EURASIAN FUND FOR STABILIZATION AND DEVELOPMENT WORKING PAPER WP/20/1

Kyrgyz Republic Debt Sustainability and External Shocks

Evgeny Vinokurov, Natalia Lavrova, Victoria Petrenko

Keywords: debt sustainability, external shocks, Kyrgyz Republic, external debt, public debt, macroeconomic resilience.

JEL codes: E37, E44, H12, H63, H68, O23.

Authors' contact information:

Evgeny Vinokurov, Chief Economist: vinokurov_ey@eabr.org

Natalia Lavrova, Head of Unit, Macroeconomic Analysis and Statistics, Chief Economist Group:

lavrova_na@eabr.org

Victoria Petrenko, Economist, Chief Economist Group: petrenko_vd@eabr.org

The electronic version of this document is available at https://efsd.eabr.org/en/research/working-papers/

EFSD Working Papers reflect the Fund's research on global, regional, and country economic trends, economic modelling, macroeconomic analysis, sectoral analysis, global financial architecture, and other issues. This Working Paper was prepared by the staff of the Project Unit of the Eurasian Fund for Stabilization and Development in the Eurasian Development Bank. The conclusions and interpretation of the facts in the Working Paper do not necessarily reflect the official position of the EDB, the EFSD Council of Experts, the EFSD Council, or the EFSD member states.

Reprinting of the text for non-commercial purposes, in whole or in part, including large fragments, and placing the text on external electronic resources are permitted with a link to the original text.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
1. INTRODUCTION	
2. LITERATURE REVIEW	7
3. METHODOLOGY AND DATA	9
4. EMPIRICAL SUPPORT AND APPLICATION	14
5. RESULTS AND IMPLICATIONS	17
6. CONCLUSION	23
REFERENCES	24
APPENDIX 1. VAR ESTIMATION RESULTS	26
APPENDIX 2. FORECASTING POWER OF VAR MODEL	27

ACKNOWLEDGMENT

The authors are grateful to Tigran Poghosyan (IMF Resident Representative in the Kyrgyz Republic), Roman Mogilevsky (Associate Director, Institute of Public Policy and Administration at the University of Central Asia), Oleg Zasov (Deputy Director, Vnesheconombank Institute) and the EFSD Project Unit for valuable comments and recommendations. All remaining errors are the authors' responsibility.

EXECUTIVE SUMMARY

Over the last decade, the emerging market and developing economies have significantly increased their debt burden. In 2018, public debt in emerging economies amounted to 51% of GDP, a significant increase compared to 2008 (34%). Low-income developing countries demonstrated a similar trend, with their public debts surging from 30% to 45% of GDP over the same period.

The last three years have witnessed notable improvement in Kyrgyz Republic's debt position. Our debt sustainability analysis under the baseline scenario suggests that the dynamics of external and public debt would remain sustainable. External debt is expected to decline from 83.8% of GDP in 2018 to 76.5% of GDP in 2024. The total public debt will go down from 56.0% to 52.1% of GDP in 2024, reflecting the favourable growth/interest rate differential (that is, we expect growth rates to be higher than interest rates). However, the primary balance deficit and relatively high current account deficit would partially offset this positive effect. Also, the debt sensitivity to the exchange rate poses a certain risk to the medium-term outlook.

Nevertheless, the debt outlook in Kyrgyzstan remains fragile. The key drivers behind debt accumulation consist of (1) direct external factors, such as countries' high dependence on commodity prices and remittances and (2) indirect factors related to the significant share of forex-denominated debt, which makes Kyrgyzstan vulnerable to external shocks. Given the growing global imbalances, the impact of external factors will remain paramount in determining debt dynamics in the years ahead.

We examined the resilience of the Kyrgyz debt path under three stress-scenarios: (1) a global recession, (2) a financial crisis, and (3) the combination of a global recession and a financial crisis.

Analysis of external and public debt growth reveals high sensitivity of the Kyrgyz economy to a global slowdown, which we define as a recession in the global economy (only 1.5% and 0.5% growth in 2020 and 2021, respectively) and a decline in commodity prices. These adverse shocks, applied to the first year of simulations (2020), have a two-year effect, which implies a complete recovery in global growth and commodity prices only in 2022. The results of this simulation suggest that global recession is a key source of concern for the debt sustainability in Kyrgyzstan. Under this scenario, the debt level would increase significantly. We estimate that the external debt would peak at 91.9% of GDP in 2024 vs. 83.8% of GDP in 2018, and public debt would rise from 56.0% of GDP in 2018 to 65.8% of GDP in 2024. The response of external debt to the global recession shock is expected to arise primarily from the depreciation of the exchange rate and the deterioration in economic growth. Given the high share of foreign currency denominated debt, exchange rate and price changes have the most significant impact on debt dynamics and explains 9.9 p.p. (or more than 50% of debt to GDP growth compared to the baseline scenario) increase in external debt to GDP. The weakening of economic growth explains roughly 5.7 p.p. of the debt growth (or 30% of debt to GDP growth compared to the baseline scenario). The worsening of external conditions accompanied by an increase in the interest rate adds additional 3.4 p.p. to debt accumulation.

The impact of a financial shock on total debt appears to be much less pronounced, indicating that in general the debt level will be manageable. We also estimated the debt sustainability under the stress-scenario of financial crisis. The size of a financial shock is translated through around 30% spike of VIX in 2020, with the VIX returning to its previous level in 2021. Under this scenario, external debt is projected to decline to 82.7% of GDP – however, it would remain higher than one in the baseline scenario. Public debt would increase from 56.0% of GDP in 2018 to 57.6% in 2024. The debt trajectory will be mainly associated with a deterioration of economic growth, reinforced by currency depreciation and worsened fiscal positions. All in all, financial shocks do not require a significant adjustment in economic policy in order to stabilize the debt level. It confirms that the financial system remains shallow and constrained by limited funding resources in the Kyrgyz economy.

The scenario of economic crisis, which combines both shocks (i.e. the combination of a global recession and a financial crisis) entails higher uncertainty and will have a more pronounced long-term impact, which will impede the country's debt position. According to our estimates, this severe event will lead to 2% GDP decline and a spike in the interest rate. Hence, it will raise notable concerns about debt sustainability. The external debt is projected to increase to 100.8% of GDP, while the public debt may increase to 74.0% of GDP. The main channels of debt growth will stem from Som depreciation, which is expected to lead to an increase in external debt of about 14.1 p.p. of GDP (or 50% of debt to GDP growth compared to the baseline scenario) by 2024 with two additional factors: a decline in economic growth (9.2 p.p.) and a rise in external interest rates (5.6 p.p.), contributing to the negative impact. Currency depreciation will lead to some current account adjustment; however, its response may be limited partially due to relatively sustainable support from the remittances channel.

The empirical findings suggest that adverse external conditions can significantly raise the risk of debt distress. In an environment of heightened global and regional uncertainty, which compels the authorities to focus more on budget stimulus, a protracted debt accumulation may significantly limit the fiscal space. In addition, a significant impact of the primary deficit on the public debt dynamics points to the importance of fiscal discipline. Given the existing overvaluation of the exchange rate, the persistent current account deficit, and the dependence on remittances and commodity revenues, cautious approach to managing external debt dynamics is recommended.

1. INTRODUCTION

In the face of heightened global risks coupled with domestic uncertainty, authorities are confronted with a choice between economic growth and debt sustainability. However, attempts to enhance economic activity by relying on global finances have resulted in a growing debt burden, especially in emerging markets and developing economies. Concerns about debt sustainability have become even more pronounced as a period of a relatively favourable external environment was interrupted, taking a turn to a deterioration in global activity since 2018. Hence, apart from assessing the impact of domestic factors on debt accumulation, an analysis of other debt-driving forces is required. In order to ascertain to what extent debt growth was due to external shocks and how they are related to domestic macroeconomic variables, a debt sustainability analysis (DSA) was developed for the Kyrgyz Republic.

Geographically, Kyrgyzstan is of the world's most isolated countries. In addition to being land-locked, its neighbouring countries also face high transport costs (including neighbouring regions of China). Subnational connectivity remains challenging given the country's mountainous landscape. Owing to these obstacles, transport costs have remained elevated. Hence, infrastructure development is undeniably a foundation of sustainable economic growth. Historically, a wide range of challenges has restricted the country's ability to allocate a more significant portion of its budget for infrastructure. Over the last 30 years, the Kyrgyz Republic has managed the transition from a planned to a market economy and experienced two revolutions, in 2005 and 2010. The consequences of these events are still tangible. Economically, the Kyrgyz Republic is one of the smallest economies in Central Asia, with a GDP about \$8 bln and GDP per capita \$1.3 tnd (current prices), which increases the requirement for investment and infrastructure development. In addition, the Kyrgyz economy is fragile to alterations in external environment: It has remained (1) one of the most remittance-dependent countries in the world, and (2) heavily dependent on gold exports, which account for 30% of its total exports. Although the country's rich mineral resource endowment contributes to its economic development, it also makes the Kyrgyz economy more vulnerable to external shocks and increases the importance of diversification and investment.

