Determinants and Sustainability of External Debt: A Panel Data Analysis for Selected Islamic Countries

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2021

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Abstract

This study analyses the determinants and sustainability of external debt of selected Islamic countries. The study uses panel data of ten oil & gas exporting countries and nine oil & gas importing countries from 2004 to 2016. For oil & gas exporting Islamic countries, economic growth, central government revenue, FDI, and population have a negative effect on external debt, while central government expenditure, trade openness, inflation, and current account balance have a positive effect on external debt. For oil & gas importing Islamic countries, economic growth, central government revenue, current account balance, domestic investment, and labour force have a negative effect on external debt; whereas, FDI and foreign exchange reserve have a positive effect on external debt. The result of sustainability analysis shows that for many oil & gas importing Islamic countries, the actual debt is more than their expected debt based on their macroeconomic performance. For oil & gas exporting Islamic countries, the situation is not as alarming and their external debt position is still better, except few countries.

Keywords: External debt, Debt sustainability, Panel data, Oil & gas exporters, Oil & gas importers

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1. Introduction

The main research objective of macroeconomic planning is to improve the standard of living of people through economic growth and development. Improved economic growth is possible through capital formation, which occurs from the investment. The investment is financed through saving. Unfortunately, domestic saving is very low in most of the oil & gas importing Islamic countries. As a result, they mostly rely on foreign borrowing to finance investment. For oil & gas exporting Islamic countries, the government revenue collection is very low. As a result, in order to finance their development and non-development expenditures, they rely on foreign borrowing. The continued reliance on foreign borrowing by oil & gas exporting and importing Islamic countries resulted in high external debt burden in these countries.

Figure 1: Total Gross External Debt in Selected Islamic Countries   (US$ Billion in 2017)
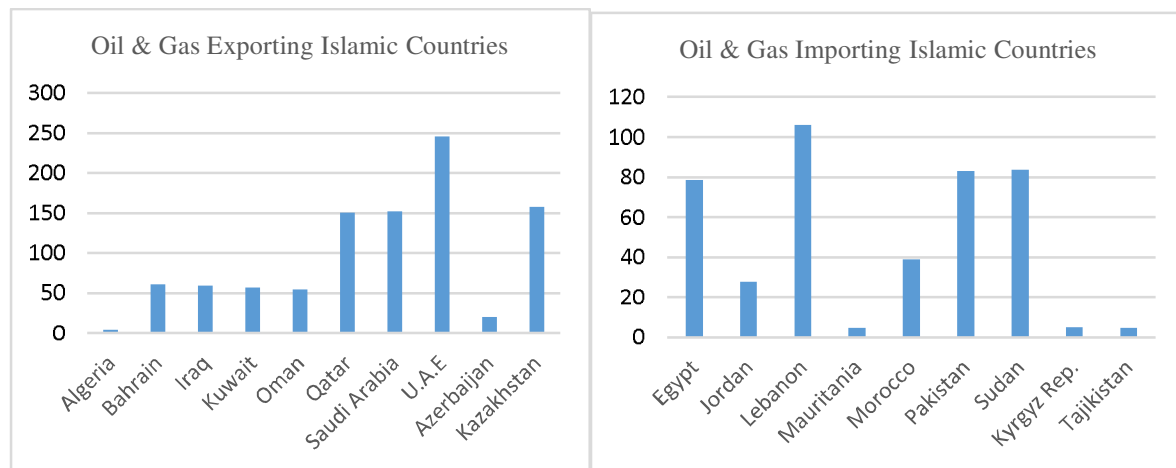
Source: Authors' construction.
Note: Data are collected from Regional Economic Outlook: Middle East and Central Asia, published by the International Monetary Fund (2018). Iran, Afghanistan, and Uzbekistan are not included due to data availability issue.

Figure 1 shows that among oil & gas exporting Islamic countries, the external debt of United Arab Emirate (UAE) is highest followed by Kazakhstan, Saudi Arabia, and Qatar. The external debt of Algeria is lowest in the oil & gas exporting Islamic countries. Among oil & gas importing Islamic countries, the external debt of Lebanon is highest followed by Sudan, Pakistan, and Egypt. The external debt of Mauritania, Kyrgyz Republic, and Tajikistan is low among oil & gas importing countries.

