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A study of external debt sustainability in highly indebted the CIS member states

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Declaration of Ethical Conduct in Research: I, as a graduate student of The Erasmus Mundus Joint Master Degree in International Development Studies (GLODEP, hereby declare that I have not committed any act that may damage the credibility of my research. This includes, but is not limited to, falsification, thesis/dissertation written by someone else, distortion of research findings, and plagiarism. I confirm that my thesis/dissertation contains honest conclusions based on my own careful research under the guidance of my advisor.

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Zásady pro vypracování

Most of the former Soviet Union countries have been experiencing low trade performance with permanent current account deficits since declaration of their independence. This condition forces them to rely on external sources to finance their savings & investment gap and trade deficit. The objective of the research is to assess the external debt sustainability of highly indebted 6 Commonwealth of Independent States countries (Armenia, Belarus, Georgia, Kazakhstan, Kyrgyz Republic and Moldova) over the period 2000-2018 and to explore the relationship between external debt, current account balance, interest and GDP growth rates using Panel data econometrics. The study also tests the impact of financial flows such as remittances and FDI to achieve debt sustainability. The development of sustainability criteria is based on a rule of improvement of current account balance and achievement of economic growth at the level, which enables to sustain in existing debt levels in steady-state equilibrium.

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Abstract
This paper investigates external debt sustainability in Armenia, Kazakhstan, Kyrgyz Republic and Moldova on the basis of variables associated with the foreign economic activity of these countries. After discussing the current problems and vulnerabilities of countries related to the current account deficit and debt structure, sustainability zones are estimated in based on GDS. Based on that, as of 2017, all 4 countries met sustainability criteria. However, the results of the ADF test demonstrated the opposite, having established that all countries except Moldova did not achieve debt sustainability. The outcomes of accounting method did not show sufficient evidences of sustainability of current account balances in 4 countries.

Keywords: non-interest current account balance, external debt, debt to GDP ratio, sustainability area, primary balance, exports, interest rate, growth rate.

Contents

List of Tables

List of Figures

List of Abbreviations

Abbreviation	Explanation
ADB	Asian Development Bank
ADF	Augmented Dickey-Fuller
CA	Current account
CBA	Central Bank of Armenia
CIS	Commonwealth of Independent States
EBRD	European Bank for Reconstruction and Development
GDP	Gross domestic product
IDB	Islamic Development Bank
IMF	International Monetary Fund
NBK	National Bank of Kazakhstan
NBKR	National Bank of the Kyrgyz Republic
NBM	National Bank of Moldova
NICA	Non-interest current account
NPI	Net primary income
NSI	Net secondary income
WB	World Bank

Chapter 1. Introduction

The dawn of the new millennium is marked by the intensification of globalization processes in financial sphere of the world economy. The increasing level of integration of financial relations, which refers to the process of forming a single financial space through the cross-border movement of mobile financial resources, leads to an increase in the mutual dependence of countries. With the increasing of these processes and the involvement of an increasing number of countries in world economic relations, no other country in the world can achieve economic growth and development with the help of state funding alone. The interstate relations taking shape in these conditions are not always socially and economically fair for all participants, the consequences of external relations can be very different (Azzimonti, De Francisco, Quadrini, 2014).

At the same time, countries with weak macroeconomic performance often fall victim to excessive dependence on debt obligations in foreign currency and, as a result, have problems with sharp fluctuations in the exchange rate and financial pressure from investors. The consistency of servicing foreign debt is one of the key factors of macroeconomic stability in the country, budget capacity, the state of its foreign exchange reserves, the stability of the national currency, the investment climate and the behavior of all segments of the financial market depend on it. The problems associated with the constant increase in public external debt are either the cause of the budget deficit or the imbalance between savings and investment.

External debt is a serious problem for the present and future development of most countries, this is especially true for countries in transition, such as the CIS. Armenia, Kazakhstan, Kyrgyzstan and Moldova have the highest levels of external debt to GDP ratio among the members, which exceeds the maximum allowable standards[1] in terms of sustainable economic development. This, in turn, increases the vulnerability of these countries to their dependence on external economic factors, in other words, in such a situation, the prospects for sustainable economic growth are compounded if external debt problems are not resolved. These countries entered the path of building an open economy and market reforms in the early 1990s. Despite the fact that the debts of the USSR were not left to the inheritance of these countries, due to the transition period they faced barriers inherent in developing countries, including in the management of foreign debt. The solution of these problems and the tasks of increasing the international competitiveness of countries requires finding the optimal and the size of foreign debt in order to implement a reasonable foreign debt management policy (Gel'Man, 2003).

The aim of the thesis is to determine sustainability of external debt at a given level of NICA balance, GDP growth and interest rates. The object of the research is the external debt of Armenia, Kazakhstan, the Kyrgyz Republic and Moldova, including the debt of both the public and private sectors of the economy. The choice of countries was due to the availability of comparable statistical information necessary for the analysis of the thesis, and the sufficiency of reliable data for analysis. The paper tries to determine the

[1] https://www.imf.org/en/About/Factsheets/Sheets/2016/08/01/16/39/Debt-Sustainability-Framework-for-Low-Income-Countries

conditions in which the foreign debt of the countries is in a stable position on the basis of data from 2008 to 2017 on average and for 2017 separately. The choice of the lower limit of the time period was due to the fact that before the financial crisis of 2007-2008, the debt and foreign economic indicators of the countries were at a relatively stable level, after a sharp drop in these indicators they remained around the same level in absolute terms. The upper time limit is determined by availability of up-to-date statistics for all countries for 2017.

This paper assesses the sustainability of external debt in Armenia, Kazakhstan, Kyrgyz Republic and Moldova. When considering the prerequisites for making a sustainability assessment, this document examines whether countries have adequate resources in the form of a surplus with the outside world or GDP growth to service external debt in order to maintain debt accumulation at a sustainable level at certain interest rates. This study contributes by filling a gap in existing literature regarding the discussion of DSA in the former Soviet republics. The study does not purport to be exhaustive, but rather provides some graphical insight into the links between interest rates and growth rates and their effect on changes in debt sustainability. The structure of the document is as follows: first, a review of the existing literature on the study of external debt is specified. Then the economic conditions of the countries are considered, and subsequently, data evaluation assesses the causal relationship between the external debt variables. Finally, after discussing the key elements of sustainability the conclusions are given.

Chapter 2. Literature review

External debt is an economic phenomenon, interrelated with the result of macroeconomic activity of the state. Debt can be considered as an obligation that is enforced collectively, while a loan is a corresponding right resulting from the appearance of an obligation. The resulting social outcome is the economic situation, or economic status, formed by the expectations to which the actions of each of the parties are directed. In terms of debt and liabilities, this is the status of submission to collective action (J. Commons, 1931).

The volume of external debt has an impact on such macroeconomic indicators as inflation, the amount of attracted investments and the overall economic growth of the country. In confirmation of this, Jeffrey Sachs and Paul Krugman (1989) point out that excessive debt has a negative impact not only on the possibility of investing in the real economy, but also on the economic policy pursued by the state as a whole (Claessens, 1996).

Economic theory asserts that foreign debt can influence economic development both positively and negatively. Neoclassical theories of growth, based on the prerequisites for a constant effect on scale and a decrease in marginal capital productivity, predicted that external financing would stimulate growth in less developed (less capital-rich) countries and lead to a leveling out of all countries. According to Pierre-Paul Leroy-Beaulieu (1843), the wasteful expenditure of borrowed funds will lead society to depletion, and in the case of directing borrowed funds to finance any important and significant work, to enrichment. However, endogenous growth theories have shown the limitations of this approach, proving that the initial premises are not fulfilled.

On the other hand, external debt may vice versa slow down economic growth. Krugman (1989) defines debt overhang as a situation in which the present value of future income does not exceed the cost of servicing foreign debt. The threat of a debt overhang arises when a country cannot fully pay off the loans raised earlier. Debt overhang leads to the fact that debt payments become a positive function of production volumes (Sachs, 1989), which in turn deprives countries of incentives to invest, since future investment returns will be used to pay off external debt. In addition, spending on human capital development, economic reforms and macroeconomic stabilization policies are being reduced, which leads to a decrease in the level of productivity in the economy. Empirical research basically supports the idea of the dual influence of external debt. Pattillo, Poirson, Ricci (2002), Clements, Bhattacharya, Nguyen (2003) and Njuguna, Elbadawi, Benno (1997) conclude that there is a non-linear relationship between external debt and growth. Their calculations show that the small size of external debt leads to an acceleration of economic growth, but after a certain level, its influence becomes opposite.

However, there are works (Presbitero, 2006), which empirically prove that an inversely proportional (linear) relationship exists between economic growth and external debt. This is partly due to samples of countries based on which research was conducted since Presbitero studied the relationship of external debt and growth primarily in countries with excessive levels of external debt. As critics of linear dependence, Pattillo, Poirson, Ricci (2002) argue that such an approach leads to an underestimation of the negative effect

of an excessively high level of external debt. Alternatively, they offer a dependency in the form of an inverted V or U curve. At the same time, they do not conclude which of these options is preferable. Based on a study of the nonlinear relationship between debt and GDP growth per capita using data from 93 developing countries, they find that the effect of debt on growth becomes negative when it reaches above 160-170 percent of exports and 35-40 percent of GDP.

Other authors also differ in their choice. For example, Clements, Bhattacharya, Nguyen (2003) choose a relation in the form of an inverted V, describing it as a spline function, and Elbadawi, Benno, Njuguna (1997) on the contrary, use the inverted U function in the analysis.

At the same time, Easterly (2001) argues that the relationship between external debt and growth actually goes in the opposite direction explaining that economic growth determines the level of external debt. In addition, Pattillo, Poirson, Ricci (2004) find some empirical evidence for this conclusion.

The impact of external debt on economic growth and debt burden problems can be explained by the Arthur Laffer curve, which in turn reflects a non-linear relationship between the volume of accumulated external debt and the estimated debt payments, while maintaining acceptable external debt payments to creditors. There is a certain optimal level of a country's foreign debt, at which the estimated volume of payments on foreign debt will coincide with the volume of liabilities on it (on the basis of full repayment of debt). However, there comes a time when the volume of debt begins to exceed the amount of expected payments and the country has no choice just but not to pay its obligations. A further increase in the volume of external debt after the optimal point leads to a fall in the total value of debt, thereby the curve from the ascending one goes into the descending one. In order to prevent bankruptcy, the state is forced to develop an external debt management policy in which the maintenance of the country's creditworthiness will be at the optimal level (writing off or restructuring part of the debt). Thus, external debt is one of the state institutions that exist according to certain rules established by the state (Claessens, 1990).

Excessive external debt adversely affects the creditworthiness of the country as a whole. According to Adam Smith interest on external debt is a deduction from national welfare, and it flows away abroad towards foreign debt holders by creating a negative impact on the country's economy. The analysis of growth patterns of debtor countries borrowing abroad to with a right of repudiation shows two stages of growth (Cohen and Sachs, 1986). At the first stage, debt grows faster than the economy and the latter subsequently catches up at next stage, where economic growth slows down. At the second stage, the total amount of interest on debts is never fully repaid, only the interest corresponding to the difference in interest and economic growth rates is returned. The lenders strategic initiative makes the growth of debt proportional to the growth of the borrowing country. Thus, refinancing of part of interest obligations is the considered the optimal way to achieve optimal growth.

The concept of the level of debt, when its maintenance becomes too difficult for the state lies on the basis of debt sustainability. According to studies, this criterion was related to the CA balance and the budget balance for external and public debt, respectively (Wyplosz, 2011).

The incompetence of developing countries to service their foreign debts in the 1980s, raised importance of debt sustainability to mitigate negative impact of external borrowings on economic development. Since that time, interest in the problem of foreign debt has not weakened, fueled by financial and debt crises that occurred in Mexico, Southeast Asia and Russia, Argentina and other Latin American countries, as well as the non-declining debt of developing countries in Africa.

The earliest studies on debt sustainability that evolved after the Latin American debt crisis were focused on the role of international organizations in overcoming the debt crisis. According to these studies, it was assumed that ensuring access to capital markets for new countries were fundamental in mitigation effects of the crisis, and granting new loans and promoting agreements on rescheduling the payment of debt in conjunction with the revival of the global economy led in 1984 to an improvement in the economic situation. As a result, developed countries and international financial institutions increased lending volumes and unburdened their terms. The Baker Plan (1985), according to which banks had to provide loans to 17 debtor countries for three years, provided that debtor countries balance their state budgets, liberalize foreign trade, and privatize state-owned enterprises was one of these initiatives. However, the failure of commercial banks to fulfil their initial targets in terms of lending and the fall in oil prices in 1986 led the collapse of the program. The Brady Plan adopted in 1989 aimed at reduction the requirements for 40 debtor countries of $70 billion, by May 1994, the amount of forgiven debt was $60 billion, which stimulated to net capital inflows to debtor economies. Although the program was criticized for its delay, on the other side, it is assumed that immediately after the oil crisis, countries were still in a state of solvency and did not need funding from outside. In addition, the governments of many debtor countries would not have undertaken the necessary economic reforms if debt relief had been the main element of the strategy, and without these reforms it was impossible to create a basis for restoring economic growth and stable prices (Cline, 1995).

In studies of the CA deficits in Post-Soviet union countries in early 90s, many researchers faced challenges due to the incoherence of local data collection methods with international standards, and difficulties in establishing of a settlement system to reflect the balance of savings and investment. In addition, doubts about the reliability of information on capital flows and particularly real exchange rates, with excessive volatility of macroeconomic situation in transition period made it difficult to get an unbiased assessment of CAs. In one of these researches, Wahtel (1994) finds that although Central Asian countries had small imbalances in USD terms, their ratio to GDP remained high due to a significant reduction in production in the early 1990s. In consonance with his conviction when monetary authorities apply fixed exchange rates it causes an excessive appreciation of a real exchange rate, and an increase in GDP, which is soon, will be followed by much more rapid growth in consumption and investment, contributing to accumulation of CA deficit. Since the mid-1990s, a significant decline in capital inflows leading to CA deficit described as a capital inflow fatigue has been observed in transition economies. The countries experienced insufficient financial inflows to sustain their trade demands and therefore had to reduce their reserves. This phenomenon in long run can be a matter of concern, since it will lead to further losses of foreign reserves. Any increase in interest rates in developed countries, will make this condition worsen, shifting the direction of financial

flows from emerging markets to developed markets. In addition, countries with big external debt stock will suffer from an increase servicing payments, which will directly lead to a further deterioration in the balance of their CAs. According his assertion, the development of economic and financial infrastructure, with legislative system as well in order to create favourable conditions for capital inflows and provide guarantee of security for investors is important to overcome capital inflow fatigue.

Llorca (2017) has studied the problem of external debt sustainability in the long term, using a group approach to the 24 developing and emerging countries in Asia in the period of 1993-2014 years, using the CA, external debt, imports, and exports as the main variables. The study refers to the structure of the currency of debt noting that since May 2014 and the appreciation of USD has increased the burden of external debt expressed in foreign currency in Central Asian countries, which are largely subject to exchange rate fluctuations. However, if the local currency increases against foreign currency, the country can benefit from reducing its external debt burden. It also defines the negative impact of a high proportion of short-term borrowings that can cause external vulnerability during periods of tension with respect to external debt, although, all sampled countries demonstrated a low level of short-term debt in their total external debt stock. Some developing countries in particular, Armenia and Kazakhstan experienced difficulties with debt service, the ratio of debt service to exports in these countries was more than 30% in 2004. In addition, the countries of Central Asia and the Caucasus, with the exception of Azerbaijan, have low level of foreign-exchange reserves, expressed in months of imports to use them as shock absorbers in the event of a crisis. These countries were expected to face challenges to accumulate sufficient reserves, due to low commodity prices and high Federal funds rate, which determines an appreciation of the USD. In general, the situation for Central Asian region was assessed as alarming, especially for Kazakhstan, because of their situation with foreign debt and their strong trade and financial integration with China. Since countries are dependent on the growth rate of the Chinese economy, its slowdown may lead to lower commodity prices, which will affect countries that dependent on exports of natural resources.