The combination of these divergent factors resulted in high but volatile economic growth, which only since 2013 stabilized at the 4% level. Over the past decade, Kyrgyz economic development was stronger than average global growth, enabling the country to make notable progress by converging upon the rank of the lower-middle-income economies. While this is a positive change, it raised uncertainty about the country's access to concessional finance.

In general, the debt burden remains a problem for most emerging and developing economies, which face the dilemma of increasing investment in infrastructure or restricting their debt obligations. The Kyrgyz Republic also faced this challenge. In the 2000s, the country was heading for a debt crisis, when its public debt peaked at 123% of GDP. However, following debt forgiveness and growing concessional financial support, in 2018 the public debt was reduced to 56% of GDP; 90% of this debt is still represented by external debt and almost all of it is concessional, with an average maturity exceeding 20 years and an interest rate of less than 2%.

Improved borrowing terms facilitated the stabilization of the debt and its dilution in the last decade. However, the debt outlook in Kyrgyzstan remains fragile and the risk of debt distress is considered moderate. Among the key drivers behind debt accumulation are (1) direct external factors, such as countries' high dependence on commodity prices and remittances and (2) indirect factors, related to the significant share of forex-denominated debt, which makes Kyrgyzstan vulnerable to external shocks. Given the growing global imbalances, the impact of external factors is expected to remain prevalent in determining debt dynamics in the years ahead. Another uncertainty surrounds the structure of external debt, which has become less transparent as the Kyrgyz Republic has relied more on non-Paris Club lenders, mainly China. In 2018, China became the main lender to the Kyrgyz Republic: its share in external public debt increased from zero in 2000 to 45%, which exceeded the total volume of debt obligations to multinational institutions.

Among internal factors, the main threat is related to the Kumtor, the country's main gold mine, the production of which is expected to taper off within a decade. Owing to the Kumtor's role as the most important export earner, a decline in its proceeds will have obvious implications for external trade outcomes. A sizeable appreciation of the real effective exchange rate (8-10 percent since end-2015) has further widened the trade deficit, which has remained negative for a substantial time span. Rising private debt, which is estimated to be around 40% GDP, is another factor that could impede fiscal sustainability. Indeed, when the private sector faces payment problem, the government tends to bail out these debtors, particularly if they are influential or in priority industries. Therefore, the government's fiscal stress would increase.

By considering debt sensitivity to external shocks, we have focused on the Kyrgyz Republic for reasons that reflect its distinctive characteristics. First, the Kyrgyz Republic is a member of the EFSD¹, with growing portfolio. Second, the Kyrgyz Republic is a small open economy, which helps us to estimate the impact of external shocks accurately. Finally, the recent path of debt growth in the Kyrgyz Republic coincides with debt dynamics in a wide range of emerging and developing countries, which notably accumulated their obligations over the past decade. As a result, the estimates we derived can be applied to a number of countries with similar features, primarily, to some countries in Central Asia. Tajikistan and Uzbekistan may benefit from an assessment of debt sustainability under conditions of external uncertainty in the Kyrgyz Republic. These countries have comparable geographical conditions and are at a similar stage of development. They face the same issues: given their limited budget capacity, they have to borrow in order to invest in infrastructure projects and promote economic growth. A large share of their external debt is forex-denominated, what makes these countries more fragile in the face of exchange rate volatility and rising uncertainty.

The literature about these countries' capacity to meet their debt obligations usually focuses on a broad debt analysis, but does not provide an in-depth investigation of the relationship between external conditions and debt sustainability. Since the countries became more economically integrated with each other, the channels through which shocks can raise the debt should be investigated more carefully. The absence of literature on such a consequential topic and the practical value of this research compelled us to assess the impact of external uncertainty on debt sustainability, with our focus on the Kyrgyz Republic. The importance of assessing this issue can be judged by the growing interest from government authorities who need to find a practical solution to mitigate the adverse effect of external conditions on their debt stance.

This study attempts to answer theoretical and practical questions regarding the relationship between debt sustainability and external shocks, as well as whether existing financial buffers are large enough to ensure debt sustainability.

The structure of the paper is as follows. Section 2 provides literature review. Section 3 contains a discussion on the methodology and data-related issues. Section 4 outlines macroeconomic features of the Kyrgyz economy, and defines the three types of external shocks used to analyse debt dynamics: (1) global recession; (2) financial shock; and (3) economic crisis, which combines effects of two above-mentioned shocks. Section 5 presents the results of the model, while drawing inferences about the model's output and describing the main channels through which external shocks affect debt dynamics. The concluding section 6 summarizes the key arguments and develops a set of policy recommendations going forward. There are also two technical Appendices.

¹ The Eurasian Fund for Stabilization and Development is a regional financing arrangement with six member states and a mandate to help its member states overcome negative crisis consequences and foster long-term macroeconomic, budget and debt sustainability. The EFSD \$5.3 billion total portfolio comprises 15 sovereign policy-based loans, project loans, and grants. The EFSD is part of the global financial safety net. For more details, see Vinokurov, Efimov, Levenkov (2019).

2. LITERATURE REVIEW

The global financial crisis has not become an antidote to the increasing debt burden, while the period of low rates have encouraged borrowing and debt increase. Over the last decade, the emerging market and developing economies have significantly increased their debt burden. In 2018, public debt in emerging economies amounted to 51% of GDP, a significant increase compared to 2008 (34%). Low-income developing countries demonstrated a similar trend, with their public debts surging from 30% to 45% of GDP over the same period. High speed of debt accumulation explains why debt sustainability has been among key topics analysed by both international organizations and academics.

In June 2005 IMF and World Bank introduced (IMF, 2005) a template for a comprehensive analysis of external and public debt (Debt Sustainability Framework, DSF), which was significantly improved in the next 15 years. As a result, an updated DSF for low-income countries has been implemented in July 2018. The key idea behind the assessment of country's debt sustainability is that the level of debt on its own cannot guarantee financial soundness of a country. Instead, debt sustainability is defined as a country's long-term solvency taking into account the dynamics of macroeconomic variables. To sum up, debt sustainability is a combination of the dynamics of macroeconomic variables (such as GDP growth, interest rates, exchange rate, international trade, and financial flows) on the one hand, and fiscal policy on the other.

Stress scenarios, assuming adverse shocks both in domestic and external variables, play a critical role in debt sustainability assessment. However, it is also crucial to accept that fiscal policy and the dynamics of economic variables are intertwined, which implies that the second-round effects should be investigated as well. Hence, a number of studies on the debt sustainability analysis focused on joint properties of macrofiscal shocks. Indeed, Favero & Giavazzi (2007, 2009), Kawakami & Romeu (2011) and Cherif & Hasanov (2017) studied the impact of fiscal shocks on macroeconomic variables using structural vector auto regression (SVAR) models accompanied by the law of motion equation for estimating debt dynamics. They particularly emphasized the importance of incorporating debt level (as an exogenous variable) into the model in order to increase its accuracy, specifically, by estimating the second-round effects of the debt level on other macroeconomic parameters. This approach considerably improved the quality of the model not only from the prospective of the economic theory (which was reflected in reconsidered equation for debt growth), but from empirical analysis as well (the values of coefficients changed significantly).

To further investigate the relationship between external conditions and debt sustainability, Tanner & Samake (2008) applied a similar approach to emerging economies like Turkey, Brazil and Mexico. By focusing on fiscal policy, they revealed a significant impact of adverse budget shock on the deterioration in the debt sustainability. The article by Celasun et al. (2006) proposed the probabilistic approach to debt sustainability analysis. The methodology was based on (1) a VAR model, which included key macroeconomic variables, (2) fiscal policy reaction function (which is estimated on a panel data for several countries) and, finally, (3) debt dynamics equation. Combining these equations, a probabilistic trajectory for the debt dynamics, based on the Monte-Carlo simulation approach, was constructed and plotted as a fan chart.

