffer D. and Larraine, Filipe B. (1993). Macroeconomic in the Global Economy, Prentice - Hall, Inc, Englewood Cliffs, New Jersey.p.404-420.

Figure 2.1 shows an increase in government expenditures in a small open economy with a floating exchange rate and full capital mobility. We assume that an initial equilibrium is in the point A, where the domestic interest rate and world interest rates are equal.

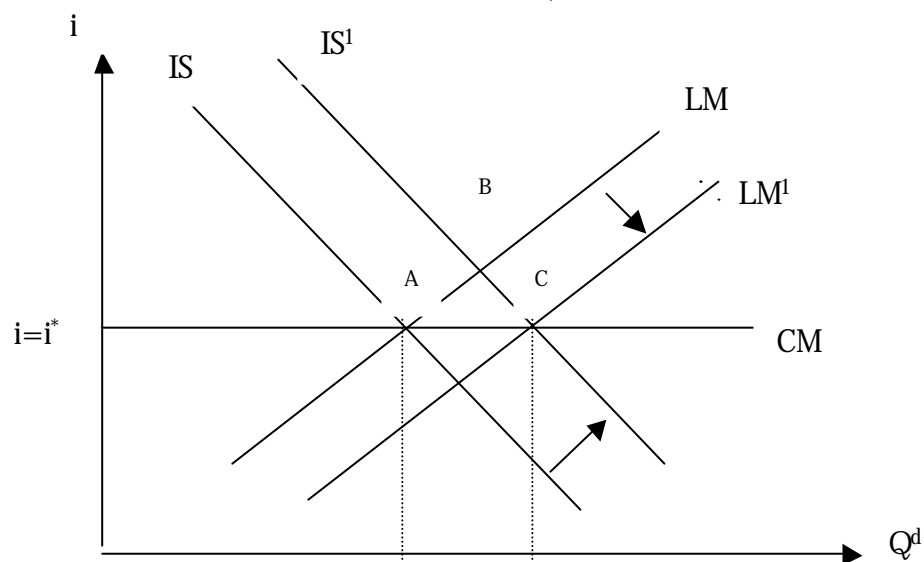
Figure 2.1. An increase in government expenditures in the small open economy with flexible exchange rate and full capital mobility. IS- LM model.



In case of floating exchange rate and full capital mobility, an increase in government expenditures raises an interest rate in the domestic economy. Because a domestic interest rate is higher than world interest rate, capital inflow occurs at the point B in the figure 2.1 and exchange rate appreciates. As a result, imports rises and export falls, current account deteriorates. It provokes IS curve to shift back in the initial position in the figure 2.1. As a result, the interest rate becomes the same in the domestic and in the world economies (as argued by

Mundell-Fleming model), domestic aggregate demand does not increase, domestic currency appreciates and current account is in the deficit.

Figure 2.2. An increase in the government expenditures in a small open economy with full capital mobility and fixed exchange rate. IS-LM model.

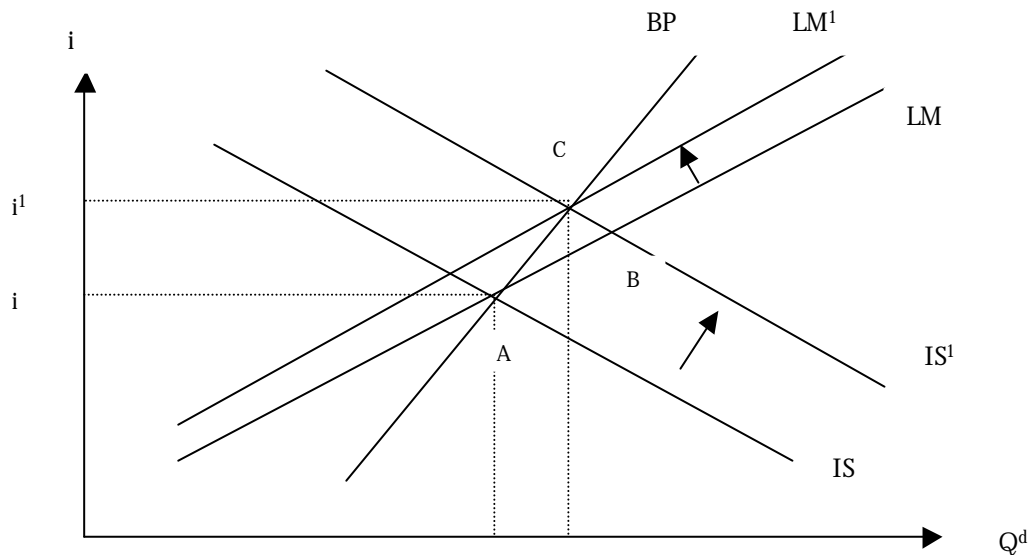


In case of fixed exchange rate and full capital mobility, an increase in the government spending (a shift of IS-curve in the position IS^1 in figure 2.2) causes domestic interest rate to rise and capital inflow occurs. As a supply of foreign currency rises and an exchange rate is fixed, economic agents start exchange foreign currency for domestic one because more domestic currency is needed for increased volume of transactions. In such a situation domestic money supply

increases (LM curve moves to the left in the position LM^1 in the figure 2.2). Although the exchange rate is fixed, an increase in aggregate demand will increase demand for import and the trade balance deficit occurs even in the short run, moreover, trade balance may deteriorate in the long run as real appreciation of domestic currency occurs. As consequence, we have the same interest rates in the world and in the home economies, aggregate demand increases and current account deteriorates.