IMF determines debt to be sustainable when a country is solvent without major adjustments for financing costs (IMF, 2002). Solvency is determined when the expected earnings in the form of income exceeds the repayment of debt with interest. Based on this, the concept of sustainability being vague depends entirely on the future. At the same time, it is noted that current and past debts, regardless of their size, are less important as many external debts, even if they remain high for many years, can be repaid if there is net income in the long term.

Sustainability in the understanding of the IMF varies depending on forecasts, and it is applicable for a certain period of time, for example, if a country expects a stable surplus, sustainability increases on the basis of these forecasts. There is also no definite way to determine the optimal threshold when foreign debt begins to be too large, since it is based on calculations of the volume of disposable assets in the country, including such difficult to estimate variables as the political environment and economic costs (Wyplosz, 2011).

In 1996, the IMF launched the heavily indebted poor countries initiative (HIPC), to assist 37 developing countries in debt cancellation or reducing its size to sustainable levels and providing low-interest loans in order to demonstrate some flexibility when external factors have led to fundamental changes in their economic situation. According to this initiative, a country can achieve external debt sustainability when it without jeopardizing economic growth is expected to fully meet its current and future obligations to serve external debt without resorting to debt relief, rescheduling or accumulation of debt.

Enhanced HIPC Initiative adopted in 2004 maintained a debt sustainability approach, but eligibility standards have been reduced for debt relief. The fiscal and trade potential of countries and the volume of grants and loans received were included as key aspects of sustainability along with the existing stock of public debt. Debt sustainability analysis (DSA) practiced by IMF uses thresholds based on previous experiences of countries, for example, net present value of public debt to exports ratio should be below 200-250% when its service should not be above 20-25% of export.

The IMF has also developed a formal framework for evaluation of sustainability of public and foreign debt to prevent countries from threatening stability due to difficulties in servicing their external debts. According to this, the IMF assesses the composition of the external debt situation with its repayment, the level of interest rates in order to have time to intervene in time when a particular country has difficulties with payment. Based on macroeconomic forecasts, the IMF determines the parameters of a country's sensitivity to political and financial changes by setting upper limits for debt elements.

DSA is based on an analysis of the evolution of the growth rate of GDP, interest rate and primary balance. Based on expectations about the level of primary balance, exchange rate, interest and growth rates, the IMF shows the process of debt accumulation. It uses two types of forecast, one takes data obtained by the experts from the organization, the other based on historical trends of the countries. However, on the grounds of the same results obtained from a certain country, it is impossible to give recommendations for the rest of the countries, since the assessment takes into account the peculiarities of a given country’s debt, as well as the history of its activities and political space. Thus, the IMF carries different estimates based on this methodology for two categories of countries separately; for countries with market access, public debt is assessed while for low-income countries, gross external debt is evaluated. Within the framework of the latter, external debt of Armenia, Kyrgyz Republic and Moldova were evaluated by the organization at different time intervals.

In 2013, Armenian external debt indices were determined as sustainable, despite the significant debt burden of the private sector, in the light of debt stock. However, the rapid accumulation of public debt after the global recession required fiscal consolidation in the medium term. The projected debt-to-GDP levels according to IMF would not exceed the indicative threshold values, but these indicators remain at a much higher level than before the crisis, which indicated a steady decline in the stability of the Armenian economy to external shocks. Based on calculations, with a budget deficit of less than 2 percent in the long run, authorities could restore the macroeconomic buffers used during the crisis and increase the resilience of the economy. For example, a deficit of one percent would halve the current value of the debt-to-GDP ratio, and

an increase in GDP growth rates of 1.5-2% would lead to a permanent decrease in present value of debt in relation to GDP by 7% within 20 years. On the other hand, based on a report of the government the situation with debts could be assessed as favorable, since the total amount of outstanding loans of public sector institutions is about 10% of GDP, and these are constantly repaid in accordance with the schedule, by reducing public debt by a quarter[2].

Kyrgyz Republic remained at a moderate risk of a debt crisis, where debt sustainability indicators were below their tentative thresholds, in particular, with limited liquidity risks of public and publicly guaranteed external debt at present values below 36% of GDP and low debt to remittances ratio (IMF, 2017). Due to an increase in exports and a significant inflow of remittances, it was expected that the CA deficit would fall in the medium term after a temporary expansion in short-term. IMF predicted improvement of the budget balance at a faster rate, and a decline in the total external debt from 85% of GDP in 2016 to 78% in the medium term future. However, sustainability of public external debt remained vulnerable to large external shocks especially to shortening of exports and non-debt flows. Public investment designed to fill a huge infrastructure gap, funded by external sources, could undermine debt sustainability, the primary budget deficit was expected to exceed the level of debt stabilization, which could lead to an increase in the public debt-to-GDP ratio. Considering these factors, the authorities were recommended to be systematic in guaranteeing new debts and resume budget consolidation[3].

The overall dynamics of the public debt in Moldova was stable and the risk of debt crisis remained low, although an increase in debt stock was expected coming as a result of large capital expenditures. In addition, for a low-income country, private sector debt was relatively high (IMF, 2017). Notwithstanding with reduced foreign borrowing as a result of the local banking crisis in 2015, large portion of foreign debt persisted in nonbank sector, and about half of this was short term consisting of trade loans, debts and other debt obligations, mainly for the import of natural resources, formed from loans of foreign companies from their parent companies abroad. By virtue of tax and customs reforms, high trade activity and growth of average wages budget revenues exceeded expectations in 2017. According to medium term forecasts, economic indicators would remain stable with steady growth, moderate inflation and a decrease in the CA deficit and recovery in the banking sector and accumulation of foreign reserves would restore a stable financial position[4].

Geithner and Nankani (2002) assessed the consequences of the early 2000s global economic slowdown for prospects of sustainable level of external debt of 24 countries in 2002. The study confirmed that, despite significant differences in the dynamics of debt indicators, the implementation of economic reform programs and their different susceptibility to shocks in the countries studied, in many cases, HIPC's export earnings and government revenues largely depended on low value added goods, as a result, they remain volatile in front of adverse external factors. A significant global decline in prices for many commodities, which led to

[2] https://www.imf.org/external/pubs/ft/scr/2013/cr1334.pdf#page=36
[3] https://www.imf.org/external/pubs/ft/dsa/pdf/2018/dsacr1853.pdf
[4] http://www.imf.org/~/media/Files/Publications/CR/2017/cr17398-MoldovaBundle.ashx

a reduction in exports and a slowdown in growth rates, deteriorated foreign debt indicators. In such an economic environment, it would be too optimistic to hope that external debt indicators of the countries would follow steady diminishing path or would remain below debt sustainability thresholds. Thereupon, external financing flows on preferential terms and in the form of subsidies in view of their weak solvency were declared as an important actions for implementation of structural reforms in diversification of their export base supported by the improved access of their export to the world markets.

The cross-country studies of countries in a completing phase of the HIPC Initiative process Sun (2004) shows the countries remained vulnerable in front of external factors due to a weak export diversification and poor mobilization of income. In addition, despite, the improvement in political and institutional foundations, the expected results were also far behind average world level. Facing the dilemma between financing economies and maintenance of the level of external borrowing at sustainable levels in long run, none of them achieved positive outcomes on all key indicators regarding improvement in political and institutional foundations of debt management, enhancement of trade and fiscal potential due to poor mobilization of tax revenues, investment climate and macroeconomic instability.

DSA only determines sustainability from a financial point of view, and neglects human development criteria (Caliari 2005, JDC 2012, Oddone 2005). In addition, it ignores the main elements of development such as healthcare, education, food security and human rights (Gunter 2009). On the way to achievement of the Millennium Development Goals, low-income countries should have capacity to finance their projects, but strict solvency requirements in DSA, makes rescheduling of repayments difficult for them.

The ignorance of the effect of inflation is another disadvantage of DSA, as exchange and interest rates cannot correctly reflect the level of inflation. For example, a fall in the national currency or an increase in the interest rate on debt leads to an increase in debt service. In the case when exchange and interest rates are not indexed with inflation, then the expected increase in inflation will reduce the cost of debt. The problem is that it is not easy to predict inflation for more than 2–3 years, moreover, reliance on inflation is considered arguable by conservative international financial institutions and they are not ready to accept the fact that growing consumer prices can mitigate debt burden (Wyplosz, 2011).

In many developing countries, governments finance their investments largely through debt instruments, and usually these investments generate long-term stable growth, which leads to a decrease in the debt ratio. However, DSA, trying to avoid optimistic results, considering rarity of long-term growth and small share of such investment projects in GDP, does not take into account expected incomes and gives more pessimistic forecasts (Berg, et al, 2012).

Some economists offer an alternative method of calculating debt sustainability according to the values of the primary balance, in so doing, the level of optimal primary balance is determined taking into account interest and growth rates at which debt becomes sustainable. For that to happen it is important to make sure that the debt burden does not evolve along an explosive path with dramatic consequences (Blanchard et al. 1990, Buiter 1985, Nissanke 2013) and the author recommends to issue debt under strict conditions to deal

with critical debt adjustment burdens (Nissanke, 2013). In addition, this method involves mitigation of effects, leading to political upheavals, tensions between creditors and debtors (Nissanke 2013; Wyplosz 2007).

Many developing countries have low levels of human capital development and suffer from vulnerable economic trends, with a number of problems associated with the structure of exports and production, the development of the financial system, and taxation, which adversely affect solvency. Considering this, and to prevent the recurrence of external shocks the application of the economic vulnerability index (EVI) and the human asset index (HAI) is proposed as an alternative or addition for main debt indicators. With respect to interest rates, it is recommended to use domestic rates adjusted with exchange and inflation rates for short-term calculations, since this is more likely to show the state of the economy of a particular country. In addition, based on number of observations, it was revealed that the use of such rates motivated the governments of low-income countries to issue bonds and loans more often for realization in foreign markets (Nissanke, 2013).

Kraay and Nehru (2006) criticize a common debt sustainability threshold for countries practiced in DSA, since it excludes the role of non-financial elements and countries with bad policies and institutions have a high risk of a crisis of default, and on a global scale, this leads to a flow of resources from good policies to countries with bad policies. However, Hemming (2003) states that the level of one indicator - a high level of debt is enough to cause a default even presence of other indicators.

Semmler, Tahiri (2017), using a non-linear model, explore the main factors generating macroeconomic volatile cycles, in particular, CA imbalances between Eurozone countries, with emphasis on peripheral countries with huge external borrowings. Remarking previous works where researchers relied on GDP for estimating the debt burden as an indicator of the ability of the economy to service its debt. The authors believe that debt sustainability should be measured in relation to debts over the total wealth of the economy while debt is measured as a liability over assets, not as debt over flow (GDP). Wherein, an accurate measurement of the total wealth of countries is required, although it is difficult to accomplish due to the substantial amount of private wealth. Following these considerations, in the face of the risk of long-term economic instability, countries are encouraged to finance interest on their obligations by imposing a capital tax.

The present value of debt is not the key instrument in creation of a system of criteria for assessing critical values of external debt, therefore estimation of the level of debt by the most common method is determined through debt to GDP ratio. Other main instruments are the size of gold and foreign exchange reserves, exports that expresses a country's capacity to repay debt and foreign debt per capita, which shows debt burden per citizen (Wyplosz, 2011).

The ratio of debt to GDP depends on the dynamics of external debt, GDP and exchange rate, which also depends on the previous two. The variables of debt behaviour are interest payments, the net resource transfers (resources available after interest payments) and their impact on economic growth. The negative

difference between growth and interest rates leads to an outflow of resources abroad to destabilize the debt to GDP ratio. For a public sector, a positive increase of non-interest budget balance is unavoidable to achieve stability. In addition, debt restructuring in times of recession has a positive effect, although it is not advisable to resort to it regularly, since it results in a conflict of interests between different lenders and a debtor country, and will complicate the settlement processes in the economy (Loser C.M., 2004).

Some studies show the importance the ratio of foreign reserves in relation to short-term external debt stock (which may be paid during the year by first demand of creditors) to explicate a country's liquidity, i.e. the ability of the economy to make repayment of debt during the year. The threshold value for this indicator is a coefficient less than one, meaning that a situation is possible in a country in which the government, in case of fluctuations in the international capital market, has to disrupt the debt repayment schedule. At the same time, a significant amount of foreign exchange reserves reduces financial risks in the event of a situation when it is impossible to obtain loans on world markets, which contributes to an increase in the country's rating as a borrower (Frank and Cline, 1971).

Nissanke (2010, 2013) criticizes application of a real growth GDP rate in DSA justifying that this indicator is already polluted by noise, because of factors like changes in the external economic situation and an unexpected large influx of funds.

However, it’s argued that GDP cannot be a good estimate of future income to cover debt, since the main source of income of the government are fiscal revenues which is a guarantee of public debt service, in the case of external debt, it can be the total net income in the form of foreign currency accumulated by residents. Moreover, such an indicator may turn out to be unreliable in the event of a change in the real exchange rate, thereby having an effect on GDP. At the same time, the difficulty lies in correctly predicting revenues in the form of GDP or net exports, and especially the debt itself, based on its composition, the terms of loans and bonds, and changes in the refinancing rate. Sustainability also depends on interest rate, increase of which leads to a worsening of the debt burden and reduces sustainability. The disadvantage of debt to exports ratio as an indicator is that when attracting foreign borrowing to invest in production, a long-term development period is used, thus aborrowing country may have relatively high ratios of foreign debt to exports (Wyplosz, 2011).

According to many of the studies mentioned above, and despite the contradictions between them in this assessment of the external debt sustainability in Armenia, Kazakhstan, Kyrgyzstan and Moldova, the ratios of debt to GDP and noninterest CA balance to GDP were applied as baseline indicators. This paper studies a linear relationship between these variables. The possible research directions are not broad, due to the short data series and the limited choice of indicators available to all countries. The method for estimations is based on the work of Vaggi and Prizzon (2013) more detailed description of which is presented in Chapter 4.

Chapter 3. Economic outlook of the countries

3.1. Dynamics of external debt

The instability and uncertainty of the economic situation after the collapse of the Soviet Union in Armenia, Kazakhstan, Kyrgyz Republic and Moldova, together with the budget deficit, limited domestic sources of funding and their high cost, necessitated attracting resources from foreign markets. Both government authorities and private commercial banks and companies pursued such a strategy. At the same time, in the pre-crisis (until 2008) and post-crisis (since 2012) periods, the external borrowings of the corporate sector (banks and non-financial companies) increased steadily, and during the crisis period (2009-2011) there was a significant expansion in the external debt of governing bodies *(Graphs 1-4).* As a result, the problem of servicing and managing external debt has become one of the main problems for these countries. During the entire post-reform period, they experienced a surge in gross external debt, with the most significant incidents in Armenia and Kazakhstan. If we consider the dynamics of the volume of external debt of these countries and its characterizing tendencies, several stages can be singled out thereat in the formation of external debt (Golodova, 2004).

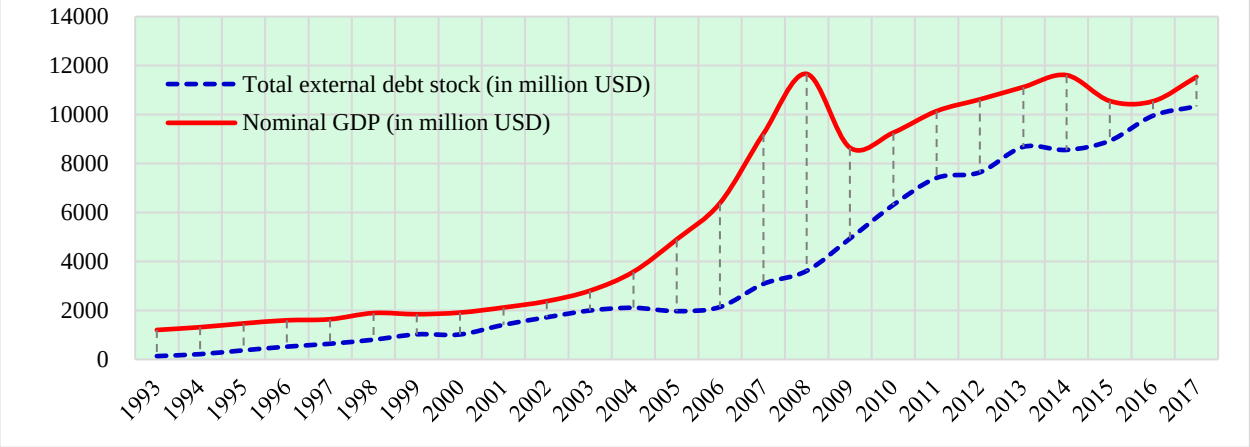
The first stage (1992–2000), during which there was a significant increase in gross external debt, primarily due to public and publicly guaranteed debt, including obligations for government borrowing, guarantees and obligations for third-party debts, obligations under contracts and agreements on prolongation and restructuring of previously incurred obligations concluded on behalf of the government. The share of government debt was 80% of total long-term external debt in Moldova and Kyrgyz Republic, and 99% in Armenia, while in Kazakhstan it was only 32%.