A wide range of studies focused on the co-movements of domestic macroeconomic variables with fiscal policy variables. However, external shocks might be much more important for emerging and developing economies, especially, given the fact that these countries usually have a large share of foreign currency denominated debt and are export-commodity-dependent. The research of Adler & Sosa (2016) addressed this question by studying the link between debt dynamics in Latin American countries and global economic environment. Their empirical approach to an assessment of debt dynamics in conjunction with external variables and fiscal policy comprised of three steps:

 An estimate of a VAR model, which determined the link between domestic macroeconomic variables and exogenous global indicators: world economic growth, commodity prices and VIX index. This block also included a panel regression across Latin American countries to identify country-specific risk premium.

- 2. Fiscal policy rule, which was represented as a separate estimates of commodity and non-commodity government revenues. Commodity revenues were estimated in conjunction with corresponding prices, non-commodity revenues based on elasticities to economic growth. As for the expenditure side, the study considered three types of scenarios: neutral, procyclical and countercyclical fiscal policy stance.
- 3. Equation describing debt dynamics.

Following this methodological framework, Adler & Sosa (2016) proceeded to the analysis of debt dynamics in Latin America countries under different stress scenarios. They concluded that external debt sustainability was not the major problem for these countries, whereas public debt burden might limit fiscal space under severe external shocks.

This methodology was also applied by Unevska-Andonova & Janevska-Stefanova (2015) to assess debt sustainability of Macedonia under adverse external shocks. The study concluded that external shocks significantly influenced public debt whereas their impact on external debt was partially offset by trade balance adjustments.

In order to contextualize the role of external conditions with respect to debt sustainability, the applied model was developed for the Kyrgyz economy. However, it is worth mentioning that the assessment of Kyrgyz debt dynamics is represented by limited studies, primarily conducted by international institutes and think tanks. The main foundation of these analyses was developed by the IMF in the framework of annual economic reports (Article IV). It is seen as the most comprehensive analysis of the debt sustainability, which included stress-testing and macroeconomic analysis of fiscal and monetary factors.

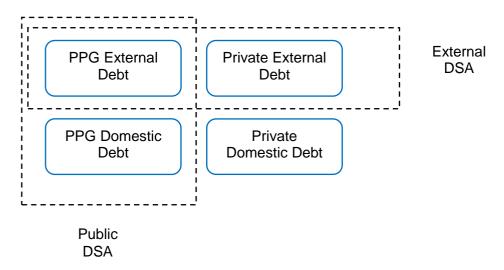
The World Bank and the IMF also provided general assessment of the debt sustainability in the framework of country's macroeconomic diagnostics. The latest comprehensive overview of debt sustainability in low-income countries was presented in their recent joint paper (World Bank & IMF, 2019). Some of their policy papers usually highlighted on particular issues of debt dynamics in countries and regions. One of these studies is of Bandiera & Tsiropoulos (2018). It provided a framework to assess the debt vulnerabilities, which resulted from the investment program under the Belt and Road Initiative (BRI). This analysis indicated that Central Asian and African countries might face significant challenges in debt servicing, primarily, due to the time gap between increased debt-service payments and realized effects of BRI investments on countries' growth. Hurley et al. (2019) also addressed this problem and concluded that some countries including the Kyrgyz Republic might suffer from debt distress resulted from BRI-related investments. By considering primarily economic collaboration between the Kyrgyz Republic and China, Mogilevskiy (2019) reported similar results, stressing that current debt situation in the Kyrgyz Republic may require stricter selection of BRI-related projects and careful estimates of their growth effects.

Despite growing interest in the debt sustainability analysis and an impact of external conditions on economic performance, there are unanswered questions concerning contradictory findings and empirical results. The limitations of these empirical studies are common for almost all emerging commodity-dependent economies — there is a scarce amount of time-series data, which yields insignificant relationships between macroeconomic indicators. Additionally, the studies devoted to relationship between global environment and debt dynamics usually consider the entire region, applying general approach to all countries but not analysing each country separately by considering its distinctive characteristics, such as sensitivity to remittances shocks or high dollarization.

3. METHODOLOGY AND DATA

Debt sustainability analysis consists of two parts (in line with the IMF's methodology): external debt sustainability and government debt sustainability (Figure 1). External debt includes both private external debt and public and publicly guaranteed external debt. Government debt includes domestic and external public and publicly guaranteed debt.

Figure 1: Definition of public and external debt



Source: IMF.

The methodology applied in the study is in line with that of the IMF and similar to an approach proposed by Adler & Sosa (2016). The key elements of our analysis are denoted by (1) equations for government and external debt dynamics, which link the evolution of debt with its past level and the dynamics of macroeconomic and policy variables. These equations are crucial for both calculation of debt dynamics and for decomposing it into contributions of different economic variables. The next component of our analysis is (2) a VAR model that links the dynamics of key domestic variables to external variables: world GDP growth, commodity prices, and financial market indicators. In line with existing literature, we also include the primary balance and the level of debt as exogenous variables to estimate the effects of fiscal policy on macroeconomic variables. Finally, we introduce (3) a set of elasticities between macroeconomic variables determining debt dynamics and key domestic economic variables projected within the VAR framework. These elasticities enable us to link macroeconomic indicators in the DSA module, which cannot be directly incorporated from the VAR model or calculated based on the accounting principle (e.g. the projection of current account is received using elasticity to the trade balance which is estimated within the VAR model.

Based on the key relations described above the scenarios are constructed as follows. First, we generate forecasts of key Kyrgyz economic variables within the VAR model based on the assumptions about exogenous variables. Then we incorporate those projections into the DSA framework. Concurrently we employ an additional set of elasticities linking the trajectories of DSA variables with VAR parameters. As a result, we obtain a simulation of public and external debt dynamics.

Following this approach, we construct a baseline scenario. This implies that the evolution of foreign variables is in line with the EFSD 2019 projections. In addition, we introduce three risk scenarios (financial

crisis, global recession and economic crisis), with corresponding assumptions about foreign variables. Finally, we obtain alternative debt dynamics and contributions of several economic factors to the differences in debt accumulation under the baseline and alternative scenarios. The difference between alternative and the baseline scenarios is assumed to be determined by the results estimated in the framework of the VAR model:

$$d(alternative)_t - d(baseline)_t \equiv d(VAR \ alternative)_t - d(VAR \ baseline)_t, \tag{1}$$

where $d(alternative)_t$ and $d(baseline)_t$ are indicators of debt dynamics calculated "directly" in the framework of DSA, and $d(VAR\ alternative)_t$ and $d(VAR\ baseline)_t$ are estimates of debt growth, calculated by implementing the obtained VAR coefficients in the DSA model.

Debt dynamics

Our further analysis builds upon equation (2), describing external debt dynamics (in foreign currency terms):

$$D_t^E = \frac{D_t^{E,L}}{e_t} + D_t^{E,F} = \left(1 + i_t^F\right) \left(\frac{D_{t-1}^{E,L}}{e_t} + D_{t-1}^{E,F}\right) - AB_t, \tag{2}$$

where D_t^E is level of external debt; $D_t^{E,L}$, $D_t^{E,F}$ are its parts denominated in local and foreign currency, respectively; e_t is a nominal exchange rate; i_t^F is an effective rate on foreign debt; AB_t is the adjusted balance, which includes non-interest current account and non-debt financing.

By denoting α_t as a share of local-currency-denominated external debt and dividing the resulting equation by foreign currency denominated GDP (lower-case letters denote ratios to GDP) after some transformations we obtain equation (3), identifying the debt dynamics:

$$\Delta d_{t}^{E} = \frac{i_{t}^{F}}{(1+\widetilde{\pi})(1+g)} d_{t-1}^{E} - \frac{g}{(1+\widetilde{\pi})(1+g)} d_{t-1}^{E} - \frac{\alpha_{t}\varepsilon(1+i_{t}^{F}) + \widetilde{\pi}(1+g)(1+\varepsilon)}{(1+\varepsilon)(1+\widetilde{\pi})(1+g)} d_{t-1}^{E} - ab_{t}$$
contribution from real GDP growth contribution from exchange rate changes (3)

where $\widetilde{\pi}$ is the growth of the foreign currency denominated GDP deflator; g is real GDP growth; ε is national currency depreciation against US dollar.

A similar approach is applied to the law of motion for the government debt (in foreign currency terms), which can be summarized by equation (4):

$$D_t = D_t^D + D_t^F = \frac{(1 + i_t^D)D_{t-1}^D}{e_t} + (1 + i_t^F)D_{t-1}^F - PB_t, \tag{4}$$

where D_t is the level of government debt; D_t^D , D_t^F are its domestic and foreign parts, respectively; e_t is the nominal exchange rate; i_t^D , i_t^F are interest rates on domestic and external government debt, respectively; PB_t is the primary balance.