Perfect capital mobility does not always exist in the real world. So, it is very useful to analyze the case of very limited capital mobility. In the figure 2.3 we present IS-LM analysis for the case of limited capital mobility and fixed exchange rate. We draw a balance of payment line, denoted by BP, steeper than the LM-curve, which denotes very limited capital mobility. Assume that economy is in the initial equilibrium at point A. As government spending increases, the IS curve shifts to the right in the position IS^1 . The intersection with LM curve occurs in the point B below the balance of payment line. At the point B, a current account deficit takes place. As exchange rate is fixed, the central bank loses its foreign exchange reserves in the process of defending the exchange rate and pressure for devaluation exists. Domestic money supply falls because domestic residents demand more foreign exchange in the economy with fixed interest rate. As money supply is reduced, the LM curve shifts in the position LM^1 and new equilibrium is restored at point C, where balance of payment is in equilibrium. In the point C domestic interest rate is higher than the initial and aggregate demand increases, so trade balance deteriorate and current account is in the deficit.

Figure 2.3. An increase in government expenditure in a small open economy with limited capital mobility and fixed exchange rate. IS-LM Model.



So, we can see that if capital mobility is limited, an increase in the budget deficit causes a rise in the domestic interest rate, which, in turn, crowds out private investment in the economy. If foreign investors lose confidence in the economy, BP -line may become almost vertical and all foreign capital will leave the country. And if it happens, the domestic interest rate rises even further, an

aggregate demand has returned to its former level, but its composition has changed: government spending has increased at the expense of private investment and consumption.

As can be seen from IS-LM models in figures 2.1-2.3, budget deficit financing in an open economy inevitably has its impact either on exchange rate or on interest rate or on both, depending on a degree of capital mobility in the economy and on exchange rate arrangements. In an economy with full capital mobility and floating exchange rate foreign borrowing causes appreciation of exchange rate, damaging export and encouraging imports. In case of fixed exchange rate an increase in aggregate demand increases import and current account deteriorates even if the exchange rate does not change. If domestic borrowing is limited, which especially is the case in some developing countries, the connection between the budget deficit and external borrowing is more likely to be close. In such a case fiscal adjustment through cutbacks in government expenditures can substantially improve the current account.

So far we assumed that saving rate is given if an economy is in full employment. So, an increase in BD results in either a reduction in investment or in an increase in the CAD. In fact, different assumptions with respect to saving can be made. In the present work we assume that rate of saving is determined by the long run level of disposable income and do not focus on the possible link between the BD and saving. We assume that saving decisions taken by private

sector of the economy are independent of government saving decisions or of government budget deficit

The alternative point of view is known as Ricardian Equivalent Hypothesis (REH) first introduced by Barro in 1974⁴. The main point is that under a very specific set of assumptions lump sum changes in taxes would have no effect on consumer spending. A cut in taxes that increases disposable income would automatically be paid by an identical increase in saving. So, according to REH (Sachs, Larraine, 1993, p.201) the budget deficit and taxes are equivalent in their effect on consumption. Current consumption can be affected by the expected income of the future generation. As REH states, the time path of taxes does not matter for the households' budget constraint as long as the present value of taxes is not changed. The explanation is the following: a tax cut does not affect households' lifetime wealth because future taxes will go up to compensate for the current tax decrease. So, current private saving, S^p , rises when taxes fall (or accordingly BD rises): households save the income received from the tax cut in order to pay for the future tax increase. Hence, a BD would not cause a twin deficit.

In practice, limits for REH exist. For example, public sector may have a longer borrowing horizon than households have and today's households would regard the current tax cut as a real windfall. Such a tax cut would produce a rise in consumption and a fall in national saving inasmuch as private saving would not

⁴ Barro, Robert J. (1974). Are Government Bonds Net Wealth? *Journal of Political Economy*, 81(December), pp. 1095-1117.

rise fully to compensate for fall in government saving. So, according to (2.10) the current account would tend to deteriorate.

The other reasons for REH limitation in the real world may be barriers for borrowing. Households may be unable to borrow against future income because of imperfections in the financial market and especially if the financial market is underdeveloped. Uncertainty is one more powerful factor that undermines the case for REH. In the present work we do not believe that REH may be relevant for real economy in transition. Some authors present quite strong evidence against REH⁵.

As can be understood from the said above, the mechanisms of linkage between BD and CAD are quite complex. We can see that government financing decisions may affect private saving, private investment and current account. The macroeconomic framework and existing institutions framework have to be taken into account to identify the exact channels through which BD and CAD are connected in the economy. In particular, we have to take into account existing exchange rate arrangements, degree of openness of the economy, existing business cycle, expected and current profitability of investment in the economy. In addition to the macroeconomic setting, one has to take into account what institutions exist in the economy and how they work. For example, if the financial sector in the economy is weak, national savings will be low and domestic resources will be unavailable for government to finance its

⁵ Bernheim, Douglas ((1987). Ricardian Equivalence: An Evaluation of Theory and Evidence. NBER Macroeconomic Annual, vol. 2, pp.263-303.) presents evidence that weakens REH.

budget deficit. If property rights are poorly defined, private investment will be very low and in such a situation government may increase budget expenditures to invest in the economy. On the other hand, private investment may be further reduced because of crowding out effect.