The growing external debt burden of oil & gas exporting and importing Islamic countries is a constant source of concern for governments and policymakers of these countries. The objectives of this study are twofold. First, to identify the main determinants of external debt in Islamic countries. This study uses the separate model for two group of countries because it is believed that the determinants of external debt in oil & gas exporting and importing countries cannot be all same. Second, the estimated models are then used to analyse the sustainability of external debt for each country.

This paper is organized into five sections. Following the introduction, section 2 briefly discusses the review of literature. Section 3 presents modelling framework, section 4 discusses the model estimation results and performs external debt sustainability analysis. The final section concludes the study, discusses policy implications, and sets directions for further research.

2. Review of Literature

Many studies investigated the determinants of external debt and estimated debt sustainability using time series, cross-section, and panel data covering different countries and time. The objectives of these studies were to identify core macroeconomic determinants of external debt and to guide policymakers for a sustainable debt reduction strategy. The theoretical literature goes back to the two-gap model (Chenery and Strout, 1966) and the three-gap model (Bacha, 1990). These models identified that developing countries often face a financing problem. For domestic investment and capital formation, developing countries need to raise funds through domestic financing or external financing. The option for domestic financing is limited due to social, political and economic reasons. Therefore, they mostly rely on external finance, due to less crowding out effect on private investment and reduced risk of inflation in the economy. Unfortunately, in many developing countries, there has been external borrowing not only for capital formation but also to finance the non-developmental expenditure. This has resulted in huge external debt. Waheed (2007) has comprehensively reviewed the literature on external borrowing as a source of development finance on the theoretical ground.

Looney (1987) examined the determinants of external debt in mineral-oil economies and non-mineral-oil economies. The author argued that developing countries have not been uniform in their debt accumulation. The study tried to show that mineral-oil economies have borrowed in international markets for a reason quite different from those of other developing countries. The cross-section regression result for 82 countries showed that in mineral-oil economies, international reserve, military expenditure, and export concentration have a significant negative effect on external debt. The study also found that gross domestic product and current account balance have a positive effect on external debt of mineral-oil economies. In the case of non-mineral-oil economies, the results were not robust for some variables. The positive effect of military expenditure and the negative effect of current account balance on external debt was robust in case of other developing countries.

Ugurel (1999) analysed different aspects of external debt of the Islamic countries during three decades and put forth a number of recommendations. SESRTCIC (2002) examined the external debt indicators of African and other Organization of Islamic Cooperation (OIC) member countries and compared them with other developing countries. The paper also presented a brief discussion of international efforts for debt relief and their implications for OIC-Heavily Indebted Poor Countries. However, both papers just presented a descriptive analysis and no econometric techniques were used.

Tiruneh (2004) analysed the determinants of external debt for a panel of sixty countries of which twenty-one were heavily indebted poor countries and thirty-nine were non-heavily indebted less developed countries. The author used fixed and random effect models for the period 1982-1998. The estimation results showed that income per capita, capital flight, the imports to GDP ratio, debt service payments, and the growth rate of GDP are the main determinants of external debt. The author suggested debt relief for poor countries and sound debt management strategy.

SESRIC (2012) used two approaches (present value and solvency ratio) to review the external debt situation in the OIC member countries. They also presented some key indicators of external debt at the regional level. The study concluded that FDI should be preferred over foreign borrowing. To attract FDI, they suggested for improvement in the overall environment through political stability and better governance. This study also did not use any econometric model.

Bittencourt (2013) investigated the main determinants of external debt in nine South American countries covering the period 1970-2007. The study used the Pooled OLS, Fixed Effect, Fixed Effect with Instrumental variables, DIF-GMM, and SYS-GMM estimators. The results based on principal component and dynamic panel data analysis suggest that economic growth is an important factor that can significantly reduce external debt in the region under study. Other variables such as inflation, inequality, constraints on the executive were not significant determinant of external debt.

Waheed (2016) analysed the sustainability of public debt of Bahrain from 1990 to 2014. The study used more rigorous time series econometric techniques for the measurement of debt sustainability. The ARDL bound testing approach result confirmed the sustainability of public debt of the country during the period under study. The study also calibrated the fiscal reaction function and confirmed that the fiscal policy measures of the country were appropriate to maintain debt sustainability.