Coefficient β_t denotes the share of foreign currency denominated government debt. After dividing equation (4) by foreign currency denominated GDP (lower-case letters denote ratios to GDP) and some regrouping, public debt dynamics yields equation (5):

where g is real GDP growth; RER is the real exchange rate vis-à-vis U.S. dollar depreciation; r_t^F is the real interest rate on foreign currency denominated government debt; r_t^w is the real weighted interest rate of government domestic and external debt.

VAR model for domestic variables

As we are primarily interested in assessing the impact of external shocks on the dynamics of government and external debt, we estimate a VAR model – equation (6) – for key domestic variables, where global macroindicators are included as exogenous:

$$Y_t = A(L)Y_{t-1} + B(L)X_t + \varepsilon_t, \tag{6}$$

where A(L) and B(L) are lag polynomials; Y_t is the vector of domestic variables: real GDP growth, change in the trade balance, real exchange rate depreciation, and country risk premium (calculated as a spread over 3-year Treasury bonds). X_t represents the vector of foreign variables: world GDP growth, VIX index, change in prices for agricultural raw materials and metals (including gold). It also includes the debt-GDP ratio and the primary balance. The primary balance is treated as exogenous variable in the VAR model, since budget response to economic changes we estimated in the framework of the DSA module, applying a number of assumptions. It implies that fiscal response to economic shocks can be either procyclical (spending goes up in economic booms and spending goes down in recessions) or countercyclical and does not completely mirror the fiscal policy of the past. Finally, the set of exogenous variables includes RTS index² as it reflects spillover effects of market and economic sentiments from Russia to the Kyrgyz economy.

Economic variables included in the VAR model are in seasonal differences in order to convert them into stationary series. Given the relatively unstable economic performance of Kyrgyzstan and its dependence on the external economic environment, a structural breakpoint is assumed to exist in the time-series data. Initially, the time period of the dataset ranged from 2000 to 2019 – which encompasses two political and two economic crises. Therefore, a hypothesis is tested using a sequential Bai-Perron breakpoint test, where breakpoints are explicitly treated as unknown (Perron, 2005). Our results confirm a notable change in the dataset since 2005Q1. Given that and a limited data of interest rates on domestic debt available, this study restricts attention to 2005-2019, thus focusing only on modern Kyrgyz political and economic regime.

Since the Kyrgyz economy has experienced a lot of economic and political distresses and has remained relatively volatile, we develop the VAR model with sign restrictions (Uhlig, 2019). By introducing economically reasonable restrictions we obtain plausible estimates resulting in more balanced projections. In particular, we assumed that public debt accumulation does not have an immediate impact on economic growth as the bulk of debt accumulation goes to infrastructure investment and need a protracted time to pay off. More than that, we assumed that world economic growth has only contemporaneous impact on Kyrgyz GDP growth to eliminate cumbersome second-round effects. In addition to that, we included only one lag of VIX index into the equations for trade balance and real exchange rate, implying that financial

² RTS Index is a capitalization-weighted composite index calculated based on prices of the most liquid Russian stocks traded on the Moscow Exchange, in the US dollars. For more details see: https://www.moex.com/en/index/RTSI

volatility tends to affect the trade balance first, while it will take a longer period to have an impact on real exchange rate

The estimation results are available in Appendix 1. The main channels of foreign variables' influence on the domestic economy are summarized below. It is worth mentioning that estimated VAR coefficients reflect distinct features of the Kyrgyz economy and do not always have a definite direction of influence. External environment affects the Kyrgyz economy through a spillover effect from the global economy, which implies a worsening in Kyrgyz economic results owing to a deterioration in external trade, which then leads to real exchange rate depreciation. Another channel is the global demand for metals – particularly, gold – which is the main Kyrgyz export commodity (amounting to around 30% of exports). Historically the demand for gold –a safe assets – as well as its price are higher during an economic slowdown. Hence, an increase in gold prices has positive impact on the Kyrgyz GDP growth and trade balance, which results in real exchange appreciation.

Government debt accumulation leads to the deterioration in trade balance as massive government infrastructure investment are accompanied by the increase in import of goods and services. Moreover, the growth in debt level results in the increase in risk premium.

The increase in VIX index results in the rise in Kyrgyz risk premium. Although financial markets in Kyrgyzstan remain shallow, VIX serves as a proxy of higher borrowing costs in the economy, under the assumption that the deterioration in the economic outlook means an increase in credit risk among lenders. The decrease in RTS index also results in elevated risk premium. Its fall tends to decrease investment activity and household disposable income, partially through the remittance channel from Russia to the Kyrgyz Republic (remittances amount to about 30% of GDP).

As mentioned by Adler & Sosa (2016), the main purpose of this VAR model is to obtain a forecast of domestic variables conditional on external variables. That is why we are not interested in inspecting either the structural representation of this model or the shape of impulse-response functions. In this study, we rather focus on the ability of the model's forecasts to replicate actual trajectories of domestic variables, to make sure that our simulation exercises will result in plausible trajectories for key domestic variables. Stochastic static forecasts for the four domestic variables under consideration are in Appendix 2. It can be seen from the plot that the model has fit the actual data quite well during the last three years and, consequently, could be employed in further simulations. In addition to that, to illustrate the forecast performance of the VAR model the appendix also contains a comparison of root mean squared errors of the VAR model relative to a benchmark seasonal random walk model. For all four variables, the VAR model substantially outperforms random walk projections in terms of forecast errors, which confirms the accuracy of the model.

Additional assumptions

In the previous section, we developed a VAR model that takes into account assumptions about the paths of foreign variables and helps us to get corresponding projections of domestic variables: GDP growth, trade balance, real exchange rate depreciation, and risk premium. We also need to define additional domestic variables in order to determine the debt dynamics.

The first set of assumptions is related to interest rates. First, we assume that the Kyrgyz interest rate on public domestic debt is equal to the 3-year Treasury bonds plus risk premium, which is estimated in the framework of the VAR model. We consider public domestic debt, which does not include concessional loans and represent market instruments. Second, we suppose a slightly ascending trajectory for the interest rate on government external debt, as the Kyrgyz external borrowing will become less concessional over time. Adding up some external assumptions about the interest rate on private external debt (which was very stable in historical perspective), it is straightforward to calculate the interest rate on total external debt

Our second set of assumptions deals with fiscal rule. Unlike Adler & Sosa (2016), we do not contemplate different policy stances. In Kyrgyzstan, it is more likely that, in the case of an external shock, the government will be reluctant to implement a budget consolidation for the following reasons. First, the government may face a challenge in reducing socially oriented expenditures – salaries and social benefits, which account for 35-40% of the total budget. Second, capital expenditures are expected to remain on a relatively sustainable level owing to the government focus on infrastructure development. Together it will lead to budget deficit contributing to an increase in the debt level.

Data and transformation

The database for the DSA consists of yearly observations on a set of macroeconomic time series from 2006 to 2019. For external debt, our main data source is the Joint External Debt Hub, developed by the BIS, the IMF, the OECD, and the World Bank. It encompass debt profile data together with foreign assets. These data are complemented with series on disbursement from government projections. As for the private external debt, we use historical data published by the Kyrgyz National Bank, accompanied by projections from a satellite model. For public debt, our main source of information is the Ministry of Finance. These data include series on the debt portfolio and its main components. We extend the dataset with projections based on the interest rate, maturity, and grace period of new borrowing.

A set of exogenous macroeconomic variables determining the debt level – such as real GDP growth, GDP deflator, U.S. inflation, and som/dollar exchange rate – is retrieved from the National Statistical Committee of the Kyrgyz Republic, the National Bank of the Kyrgyz Republic, and the World Bank. The fiscal variables complement these data, including government revenues (including grants), primary expenditures, and other parameters (privatization proceeds, debt relief). Their main source is the Ministry of Finance.

For the estimation of the VAR model, we use quarterly data from 2005 to 2019. The model includes quarterly counterparts of the time series used in the DSA: real GDP growth, trade balance, real exchange rate, primary deficit, and debt level. It also encompasses the country risk premium and external variables (world economic growth, VIX index, agricultural raw material prices, metal prices, RTS index). External data are retrieved from the IMF, Federal Reserve Bank of St. Louis, Bloomberg and Moscow Exchange.

4. EMPIRICAL SUPPORT AND APPLICATION

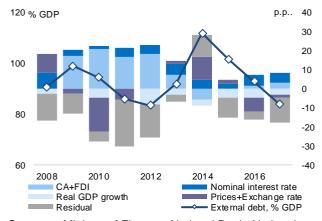
The main objective of the research is to estimate the sustainability of public finances, which contributes towards an efficient and healthy macroeconomic performance.