A drop in government loans and their share in the structure of gross external debt amid a significant surge in the debt of commercial banks and non-financial private sector characterize the second stage (2001–2007). Over this period, external debts of commercial banks escalated more than 11 times in Moldova, and almost 5 times in Armenia. A similar shock hit the debt market of non-financial companies in Kazakhstan and Moldova, which became a reason of an accumulation of borrowings more than six and two times in respective countries.

At the third stage, which corresponded to the Great Recession of 2008–2011, gross external debt boosted, which was due to higher prices in global commodity and energy markets, lower demand and, consequently, reduced export earnings and a downturn. At the same time, the debts of all entities grew, which led to significant changes in the structure of external debt.

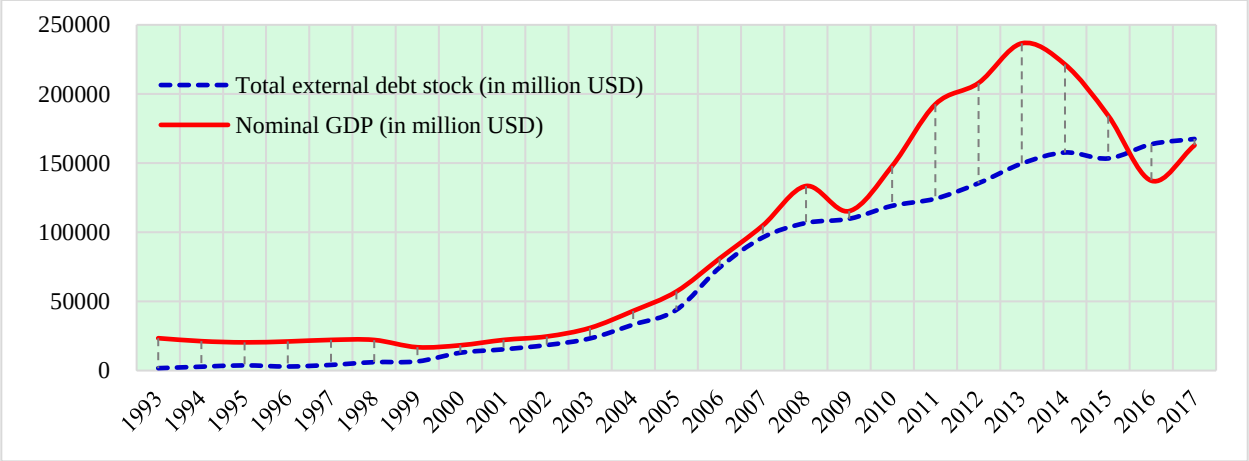
First, the state and state-guaranteed foreign debt has lifted in all countries, more than 2.5 times in Kazakhstan, 1.5 times in Armenia and Moldova, 1.2 times in Kyrgyz Republic. Whereas, the share of public debt in gross external debt dropped in 4 countries. Secondly, the debt of the monetary authorities moved up significantly: 5 times in Kazakhstan and twice in Moldova, which was an evidence of problems with regulators in terms of liquidity management in the banking sector. Thirdly, commercial banks' debts tripled in Armenia and increased almost 1.5 times in Moldova.

Figure 1. The dynamics of external debt stock and nominal GDP in Armenia



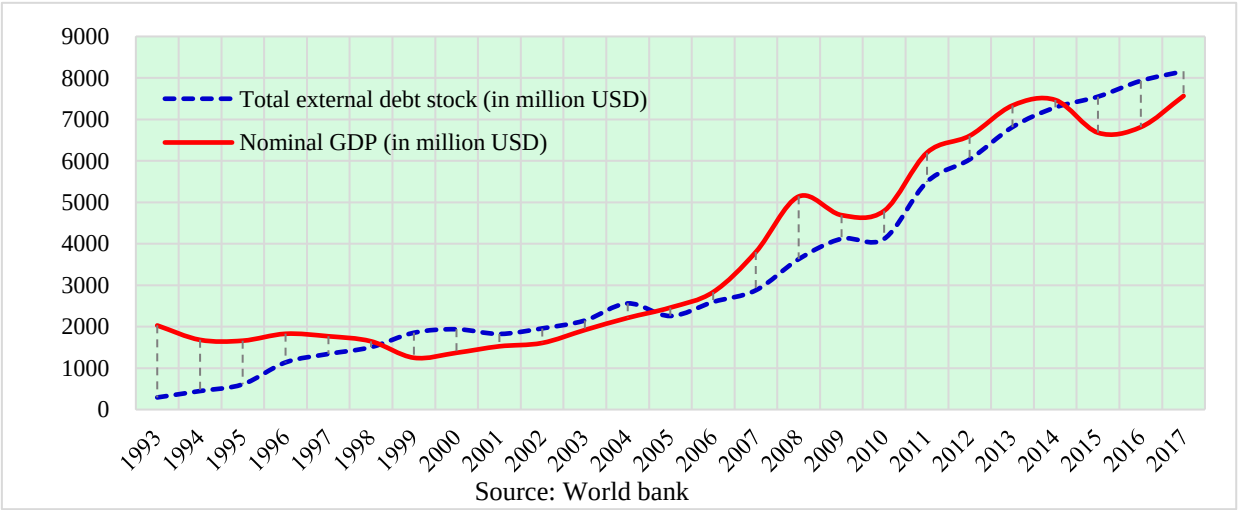
Data source: WB Database

Figure 2. The dynamics of external debt stock and nominal GDP in Kazakhstan



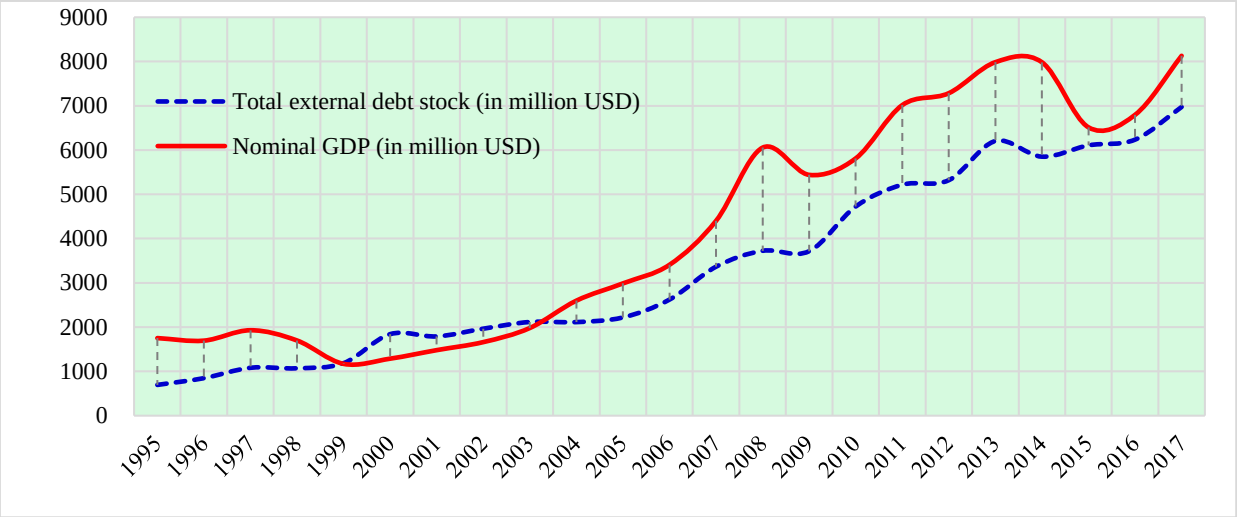
Data source: WB Database

Figure 3. The dynamics of external debt stock and nominal GDP in Kyrgyz Republic



Data source: WB Database

Figure 4. The dynamics of external debt stock and nominal GDP in Moldova



Data source: WB Database

At the fourth stage, which began in 2012, the countries, especially their commercial banks and private non-financial companies continued to levitate their foreign borrowings. During 2012-2013 external debt of commercial banks deepened by half in Armenia. On the other hand, due to the tightening of regulations and the establishment of additional prudential standards, a reverse tendency has been observed in Kazakhstan, the debt of commercial banks reduced by 24% for the same period. The liabilities of the non-financial private sector grew in Kazakhstan by 1.3 times, due, among other factors, to the activation of many national companies in foreign securities markets (four companies placed Eurobonds worth over $4.5 billion in 2013). At the same time, there was a multidirectional trend of changes in the debts of the financial and banking regulatory authorities, it was ascending in Armenia and Kazakhstan whereas, it was declining in Moldova (CBA, NBK and NBM).

In addition to absolute indicators, a set of relative indicators determined by WB HIPC Capacity Building Program is implemented to analyse the external debt sustainability in countries. The analysis applies threshold indicators of external debt security, which determine the possibility of servicing external debt and paying interest on it (recommended thresholds have been established for all indicators). The results of calculations of these parameters confirms an increase in the debt burden and a reduction in the possibilities of paying external debt in 4 countries (Table 1).

If in 2008 the ratio of external debt to GDP in Armenia was at medium level, by 2017 it had tripled. Under the influence of the financial crisis and the post-crisis instability, this indicator has aggravated in other countries as well. The ratio of external debt to the export of goods and services shifted from medium to highest level in all countries. Another ratio shows that debt service opportunities have degraded for Kazakhstan, but it dramatically deteriorated in Armenia and Kyrgyz Republic, due to decline in the CA balance associated with a decrease in exports and, conversely, higher prices for imports in Armenia. On the other hand, over 10 years Moldova has improved its position on this criterion. The last two figures on the table display the disproportionately growing debt and its servicing costs is putting a strong pressure on lagging budget revenues in Armenia and Kyrgyz Republic.

Table 1. Debt burden ratios calculated based on IMF thresholds

Indicators	Year	Armenia	Kazakhstan	Kyrgyz Republic	Moldova
Debt/GDP	2008	31%	80%	71%	62%
	2017	90%	103%	108%	86%
Debt/Exports	2008	186%	140%	135%	173%
	2017	240%	300%	317%	225%
Debt service/Exports	2008	19%	44%	13%	24%
	2017	34%	50%	30%	14%
Debt/Budget revenue*	2008	136%	362%	280%	179%
	2017	408%	491%	398%	249%
Debt service/Budget revenue*	2008	14%	113%	26%	24%
	2017	57%	82%	38%	15%
Debt Burden Severity levels		**low**	**medium**	**high**	

Data sources: WB, IMF, * The CIA World Factbook

3.2. The structure of external debt

Armenia

Armenia owed to $10916 million to foreign creditors by the end of 2017, only $1132 million of which were short-term (10.4%) and non-guaranteed private sector debt accounted for 41% of the corresponding number. The share of government borrowings in the gross external debt was 45.5% amounting to about $4,937 million. A significant proportion of long-term liabilities were received in the form of loans (80.7%). The structure of the external debt was moderately diversified, in the total volume of foreign debt as of October 1, 2017 multilateral debt dominated with 66.7% share, followed by investments of non-residents in Armenian Eurobonds (17.3%), and bilateral credit programs accounting for 14.4% (CBA).

According to Moody's[5], the huge debt burden of the government, with moderately low incomes of the economy, reinforced with geopolitical tensions with neighbouring Azerbaijan are the main credit problems of Armenia. In addition, some factors, including fluctuations of exchange rates *(Figure 5)*, weak money supply in the market, low foreign exchange reserves, and uncertain prospects for the development of exports are contributing to the deterioration of the country's international rating, both in terms of meeting international financial obligations and in terms of financial and economic stability.

Therefore, the government, in view of the lack of investment, and accordingly, in view of the increase in problems associated with non-fulfilment of the budget, is forced to seek additional external financial resources, thereby raising the threshold of external debt. In 2017, the actual budget deficit of Armenia was 267 billion drams ($550 million) instead of the stipulated 150 billion drams. The budget for 2018 was also

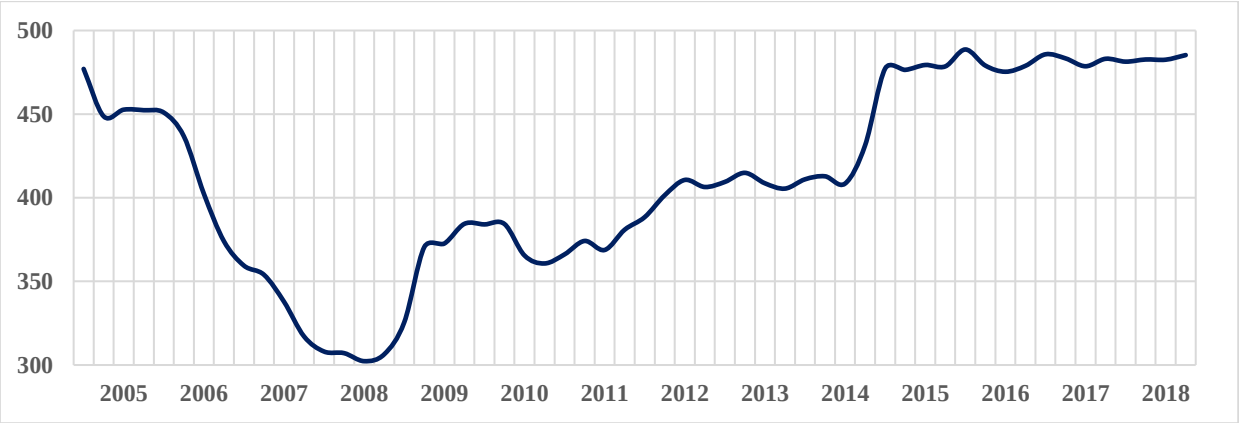
[5] https://www.moodys.com/research/Moodys-Armenias-credit-profile-reflects-effective-institutions-and-robust-growth--PR_381219

adopted with a decent deficit of 157 billion drams ($324 million), with expected revenues of 1.3 trillion drams ($ 2.7 billion) and expenses of 1.47 trillion drams ($3.0 billion) (The Ministry of Finance of Armenia).

Considering that the government relies mainly on export revenues and remittances to compensate external debt service, instability of these sources, explained by exogenous (e.g. a 40% drop in remittances from the Russian Federation in 2015) or endogenous (a weak diversification of exports, lack of high value-added goods in exports) factors exacerbated by a big debt appetite may put the economy at the risk of default.

Despite 7.5% growth rate of the economy in 2017, it may not generate the necessary income to cover the budget deficit, and the deficit has to be closed by increasing the debt, the growth of which in corresponding year was almost twice higher than GDP dynamics.

Figure 5. USD /AMD (Armenian dram) average quarterly exchange rate



Data source: The IMF, CBA

Kazakhstan

The external debt of Kazakhstan reached $167.5 billion in 2017, more than 90% of which was borrowed for more than one-year period. The structure of the external debt of Kazakhstan consisted of loans and borrowings from non-residents (79.8%) and debt securities in the hands of non-residents (12.9%) (NBK).