Al-Fawaz (2016) analysed the major determinants of external debt in Jordan during the period 1990-2014 through Autoregressive Distributed Lag (ARDL) model. The results show that GDP per capita has a statistically significant negative effect on external debt in the short-run. The study also found a statistically significant positive effect of terms of trade on external debt in the long run.

Waheed (2017) investigated the macroeconomic determinants of external debt in two group of countries; oil and gas exporters and importers. The study used panel data of 12 oil and gas exporter countries and 12 oil and gas importer countries covering the period 2004-2013. The author identified several macroeconomic factors that significantly affect the external debt of these two grouped countries. The important finding of this study was that the determinants and effects of macroeconomic variables on external debt are different in oil and gas exporting and importing countries.

A brief review of the above studies indicates that the determinants of external debt and its sustainability have been investigated in various countries, but their focus was not Islamic countries. This study fills this gap in the literature by investigating the determinants of external debt in selected oil & gas exporting and importing Islamic countries and measure the sustainability of external debt for each country.

3. Modelling Framework

The external debt problem can be analysed in several modelling frameworks. For a proper identification of macroeconomic determinants of external debt, it is necessary to focus upon the factors in the economy that generate the need to borrow externally. According to the gap models, there are different ways to finance a fiscal and current account deficit. This includes printing money, using the foreign exchange reserve, domestic borrowing or external borrowing. From the fiscal side, an increase in government expenditure or interest on debt requires external borrowing, whereas higher government revenue reduces the need for borrowing. From the current account balance side, the higher export of goods and services, and international reserve reduces the need for external borrowing while higher imports of goods and services require more external borrowing and ultimately result in accumulation of external debt. Thus, the theoretical literature shows that government expenditure, government revenue, interest on debt, exports, imports, international reserve, and domestic investment are the main macroeconomic factors that affect external debt (see Waheed, 2017). The empirical literature identifies some additional factors such as inflation, FDI, Labour force, literacy rate, and domestic debt.

The effects of above factors on external debt in oil & gas exporting Islamic countries (where current account is in surplus) and oil & gas importing Islamic countries (with large current account deficit) can be different. Therefore, for both groups' same external debt model cannot be used. Keeping in view the macroeconomic theory, the findings of the previous empirical studies, and regional specific conditions, two different econometric models are suggested for oil & gas exporting and importing Islamic countries. The following econometric model is used to identify the macroeconomic determinants of external debt in oil & gas exporting Islamic countries.

$$ED_{it} = \alpha_0 + \alpha_1\ GDP_{it} + \alpha_2\ CGE_{it} + \alpha_3\ CGR_{it} + \alpha_4\ OPEN_{it} + \alpha_5\ INF_{it} + \alpha_6\ CAB + \alpha_7\ FDI_{it} + \alpha_8\ TPOP_i + u_{it} \tag{3.2}$$

Where ED is the external debt as a percent of the gross domestic product. In oil and gas exporting Islamic countries, it is assumed that external debt is determined by gross domestic product (GDP), central government expenditure (CGE), central government revenue (CGR), trade openness (OPEN),

inflation (INF), current account balance (CAB), foreign direct investment (FDI), and total population (TPOP). The subscript i represents the country (where $i = 1, 2 \dots 10$) while t represents the time which is in year ($where\ t = 2004, \dots 2016$). The $\propto_0$ is the intercept, $\propto_1$ to $\propto_8$ are the parameters to be estimated and u_{it} is the random error term.

The following model identifies the macroeconomic determinants of external debt of oil & gas importing Islamic countries.

$$ED_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 CGR_{it} + \beta_3 CAB_{it} + \beta_4 FDI_{it} + \beta_5 GCF_{it} + \beta_6 RES_{it} + \beta_7 TLF_{it} + w_{it}$$

(3.1)

In oil and gas importing Islamic countries it is assumed that external debt (ED) is determined by gross domestic product (GDP), central government revenue (CGR), current account balance (CAB), foreign direct investment (FDI), gross capital formation (GCF), international reserve (RES) and total labor force (TLF). The subscript i represents the country ($where\ i = 1, 2 \dots 9$) while t represents the time, which is in year ($where\ t = 2004, \dots 2016$). The β_0 is the intercept, β_1 to β_7 are the parameters to be estimated and w_{it} is the random error term.