We expect that, if BD is financed by running down foreign reserves or by foreign borrowing, the twin deficit relationship have to be stronger. In both cases appreciation of exchange rate occurs which worsens current account balance by rise in import and fall in export. If exchange rate is fixed and excessive running down of foreign reserves occurs, private sector agents, expecting future depreciation, fly capital abroad, which also deteriorate current account. Foreign borrowing, as a way of financing budget deficit, will be most likely used if the domestic financial sector of the economy is weak. In case of full capital mobility an inflow of capital causes exchange rate appreciation, in case of floating exchange rate, and expansion in aggregate demand, in case of fixed exchange rate, which in both cases leads to trade deficit. If foreign borrowing occurs in a country with very limited capital mobility, an increase in government expenditures causes an increase in domestic interest rate and a rise in aggregate demand, which deteriorate the trade balance and the current account.

Chapter 3

LITERATURE REVIEW

The question of relationship between budget deficit and current account deficit started to draw researcher's attention in the 1980's. At that time record CAD and BD emerged in many countries, including the United States.

The twin deficit hypothesis asserts that an increase in BD will cause a similar increase in CAD. But results of testing this hypothesis turned out different for different countries. Moreover, the results differ even in case of using different econometric techniques and model specifications for the same country data. In the preceding chapter we saw that the issue of relationship between BD and CA balance is quite complicated. In fact, if we look at the national accounting identity (2.10);

$$CA = S^{pr} - I - (G + Tr - T), \quad (2.10)$$

where $(G + Tr - T)$ is budget deficit, we recognize that all variables are endogenously determined. Budget deficit may influence investment, private savings and current account because financing government budget deficit may change interest rate or exchange rate in the economy. At the same time, fiscal policy is itself derived from the existing macroeconomic framework. The government may subsidize exporters if an external shock deteriorates domestic terms of trade or government may increase investment spending in the economy if private sector investment is insufficient because of poorly defined property rights or because of underdeveloped financial institutions. It is understood that the twin deficit hypothesis may or may not hold depending on the whole set of

macroeconomic conditions. Henceforth, it has become very important for research to find empirical evidence of a relationship between the two deficits, if any. Investigations for different countries have been made and in the present chapter we will look at the results obtained by different research. In the first part of this chapter result of testing the twin deficit hypothesis for the USA alone are presented and in the second part we present cross-country studies of the problem.

PART 1. TWIN DEFICITS IN THE USA

The vast majority of studies were made for the United States alone. Bahmani-Oskooee (1989), Latif- Zaman, DaCosta (1990) and Bachman (1992) all found a unidirectional link from BD to CAD.

Bahmani- Oskooee (1989) built a model that assumes that CAD depends, along with present and past value of full- employment BD, on present and past values of real exchange rate, domestic and foreign real output and domestic and foreign high-powered money in real terms. The model is estimated by using OLS and 2SLS technique for the period of flexible exchange rate using quarterly data from 1973:1 to 1985:4. The results of estimation show that BD has a negative impact on CA in the short run as well as in the long run. But not only BD explains CAD in the US. In most cases the domestic and world monetary variables had significant effects on the US CA as predicted by the theory. An increase in domestic money supply improves CA by depreciating domestic currency. An

increase in domestic income carried significantly negative effect on current account.

Latif- Zaman and DaCosta (1990) tested hypotheses whether the relationship between BD and CAD is unidirectional, bi-directional or are these variables independent. Granger causality technique is employed for quarterly data for the period 1971:1 to 1989:4. The empirical results indicate that the BD and trade deficit are related and the evidence supports the conventional proposition that high BD have caused high trade deficits. The authors concluded that more research in terms of variables and methodology used is needed to state that no causality is running from trade deficit to BD.

Bachman (1992) tested four hypotheses trying to explain why the US CAD is large. The hypotheses are the following: 1) large BD causes CA to deteriorate; 2) increase in investment spending because of tax cut causes CA to deteriorate; 3) falling productivity in the USA in comparison with its trading partners; 4) US is a safe place for capital flight from the other countries. Bachman used four variables: federal government surplus, gross domestic investment, US relative to foreign productivity and the estimated risk premium to represent the causal agent for each of the four hypothesis. All estimates use quarterly data for the period 1974 - 1988. Bivariate VAR models are used for each hypotheses. Behavior of these systems will show the relative ability of each of the hypothesis to explain the CAD of the 1980-s. The results show that only the federal budget deficit explains the evolution of the CA. The other three possible casual variables can not explain how the CA changes over time.

The other researches Zietz and Pemberton (1990), Mohammadi and Skaggs (1996), Darrat (1988), Enders and Lee (1990) found that relationship and the direction of causality between US BD and CAD is not very clearly defined.