Describing fiscal sustainability, we first focus on historical debt dynamics over the past decade. Between 2008 and 2015, the economic situation in the Kyrgyz Republic remained unstable, suffering from the consequences of global and regional crises. Both periods were accompanied by a roughly 15% exchange rate depreciation, which – given the high share of foreign currency denominated debt – led to a sharp increase in the debt burden. As a result, at end-2015, the total debt peaked at around 115% of GDP.

Since 2016, the debt situation has shown significant improvement. Hence, in 2018 total debt declined, primarily due to an acceleration in real GDP growth. However, the fiscal stance has remained weak and sensitive to external and internal risks.

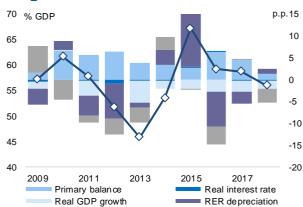
Considering public and external debt separately reveals more factors behind the debt path in the last three years. In general, the GDP growth effect explains roughly 12 p.p. of decline in the debt ratio over this time span. However, external debt (Figure 2) declined not only due to the sustainable economic growth, but partially owing to the appreciation of the national currency. One-off factors – such as the debt relief received from Russia in 2017 – also played a favourable role in easing the debt burden. However, while the influence of debt-reducing factors has tended to remain unstable, debt-driving forces continue to look strong. Over the last three years, the rising interest rate has contributed around 14 p.p. to debt growth. Despite the decrease in the impact of current account and FDI inflows on debt dynamics, they still have contributed around 5 p.p. to external debt growth. Apart from that, the significant share of forex obligations in total debt makes the country more vulnerable to large external shocks due to depreciation of the domestic currency.

Figure 2: External Debt



Sources: Ministry of Finance, National Bank, National Statistical Committee of the Kyrgyz Republic

Figure 3: Public Debt



Sources: Ministry of Finance, National Bank, National Statistical Committee of the Kyrgyz Republic

Public debt remained sustainable, slightly decreasing from 59.3% of GDP in 2016 to 56.0% of GDP in 2018 (Figure 3). The main factor behind this moderate decline was relatively strong growth performance. However, the relatively high primary balance deficit has completely offset that tendency, which indicates

the importance of fiscal discipline. Over the period 2016-2018, the composition of public debt changed as the share of domestic debt more than doubled from 4.7% of GDP. The reliance on domestic debt – composed of treasury bills and bonds – is expected to further increase, driven by the government's intention to develop the financial market.

Baseline scenario

The baseline scenario is conducted for a period of 5 years and is based on the EFSD mid-term projections for key economic variables: GDP growth, fiscal and external positions. The baseline forecast rests on the following assumptions:

- real GDP growth converges to potential output growth in the long run;
- budget revenues are obtained, taking into account real GDP growth, while government expenditures are projected on the assumption of gradual fiscal consolidation i.e., expenditures growing below the growth rate of government revenue. The primary balance is then calculated as a difference;
- current account (CA) assumptions remain in line with the recent pattern, indicating that the CA deficit continues to hover around 8-9% of GDP, with average 5.5% export growth, 4% import growth and 2% current transfers growth.

In line with these baseline assumptions, the dynamics of external and public debt are estimated to remain sustainable. According to the baseline scenario, external debt is expected to decline from 83.8% of GDP in 2018 to 77.5% of GDP in 2024, while total public debt will converge to 53.4% of GDP in 2024, reflecting the favourable snowball effect – the growth/interest rate differential. This positive influence is assumed to be partially offset by the primary balance deficit and high current account deficit. The main risks to the medium-term outlook will be related to debt sensitivity to the exchange rate. The composition of total public debt is expected to shift gradually towards domestic debt, as the authorities will continue covering their financial needs through reliance on domestic debt, which is expected to mitigate foreign exchange risks.

Stress scenarios

Given the estimated baseline scenario, we then examine the resilience of the country's debt path under three alternative scenarios. These scenarios are determined by changes in external variables, such as (1) a spike of VIX, (2) a significant deterioration in global economic performance, and (3) a combination of above-mentioned shocks (Table 1). We use these scenarios for the following reasons. First, the Kyrgyz economy has remained fragile to external shocks. The high share of forex denominated debt and dependence on commodity prices is seen as a notable threat to economic sustainability. Second, given the weakening of global economic activity in 2019, these adverse scenarios have a relatively high likelihood of materializing. Hence, in order to develop measures to mitigate external risks, we estimate the consequences of these shocks and the channels through which they are transmitted.

Table 1: Baseline (BL) and alternative scenarios

		Scenarios			
Global assumptions		Baseline 2020-2024 average	Global recession	Financial shock	Combined scenario
World GDP growth, %		3.3	2020: 1.5 2021: 0.5 2022–2024: = BL	BL	2020: 1.5 2021: 0.5 2022–2024: = BL
VIX, points		14.5	BL	2020: 25.7 (2008-like dropdown) 2021–2024: = BL	2020: 25.7 (2008-like dropdown) 2021–2024: = BL
Commodity prices, relative to 2019 level	Agriculture raw materials*	0	2020: -10% 2021–2024: = BL	BL	2020: -10% 2021–2024: = BL
	Metals	0	2020: -20% 2021: -10% 2022–2024: = BL	BL	2020: -20% 2021: -10% 2022–2024: = BL

* An index includes prices for timber, natural rubber and tobacco.

The external shock scenarios are based on a narrative approach, meaning that the simulations are designed based on actually perceived economic shocks that occurred in the past. The size of a financial shock is translated through an around 30% spike of VIX in 2020, with the VIX returning to its previous level in 2021; other variables are assumed to remain in line with their initial pattern.

A global economic slowdown is reflected through two channels: a global growth slowdown and a decline in commodity prices. These adverse shocks, applied to the first year of simulations (2020), have a two-year effect (with the assumption that agricultural raw materials prices will recover after one year), which implies a complete recovery in global growth and commodity prices only in 2022. Fiscal policy is assumed to remain unchanged – government expenditure behave as in the baseline scenario.

The third scenario is an economic crisis, which combines both shocks: from the financial market and the global economy. This scenario entails higher uncertainty and is assumed to have a more protracted effect, which will contribute to debt accumulation. Concurrently, it seems more realistic and reflects the real influence of a deterioration in economic and financial activities, which usually occurs simultaneously.

5. RESULTS AND IMPLICATIONS

By comparing model estimates under the baseline and alternative scenarios, it can be concluded that adverse financial shocks and global slowdown will result in noticeable deterioration in domestic economic growth. The high level of uncertainty is assumed to be reflected in an increase in the Kyrgyz risk premium and som depreciation. Concurrently, lower commodity prices and global economic growth are estimated to weaken trade positions (Figure 4). However, taking into account that the financial market remains shallow in Kyrgyzstan, the effect of financial stress seems to be less pronounced and will tend to have only a moderate impact on the real economy. By contrast, a global recession accompanied by a decline in commodity prices affects the Kyrgyz economy via multiple channels, which results in more severe deterioration in external positions and protracted economic slowdown. Combined scenario associated with higher degree of uncertainty has even more significant adverse impact on the Kyrgyz economy and the debt sustainability.

---- Baseline Financial shock Global recassion Combined scenario Real GDP Growth, % y/y Risk Premium, % 6 10 Λ 2020 2019 2020 2024 2019 2021 2022 2023 2024

Figure 4. Key domestic variables

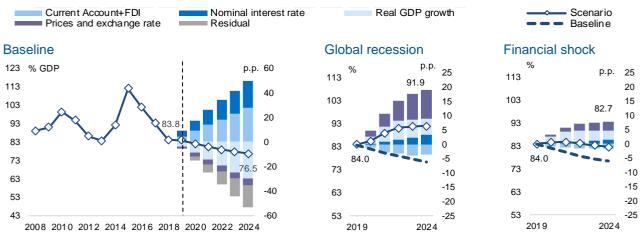
Sources: National bank, National Statistical Committee of the Kyrgyz Republic, authors' calculations.

Global recession scenario

The main result suggests that global recession may be a key source of concern for debt sustainability in Kyrgyzstan. Under this scenario, the debt level is expected to increase significantly: external debt is projected to peak at 91.9% of GDP in 2024 vs. 83.8% of GDP in 2018; public debt will rise from 56.0% of GDP in 2018 to 65.8% of GDP in 2024.