4. Model Estimation Results

The sample covers the time period from 2004 to 2016 and includes 10 oil and gas exporting Islamic countries and 9 oil and gas importing Islamic countries. The data on external debt, current account balance, foreign direct investment, gross capital formation, imports, central government expenditure, central government revenue are taken as a percent of GDP, whereas inflation is in percent and the other variables are in absolute term. The description of all variables, their unit, and sources are given in Table-1 in the appendix.

Table 4.1: Macroeconomic Determinants of External Debt

Oil & Gas Exporting Islamic Countries				Oil & Gas Importing Islamic Countries			
Variable	Coefficient	t-Stat.	Prob.	Variable	Coefficient	t-Stat.	Prob.
Constant	5.165	0.235	0.815	Constant	132.615	6.880	0.000
GDP	-0.109	-2.707	0.007	GDP	-0.204	-3.048	0.003
CGE	2.219	5.846	0.000	CGR	-2.995	-4.317	0.000
CGR	-1.625	-3.516	0.001	CAB	-1.684	-3.533	0.001
OPEN	1.267	3.961	0.000	FDI	2.085	2.952	0.004
INF	3.615	5.376	0.000	GCF	-1.146	-3.412	0.001
CAB	0.431	2.361	0.020	RES	1.821	7.013	0.000
FDI	-2.014	-2.709	0.008	TLF	-0.741	-2.270	0.025
TPOP	-1.037	-2.023	0.045				
Adj.-R²	0.465	F-statistic	15.010	Adj.-R²	0.638	F-statistic	27.425
DW Statistic	0.456	Prob. (F-stat.)	0.00	DW Statistic	0.787	Prob. (F-stat.)	0.00

Source: Authors' Estimation

The models for oil & gas exporting countries and oil & gas importing countries are estimated employing the method of panel least square. The panel data analysis has many advantages over time series and cross-sectional analysis. As mentioned by Baltagi (2005), we can avoid multicollinearity problem and can have more degrees of freedom. In panel data analysis, the effect of variables can be measured better compare to time series or cross-section data analysis. It is observed that parameter heterogeneity is a

major issue in regression analysis. To overcome this problem, we divided the sample into two groups (oil & gas exporting and oil & gas importing countries). We also employed the Hausman test for the selection of a fixed or random effect model but the results were not encouraging. The panel least square estimation results are presented in table 4.1.

The economic growth (GDP) is the most important determinant of external debt as suggested in both theoretical and empirical literature. The sign of the coefficient of GDP can be positive or negative. Theoretically, if income increases, there will be less need for external borrowing. However, higher income is also an indicator of creditworthiness, and the country can get more loans. In our case, the coefficient of GDP is negative in case of both oil & gas exporting and importing countries. This shows that economic growth reduces external debt. These findings are in consistent with the findings of Bittencourt (2013), Benedict et al. (2014), and Al-Fawaz (2016), who also found the negative effect of economic growth on external debt.

The government expenditure (CGE) and revenue (CGR) play an important role in the accumulation of external debt as suggested by the three-gap model (Bacha, 1990). The two-gap model was extended to include the fiscal gap as high government expenditure and low revenue may require foreign borrowing. It is expected that the coefficient of CGE will be positive and CGR will be negative. The results show that in the case of oil and gas exporting countries the coefficient of both variables has expected sign and are statistically significant. In the case of oil and gas importing countries, CGE was not significant, therefore, not included in the model but CGR is statistically significant and has expected negative sign. Craigwell et al. (1998) found a significant positive effect of government expenditure on external debt in the case of Barbados. Mensah et al. (2017) found a bi-directional causality between external debt and tax revenue in Highly Indebted Poor Countries (HIPCs) in Africa.

The effect of imports to GDP (OPEN) is positive and statistically significant in the case of oil & gas exporting Islamic countries. This coefficient has expected positive sign, which is theoretically justified. A higher imports of goods and services need higher foreign borrowing, which results in the accumulation of external debt. These results are also in consistent with the findings of Hajivassiliou (1987), Tiruneh (2004), and Zaffar and Butt (2008).