Zietz and Pemberton (1990) investigated the role of BD and income growth abroad for explaining the US trade deficit (TD). The analysis employs a structural simultaneous equation framework. The model of three structural equations is estimated on quarterly seasonally adjusted data for period 1972:4 to 1987:2. This theoretical model allows for three transmission channels between the BD and CA. The first channel operates directly via the bond market and exchange rate. Channels two and three both rely for their initial impact on a positive relationship between BD and increase in domestic absorption⁶. Using policy simulation the authors concluded that the BD was transmitted to the trade balance primarily through the impact on imports of rising domestic absorption and income rather than of rising interest and real exchange rates. Authors found that higher foreign income can play limited role in lowering the US trade deficit, especially taking into account the fact that foreign income growth also implies a rising real exchange rate. Moreover, perceptible increase in foreign income and a very substantial cut in the BD did not manage to cut the TD even in half by 1987.

Mohammadi and Skaggs (1996) investigate BD and TD relationship using multivariate VAR model for the flexible exchange rate period from 1973:1 to 1991:4. The model includes real total government budget surplus, real CA

⁶ Domestic absorption is a sum of consumption and investment spending made by domestic residents.

balance, money growth, real income and the real exchange rate. The results indicate that the effect of the budget surplus (BS) on the trade surplus (TS), if any, is modest. Different measures of BS and TS are employed. The choice of variables to include in the VAR along with the BS and TS affects the estimated relationship between the twin deficits. Including the real interest rate rather than, or in addition to, money growth reduces the estimated effect of the BS on the trade balance. The same is true when the inflation rate is included in place of a real interest rate. After considering all possible combinations, orderings, lag lengths, and estimation techniques are considered, the authors found that the maximum effect of an innovation in the BS on the trade balance is relatively modest. So, shocks in the BS are not the major factor in determining the behavior of the trade balance.

Darrat (1988) investigates empirically causality between BD and CAD in the USA for the period from 1960:1 to 1984:4. Taking into account complexity of the relationship between the two deficits the author test four hypotheses: 1) BD causes TD; 2) TD causes BD; 3) the two variables are causally independent; 4) the two variables are mutually causal. Such an approach is justified by the fact that not only BD influences CA but also deterioration in the CA may induce the government to increase spending on support of domestic industries. The paper employs Granger- type multivariate causality tests combined with Akaike's final prediction error criterion. The result shows that bi-directional link exists between the two deficits, so the 4) hypothesis is supported. The author examines not only causal relationship between BD and CAD but also causal role of a number of other macro variables in the budget and trade deficit process. For example, growth of money base that could approximate aggregate demand

Granger- causes TD; interest rates cause TD; foreign real income does not Granger causes TD. Such variables as short term interest rate, wage cost, monetary base, real output, foreign real income, inflation, exchange rate, long term interest rate were included in the BD equation and were influenced the behavior of fiscal authorities.

Enders and Lee (1990) developed a two- country macro- theoretical model consistent with REH. VAR technique shows that US data for the period from 1947:3 to 1987:1 appear to be inconsistent with the REH. The authors found that positive innovation in government debt is associated with an increase in consumption spending and in the CAD.

PART 2. CROSS-COUNTRY ANALYSES OF TWIN DEFICITS.

A number of studies were done for several countries, including the USA. So, Laney (1984) investigated relation between the overvalued US dollar, large BD and CAD for the USA and 58 the other developed and developing countries. Kearney and Monadjemi (1990) examine the twin deficit relationship for eight countries: the USA, Australia, Britain, Canada, France, Germany, Ireland and Italy. Bernheim (1988) investigates the relationships between fiscal policy and the current account for the USA and five of its major trading partners (Canada, The United Kingdom, West Germany, Mexico and Japan). Khalid and Guan (1999) compare how the twin deficit relationship is different for developed vs. developing countries. Developed countries include the US, the UK, France, Canada, Australia and developing countries are India, Indonesia, Pakistan,

Egypt and Mexico. The choice of countries is motivated by existence relatively high BD and CAD in their economies. All these studies are particular interesting because using the same methodology the researchers have an opportunity to compare how the twin deficits behave in different countries.

Laney (1984) discovered that the linkage between the fiscal balance and the external balance to be much tighter for the smaller developing countries than for industrial economies, like the USA. He explains the result by the fact that for advanced economies private savings and more- developed capital markets can cushion the impact of fiscal policy on the balance of international payments. On the other hand, if BD is very large (like in the USA) no country is immune. The author hypothesizes that a size of an economy also matters. So, a relatively small and open economy, for which international transactions are very important, would be more likely to have domestic developments dictated by the large foreign balance. A large economy for which foreign trade is less important would probably have its external balance conform to domestic policy. The estimation is done by using OLS technique. An external balance variable is regressed on the constant and a budget deficit variable for all countries. Although such an estimation technique leads to biased results such an exercise can determine whether there is any correspondence between the two balances. The result shows that the fiscal balance as a determinant of the external balance is statistically significant noticeably more frequently in the developing country group than in the industrial country group. Even within the industrial country group, it is in the smaller economies that the variable shows significance. Among world's seven largest economies, only Canada and Italy (not the USA) demonstrate a statistically significant positive relationship.