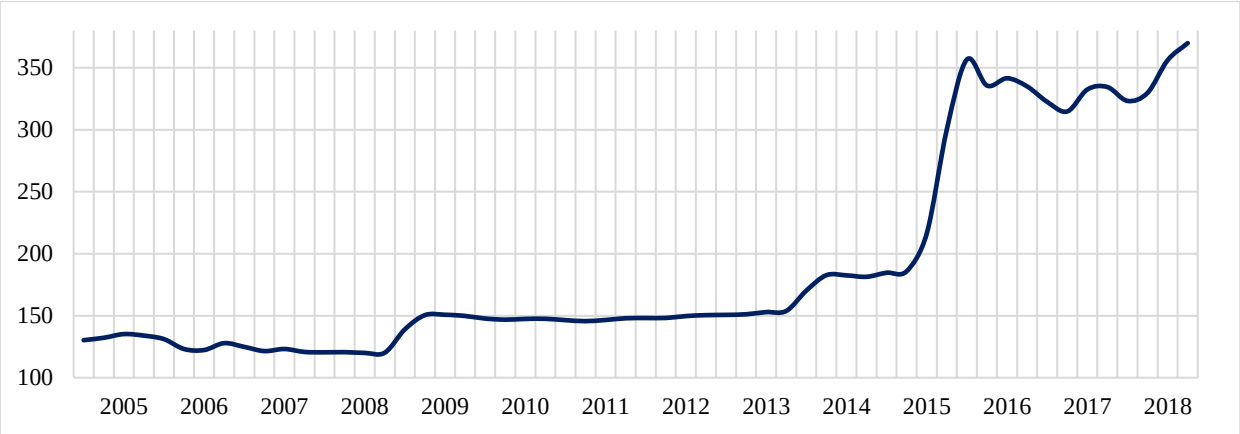
The external debt of the banking sector equalled $6.5 billion or 4.1% of GDP, liabilities of other sectors (including state-controlled organizations) to non-affiliated non-residents amounted to $43.5 billion or 27.5% of GDP. Intercompany debt (including debt owed to affiliated creditors of state-controlled organizations) was $104.5 billion (66.0% of GDP) and the external debt of the public sector was $ 40.4 billion (25.5% of GDP). Consequently, the external debt to GDP ratio with intercompany debt overtook 100% threshold, but the ratio excluding intercompany debt was just 39.8% (NBK).

Today, Kazakhstan owes foreign lenders more than it can produce goods and servicesin in a year. The total amount of external debt of Kazakhstan over the past 10 years has more than doubled. The country has a debt to 173 countries of the world, as well as international organizations. Two-thirds of foreign debt accounted for the 5 largest creditors of Kazakhstan: the Netherlands ($49.8 billion), the UK ($27.7 billion), the USA ($13.2 billion), China ($12.3 billion) and France ($11.9 billion). The largest (about 50%) portion

of external debt is concentrated in the oil sector, which reflects the main priority of foreign investors. In addition, there is a complex situation with intercompany indebtedness exceeding $104 billion (2/3 of external debt) seeing that the government is not willing to take measures to mitigate its burden since formally the state does not bear any responsibility for failure to fulfil obligations of private debtors. However, under these circumstances, foreign investors having optimized taxes may continuously extort capital from the country in long term (NBK).

The non-diversified, uncompetitive economy of Kazakhstan is critically dependent on oil exports. The deterioration of the balance of payments, which causes a devaluation of the national currency-tenge *(Figure 6)*, is associated not only with a fall in the price of oil as a source of foreign currency earnings, but also with large volumes of payments on increasing external debt.

Figure 6. USD/KZT (Kazakhstani Tenge) average quarterly exchange rate



Data source: The IMF, NBK

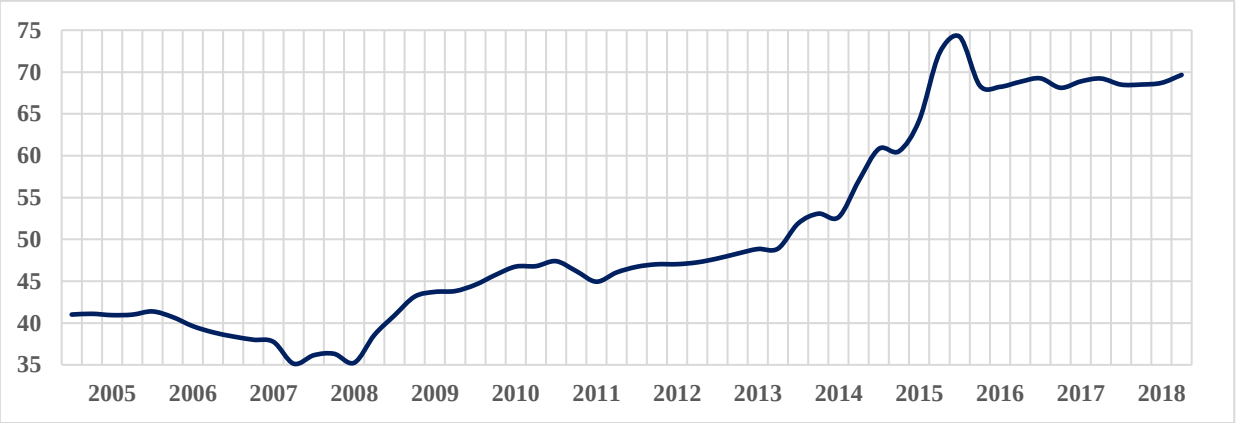
Kyrgyz Republic

Kyrgyz Republic had accumulated $7002 million external debt by the end of 2017, which was 2.5 percent higher than the corresponding date of 2016. In its composition, public external debt equalled $4080 million, which amounted to more than half of the total external debt. The structure of the public external debt of the Kyrgyz Republic expressed by multilateral and bilateral creditors holding 40% and 60% of its volume, respectively. Public external debt is mainly represented (98%) by privileged loans with low interest rates and a long repayment period. Multilateral creditors of the Kyrgyz Republic are predominantly international financial institutions, such as WB, ADB, IMF, IDB and EBRD. Over the past five years, the sources of multilateral debt has remained unchanged: 89.0 percent of multilateral debt falls on obligations to WB, ADB and IMF, on top of that the country received 90% of its bilateral credits from 3 countries: China, Japan and Russia. These multilateral and bilateral loans are mainly aimed at implementation of projects to enhance infrastructure in the country concerning the energy, financial and agricultural sectors (NBKR).

Private external debt is represented by loans received from direct and other foreign investors, the largest creditors of the private sector were China ($1312 million), Great Britain ($263 million), Russia ($239 million) and Kazakhstan ($223 million). The policy of actively attracting foreign borrowing of all presidents has led to the fact that today Kyrgyz Republic has multimillion debts to 21 lenders - these are

both multilateral donors and individual countries. The largest debt stock was generated by $1523 million loan of the Export-Import Bank of China was invested for road construction and energy development in the country (NBKR).

Figure 7. USD /KGS (Kyrgystani Som) average quarterly exchange rate



Data source: The IMF, NBKR

Moldova

The volume of external debt of Moldova at the end of 2017 rose to $6964 million, $1764 million of which were short-term (25%) and non-guaranteed private sector debt accounted for 71% of total debt. A large proportion of long-term liabilities were received in the form of loans (63.6%), whereas trade loans dominated in short-term loans (76.9%). The main lenders of long-term assets were WB 35%, the IMF 28%, the European Investment Bank 10%, Romanian investors 9%, and the EBRD 4%. Public sector debt reached $1986 million, interbranch borrowings of companies were $1836 million and debts of other sectors amounted to $2716 million (NBM).

Figure 8. USD /MDL (Moldovan Leu) average quarterly exchange rate

Data source: The IMF, NBM

3.3. The composition of current account balances

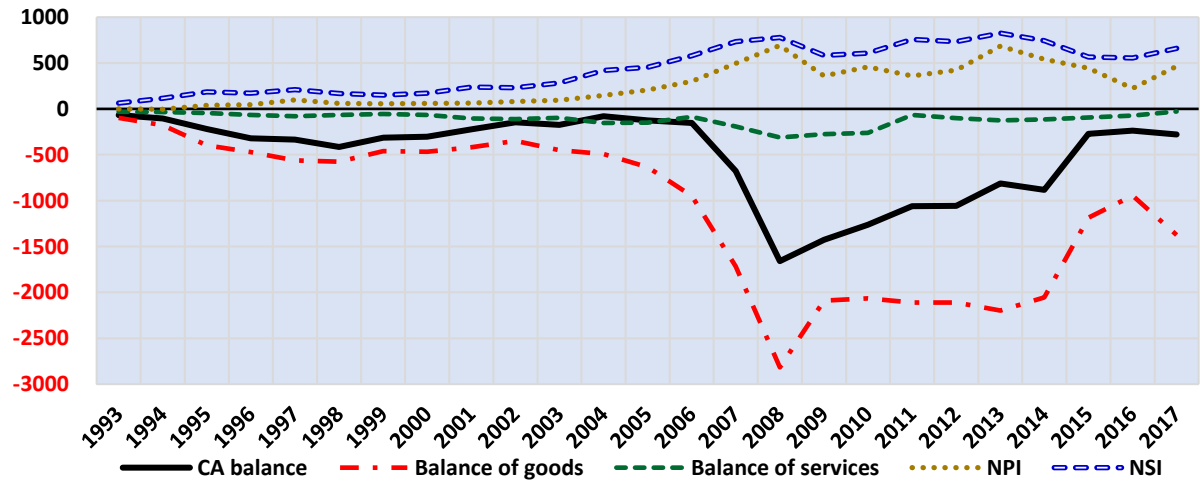
Armenia

Since 1993, despite frequent variations of CA balance to GDP ratio in Armenia, the CA balance itself was almost constant and never went below the negative $500 million threshold until 2006. However, starting from 2008, the deficit dramatically deepened from $153 million to $1659 million due to a strong imbalance between exports and imports of goods. Although 6-7 years after the crisis, the deficit has reduced, however today it is still below the post-crisis level in absolute terms. In addition, it is noteworthy that since 2006, the balance of goods has been the main determining element in the CA balance, whereas the remaining components have stable dynamics and relatively insignificant values. For example, external factors did not greatly affect the balance of services, while NPI and NSI, having a positive balance, on the contrary, slightly increased during the crisis, and remained steady at those levels *(Figure 9)*.

Armenia's exported goods worth $2.44 billion in 2017, the Russian Federation traditionally remained the main trading partner receiving 23% or $ 570 million of Armenian exports followed by Bulgaria (12%) which imports exclusively copper ore from Armenia.

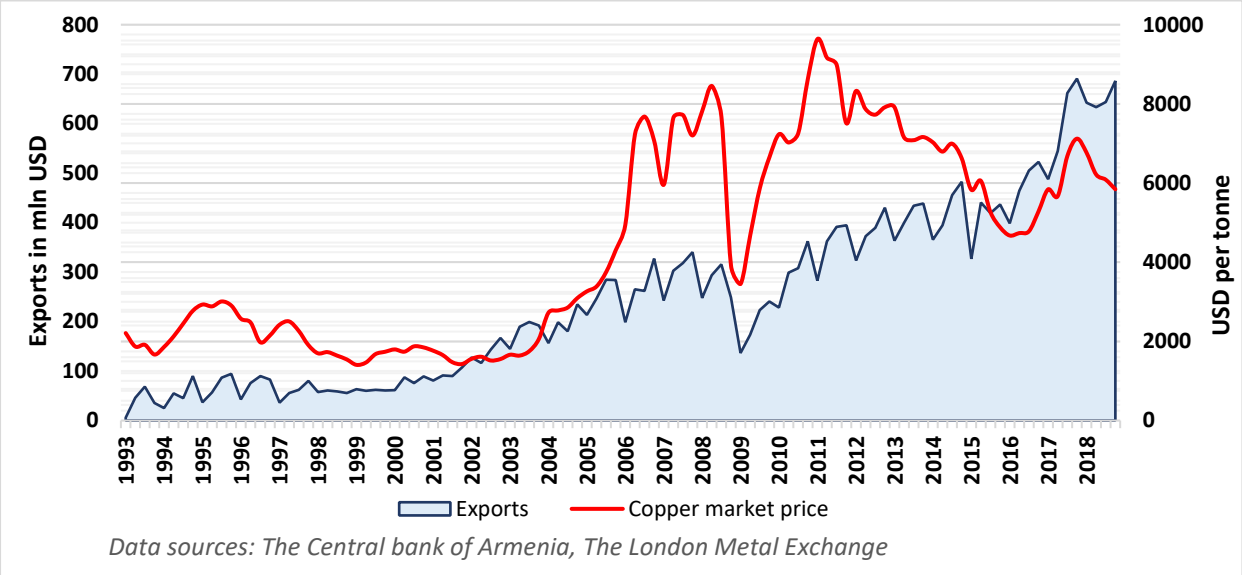
In the largest quantities, Armenia exports such goods as copper ore, cigars and cigarettes, spirits, gold and diamonds. In 2017, the largest share in the export structure of Armenia was copper ore (38% of the total share) due to the huge reserves of this mineral *(Table 2)*. In recent years, copper ore less stands out from the other commodity structures, which indicates a simultaneous fall in world prices for copper, an increase in prices for gold and diamonds and a growth in the production of cigars and spirits. This can be seen on the chart, since 2011, when the price of copper on the world market went down sharply, in the next 5 years, gross export earnings, having a reverse correlation with the price of copper, was independent from its fluctuations *(Figure 10)*.

Figure 9. The composition of CA balance of Armenia in million USD



Data source: The World Bank

Figure 10. The trends of exports of Armenia and price of copper



The volume of exports of services for 2017 amounted to $1921 million, in the structure its was dominated by travel related services (63%), transportation services (13%), telecommunication, computer and information services (13%) and construction works (10%).

Armenian import of goods was estimated $3.96 billion in 2017, 29% and 12% of goods were originated from the Russian Federation and China respectively. The Russian Federation was the main supplier of oil and gas with a share of 75% of the total import of fuel and energy resources. In the supply of machinery and electronics, one of the leading positions was occupied by China with a share of 31% of the country's total imports of these products and a quarter of all imported textiles and clothing were supplied by Turkey.

The commodity groups that are imported to Armenia are mainly mineral fuels, machinery and equipment, electrical machinery, precious metals, pharmaceutical products, and vehicles. The geographical location, as well as the absence of large oil and gas fields enforces the country to import mineral fuels. Despite the presence of deposits of low-grade coal in the country, this source is only suitable for local utilisation. In addition, Armenia imports pharmaceuticals, electronics and other high-tech equipment due to the lack of large engineering and chemical enterprises. There are commodity groups in which exports exceed imports, these are precious metals, tobacco, non-alcoholic and alcoholic beverages. Precious metals are mainly imported as raw materials for the production of high-quality jewellery and their further export.

The volume of imports of services for 2017 amounted to $1949 million, with prevailing share of services related to travel of residents abroad (72%) and transport services (26%).