The inflation (INF) is a measure of macroeconomic instability and high inflation may need to issue foreign currency debt (Calro, 1988). Inflation is contributing to the accumulation of external debt in oil and gas exporting Islamic countries. The sign of the coefficient of inflation is positive as expected and highly significant. Most of the oil and gas exporting Islamic countries are following a fixed exchange rate system, in which they are required to keep the exchange rate of their currency fixed with US dollar. An increase in inflation rate put a pressure on the exchange rate and to maintain the fixed rate, they need foreign exchange, which can be acquired through foreign borrowing, resulting in accumulation of external debt. Barro (1979) argues, theoretically and empirically, that there is a positive effect of inflation on debt. Lau et al. (2015) found empirically a unidirectional causality running from inflation to external debt in the case of Malaysia.

The gross capital foundation (GCF) is used as a proxy for investment and is expected to have a positive or negative effect on external debt. If investment is contributing to economic growth, it will have a negative effect on external debt. If the contribution of domestic investment in economic growth is less, it may result in accumulation of external debt. The result shows that investment has a negative effect on external debt of oil & gas importing Islamic countries. This indicates that domestic investment is contributing to economic growth and resulting in decrease in external debt in oil & gas importing countries.

The international reserve (RES) also affect external debt but it's relationship is more complex. An increase in international reserve may result in less external borrowing and a decrease in external debt. However, an increase in international reserve increases the country's ability to service external debt,

which may result in higher external borrowing and debt. Therefore, the coefficient of RES can be positive or negative. The estimation result shows that the effect of the international reserve is positive on external debt of oil & gas importing Islamic countries. These results are consistent with the findings of Looney (1987) who also found a positive effect of international reserve in one of his model for non-mineral exporting countries.

The effect of the population (TPOP) and labor force (TLF) can be positive or negative on external debt. Higher population and labor force may increase foreign borrowing if it is not contributing to economic growth. However, if they are contributing to economic growth, it has a negative effect on external debt. In our case, the coefficient of population and labor force are negative. This shows that population and labor force in oil & gas exporting and importing countries are making their contribution to economic growth and resulting in less need for foreign borrowing. In case of oil & gas exporting countries, the population has a large proportion of expatriate and their contribution to economic growth and development of these countries cannot be denied. In oil & gas importing countries, there is an increase in literacy, and health facilities, which is contributing to the human capital development and thus, playing a role in the reduction of external debt.

Current account balance (CAB) is an important factor that affect external debt. A surplus in current accounts may have a positive or negative effect on external debt. An increase in surplus may decrease foreign borrowing and debt, but it also increases the creditworthiness of the country and access to foreign borrowing, which may increase external debt. The coefficient of CAB is positive in the case of oil & gas exporting Islamic countries and negative in case of oil & gas importing countries. It is well known that current account is in surplus for most of the oil & gas exporting countries and is in deficit for most of oil & gas importing countries. The implication of this finding is that for oil & gas exporting countries, current account surplus should not be used as a tool for higher foreign borrowing. These results are in consistent with the findings of Looney (1987), who found a positive effect of current account balance on external debt in the case of oil exporters and negative effect in case of non-oil exporters countries.

Foreign direct investment (FDI) is considered as an alternative of external borrowing. In the case of oil & gas exporting countries the coefficient of FDI is negative and statistically significant but in case of oil & gas importing countries, it is positive and statistically significant. It is known that in most of the oil & gas exporting countries, the infrastructure is well developed. Therefore, they need less external borrowing for the development of infrastructure, that's why FDI inflows have a negative effect on external debt. Since in oil and gas importing countries infrastructure is not well developed, they borrow externally to improve infrastructure facilities for the attraction of FDI. This is why FDI inflows are also contributing to external debt accumulation in oil & gas importing countries.

The estimated models are then used to identify the Islamic countries, where external debt is becoming unsustainable. This identification is based on estimated external debt, which is obtained from the estimated model. We took the ratio of estimated external debt to actual external debt. If this ratio is less than one, this means that external debt is becoming unsustainable as the country has borrowed too much and their actual debt is more than their expected debt based on their macroeconomic performance. Table 4.2 shows that among oil & gas exporting Islamic counties, Bahrain, Iraq, Kazakhstan, and Qatar accumulated external debt more than what is expected by the model. Among oil & gas importing Islamic countries, Egypt, Mauritania, Pakistan, Kyrgyz Republic, and Tajikistan borrowed extensively and they accumulated external debt more than what is expected by their macroeconomic performance.