The response of external debt to a global recession shock is expected to arise primarily from changes in exchange rate and prices as well as the deterioration in economic growth. Given the high share of foreign currency denominated debt, exchange rate and price changes have the most significant impact on debt dynamics and explains 9.9 p.p. increase in external debt to GDP (Figure 5). The inflation component depicts its effect through several channels. First, higher prices tend to reduce debt ratio via the denominator. Second, they may increase interest expenditure – Fisher equation – however, given limited role of market loans in the Kyrgyz Republic– this channel has remained less developed. The weakening of economic growth explains roughly 5.7 p.p. of the debt growth (compared to the baseline). The worsening of external conditions accompanied by an increase in the interest rate adds additional 3.4 p.p. to debt accumulation.

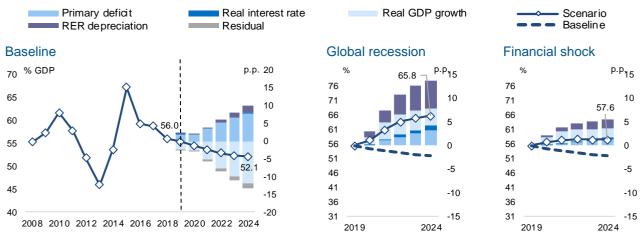
Figure 5. External debt dynamics (the baseline scenario: contributions to change in debt-to-GDP ratio, in percent of GDP; alternative scenarios: deviation from the baseline scenario)



Sources: authors' calculations.

Public debt under the global recession scenario is also projected to remain more vulnerable to exchange rate depreciation and will reach 65.8% GDP by the end of 2024. Exchange rate depreciation is expected to entail a notable impact on the public debt path, implying a 6.0 p.p. contribution to debt-to-GDP growth over the baseline by the end of the forecast horizon (Figure 6). Real GDP growth will slow to around 1.0% over 2021-2022 and its further weak dynamics result in 3.5 p.p. of public debt-to-GDP increase compared to the baseline projection in 2024. A primarily expansionary policy over the past decade, which is supported by a wide range of external grants, makes the debt rather responsive to budget policy amendments, explaining around 3.3 p.p. increase in the public debt. The impact of interest rate growth is expected to be transmitted through the channel of domestic public debt, since public external debt has remained primarily concessional. An increase in the interest rate explains around 1.0 p.p. of public debt growth compared to the baseline scenario.

Figure 6. Government debt dynamics (the baseline scenario: contributions to change in debt-to-GDP ratio, in percent of GDP; alternative scenarios: deviation from the baseline scenario)



Sources: authors' calculations.

Financial shock scenario

The impact of a financial shock on total debt appears to be less pronounced, indicating that in general the debt level will be manageable. In general, it confirms that the financial system remains shallow and constrained by limited funding resources. Under this scenario, external debt is projected to decline to 82.7% of GDP. However, it would remain higher than one in the baseline scenario. The debt trajectory will be mainly associated with economic performance and KGS exchange rate. The deterioration of GDP growth explains about 3.0 p.p. of debt growth over the baseline projection in 2024. The impact of real depreciation on debt dynamics will be almost equal to that of the deterioration of GDP growth. An increase in the interest rate will have less effect on debt dynamics — only 1.6 p.p. All in all, financial shocks do not require a significant adjustment in economic policy in order to stabilize the debt level.

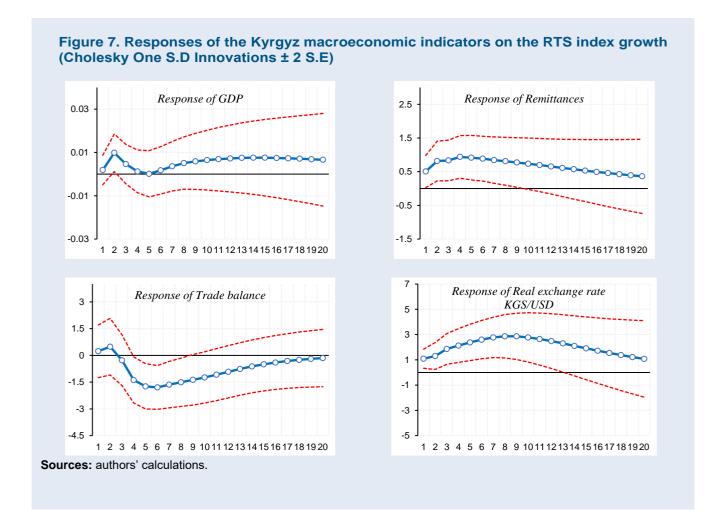
The public debt is also projected to remain at a moderate level. The major driver of its dynamics will be a deterioration of economic growth, reinforced by currency depreciation and worsened fiscal positions. Together with an increased interest rate, they will contribute to a change in debt growth from 56.0% of GDP at the end 2018 to 57.6% of GDP in 2024.

Financial vulnerabilities are considered to have limited effect on debt dynamics, partially because in the framework of estimated model we assume that they are isolated. Although, it is not realistic – as the second-round effect usually takes place through the lower global growth. That said, the debt analysis under separate scenarios enable to receive "clean" (direct) impact of economic changes on debt accumulation by ignoring economic and financial synergetic effects. However, our estimates are not only focused on impacts of global economic and financial changes on debt dynamics, they partially reflect spillover effects from regional market, which are transmitted through RTS channel (see Box 1)

Box 1. The impact of RTS on the Kyrgyz macroeconomic indicators

As we stressed before, the Kyrgyz financial market remains relatively shallow. Hence, debt dynamics is less sensitive to high financial volatility. However, our stress-test analysis was mostly focused on the impact of the global financial market on the Kyrgyz economy and did not investigate the effect of regional or neighboring financial markets. In order to shed some light on relationships between the Kyrgyz activity and the performance of the regional financial markets, we focused on the Russia's RTS index. The choice of Russia was determined by two important factors: (1) Russia is one of the leading economies in the CIS region; and (2) it has a significant influence on the Kyrgyz economic development. Implying that the Kyrgyz economy is a small open economy our investigation reveals that a number of macroeconomic parameters are sensitive to investor sentiments on the Russian financial market. To support these results, we focus on the impact of RTS index on the Kyrgyz GDP growth, remittance inflows, trade balance dynamics and real exchange rate (in the framework of the SVAR model).

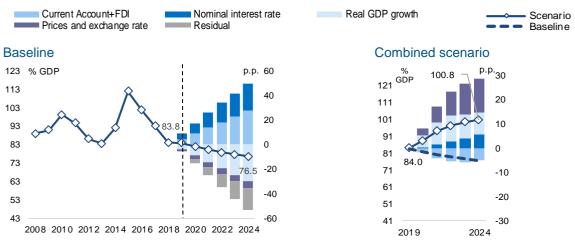
The analysis of these indicators and their vulnerability reveals that remittance and currency channels reflects notable dependence of the Kyrgyz economy on the Russian financial market performance. However, the Kyrgyz GDP appears less sensitive to RTS index – moderate positive economic growth's response is partially eliminated by growing imports and as a result, a worsening in the trade balance (Figure 7). This increase in imports primarily reflects growing remittance inflows, which leads to household income growth and less sensitive nominal exchange rate to alterations in external trade positions (in the framework of the SVAR model).



An economic crisis (combined) scenario

The worst-case scenario, which includes both shocks from a deterioration of the financial market and global economic growth, does not display a quick rebound in the Kyrgyz economic activity. As a result, under this scenario the economy is estimated to suffer from a substantial increase in the debt burden. According to our estimates, this severe event, which leads to 2 % GDP decline and a spike in the interest rate may raise concerns about debt sustainability. Hence, the external debt is projected to increase to 100.8% of GDP (Figure 8). The main contributor to debt accumulation will be represented by som depreciation, which is expected to lead to an increase in external debt of about 14.1 p.p. of GDP by 2024. More muted impact on external debt is estimated to come from a decline in economic growth – it will add around 9.2 p.p. to debt accumulation. The associated rise in external interest rates – owing to an increase in spreads – will amount to almost half of that of the deterioration of GDP growth (5.6 p.p.). Currency depreciation will lead to some current account adjustment however; its response may be limited partially due to relatively sustainable support from the remittances channel.

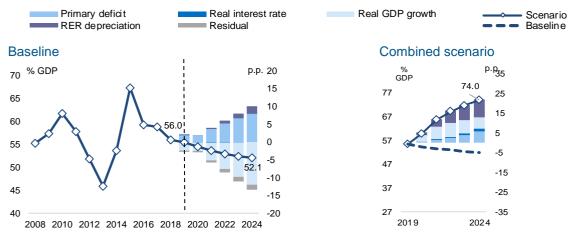
Figure 8. External debt dynamics under combined scenario (the baseline scenario: contributions to change in debt-to-GDP ratio, in percent of GDP; alternative scenarios: deviation from the baseline scenario)



Sources: authors' calculations.