Table 2. The composition of Armenian trade with goods in 2017

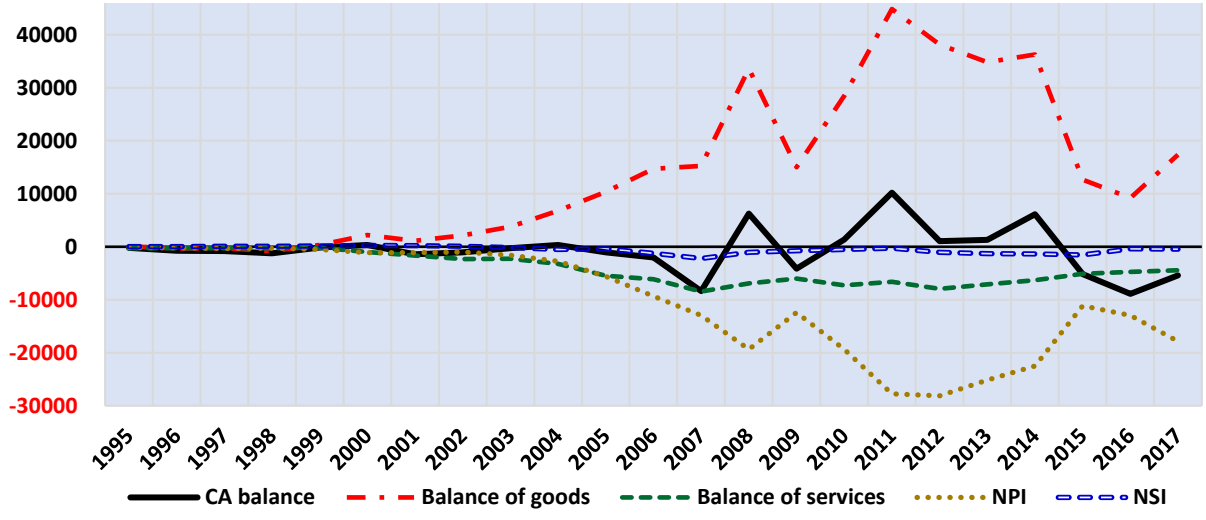
Main exported goods	% in exports	In million USD	Main imported goods	% in imports	In million USD
Copper ores and concentrates	38%	918	Machines	18%	706
Rolled tobacco	9%	231	Foodstuffs	18%	705
Hard liquor	8%	204	Petroleum	14%	569
Textiles	7%	172	Chemical products	10%	396
Gold	6%	142	Metals	7%	286
Aluminum foil	5%	119	Textiles	7%	259
Ferroalloys	4%	91	Vehicles	5%	202
Diamonds	3%	78	Precious metals	5%	197
Lightning equipment	2%	37			
Jewelry	1%	25			

Data source: The Central bank of Armenia

Kazakhstan

The Republic of Kazakhstan is one of the leaders in terms of economic growth in Central Asia, its economy in the post-Soviet period grew faster than neighbouring countries, but country's well-being was generated by virtue of exports of oil and minerals *(Figure 10)*. The devaluation of the national currencies of the country's main trading partners (The Russian Federation and China) and the reduction in world prices for the main export goods of Kazakhstan created a slowdown of the economy starting from late 2014 when GDP growth rates dropped from post crisis level (4-7%) to 1% in 2015–2017 *(Figure 11)*. In order to maintain adequate level of exports, the Central bank carried out two devaluations of the national currency in 2015 and 2016.

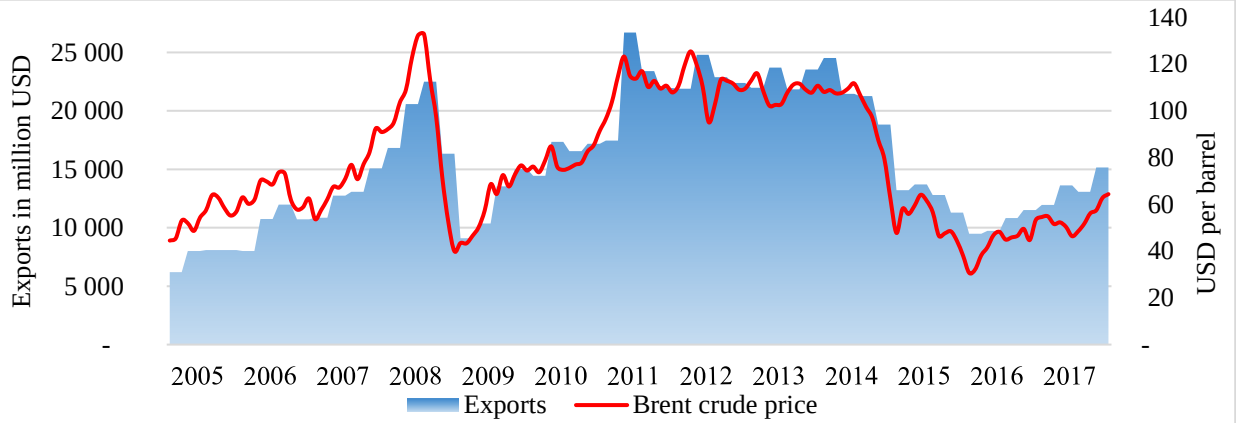
Figure 11. The composition of CA balance of Kazakhstan in million USD



Source: The World Bank

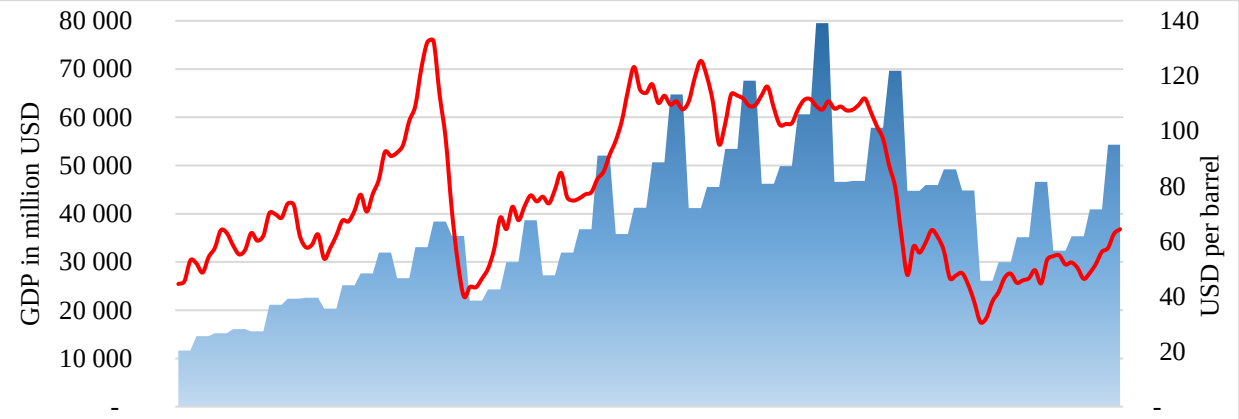
Kazakhstan had $5.4 billion deficit the CA balance in 2017 *(Figure 12)* which experienced an increase in residents' income and expenses in its all components, with the exception of the import of services. In its structure, the largest growth was in exports and imports of goods, as well as payments of investment income to non-residents. The improvement in the CA in comparison with the previous year was due to doubling of the trade surplus, which reached $17.4 billion ($9,2 billion in 2016). This happened predominantly as a result an elevation of world prices for Brent crude from $44.0 per barrel in 2016 to $54.4 in 2017 in average (23.5%), which shifted total exports up by 32.3% reaching $49.3 billion. Exports of oil and gas condensate (55.0% of total exports) surged by 37.8%, due to high contract prices and an expansion in quantitative supplies, including those associated with the launch of production at new fields, while ferrous and non-ferrous metals exports jumped by 52.2% and 27.3%, respectively.

Figure 12. Kazakhstan's exports and oil price trends



Sources: The World bank, The US Energy Information Administration

Figure 13. Kazakhstan's GDP and oil price trends



Sources: The World bank, The US Energy Information Administration

Imports of goods under other conditions grew by 15.5%, reaching $31.8 billion. The increase occurred in all groups of the main commodity nomenclature, for example, imports of intermediate industrial goods (36.4% of official imports) rose by 15.4% to $10 billion and investment goods import increased by 13.9% exceeding $10 billion. The country imported consumer goods worth $8.0 billion, including food products

of $3.2 billion. The Russian Federation and China being biggest trade partners of the country expanded their share in total imports to 39.2% and 16.0 % respectively.

Table 3. The composition of trade in 2017 in Kazakhstan.

Main exported goods	% in exports	Exports in billion USD	Main imported goods	% in imports	Imports in billion USD
Crude petroleum	51%	22,30	Machines	26%	7,83
Metals	23%	9,94	Metals	11%	3,44
Chemical products	7%	2,94	Chemical products	11%	3,41
Petroleum gas	5%	2,40	Mineral products	9%	2,75
Mineral products	5%	2,00	Vehicles	9%	2,69
Vegetables	4%	1,80	Food	6%	1,78
Precious metals	2%	0,84	Plastics	5%	1,64
			Textiles	4%	1,12

Source: The Central bank of Kazakhstan

Kazakhstan continued having deficits in services reaching $4.4 billion in 2017, more than half of earnings from services ($6.4 billion) were created in transportation sector ($3.5 billion), which to greatest extent were generated by services of transport companies for pipeline transit of oil and gas through the territory of the Republic. Residents spent $10.8 billion for international services predominantly for business and consultancy services ($4.3 million), including architectural and engineering services ($2.7 million), travelling ($1.8 million), and transportation ($1.6 million) during corresponding period.

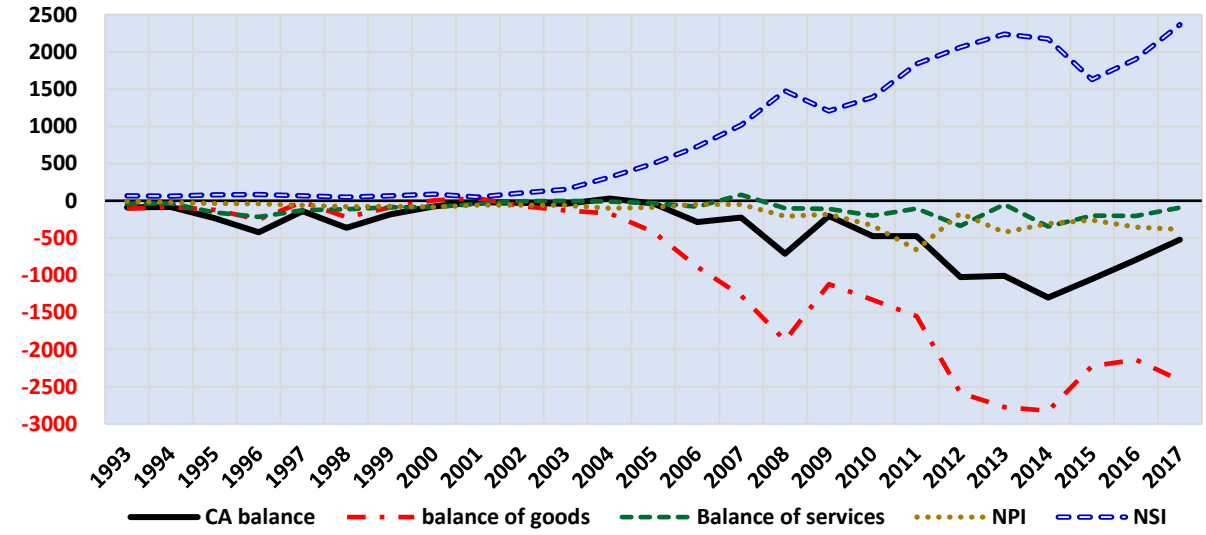
Kazakhstan has introduced a comprehensive system of state support for investment activities in order to create a favourable investment climate for the development of the economy and encourage investment in creating new or expanding and updating existing industries. The country also provides investment preferences (depending on the type of investment project): exemption from customs duties and import VAT, grants, tax preferences, investment subsidies, exemption from import customs duties. Over the past 12 years, the country has attracted $264 billion of direct investment, mainly from the Netherlands, USA, France, Switzerland, Russia and China and significant proportion of them were directed to mining industry. However, in recent years, there has been a shift in the focus of foreign investors on the manufacturing sector. Oversaturation of the economy with foreign assets and their volatile flow due to erratic market conditions was reflected in balance of primary income which deficit reached $17.9 billion, provoked by enormous net incomes of non-residents on direct investment operations ($15.3 billion).

The sharp devaluation of the Russian ruble against foreign currencies, caused by the rapid decline in world oil prices, the export of which largely determines the Russian budget, as well as the introduction of economic sanctions against the Russia Federation in connection with the events in Ukraine in 2014, induced the flow of Central Asian labour migrants towards Kazakhstan. In this regard, in 2017, $2.3 billion transfers made abroad mainly in the form of uncompensated remittances of individuals, which ultimately formed $457 million deficit in NSI.

Kyrgyz Republic

Foreign trade policy of Kyrgyz Republic has the most liberal regime among the CIS countries with absence of enterprises with exclusive rights in the country that could influence the freedom of trade. In addition, the list of goods subject to mandatory licensing was significantly reduced. The licensing procedure remained only for a narrow list of goods, such as drugs, jewelry etc. The established practice of conducting foreign trade significantly expands the horizons of foreign trade, on the other hand, with a low export potential of the country, as well as its weak diversification, the liberal policy is blamed to be one of the reasons of country's immense trade deficit. Kyrgyz Republic has a constant negative CA balance since 2005, impelled mainly by disproportion in trade balance *(Figure 13)*. During this period, only the balance of services and NPI were stable, whereas extremely volatile indicators a positive net secondary income from one side and a negative trade balance from another side mirrored each other (Graph), making them as the main balancing components of the CA balance.

Figure 13. The composition of CA balance of Kyrgyz Republic in million USD



Source: The World Bank

In a net secondary income structure, remittances of employees play a decisive role, which formed 98.8% of its total size in 2017. The volume of funds received through transfer systems in the same year amounted to $2688 million (36% of GDP or $433 per capita). This situation makes Kyrgyz Republic one of the world's most dependent economies on remittances. In addition, unlike other three countries in the sample, here remittances receivable represents generally an augmenting trend. The geographical structure of remittances has been remained unchanged over many years, having overwhelming proportion of revenues in a form of personal transfers from Russia (98%), which makes them as a major contributor in financing of the trade deficit.

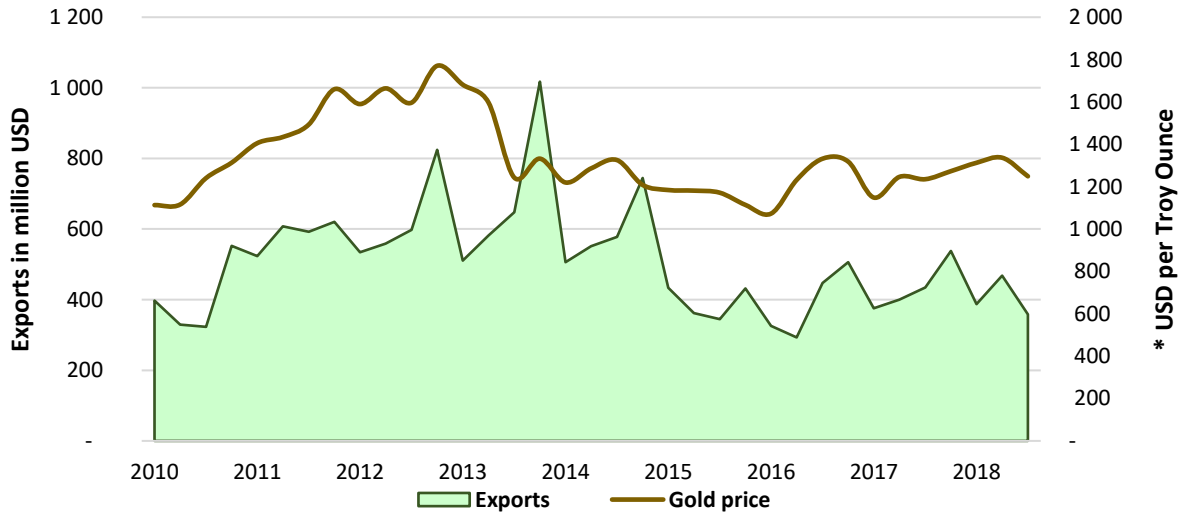
In 2017, the country exported goods worth $1840 million, the most significant commodity group in its structure was gold (38%), recent improvements in production of apparel, strengthened position of textile industry in exports as well. The main export destinations were Switzerland (27% of total exports), Kazakhstan (15%), Russia (15%) and the United Kingdom (10%) and 96% of exported gold went to

Switzerland and the United Kingdom. As a result of devaluation of gold price in world market in 2018, total exports shrank to $1765 million, however imports rose reaching $4907 million, by making them 2.8 times higher than exports.