Khalid and Guan (1999) comparing developed and developing countries arrive at conclusions similar to Laney (1984). Applying cointegration technique to annual time series the researchers discovered no long run relationship between the two deficits for developed countries while the data for developing countries do not reject such a relationship. Existence of such a relationship for developing countries may be explained by the fact that lack of deep domestic capital markets necessitates huge external financing for large fiscal deficits in such countries. Moreover, developing countries may be debtors whose economic growth is largely dependent on foreign capital inflows and lending. In addition, inefficient tax systems and large public spending can provoke a causal relationship between BD and CAD. Causality test using annual time series ranging from 1950 to 1994 for developed countries and from 1955 to 1993 for developing countries are used. The results show that rising BD in developed countries caused a surge in the CAD in the US, France and Canada, while the CAD and BD are independent for the UK and Australia. There is also some weak support for bi-directional causality in case of Canada. The developing countries have more diversified results. The estimation for India indicates two-way causality, though weak in both cases (at 10% significant level). The results for Indonesia and Pakistan show that direction of causality runs predominantly from CAD to BD. High BDs are source of CAD in Egypt and Mexico.

Kearney and Monadjemi (1990), using VAR technique for quarterly data from 1972:1 to 1987:4, investigate the twin deficit relationship for eight countries. Variables in the model were government expenditure, tax revenue, money creation, real effective exchange rate index and current account balance. Lag length between 4 and 8 quarters was used. Estimation shows significant

feedback to the government's fiscal deficit from macroeconomic variables such as the exchange rate and the current account balance. Although the latter is consistent with the existence of twin deficits relationship, it implies the existence of reverse (from CAD to BD) directional causality, which has been reported for the USA by Darrat (1988). The authors present the impulse response functions for the CA balance to such innovations as an increase in government expenditure by issuing debt, by raising taxes (balanced budget expansion) and by increasing money growth. Except for Australia and France, CA experiences initial deterioration caused by an increase in government expenditure. Such deterioration varies in duration and magnitude. In general, the pattern of the CA dynamic response to innovations in the stance of fiscal policy is independent of the government financing decisions in the long run equilibrium. But substitution of taxes for debt has important implication for the short run dynamic response of CA balance to innovations in government spending although it is true not for all countries. In particular, substitution of taxes for debt exacerbates Australia's CA but improves Germany's. The authors explain such a phenomenon by different net external asset position for these countries.

An interesting cross-country study was done by Bernheim (1988). He investigated BD and the balance of trade relationship for the USA and its five major trading partners (Canada, the UK, West Germany, Mexico and Japan). Yearly data for period from 1960 to 1984 were used in an OLS regression with CA surplus as an endogenous variable. To control for business cycle effects along with government budget surplus variable current and lagged values of real GDP growth variable were included. In some equations a government

consumption variable was included to control correlation between BS and government consumption. Different shocks to the economies were taken into account, in particular, change in exchange rate regime after 1972, oil shocks and large US BD emerged after 1982. Analysis of time series data for the US, Canada, the UK and West Germany shows that a \$1 increase in the BD is associated with roughly a \$0.30 decline in the CA surplus. Fiscal effects are substantially larger for Mexico (approximately \$0.85 decline in the CA surplus on the dollar). The author explains such a result by high marginal propensity to consume in poor countries like Mexico. But after 1981 these effects were obscured by the Mexico debt crisis. No fiscal effects are evident for Japan possibly because Japanese government takes strongly interventionist role with respect to international trade by traditionally regulating import, exports, and capital flows.

Vamvoukas (1997) has done a twin deficit study for Greek economy. He uses yearly data for period from 1948 to 1993 when the Greek state budget and trade balance were in deficit. Using cointegration analysis, error correction modeling and Granger causality the author concludes that one way causality from BD to TD takes place which is consistent with Keynesian proposition in the long and the short run.

Although this thesis does not include all studies of the twin deficit problem, we can see that the topic is interesting and different results for different countries may be got. Noticeably fewer studies were done for developing countries than for developed ones, and no studies at all have been done for transition economies such as Ukraine and the other Eastern European transition

economies. In the present research paper an attempt has been made to fill the gap in this research space.

Chapter 4

TWIN DEFICITS IN RECENT UKRAINIAN EXPERIENCE.

During the last eight years Ukraine has been running a budget deficit and a current account deficit. Let us look more precisely at the quantitative characteristics of twin deficits phenomenon in Ukraine.

According to the Ministry of Finance data (see table 4.1 in the Appendix), the budget deficit in Ukraine has been significantly reduced in recent years: from about 7.9% of GDP (including the State Pension fund) in 1995 to about 1.5% in 1999. A downward trend is observed from 1997 when there was a huge spike in the budget deficit figure (about 7 % of GDP). It is appropriate to mention here that figures on the budget deficit produced by Ministry of Finance statistics do not tell the whole story. In particular, they do not include huge amount of arrears accumulated by Ukrainian government in recent years. In addition, official statistics do not differentiate between cash revenues and revenues in form of barter transactions and mutual cancellation as a mean of paying taxes. In case of mutual cancellations, the value of goods, given instead of cash, is not easily determined which may provoke over-valuation, cheating and corruption.