This scenario also entails a notable impact on public debt path (Figure 9). In the case of contemporaneous financial and global growth shocks, the public debt may increase to 74% of GDP compared to 52.1% under the baseline scenario. The main channel of public debt growth will stem from a national currency depreciation and a rapid decline in GDP growth. Together they explain around 14.5 p.p. of an additional public debt accumulation to GDP. The weakening of the primary balance also will be non-negligible – it will contribute 5.6 p.p. to public debt growth, increased interest rate will push debt up by 1.8 p.p. of GDP.

Figure 9. Government debt dynamics under combined scenario (the baseline scenario: contributions to change in debt-to-GDP ratio, in percent of GDP; alternative scenarios: deviation from the baseline scenario)



Sources: authors' calculations.

A closer look at the underlying debt dynamics under three scenarios reveals a high sensitivity of Kyrgyz debt performance to external conditions. The weakening of external environment usually come with a decline in economic growth, which is one of the key channels of debt increase. Thus, the government is under the trade-off between GDP growth and fiscal consolidation for debt reversal. Given relatively high fiscal multiplier effects – due to significant country's infrastructure needs – any change in GDP in turn have an impact on the fiscal deficit. It implies that lower government spending / higher taxes may worsen the

debt to GDP ratio (at least in the short-run). The role of interest rate is less significant; however, it may increase as the country shift from concessional to market loans. In this case, the performance of public finances may significantly correlate with interest servicing – if interest rate drops due to healthier budget, the budget balance tends to be improved as the government issue new bonds. So far, the interest rate's channel mainly serves through its impact on the economic growth: low interest rates encourage households and investors to spend more, which stimulate economic growth and reduce debt to GDP ratio.

Our stress-tests confirm that changes in external conditions may have a notable adverse effect on the debt sustainability in Kyrgyzstan: economic crisis may increase external debt-to-GDP ratio to more than 100% and public debt to 75%. The country had already faced that challenge at the end of 1990s (and, thanks to international support, managed to reduce it to more sustainable level in the 2000s), the risk of debt distress under unfavourable external conditions remains significant. While there is no an exact threshold for the safe debt limit, following Mendoza (Mendoza, Oviedo, 2006), who demonstrated that the natural debt limit was sensitive to economic and budget volatility, we can conclude that emerging markets are under higher threat than advanced economies. Indeed, given the high level of growth volatility and the fact that external debt in emerging economies tends to be denominated in foreign currency, aggregate uncertainty can significantly reduce the level of debt which emerging markets can comfortably maintain.

In general, empirical studies emphasize the importance of a more conservative approach to debt accumulation. According to Reinhart and Rogoff (2010), high debt-to-GDP ratio tends to have an adverse effect on country's GDP growth. By analysing external debt, they stressed that when the debt exceeds 60% of GDP, economic growth may decline by around 2%; if debt-to-GDP ratio reaches 90%, economic growth may be cut in half. While these estimates are approximate, they confirm the fragility of the current debt situation in the Kyrgyz Republic. Coupled with our quantitative conclusions, they encourage cautious approach to managing external debt dynamics.

6. CONCLUSION

In this paper, we have explored the role that external shocks play in shaping the debt level. By considering the resilience of the Kyrgyz debt path under conditions of economic uncertainty, we have integrated a DSA framework with a VAR model. Debt dynamics is considered under three stress-scenarios, with the following shocks: (1) a global slowdown, which is accompanied by a decrease in commodity prices; (2) a higher financial vulnerability; and (3) an economic crisis as a combination of economic and financial shocks.

Analysis of external and public debt growth, obtained under alternative and baseline scenarios, reveals a higher sensitivity of the Kyrgyz economy to a global slowdown than to a financial shock. Indirectly, this implies that the financial market in the country remains shallow, while its dependence on commodity exports and labour migrants' remittances is persistently high. Apart from that, national currency depreciation is considered to be among main factors contributing to the adverse dynamic of both public and external debt. Together with the deterioration of GDP growth, they significantly override the favourable snowball effect (growth/interest-rate differential) observed in the baseline scenario.

A combination of financial and global growth shocks leads to more protracted economic crisis. Considering this scenario as the most realistic – given historically significant dependence between financial and economic performance – we can conclude that external and public debt may increase to 100.8 % and 74.0 % of GDP, respectively. These results of the research project may have a variety of important implications for future policy decisions. In an environment of heightened global and regional uncertainty, which compels the authorities to focus more on budget stimulus, a protracted debt accumulation may significantly limit this fiscal space. In addition, a significant impact of a primary deficit on the public debt dynamics also points to the importance of fiscal discipline. Given the existing overvaluation of the exchange rate, the persistent current account deficit, and the dependence on remittances and commodity revenues, the authorities should be especially cautious about external debt dynamics. Hence, in order to withstand external shocks, the Kyrgyz Republic should focus more on shifting towards economic diversification.

While the results of the research provide a theoretical extension to the existing literature and a thorough understanding of the effect of the external conditions on debt dynamics, the research has some limitations. The period analysed appeared to be extremely volatile due to the economic crises of 2009 and 2015 and the political turmoil in 2005. As a result, frequent adjustments of the Kyrgyz economy to political and external shocks yielded significant changes to macroeconomic indicators. Another issue is related to the fiscal policy regime, which over the last decade was primarily expansionary.

Thus, a natural progression of this study could consider different fiscal policy regimes as a reaction to negative external shocks. Developing the study in this direction could establish a greater degree of accuracy on debt dynamics under different shock scenarios and government responses. In this working paper we only investigated the effect of RTS index' changes on the Kyrgyz economic performance, which only partially reflects regional spillover effect. Analysis of larger economies that determine the development of low-income countries, and investigation of transmission channels, would make our estimates more accurate and relevant to a specific country, which is a topic for future research.

REFERENCES

Adler, G., and Sosa, S. (2016). External Factors in Debt Sustainability Analysis: An Application to Latin America? *Journal of Banking and Financial Economics*, 2016(1), pp. 81-120.

Bandiera, L., and Tsiropoulos, V. (86.8

). A Framework to Assess Debt Sustainability and Fiscal Risks under the Belt and Road Initiative. World Bank Policy Research Working Papers, 8891, pp. 1-56.

Celasun, O., Ostry, J., and Debrun, X. (2006). *Primary Surplus Behavior and Risks to Fiscal Sustainability in Emerging Market Countries: A "Fan-Chart" Approach.* IMF Staff Papers, *53*(3), 401-425

Cherif, R., and Hasanov, F. (2017). Public debt dynamics: the effects of austerity, inflation, and growth shocks. *Empirical Economics*, 54(3), pp.1087-1105.

Favero, C., and Giavazzi, F. (2007). Debt and the Effects of Fiscal Policy. *National Bureau of Economic Research Working Papers*, 12822.

Favero, C., and Giavazzi, F. (2009). How large are the effects of tax changes? *National Bureau of Economic Research Working Papers*, 15303.

Hurley, J., Morris, S., and Portelance, G. (2019). Examining the debt implications of the Belt and Road Initiative from a policy perspective. *Journal of Infrastructure, Policy and Development*, 3(1), p.139.

IMF (2019). Operational Framework for Debt Sustainability Assessments in Low-Income Countries – Further Considerations. Available at: https://www.imf.org/en/Publications/Policy-Papers/Issues/2016/12/31/Operational-Framework-for-Debt-Sustainability-Assessments-in-Low-Income-Countries-Further-PP412 [Accessed 26 Nov. 2019].

IMF and World Bank. (2019). The Evolution of Public Debt Vulnerabilities in Low Income Economies (forthcoming)

Kawakami, K., and Romeu, R. (2011). Identifying Fiscal Policy Transmission in Stochastic Debt Forecasts. *IMF Working Papers*, 11(107), pp.1-35.

Mendoza, E. G., Oviedo, P. M. (2006). Fiscal policy and macroeconomic uncertainty in developing countries: The tale of the tormented insurer. *National Bureau of Economic Research Working Papers*, 12586.

Mendoza, E. G., and Oviedo, P. M. (2009). Public Debt, Fiscal Solvency and Macroeconomic Uncertainty in Latin America. *Economía Mexicana NUEVA ÉPOCA*, *18*(2), pp.133-173.