Table 4. The composition of trade in Kyrgyz Republic in 2017

Main exported goods	% in exports	Exports in million USD	Main imported goods	% in imports	Imports in million USD
Gold	38%	700	Textiles	22%	1 290
Metal ores and scrap metal	9%	173	Footwear	14%	852
Apparel	8%	139	Petroleum and other fuels	12%	700
Fruits and vegetables	7%	121	Machinery and electronics	12%	697
Footwear	3%	52	Foodstuffs	11%	653
Car parts	2%	42	Chemical products	7%	432
Jet fuel	2%	39	Metals	6%	388
Rolling glass	1%	27	Vehicles	4%	224
Cotton	1%	25			
Electricity	1%	25			
Cigarettes	1%	22			

Figure 14. The trends of exports of Kyrgyz Republic and gold price



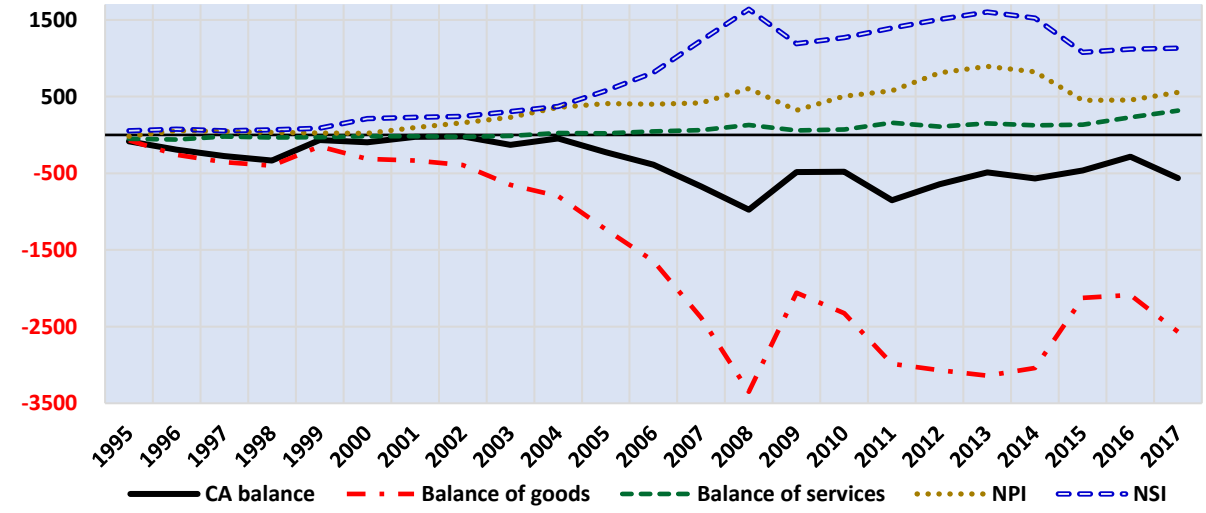
*Data sources: The World Bank, *The Federal Reserve System*

Moldova

One of the key difficulties of the Moldovan economy is its orientation towards domestic demand in the context of a massive outflow of population from the country. It is growing at the expense of the service sector, but trade revenues are mainly collected from exports of goods. The share of goods in the economy has been steadily decreasing from year to year, for example, in 1998, the share of goods in GDP was more 40%, and in 2017, this indicator balanced at around 25%. Today the main engine of growth is concentrated

in trade and catering, in spheres which do not create real added value unlike education, medicine and these sectors are not export oriented. Another chronic problem is an imbalance in the structure of exports and imports, as Moldova imports two times more than it exports. Thus, the model of the economy was built on massive imports and domestic consumption. For the country, besides the goods traditionally produced by it, it has not been possible for almost three decades to create some kind of new industry in response to the demands of global demand. There is also an abnormal situation when, with an increase in exports to some countries, exports to others are sure to decrease, which indicates the very limited possibilities of the national economy. Moreover, in response to the needs of global demand, the country could not manage to create any forms of new industry besides the goods traditionally produced for almost three decades, the observed situation, when, with an increase in exports to certain countries, exports to other countries automatically reduces, demonstrates a very limited capacity of the national economy.

Figure 15. The composition of CA balance of Moldova in million USD



Source: The World Bank

Over the past 10 years, the CA balance of Moldova in comparison with other 3 countries under the sample behaved more steadily by fluctuating around negative $500 million, and reaching $562 million in 2017 *(Figure 15)*. An unstable trade balance with a relatively steady net secondary income were the key determining components of the CA balance and a huge deficit of $2569 million (27% of GDP) created by trade with goods was mitigated mostly by remittances of individuals working abroad, and to a lesser extent by NPI and the balance of services. Foodstuffs and textiles traditionally dominate in the structure of exports, while the country mainly imports machinery and equipment, chemicals, oil and foodstuffs. The main trading partners of the country are Romania (20% of total trade), Russia (13%), Ukraine (10%), Germany (8%), Turkey (6%), China (5%) and Italy (5%). In the balance of services, a net revenue of $317 million was gained in transportation services (33%), travel (26%), telecommunications and information services (14%) and business services (9%), while the expenditures for services came into the same categories of services: transportation (37%), travel (32%), business and consultancy (11%) and telecommunications (9%).

Total remunerations of resident employees received from non-residents ($839 million) far surpassed non-residents net incomes from investments ($205 million), which led to net primary surplus of $557 million.

According to the estimates, population of Moldova had dropped from 3.3 to 2.8 million within 10 years (2004 -2014)[6]. These numbers came as a result of the mass emigration that occurred after the collapse of the Soviet Union, when people faced with economic instability, a sharp drop in income levels and rapidly growing unemployment, began to emigrate on a large scale in the first half of the 1990s. The Russian Federation, the EU countries, Ukraine, Turkey and Israel were the main destinations of emigration, on the grounds these factors, the country's economy directly depends on the economies of neighbouring countries, like Romania and Ukraine, and especially on the Russian economy. In 2014, the country experienced significant damage due to the tension related the Crimean Peninsula. This situation consequently, led to depreciation of Moldovan leu against USD by 17% and against euro by 7%, which to some extent also affected to reduce incoming remittances from Ukraine and the Russian Federation. In 2017, Moldova had $1133 million surplus in net secondary income predominantly supported by official remittances worth $1270 million that comprised 16% of country's GDP.

Table 5. The composition of trade in 2017 in Moldova.

Main exported goods	% in exports	Exports in million USD	Main imported goods	% in imports	Imports in million USD
Textiles	17%	493	Machines	18%	936
Fruits and vegetables	14%	416	Foodstuffs	14%	726
Insulated wire	12%	350	Chemical products	12%	594
Sunflower seeds	8%	225	Petroleum	9%	475
Foodstuffs	8%	224	Textiles	9%	453
Metals	7%	211	Metals	9%	447
Wheat	5%	147	Vehicles	7%	341
Wine	4%	119	Plastics	6%	305
Medicaments	2%	58	Construction materials	3%	128

[6] http://www.md.undp.org/content/moldova/en/home/blog/2018/making-the-most-of-emigration.html

Chapter 4. Empirical analysis

4.1. The geometry of debt sustainability

4.1.1. Methodology

"The geometry of debt sustainability" (GDS) is used for the analyses of external debt sustainability which is extends the analysis of Pasinetti (1998). The Pasinetti model describes the relationship between the debt-to-GDP ratio — and the country's overall budget balance and sets the boundaries that define the sustainability area of public finances, within which the debt ratio does not increase.

The GDS is based on NICA, which is analogue to a primary surplus in the case of an internal public debt. NICA and GDP are interrelated, as well as the amount of debt to GDP. The model illustrates ratios of NICA to GDP and debt to GDP, which are interconnected. In the long term, this means, that debt should tend to zero. The GDS makes it possible to evaluate the effectiveness of various debt relief measures and offers a new perspective and an analytical explanation of some of the possible policy actions. If, in accordance with Pasinetti's model, budget sustainability normally focuses on primary surplus, in the GDS model in open economy conditions, this indicator is equivalent to the CA balance. CA estimates difference in the net external position relative to the rest of the world, deficit of which provokes an escalation in net external liabilities. However, for this analysis, it is preferable to use NICA, which can be presented by the Trade Balance, but the latter does not cover grants and remittances. NICA is a source, from which foreign debt can be repaid in the long term, and it's value independent on debt and excludes interest payments, and implementation of NICA provides more fitting estimation for long-term external sustainability (Vaggi and Prizzon, 2013).

The model uses the following indicators:

i – nominal interest rate,

D – debt stock,

ΔD - change in debt stock,

iD - interest payments.

Assuming that the capital account (KA) as an indicator of changes in net external liabilities includes only debt flows: KA ≡ ΔD, we get NICA ≡ - ΔD + iD. After dividing the equation by Y (GDP):

$\frac{\mathrm{NICA}}{\mathrm{Y}} \equiv \frac{\mathrm{iD}}{\mathrm{Y}} - \frac{\Delta \mathrm{D}}{\mathrm{Y}} \Rightarrow \frac{\mathrm{NICA}}{\mathrm{Y}} \equiv \frac{\mathrm{D}}{\mathrm{Y}}(\mathrm{i} - \frac{\Delta \mathrm{D}}{\mathrm{Y}} * \frac{\mathrm{Y}}{\mathrm{D}})$ From this equation, we define:

$\frac{\mathrm{NICA}}{\mathrm{Y}} = nica,\ \frac{\mathrm{D}}{\mathrm{Y}} = d,\ \frac{\Delta \mathrm{D}}{\mathrm{Y}} = d',\ \frac{\Delta \mathrm{D}}{\mathrm{D}} = \theta$ Here, θ is a growth rate of debt stock.

$nica = (i - \theta)d$

In a condition of not increasing debt, the growth rate of GDP must be equal to or higher than the growth rate of debt $(g \geq \theta)$.

$nica \geq (i - g)d$ (1)

The resulting inequality can be entered in a two-story graph, the vertical axis of which represents the ratio of NICA to GDP, while the horizontal axis represents the ratio of debt to GDP. There are three different scenarios in a typical situation for developing countries where $nica < 0$, and $i < g$.

First, the debt ratio is constant if the country is at the boundary in all combinations of nica and d. Secondly, the debt ratio decreases if the country is above the boundary relations, $nica > (i - g)d$. The stability domain is above the boundary relation, including the boundary relation itself. Third, the debt ratio increases if the country is below the boundary ratio, $nica < (i - g)d$. Here, low growth rates in relation to the interest rate will not be able to cover the high negative *nica*.

The lower part of the graph is complemented by the equation for the state of the debt ratio, which describes the change over time of the debt-to-GDP ratio:

$d' = d(i - g) - nica$ (2)

The stabilization of the debt ratio for equation (1) and (2) are similar. In the last equation, value of *nica* is a parameter. Since in the absence of debt (d = 0) equation changes to $d' = - nica$. The stability of debt is often associated with equation (2), with predetermined values of *nica*, *i*, and *g*, an increase in the debt ratio shifts the country to the right, approaching the area of sustainability.

The GDS allows to analyse the relationship between two main sides of the financial aspects of debt sustainability. The debt ratio, on the one hand, can be kept in steady state, in the event that it can go on the irrevocable path in a country with a *nica* deficit. Contrarily, debt repayment in the future can be guaranteed only when *nica* has a surplus. The accomplishment of a balanced debt-to-GDP ratio can be challenging from an economic point of view, but can be achieved in a short period. However, in a low-income economy, it needs sufficient time and requires a process of structural changes due to weak diversification of exports and obstacles in shifting from deficit to surplus of *nica*. Debt is a phenomenon, for which the short-term and long-term periods are interrelated, the GDS illustrates the relationship amidst the two time dimensions, but accentuates the important role of *nica* in this general process.

4.1.2. Data description

The following indicators for 4 countries, namely Armenia, Kazakhstan, Kyrgyz Republic and Moldova are used in the GDS model:

Variables	Description	Frequency	Sample	Source
GDP	in current USD	annual	2008-2017	WB
CA balance	in current USD	annual	2008-2017	WB
Total external debt stock	in current USD	annual	2008-2017	WB
Interest payments	in current USD	annual	2008-2017	WB

Interest rescheduled	in current USD	annual	2008-2017	WB

In the analysis, indicators for two time intervals, for 2017 and the arithmetic means for 2008–2017 were taken, except, debt to GDP ratio (d) of where value of total external debt stock for 2017 and an average GDP for 10 years were calculated.

Based on the above five indicators, the following variables are measured according to equations 1 and 2:

NICA to GDP ratio *(nica)*

NICA = CA balance - Interest payments, NICA/GDP = *nica*.

nica for 2008-2017:

$$nica = \frac{\sum_{i=2008}^{10}(\text{CA balance}) + \sum_{i=2008}^{10}(\text{interest payments})}{\sum_{i=2008}^{10}(\text{GDP})}$$

Change in debt stock to GDP ratio *(d')*

Change in debt stock (ΔD) is a change in total external debt stock over a year $\Delta D = D_1 - D_0$

$d' = \frac{\Delta D}{GDP}$,

d' for 2008-2017: $\Delta D = D_{2017} - D_{2007}$

$$d' = \frac{\Delta D}{\sum_{i=2008}^{10}(GDP)}$$

Annual nominal growth rate of GDP *(g)*

The nominal GDP growth rate is required for the GDS. Annual nominal growth rate is weighted in USD as the difference in nominal GDP within a year divided by the GDP of the base year.

g for 2017: $g = \frac{GDP2017 - GDP2016}{GDP2016}$ and

g for 2008-2017: $g = \left[\left(\frac{GDP2017}{GDP2007}\right)^{\frac{1}{10}} - 1\right]$

The groundings for applying USD are, first, nominal GDP growth rates in national currency distort the estimate due to the high volatility of local currencies with high inflation, secondly, the share of USD in total external debt stock in 2017 was 72% in Armenia, 98% in Kazakhstan, 74% in Kyrgyz Republic, and 53% in Moldova (WB, 2017).

Annual interest rate *(i)*

Considering that private debt has a large share in total debt stock in all 4 chosen countries *(in graph)*, in addition, due to lack of reliable data in official sources about average interest rates for total and private debts and about scheduled interest payments for previous years, *i* was estimated in the following way:

i for 2017: $i = \frac{\text{interest payments + rescheduled interest payments}}{\text{total external debt stock}}$ and

i for 2008-2017: $$i = \frac{\sum_{i=2008}^{10}(\frac{\text{interest payments + rescheduled interest payments}}{\text{total external debt stock}})}{10}$$

4.1.3. Findings

During 2008-2017 a nominal growth of GDP in USD was equal to the average interest rate on external debt (i = g) in Armenia, while the ratio of NICA deficit was 7% of GDP, gross external debt equalled with GDP and the average growth over 10 years reached 5%, which far exceeded GDP growth *(g)* in corresponding period. These indicators are reflected in the chart by a dot, which is located below the two lines *(Figure 17)*. Also, the situation with weak economic growth *(i = g)* sends the line exactly on the horizontal grid, which in turn being a parallel in the lower table does not intersect the d axis. Consequently, this explains that in order to achieve a not growing debt balance *(d '= 0)*, the country will have to endlessly walk along a horizontal line, increasing its debts. To overcome the situation, it is necessary to improve the CA balance, then the line *nica = (i-g)*d* line shifts down, in case of an increase in GDP growth, the slope rotates downwards. In 2017, due to high growth rate of GDP in USD terms (peaked at 9.4%) with stable exchange rates the situation changed remarkably, the relationship between *i* and *g* was improved, the upper angle of the line decreased, and the country was already in the zone of sustainability. Despite an increase of the total debt stock to 90% of GDP, average growth rate of debt shrank twice to 3%. In this case, according to the GDS model, the country representing a declining external debt and should move to the left to the beginning point of horizontal axis reducing debt to GDP ratio close to zero.

Based on average numbers for 10 years, having NICA surplus Kazakhstan was above the boundary area, however resembling the case with Armenia when difference between i and d was almost close to zero what characterizes a more horizontal line with an acute angle. Despite the deficit of NICA in 2017, the country improved overall performance, and found itself in the sustainability zone as a result of the expansion of the latter, shaped by growth of nominal GDP expressed in USD by 18.7%, at the same time having stable interest rate, whilst debt growth rate dropped by 1% in 2017 comparing with the corresponding period. According to the scenario of the model, the country with a constant *i* and *g* level should shift far to the left reducing its debt to GDP ratio significantly from 1.03 to less than 0.10 *(Figure 18).*

Kyrgyz Republic external debt was not sustainable over the period from 2008 to 2017, largely because of enormous deficit in NICA balance, which amounted to 11% of GDP in average. Thus, the current positive difference between *g > i* was not enough for the optimistic scenario as here the country had to rise debt until it becomes 1.8 times higher than GDP *(Figure 19)*. In 2017, a deficit of NICA reduced by half and reached 6% of GDP, whereas a total volume external debt overtook GDP level. In addition, growth rate of debt was 3% in 2017 compared with average 7% in 10 years. Meanwhile, high GDP growth rates at a given level of debt shifted the country to sustainability area. Here with constant values of *nica, i* and *g*, the country is expected to lower debt to GDP ratio to 0.5.