There are different methodologies of budget deficit measure⁷. According to IMF method (Quanes and Thakur, 1997, p.59) privatization receipts should not be included in budget revenue. As a consequence, budget deficit will increase (see

⁷ Nina Legeida investigates the question in her Master's thesis "Measurement of the fiscal deficit in a transition economy, case of Ukraine, 1995-1999". Economic Education and Research Consortium Program in Economics, Kyiv, 2000.

column 2 in the table 4.1 in the Appendix). The motivation is that privatization of the public assets will not change the government's net worth, it will only provide the significant amount of revenues at the time of sale. In accordance to this reasoning, necessary adjustments may be made to the budget deficit.

In the present research we take UEPLAC quarterly data on budget deficit as percent of GDP. In fact, these data are used as a proxy for consolidated public sector deficit. It is highly problematic to get data on the deficit of consolidated public sector, which are required by equation (2.10).

$$CA = S^{pr} - I - (G + Tr - T) \quad (2.10),$$

where $(G + Tr - T)$ stands for deficit of all consolidated public sector savings.

Data on the current account of balance of payment are taken from National Bank of Ukraine statistics. Data on current account are available from 1994. Balance of payment data are presented in the appendix in table 4.2. The table 4.3 in the appendix gives annual data on trade balance and current account balance. Quarterly data on trade in goods and services are plotted in figures 4.1 – 4.2 in the appendix. Data on goods structure of Ukrainian import and export are presented in table 4.4 in the appendix. From the presented data on foreign trade we can see that trade deficit exists mainly because of high import of mineral products, including petroleum products from Former Soviet Union countries, in particular from Russia.

In the present research we use quarterly data on current account expressed as a percent of GDP, published by UEPLAC. Government budget surplus and current account surplus data are plotted in figure 4.3 in the Appendix.

Comparable data on national savings, gross capital formation, budget balance and current account balance are presented in the figure 4.4 in the appendix. It is worth mentioning here that statistics methodology of collecting data on saving and investment in Ukraine has some peculiarities. For example, it does not allow distinguishing between private and government investment. So, total national saving and total gross capital formation are used as approximation for private savings and investment required by the equation (2.10). As can be seen, during the period 1992-1999 gross capital formation and gross national savings as a share of GDP decrease considerably. Budget balance and current account balance being in deficit during almost the whole period improved slightly recently. From the figure 4.4 we can definitely see that increase in current account deficit is not due to surge in investment but possibly is driven by budget deficit.

Now, let us look at the ways in which the budget deficit was financed in Ukraine. As can be seen from figure 4.5 and 4.6 in the appendix, during the period 1992-1999 budget deficit was financed by Central bank money emission (mostly in period of 1992-1994), by issuing treasury bills (OVDP) and by foreign borrowing.

In figure 4.6 we can see that an increase in monetary base follows almost the same pattern as the budget deficit until the mid of 1995. Financing budget deficit by increasing monetary base is called seigniorage. Government uses newly issued money to purchase goods and services which causes the price level in the economy to rise. As macroeconomic stabilization program was

implemented, seigniorage financing of budget deficit was significantly reduced during 1995- 1996 (see figure 4.5).

From the mid of 1995 the government started to finance the budget deficit by issuing T-bills, which is known as OVDP in Ukraine. OVDP stands for “obligations of internal domestic borrowing”. In fact, OVDP were sold not only to Ukrainian residents but also to non-residents since 1996 and in the figure 4.7 in the appendix we can see that in 1997 more than 50% of OVDP were held by foreigners. Only during first half of 1997 non-residents invested about 950 mn USD into OVDP (Vakhnenko, T., (2000), p.34). Interest rate on OVDP was very high because of risk premium included which increased government expenditures on debt servicing.

After the economic crisis in Asia in 1997 and, especially, after the crisis in Russia in the summer of 1998, foreign investors lost confidence in developing countries and short- term capital started to leave Ukraine. When capital inflow existed, the National Bank of Ukraine (NBU) did not undertake interventions for replenishment of foreign currency reserves but strengthened the national currency hryvnia (UAH) instead. It was not taken into account that the capital inflow was short- term and volatile by nature and could change its direction to the opposite. This exactly happened in the second half of 1997. Only during 1998 1.4 bn UAH were paid to non-resident on OVDP interest and principal. During 1998 the NBU sold in the foreign currency market about 1.8 bn USD from its reserves. (Vakhnenko, 2000, p.34). Capital outflow increased the demand for dollars, which induced a pressure on the hryvnia exchange rate. National Bank of Ukraine started to lose foreign exchange reserves and

eventually devaluation of the hryvnia occurred. Hryvnia exchange rate changed from 2.8374 UAH/USD in the end of June 1998 to the 4.8253 UAH/USD by the end of the 1998 (NBU, web site).

Since the summer of 1998 the Ukrainian government was not able to sell T-bills to foreigners and experienced difficulties to sell its debt obligations to the residents. According to the State Treasury data, only 40% of total budget deficit was financed by external financing in 1998 and about 20% of total deficit in 1999 (UET, 2000). Difficulties with finding lenders forced the government to decrease official budget deficit by cutting expenditures or by increasing arrears. Arrears may or may not be shown in the official statistics. Arrears are not shown if the government simply does not pay its obligation (Pynzenyk, 2000). Any way, official figure of the budget deficit decreases during 1998-1999 (as can be seen from figures 4.3 and table 4.1 in the Appendix).