Table 4.2. External Debt Sustainability of Selected Islamic Countries

Oil and Gas Exporters	2004	2006	2008	2010	2012	2014	2016
Algeria	0.492	0.868	4.963	8.224	22.765	16.006	1.759
Bahrain	1.501	0.474	0.590	1.022	0.681	0.616	0.000
Iraq	0.509	0.298	0.692	1.737	4.872	3.269	0.105
Kuwait	1.579	0.503	3.296	1.427	1.305	1.362	1.708
Oman	3.407	2.488	4.428	5.592	4.946	5.010	2.572
Qatar	0.897	1.532	0.624	0.834	0.562	0.543	0.605
Saudi Arabia	0.674	0.224	0.070	0.693	0.318	0.181	1.644
United Arab Emirates	2.244	0.742	2.119	1.572	1.787	2.027	1.427
Azerbaijan	0.276	4.465	10.374	3.226	1.828	3.523	3.645
Kazakhstan	0.558	0.411	0.874	0.418	0.251	0.322	0.471
Oil and Gas Importers							
Egypt	0.765	1.711	2.275	3.064	0.349	0.351	0.922
Jordan	0.716	1.787	2.618	3.283	3.516	1.186	1.276
Lebanon	0.615	0.537	0.677	0.988	0.985	0.996	1.031
Mauritania	0.589	0.349	1.429	0.509	1.006	0.933	0.890
Morocco	1.402	1.735	1.187	1.527	1.168	1.240	1.461
Pakistan	1.354	1.674	1.608	0.806	0.537	0.204	0.117
Sudan	0.436	0.878	0.732	0.706	1.139	1.000	1.275
Kyrgyz Republic	0.830	1.099	1.859	0.908	0.893	0.968	0.747
Tajikistan	1.659	1.971	1.343	1.301	1.303	1.000	0.705

Source: Authors' estimation.

5. Conclusion and Policy Implications

The rising external debt of Islamic countries is a constant source of concern for policymakers in these countries. This study selects nineteen Islamic countries and divides them into two groups (oil & gas exporters and oil & gas importers). As a first step, the study identifies the macroeconomic factors that affect external debt in these countries. The first conclusion of the study is that the macroeconomic determinants and their effect on external debt in oil & gas exporting and importing Islamic countries are different. Therefore, the policymakers need to be careful while designing a debt reduction strategy based on macroeconomic variables. The results of both models clearly identified that economic growth and central government revenue are important factors needs to be focused for reduction of external debt.

Later, this study uses the regression result of two models and estimate the external debt for each year. The estimated and actual external debt is then used to identify the countries who accumulated more debt than expected by the model based on macroeconomic performance. The second conclusion of this study is that among oil & gas exporters, Bahrain, Iraq, Qatar, and Kazakhstan and among oil & gas importers, Egypt, Mauritania, Pakistan, Kyrgyz Republic, and Tajikistan accumulated more external debt than what is expected by the model based on their macroeconomic performance. The policymakers in these countries should rely on external borrowing based on their macroeconomic performance.

At this stage, we can set some directions for further research. First, there is a need to extend this study to all Islamic countries. Second, one can further divide these Islamic countries based on per capita income. The extended sample of Islamic countries is expected to identify more macroeconomic variables that are responsible for the accumulation of external debt in Islamic countries.

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Appendix:

Table-1.

Variables	Explanation	Data Sources
ED	External debt (% of GDP)	Regional Economic Outlook, IMF (2017)
OPEN	Openness (measured as imports % of GDP)	WDI, World Bank (2017)
RES	Reserves, total (includes gold, billion, current US$)	WDI, World Bank (2017)
TPOP	Population, total (million)	WDI, World Bank (2017)
TLF	Labour force, total (million)	WDI, World Bank (2017)
FDI	Foreign direct investment, net inflows (% of GDP)	WDI, World Bank (2017)
GDP	Gross domestic product (billion, current US$)	WDI, World Bank (2017)
GCF	Gross capital formation (% of GDP)	WDI, World Bank (2017)
CAB	Current account balance, (% of GDP)	Regional Economic Outlook, IMF (2017)
CGE	Central government expenditure (% of GDP)	Regional Economic Outlook, IMF (2017)
CGR	Central government revenue (% of GDP)	Regional Economic Outlook, IMF (2017)
INF	Inflation (%)	Regional Economic Outlook, IMF (2017)