Almost the same situation was observed in Moldova for 2008-2017, except that the level of debt growth was slightly at lower level (5%). Similarly, the country had to increase of debt to GDP ratio more than 1.5

to achieve the stability level *(Figure 20)*. If in 2017 the country's real GDP in national currency increased by 4.5%, then the nominal GDP reflected in USD increased by 19% from 6.8 billion to 8.1 billion caused by a sharp strengthening of the national currency in relation to USD. This in turn had an impact on the indicator *(i-g)* by significantly increasing its downward slope.

Although Moldova ended up in sustainability area, there was no noticeable improvement in *nica* and *d '*. For example, the NICA deficit only decreased from 7% to 6%, while growth rate of debt increased from 5% to 9%.

According to the results, it can be construed that, as of 2017, Armenia, Kyrgyz Republic and Moldova having improved their economic indicators achieved external debt sustainability, which is impossible to assert on the basis of data for 2008-2017. Kazakhstan, on the other hand, diminished its NICA position, but still remained sustainable. This improvement was largely observed due to stabilization or fall (in the case of Moldova) USD exchange rate in relation to the local currencies (Graphs 5-8), and due to increase in prices of copper (Armenia) and oil (Kazakhstan) during 2017 (Graphs 9-10). However, since developing economies are often prone to shocks and various fluctuations, also considering that the GDS sustainability criteria is also subject to variations from year to year, it is impossible to determine with certainty that this situation observed in 2017 will persist in the following years.

4.2. Feve and Henin approach to assess sustainability of debt

4.2.1. Data description and methodology

Feve and Henin (1998) applied the model of a standard approach to sustainability in order to assess the intertemporal budget constraint of the government. The model consists of two parts, in the first part the state of the primary balance under which the country can achieve the sustainability of public debt is calculated by accounting method. In this paper, an extended version of the first part of the Feve and Henin model for external debt is used. In the second part, an econometric analysis is practiced to determine the stationarity of debt and foreign trade indicators. The following variables are used in the first part of the analysis:

Variables	Description	Frequency	Sample	Source
GDP	in current USD	annual	1997-2017	WB
CA balance	in current USD	annual	1997-2017	WB
Total external debt stock	in current USD	annual	1997-2017	WB
Nominal interest rate	in levels	annual	1997-2017	See 4.1.2.
Nominal GDP growth rate	in levels	annual	1997-2017	See 4.1.2.

It is assumed that the current amount of debt depends on the previous levels of debt and interest rate with the balancing effect of the current deficit or surplus of the CA balance.

$D_t = D_{t-1}\,(1 + i_{t-1}) - CA_t$

Here, D_{t-1} and D_t are previous and current levels of external debt stock.

i_{t-1} – previous nominal interest rate.

CA_t – the CA balance. With its positive value in the level of debt is reduced, and the negative value is compensated by new borrowings.

If we divide the formula by the expected level of GDP (Y_t) we get:

$$\frac{D_t}{Y_t} = \frac{(1 + i_{t-1})D_{t-1}}{Y_t} - \frac{CA_t}{Y_t} \quad \Rightarrow d_t = \frac{(1 + i_{t-1})D_{t-1}}{Y_t} - ca_t$$

$Y_t = Y_{t-1}(1 + g_{t-1})$ Hence, g – GDP growth rate.

$$d_t = \frac{(1 + i_{t-1})d_{t-1}}{(1 + g_{t-1})} - ca_t$$

Sustainability condition of requires $d_t = d_{t-1}$, this implies:

$$ca_t = \frac{(i_{t-1} - g_{t-1})}{(1 + g_{t-1})} * d_t$$

Here, ca_t represents the border level of CA balance to GDP ratio at which foreign debt will become sustainable.

In accordance with Feve and Henin (1998) the absence of unit root at level for debt to GDP ratio is a necessary condition of debt sustainability. To verify this, in EViews, ADF test was applied for four variables with Akaike criterion a maximum of 8 lags for quarterly data.

Variables	Description	Frequency	Sample	Source
*External debt / GDP	in levels	Quarterly	1999Q1 - 2017Q4 (Armenia) 2001Q1 - 2017Q4 (Kazakhstan) 2003Q1 - 2017Q4 (Kyrgyz Republic) 2006Q1 - 2018Q4 (Moldova)	IMF, *the Central banks of the countries
CA balance / GDP	in levels	Quarterly		
*External debt / Exports	in levels	Quarterly		
CA balance / Exports	in levels	Quarterly		

4.2.2. Findings

According to the first part of the test, the calculation of the required level of CA surplus was carried out, as well as, the gap between this indicator and observed CA balance. Positive values in gaps on tables (6-9)

indicate sustainability of external balances. Corresponding to the outcome of the assessment, based on 21 observations sustainability hypothesis was verified only in 4 cases for Armenia, in 12 cases for Kazakhstan, in 9 cases for Kyrgyz Republic and in 7 cases for Moldova. Following the results of ADF test, stationarity of debt to GDP ratio integrated at the order of zero was determined only in Moldova. However, other indicators of the country were integrated at first order, which is not sufficient to reject null hypothesis of presence of a unit root. Stationarity of the CA balance to GDP ratio was proved for Kazakhstan, and stationarity of the CA balance to exports ratio was verified for Armenia. Kyrgyz Republic did not meet sustainability criteria in all variables.

Results of ADF tests for Armenia

Variable	ADF value	Critical value (5%)	Prob critical	Integration degree
External debt / GDP	-3,1751	-1,9455	0,0019	I(I)
CA balance / GDP	-3,5123	-2,9036	0,0104	I(I)
External debt / Exports	-2,4131	-1,9455	0,0163	I(I)
CA balance / Exports	-2,9454	-2,9036	0,0453	I(0)

Results of ADF tests for Kazakhstan

Variable	ADF value	Critical value (5%)	Prob critical	Integration degree
External debt / GDP	-4,2613	-1,9462	0,0001	I(I)
CA balance / GDP	-2,3077	-1,9462	0,0214	I(0)
External debt / Exports	-7,4220	-1,9458	0,0000	I(I)
CA balance / Exports	-6,3069	-1,9462	0,0000	I(I)

Results of ADF tests for Kyrgyz Republic

Variable	ADF value	Critical value (5%)	Prob critical	Integration degree
External debt / GDP	-3,6506	-1,9470	0,0005	I(I)
CA balance / GDP	-9,6842	-1,9468	0,0000	I(I)
External debt / Exports	-3,1497	-1,9469	0,0022	I(I)
CA balance / Exports	-8,9665	-1,9468	0,0000	I(I)

Results of ADF tests for Moldova

Variable	ADF value	Critical value (5%)	Prob critical	Integration degree
External debt / GDP	-2,3877	-1,9480	0,0179	I(0)
CA balance / GDP	-7,2600	-1,9478	0,0000	I(I)
External debt / Exports	-3,0052	-1,9489	0,0035	I(I)
CA balance / Exports	-5,8138	-1,9480	0,0000	I(I)