Government's difficulties with servicing its short - term debt has several serious consequences for the Ukrainian economy and the most important effect was real devaluation of the national currency, hryvnia. Ukrainian currency was devalued in real terms (nominal devaluation divided on change in the overall price level) by 50.7% during the 1998 and by 25.4% during 1999 (Pynzenyk, 2000). According to economic theory real devaluation of the national currency has to have a positive effect on the trade balance and, indeed, from data on current account balance (figure 4.1 and 4.2 in the Appendix) we can see significant improvement in the current account mainly due to import decrease.

In general, the budget deficit may influence current account in two different ways. The first is through exchange rate change. The direction of exchange rate movement depends on direction of cross border capital flows as was stated in the chapter 2. If capital inflows are unavailable (the case of very limited capital mobility, see figure 2.3), an increase in budget deficit causes devaluation pressure on exchange rate. Real devaluation makes a country's exports cheaper for the rest of the world and imports becomes more expensive for domestic residents. Real exchange rate appreciation has reverse effect. So, the exchange rate movements influence the foreign trade balance component of the current account.

The second way of budget deficit impact on the current account occurs by a change in net income from abroad category in the current account. As government runs big foreign debt by borrowing abroad to finance budget deficit, net factor income from abroad often becomes negative and large in absolute value due to high debt servicing payment. In Ukraine debt payment are quite considerable (net factor income from abroad are usually large negative numbers, see table 4.2 in the appendix), but current account and trade balance are almost the same because of received unilateral transfers from abroad. Although the unilateral transfers have not to be repaid in the future, in the long run the country can not rely on the assumption that big debt servicing item will be almost covered by unilateral transfers from abroad. In the long run debt service may increase considerably. As pointed out by (Siedenberg and Hoffman, 1998, pp.93-103), external debt servicing may be very burdensome for Ukraine

in the future and it will definitely cause deterioration of current account of the balance of payment.

From the existing macroeconomic framework, we can conclude that there should be some correlation between government budget balance and current account balance in Ukraine. Because of weak financial sector of the economy, domestic resources for budget deficit financing are quite limited and foreign borrowing played a very important role. As foreign financing became unavailable since the second half of 1997 and large short-term capital outflow occurred in 1998, depreciation of domestic currency, hryvnia, took place. Improvement in the trade balance followed mainly due to the consequent fall in imports. As foreign financing became unavailable, the government was forced to reduce its spending and government deficit was reduced significantly during 1998-1999.

In the next chapter we will empirically investigate what relationship exists between budget deficit and current account deficit in Ukraine.

Chapter 5

EMPERICAL RESULTS

In this section we want to investigate whether the statistical relationship between the government budget deficit and current account deficit in Ukraine is unidirectional, bi- directional or the two variables do not influence each other. To identify the relationship between the two time series, cointegration test and Granger- causality test are employed.

Quarterly data on BB (budget balance) and CAB (current account balance) are taken for period 1995:1 to 1999:4. As we can see from figure 4.3, there are a lot of seasonal variations in the data. In the econometrics literature there are several approaches to deal with seasonality in the data (see Johnston and Dinero, 1998, p. 235). Usually, seasonal dummy variables are used, but taking into account that the time series are very short and inclusion seasonal dummy will consume additional degrees of freedom, we smoothed the data by taking moving average 4 (see time plot in figure 4.8)

Time series data are often found to be nonstationary, containing a unit root. (Gujarati, 1995, p.714). VAR estimates are efficient if variables included in the VAR model are either stationary or cointegrated (their linear combination is stationary). So, first we test for stationarity BB and CAB, using Augmented Dickey- Fuller test (ADF). The output of E-Views ADF is presented in table 5.1. We can see that both BB and CAB are nonstationary.

Table 5.1. E-Views output of unit root test for government budget and current account as % of GDP.

Government budget balance as % of GDP (moving average 4)	Current account balance as % of GDP (moving average 4)
ADF Statistics -2.108505	ADF Statistics -1.618922
MacKinnon critical values for rejection of hypothesis of a unit root	MacKinnon critical values for rejection of hypothesis of a unit root
1% Critical Value -3.8572	1% Critical Value -2.6968
5% Critical value -3.0400	5% Critical value -1.9602
10% Critical value -2.6608	10% Critical value -1.6251

In the next step, we have to check whether BB and CAB are cointegrated. The two time series are cointegrated, if residuals from regression:

$$CAB_t = c(1) + c(2)* BB_t + u_t \quad (5.1),$$

are stationary. (Gujarati, 1995, pp. 726-727). E-views estimation output of regression (5.1) is presented in table 5.2 and ADF test for residuals, u_t , is presented in table 5.3. We can see that these residuals are stationary, so BB and CAB are cointegrated and we can conduct Granger- causality test in levels.