Mogilevskii, R. (2019). The Kyrgyz Republic and the Belt and Road Initiative. In Kohli, H., Linn, J. & Zucker, L. (eds). *China's Belt and Road Initiative: Potential Transformation of Central Asia and the South Caucasus*. Los Angeles and New Delhi: SAGE Publications.

Perron, P. (2005) *Dealing With Structural Breaks*. In: Mills, T. and Patterson, K. (eds), *Palgrave Handbook of Econometrics* 1. Basingstoke and New York: Palgrave Macmillan.

Reinhart, C. M., Rogoff, K. S. (2010). Growth in a Time of Debt. *American economic review*, 100(2), pp. 573-78.

Tanner, E., and Samake, I. (2008). Probabilistic Sustainability of Public Debt: A Vector Autoregression

Approach for Brazil, Mexico, and Turkey. IMF Staff Papers, 55(1), pp.149-182.

Uhlig, H. (2017) Shocks, Sign Restrictions, and Identification. In Honoré, Bo. et al (eds) *Advances in Economics and Econometrics: Volume 2: Eleventh World Congress* (Vol. 59). Cambridge University Press.

Unevska-Andonova, D., and Janevska-Stefanova, D. (2015). *Transmission of External Shocks in Assessing Debt Sustainability, the Case of Macedonia*. The National Bank of the Republic of North Macedonia Working Papers, 2015-04.

Vinokurov E., Efimov, A., and Levenkov, A. (2019) *The Eurasian Fund for Stabilization and Development:* A Regional Financing Arrangement and its Place in the Global Financial Safety Net. EFSD Working Paper, 1. Available at: https://efsd.eabr.org/upload/iblock/5d2/EABR_EFSR_RD_19_1_EN_A4_web.pdf [Accessed 26 Nov. 2019].

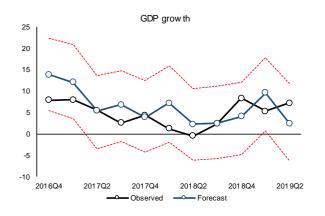
APPENDIX 1. VAR ESTIMATION RESULTS

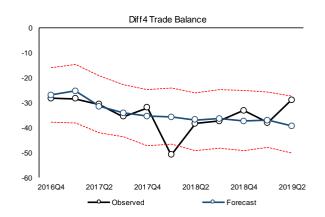
	GDP growth	Trade balance	Diff4 log RER	Diff4 Risk premium
GDP growth.L1	0.39***	0.26+	-0.08	-0.08
S .	(0.12)	(0.17)	(0.14)	(0.07)
GDP growth.L2	-0.19 ⁺	-0.1	0.14	0.28***
	(0.13)	(0.17)	(0.14)	(0.07)
Diff4 Trade balance.L1	0.26**	0.18	0.01	-0.08+
	(0.11)	(0.14)	(0.11)	(0.06)
Diff4 Trade balance.L2	-0.29***	-0.06	0.12	-0.05
	(0.1)	(0.14)	(0.1)	(0.06)
Diff4 log RER.L1	-0.3**	0.71***	0.75***	-0.23**
	(0.14)	(0.24)	(0.2)	(0.1)
Diff4 log RER.L2	0.18+	0.17	-0.03	0.11+
	(0.13)	(0.17)	(0.14)	(0.07)
Diff4 Risk premium.L1	0.51+	0.36	-0.37	0.21
	(0.33)	(0.48)	(0.4)	(0.2)
Diff4 Risk premium.L2	-0.36 ⁺	0.86**	0.3	-0.01
	(0.26)	(0.34)	(0.27)	(0.13)
Constant	7.68	-29.35***	9.4+	-7.62**
	(5.99)	(8.46)	(6.32)	(3.47)
Diff4 Debt.L1	0	-0.74**	0.22	0.18+
	-	(0.27)	(0.23)	(0.12)
World GDP growth	0.03	-2.05*	1.17	-0.36
	(0.7)	(1.09)	(0.93)	(0.46)
World GDP growth.L1	0	0.92	-2.24**	0.67
	-	(1.13)	(0.96)	(0.51)
Diff4 Agriculture	-0.07	0.15	-0.04	0.24
	(0.1)	(0.15)	(0.11)	(0.06)
Diff4 Metals	0.18**	0.26**	-0.18*	-0.05
	(0.07)	(0.11)	(0.09)	(0.05)
Diff4 Metals.L1	-0.19	0.04	0.08	0
	(0.07)	(0.09)	(0.07)	(0.04)
VIX.L2	-0.27***	0	0.07	-0.07
	(0.09)	-	(0.09)	(0.05)
VIX.L1	0.11	0.01	0	0.12+
	(0.13)	(0.17)	-	(0.07)
Diff4 Ln RTS	0.01	0	-0.06	-0.07**
	(0.05)	(0.07)	(0.06)	(0.03)
Diff4 Ln RTS.L1	0.01	-0.01	0.06	0.01
	(0.05)	(0.06)	(0.05)	(0.02)
Primary balance	0.19	-0.12	0.29	-0.02
	(0.16)	(0.23)	(0.16)	(0.09)

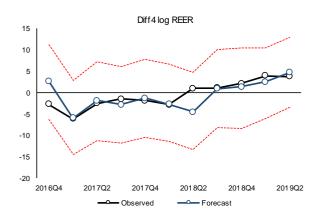
Observations: 44 Log likelihood: -471.2 Akaike IC: 22.8 Schwarz criterion: 25.8

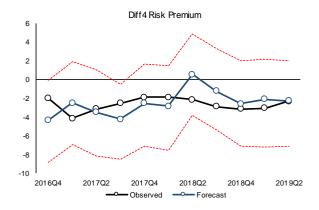
Standard errors in parentheses: *** p < 0.01, ** p < 0.05, * p < 0.10, + p < 0.20.

APPENDIX 2. FORECASTING POWER OF VAR MODEL









Model root mean squared errors relative to seasonal random walk

Value of the relative RMSE smaller than 1 indicates that model forecast outperforms random walk forecast RMSE^{mod}/RMSE^{RW}

	KIVISE TIVISE
GDP growth.	0.33
Diff4 Trade balance	0.36
Diff4 log RER	0.46
Diff4 Risk premium	0.50



EFSD WP/19/1 (RU/EN)

The Eurasian Fund for Stabilization and Development: A Regional Financing Arrangement and Its Place in the Global Financial Safety Net

The objective of the first working paper is to bridge the gap in understanding the dynamics of EFSD development and its place in the Global Financial Safety Net (GFSN) and the region's financial architecture. The GFSN is the set of financial resources and institutional arrangements that provide a backstop during a financial or economic crisis. It comprises international reserves, central bank bilateral swap arrangements, regional financing arrangements (RFAs), and the IMF.



EFSD WP/19/2 (RU/EN)

Achieving Stabilization and Development Objectives in a Single Agenda: The Experience of the Eurasian Fund for Stabilization and Development

Responding to the agreements among RFAs reached during the 3rd RFA High Level Dialog, EFSD led the research track on stabilization vs development agenda in the activities of regional financing arrangements. The EFSD experience suggests that in the context of low-income and less developed countries the stabilization mandate of an RFA may benefit from complementing it with developmental agenda. This came from understanding that without structural and institutional transformation as well as infrastructure and human capital development economic growth in those countries is likely to be excessively volatile and less inclusive, while external vulnerability is unlikely to decrease.



E. Vinokurov, N. Lavrova and V. Petrenko

Kyrgyz Republic Debt Sustainability and External Shocks

The Eurasian Fund for Stabilization and Development (EFSD) amounting to US\$8.513 billion was established on June 9th, 2009 by the governments of the Republic of Armenia, the Republic of Belarus, the Republic of Kazakhstan, the Kyrgyz Republic, the Russian Federation, and the Republic of Tajikistan. The objectives of the EFSD are to assist its member countries in overcoming the consequences of the global financial crisis, ensure their economic and financial stability, and foster integration in the region. The EFSD member countries signed the Fund Management Agreement with Eurasian Development Bank giving it the role of the EFSD Resources Manager. More information about the EFSD is available at: https://efsd.eabr.org/en/

EFSD Working Papers are the main format of the Fund's public research. They reflect the Fund's research on global, regional, and country economic trends, economic modelling, macroeconomic analysis, sectoral analysis, global financial architecture, and other issues. EFSD publications are available at https://efsd.eabr.org/en/analytics/

Address:

1-st Zachatievskiy pereulok, house 3, block 1, Moscow, 119034, Russian Federation

Tel: +7 (495) 645 04 45 Fax: +7 (495) 645 04 41 www.efsd.eabr.org/en/





www.eabr.org