Figure 17. The GDS results for Armenia

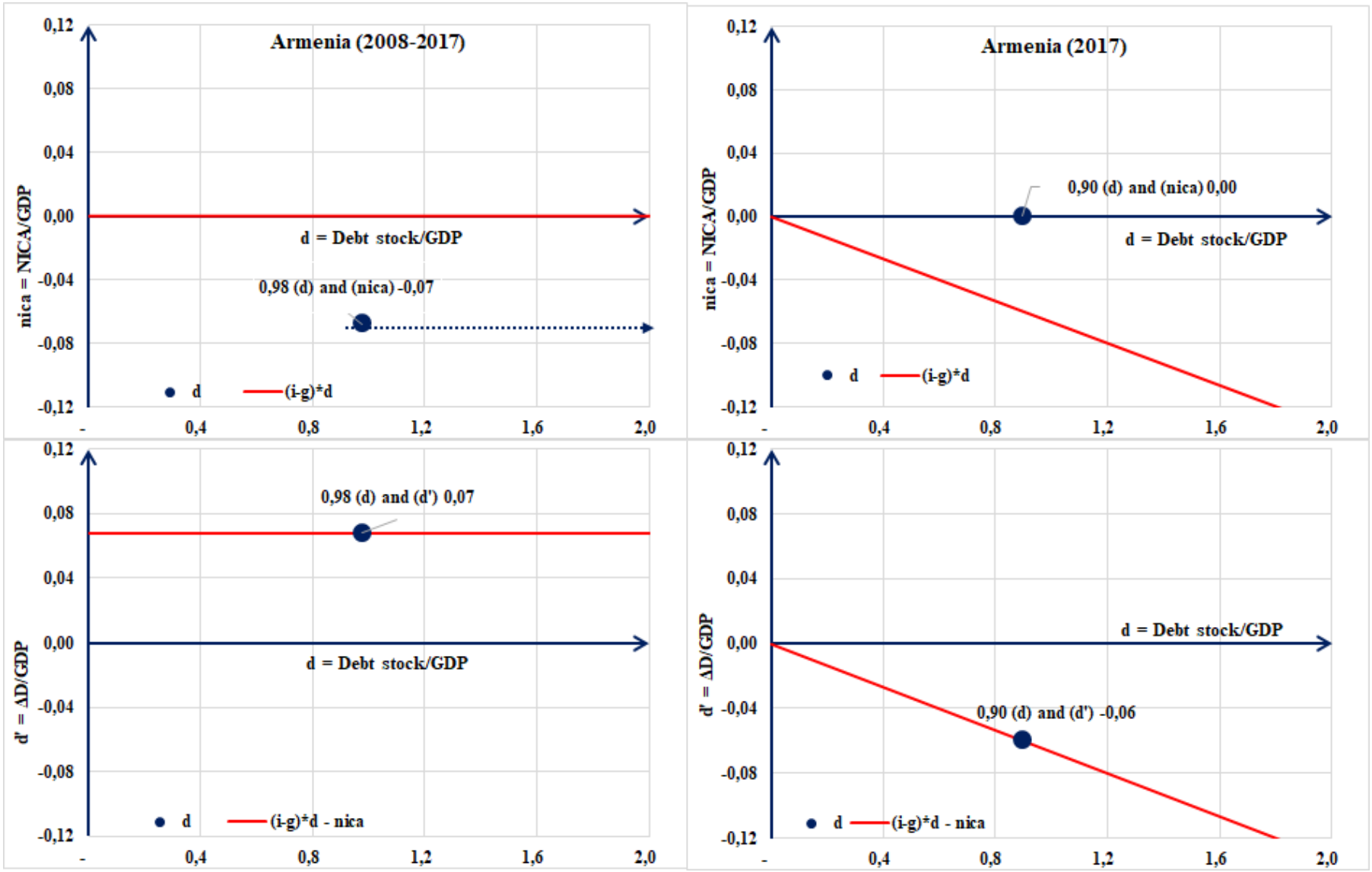


Figure 18. The GDS results for Kazakhstan

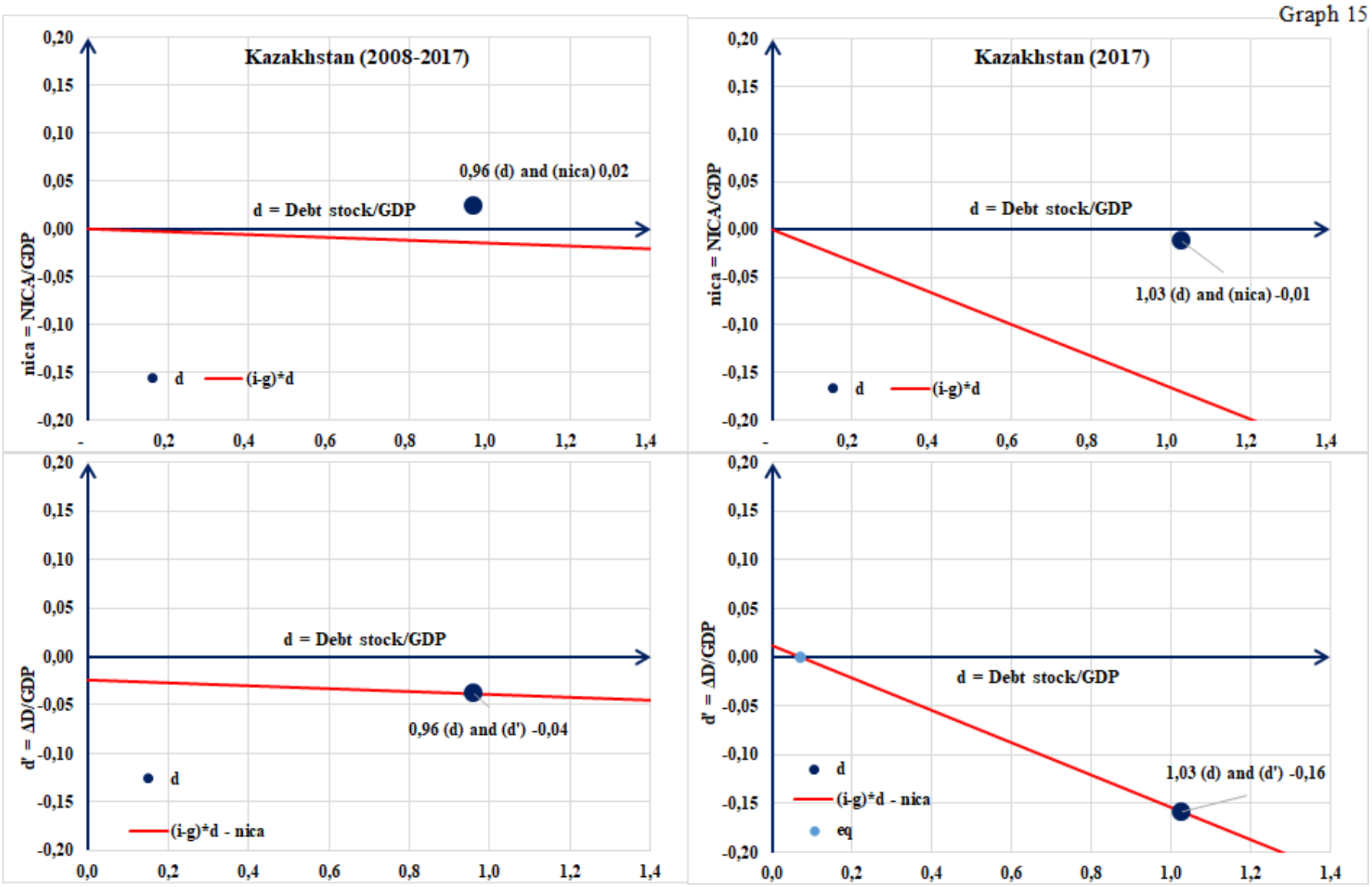


Figure 19. The GDS results for Kyrgyz Republic

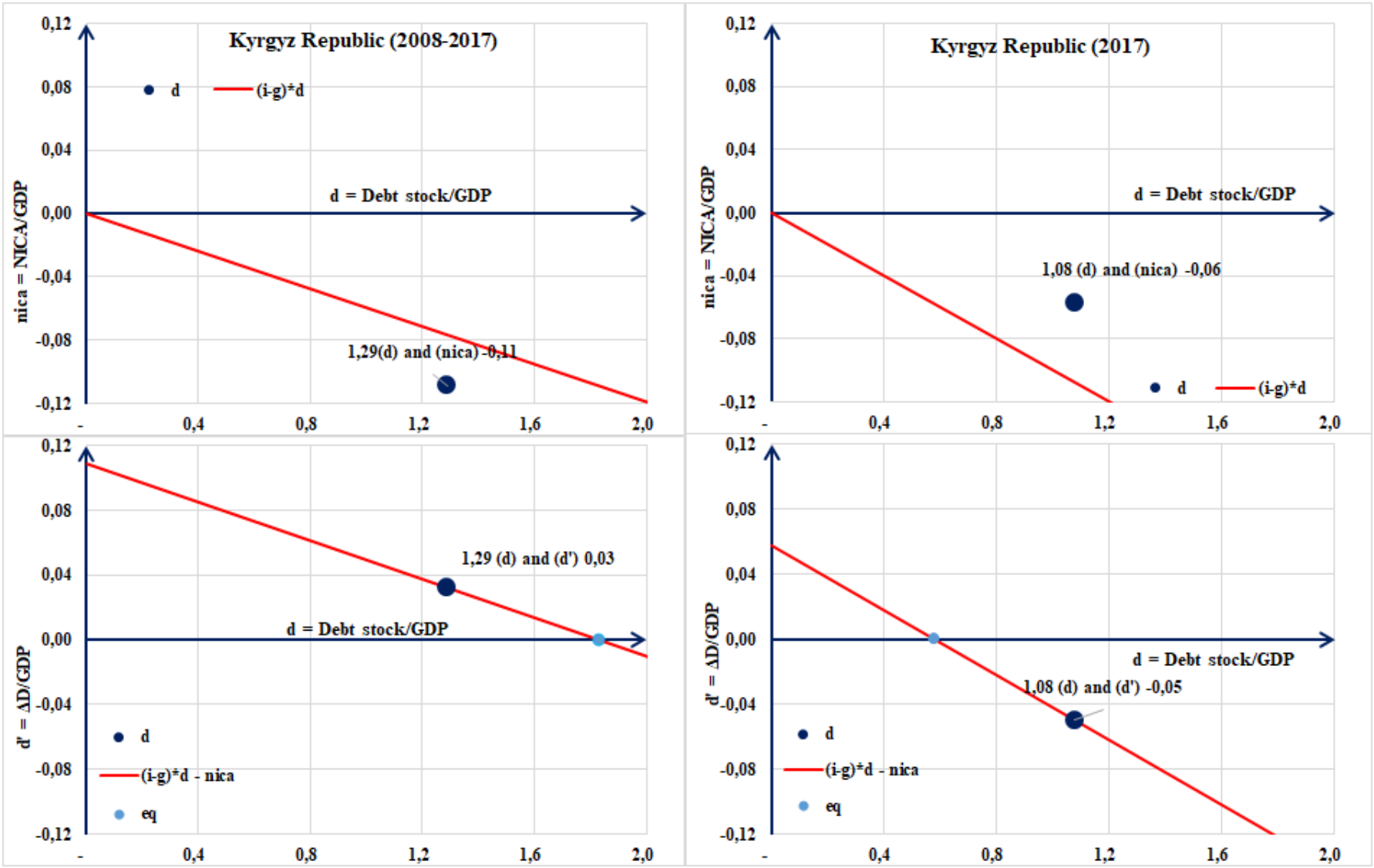
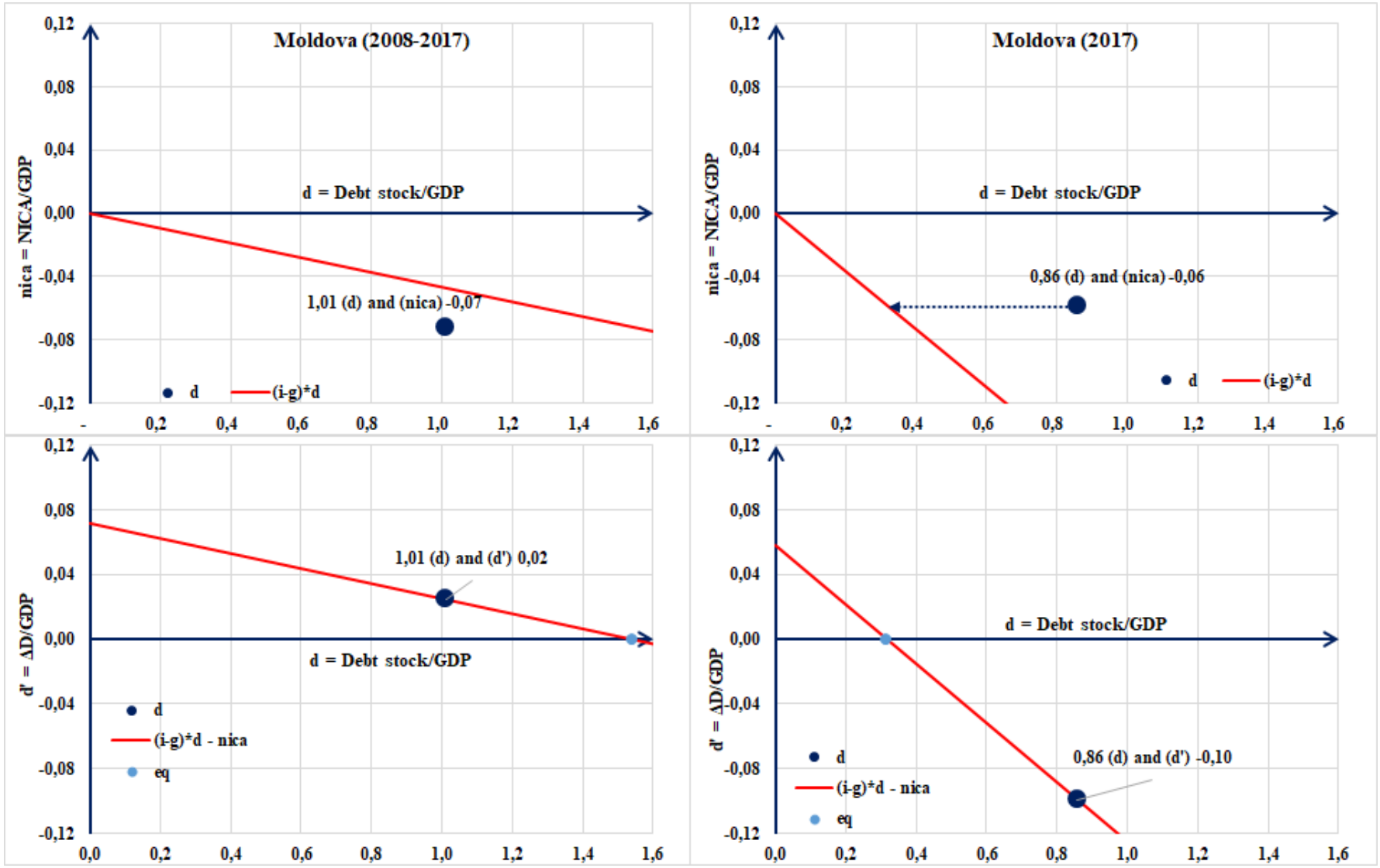


Figure 20. The GDS results for Moldova



Chapter 5. Conclusion

The economies of Armenia, Kazakhstan, Kyrgyz Republic and Moldova experienced several stages of severe shock from the influence of external and internal factors. If during the first stage after independence, the countries were in an unstable macroeconomic situation, largely due to factors such as changes in the political situation, legislative base and transition to a market economy. The next upheaval was caused by the financial crisis of 2007–2008, after which the components of CA balances of the countries deteriorated so dramatically that in absolute terms they have not greatly improved to this day.

Today, the economic growth of Armenia, Kazakhstan and Kyrgyz Republic is supported mainly by the export of minerals such as copper, oil and gold, whereas Moldova has more diversified exports structure, although its composition is dominated by low value added goods and agricultural products. Remittances from migrants are also one of the key funds for maintaining the CA balance for Armenia, Kyrgyz Republic and Moldova.

The GDS results for 2008-2017 showed that all countries except Kazakhstan had negative CA balances being below sustainability area, caused primarily by a constant NICA deficit and due to the unfavourable difference between growth and interest rates. However, the observations for 2017 showed a remarkable improvement in the performance of all countries mainly due to growth of GDP, in 2017, which in terms of USD in Armenia reached 9.4% (0.0% in 2016), in Kazakhstan 18.7% (-25.5% in 2016), in Kyrgyz Republic 11.0% (2.0% in 2016) and in Moldova 19.6% (4.3% in 2016). The noteworthy feature is that these optimistic results occurred due to abnormal conditions caused by excessively favourable conditions in world's commodity markets and an improvement in national currencies in relation to USD. Obviously, this trend is unlikely to repeat for 1-3 years ahead, and structural changes are necessary to keep these criteria at a sustainable level for the long term. In addition, the GDS assessment does not show the evolution of sustainability over time, since, depending on the change of variables, the indicators determining criteria are subject to change as well. Conflicting information was obtained from stationarity tests during which the state of sustainability was proven only for Moldova. This is largely due to the long time series used for the sample, which included shocks during the financial crisis. However, checking the estimates for the post-crisis period results in a loss of the number of observations.

The stability of the current balance was observed only before the crisis period in Armenia (2002-05) of Kyrgyz Republic (2000-08) in Moldova for (2000-04), and in Kazakhstan it lasted within 2001-13. However, in general, the analysis for 1997-2017 revealed that almost all countries did not have funds in the form of net revenues from foreign economic operations in order to maintain their debts at a sustainable level.

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Appendix A. The results of sustainability conditions of current account balances

Armenia

Years	$i_{t-1}-g_{t-1}$	$1+g_{t-1}$	d_t	ca_t	ca_t (balancing)	Gap
1997	-0,069	1,088	0,389	-0,205	-0,025	-0,180
1998	-0,001	1,027	0,425	-0,220	0,000	-0,219
1999	-0,129	1,155	0,554	-0,169	-0,062	-0,107
2000	0,049	0,975	0,533	-0,158	0,027	-0,185
2001	-0,016	1,036	0,666	-0,104	-0,011	-0,094
2002	-0,092	1,108	0,724	-0,062	-0,060	-0,002
2003	-0,103	1,122	0,711	-0,062	-0,066	**0,004**
2004	-0,166	1,181	0,589	-0,022	-0,083	**0,061**
2005	-0,248	1,274	0,402	-0,025	-0,078	**0,053**
2006	-0,350	1,370	0,335	-0,024	-0,086	**0,062**
2007	-0,268	1,303	0,335	-0,074	-0,069	-0,005
2008	-0,405	1,442	0,310	-0,142	-0,087	-0,055
2009	-0,242	1,267	0,571	-0,165	-0,109	-0,056
2010	0,279	0,742	0,681	-0,136	0,256	-0,392
2011	-0,056	1,071	0,731	-0,104	-0,038	-0,066
2012	-0,072	1,095	0,719	-0,100	-0,047	-0,052
2013	-0,025	1,047	0,781	-0,073	-0,019	-0,054
2014	-0,027	1,047	0,737	-0,076	-0,019	-0,057
2015	-0,019	1,044	0,846	-0,026	-0,016	-0,010
2016	0,116	0,909	0,944	-0,023	0,120	-0,143
2017	0,028	0,999	0,896	-0,024	0,025	-0,050

Kazakhstan

Years	i_{t-1}-g_{t-1}	1+g_{t-1}	d_t	ca_t	ca_t (balancing)	Gap
1997	0,012	1,032	0,184	-0,036	0,002	-0,038
1998	-0,002	1,054	0,274	-0,055	-0,001	-0,055
1999	0,046	0,999	0,391	-0,010	0,018	-0,028
2000	0,284	0,762	0,705	0,020	0,262	-0,242
2001	-0,023	1,084	0,692	-0,063	-0,014	-0,048
2002	-0,162	1,211	0,748	-0,042	-0,100	**0,059**
2003	-0,073	1,112	0,753	-0,009	-0,049	**0,040**
2004	-0,217	1,252	0,770	0,008	-0,134	**0,141**
2005	-0,372	1,399	0,768	-0,018	-0,204	**0,186**
2006	-0,284	1,324	0,919	-0,025	-0,197	**0,172**
2007	-0,387	1,418	0,918	-0,080	-0,250	**0,171**
2008	-0,257	1,294	0,800	0,047	-0,159	**0,206**
2009	-0,232	1,273	0,952	-0,036	-0,173	**0,137**
2010	0,188	0,864	0,805	0,009	0,175	-0,165
2011	-0,243	1,284	0,645	0,053	-0,122	**0,175**
2012	-0,251	1,301	0,652	0,005	-0,126	**0,131**
2013	-0,063	1,080	0,633	0,005	-0,037	**0,042**
2014	-0,120	1,138	0,712	0,028	-0,075	**0,103**
2015	0,085	0,936	0,832	-0,028	0,076	-0,104
2016	0,191	0,833	1,193	-0,065	0,274	-0,339
2017	0,274	0,745	1,028	-0,033	0,378	-0,411

Kyrgyz Republic

Years	i_{t-1}-g_{t-1}	1+g_{t-1}	d_t	ca_t	ca_t (balancing)	Gap
1997	-0,042	1,100	0,759	-0,078	-0,029	-0,049
1998	0,076	0,967	0,914	-0,221	0,072	-0,293
1999	0,110	0,931	1,483	-0,147	0,176	-0,323
2000	0,272	0,759	1,415	-0,056	0,506	-0,562
2001	-0,054	1,097	1,196	-0,012	-0,059	**0,047**
2002	-0,078	1,113	1,219	-0,018	-0,086	**0,068**
2003	-0,031	1,053	1,120	-0,022	-0,033	**0,011**
2004	-0,175	1,195	1,158	0,013	-0,170	**0,183**
2005	-0,134	1,152	0,917	-0,015	-0,106	**0,091**
2006	-0,093	1,112	0,916	-0,101	-0,076	-0,025
2007	-0,138	1,152	0,757	-0,060	-0,091	**0,031**
2008	-0,327	1,342	0,706	-0,139	-0,172	**0,033**
2009	-0,337	1,352	0,878	-0,043	-0,219	**0,176**
2010	0,099	0,912	0,859	-0,099	0,093	-0,192
2011	-0,004	1,022	0,886	-0,077	-0,004	-0,073
2012	-0,280	1,293	0,914	-0,155	-0,198	**0,042**
2013	-0,056	1,066	0,929	-0,138	-0,049	-0,089
2014	-0,101	1,111	0,976	-0,174	-0,089	-0,086
2015	-0,008	1,018	1,130	-0,158	-0,009	-0,149
2016	0,116	0,894	1,164	-0,116	0,151	-0,267
2017	-0,010	1,020	1,079	-0,069	-0,010	-0,059

Moldova

Years	i_{t-1}-g_{t-1}	1+g_{t-1}	d_t	ca_t	ca_t (balancing)	Gap
1997	0,083	0,967	0,561	-0,142	0,048	-0,190
1998	-0,091	1,139	0,630	-0,197	-0,051	-0,146
1999	0,171	0,880	1,014	-0,058	0,197	-0,255
2000	0,365	0,689	1,429	-0,076	0,757	-0,833
2001	-0,057	1,100	1,209	-0,018	-0,062	**0,044**
2002	-0,109	1,149	1,182	-0,012	-0,112	**0,100**
2003	-0,090	1,122	1,068	-0,066	-0,086	**0,020**
2004	-0,167	1,192	0,814	-0,018	-0,114	**0,097**
2005	-0,275	1,312	0,743	-0,076	-0,156	**0,080**
2006	-0,118	1,150	0,769	-0,113	-0,079	-0,034
2007	-0,095	1,141	0,765	-0,152	-0,064	-0,089
2008	-0,257	1,291	0,615	-0,161	-0,122	-0,039
2009	-0,349	1,376	0,683	-0,089	-0,173	**0,084**
2010	0,121	0,898	0,813	-0,083	0,109	-0,192
2011	-0,051	1,068	0,744	-0,121	-0,036	-0,086
2012	-0,189	1,207	0,730	-0,088	-0,115	**0,026**
2013	-0,023	1,038	0,777	-0,061	-0,017	-0,044
2014	-0,080	1,096	0,733	-0,071	-0,053	-0,018
2015	0,016	1,000	0,938	-0,071	0,015	-0,086
2016	0,195	0,816	0,918	-0,042	0,220	-0,262
2017	-0,029	1,043	0,858	-0,069	-0,024	-0,045