Table 5.2. E-views output of OLS estimation of equation (5.1)

Variable	Coefficient	Std. Error	t-Statistics	Prob.
BB	0740767	0.133486	5.549413	0.0000
C	1.436926	0.690954	2.079627	0.0521
R-squared	0.631117			

Table 5.3. Unit root test for residuals form equation (5.1)

Residuals from regression (5.1)

ADF Statistics -3.329190

MacKinnon critical values for rejection of hypothesis of a unit root

1% Critical Value -2.7057

5% Critical value -1.9614

10% Critical value -1.6257

Our specification for Granger-causality test is as follows:

$$BB_t = \alpha + \sum_{j=1}^l \beta_j CAB_{t-1} + \sum_{j=1}^l \gamma_j BB_{t-1} + u_{1t} \quad (5.2)$$

$$CAB_t = \theta + \sum_{j=1}^l \delta_j BB_{t-1} + \sum_{j=1}^l \lambda_j CAB_{t-1} + u_{2t} \quad (5.3)$$

Where:

BB- government budget deficit taken on national account basis as a percentage of gross domestic product;

CAB- current account balance (national account basis) as a percentage of gross domestic product;

l- the length of lag term

t - time period (quarterly).

The lag length is taken to be equal 2 in our case. It is desirable to trace the longer lag period, maybe 4 quarters, but in case of short time series it is impossible to do so. Many researchers (see chapter 3) take yearly data and use one or more lags. The rationale for such a procedure may be the following: if cross- border capital mobility is low, a longer period is needed to trace the impact on the current account. In case of short time series, however, a lag length that is longer than 2 will consume a lot of degrees of freedom and estimation becomes impossible (Gujarati, 1995, p.632).

E-Views runs Granger- causality test by automatically testing four hypotheses:

- 1) BB Granger- cause CAB;
- 2) CAB Granger- cause BB;
- 3) Causality goes in both directions;
- 4) CAB and BB are independent.

E-Views output is shown in table 5.4. The Granger- causality test shows that unidirectional causality goes from BB to CAB. F test is used to test the hypothesis that collectively the various lagged coefficients are zero. In our case uni-direct causality from BD to CA deficit exists. The result of F test presented

in table 5.4 shows that $\sum \beta_j = 0$ in equation (5.2) and $\sum \delta_j \neq 0$ in equation (5.3). We discovered that there is statistical dependence between movement in BB and CAB. In particular, past movements of BB contribute to an explanation of movements in CAB.

Table 5.4. E-Views output of Granger-causality test between budget deficit and current account deficit.

Null Hypothesis	Observations	F-Statistics	Probability
CAB does not Granger Cause BB	18	0.28954	0.75331
BB does not Granger cause CAB		3.73763	0.05220

Empirical investigation showed that long run relationship between budget deficit and current account deficit is present for the Ukrainian data. The two time series are cointegrated. By employing Granger-causality test we identified that there is statistical dependence between the two deficits. In particular, past movements in government budget deficit Granger-cause movement in current account. So, we can conclude that twin deficit hypothesis is supported by Ukrainian data over the time period of our analysis.

Chapter 6

CONCLUSIONS AND POLICY RECOMMENDATIONS

Empirical investigation showed that twin deficit hypothesis is supported by Ukrainian data. The transmission mechanism between the two deficits is the exchange rate. Statistically government budget deficit and current account deficit are cointegrated and Granger causality test showed that past value of the government budget deficit contributes to explain the current account deficit.

In context of equation (2.10)

$$CA = S^{pr} - I - BD \quad (2.10)$$

our results mean that relationship between private savings and investment is more or less stable over time, so, all changes in budget deficit are transmitted to the current account. This result is compatible with similar studies done for the other developing countries.

If the twin deficit hypothesis holds, several serious consequences for an economy exist. First of all, reduction in current account deficit will require fiscal adjustment, in particular, reduction in government budget deficit is a necessary condition for elimination of current account deficit. On the other hand, a reduction in current account deficit will also require an increase in domestic saving, which in turn requires development of a strong financial sector.

Causality between budget deficit and current account deficit presupposes that government borrows abroad and not in the domestic economy. Economic

consequences of external borrowing differ from domestic borrowing. In particular, external borrowing involves exchange rate risk. If domestic currency depreciates the burden of debt on domestic economy will increase. On the other hand, the consequences of default are also different if foreign borrowing is used. The debtor country's international position will be weakened if debt-servicing problems arise. And taking into account that Ukraine has already encountered problems with serving its external debt, several policy recommendations can be suggested.

Twin deficits exist in Ukraine partly due to weak financial sector of the economy. If financial sector works properly, it channels financial resources from savers to borrowers in the economy. In such a situation government can borrow domestically. Moreover, development of financial intermediaries will provide funds for private investment activity. If private investment increase, it is very possible that the government will be able to reduce budget spending to some extent. During the whole period government was forced to provide financing for certain industries. Although some researches point out that direct and indirect subsidies industry support is very substantial in Ukraine (see Siedenberg and Hoffmann, 1998, p. 97-127), it is uncertain what share of such spending can be related to investment activity. Question about public investment is beyond the scope of the present research but it is certainly related.

Twin deficit relationship may cease to exist if the investment climate is improved. In this case the relationship between private savings and investment will not be stable like it is. By implementing market reforms, the government may improve business environment and investment activity.

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