Pakistan's Economic Growth Restraints: The Three-Gap Model

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Abstract

Almost all the developing economies are confronted with three gaps which are termed as foreign exchange, savings-investment and fiscal gap. These gaps constrain the economic growth. Pakistan is also one of such developing economies and substantially facing three gaps in its economy. In order to observe the effect of these gaps on economic growth, we have used time series data ranging from 1980 to 2019. In the foreign exchange constrained growth findings show that an increase in investment opportunity, growth rate of potential GDP and a stable exchange rate will reduce the current account deficit there by increasing the growth rate of potential GDP. In the saving constrained growth findings show that an increase in tax revenue will increase the public savings reducing the saving-investment gap which will accelerate the potential GDP's growth rate. In the fiscal constrained growth finding show that public investment crowds in private investment, as private investment increases tax revenue will increase thereby reducing the fiscal gap. Higher tax revenue and public borrowing increase the growth rate of potential GDP.

Key words: *foreign exchange gap, net transfers, foreign direct investment, public savings, taxes, government borrowing, generalized method of momen*

Introduction

The 1980s saw a marked decline in Pakistan's economic performance after a decade of relatively rapid economic expansion throughout the 1960s and 1970s. Many policymakers believed that the country's experiment with an inward-looking import-substituting industrialization approach had reached its limits as economic development slowed and became more unstable. In an effort to boost economic growth, Pakistan implemented an established structural adjustment program that included changes to agricultural markets, public sector restructuring, and financial sector reform, among other things. It also pursued macroeconomic stabilization, external trade liberalization, and internal de-regulation. Insofar as it reversed the trend rate of output growth's decline, diversified exports, and restored macroeconomic balances, the adjustment program appears to have been effective. However, in other ways, it fell short of policymakers' goals. The adjustment program failed to produce a sufficiently high rate of growth in output and did nothing to encourage a generalized increase in job creation. It also did little to reverse the trend of falling investment growth rates.

Numerous academics use the three-gap model to examine the constraints imposed by each gap that affects economic growth in order to present a macroeconomic performance selection program. Using a simplified analytical approach, Mwega, Mwangi, and We-ochilo (1994) investigate whether Kenya's capacity expansion is restricted by the saving, fiscal, or foreign exchange shortfall and how these gaps have evolved since the early 1970s. They discover that the binding resource constraint on Kenya's potential growth, for plausible intermediate import ratios, is foreign exchange. Therefore, if its availability were to be enhanced by the promotion of exports and more liberal capital inflows, along with a decrease in import compression, this would close the external, fiscal, and saving gaps that impede sound macroeconomic performance. By simulating a model, Sepehri, Moshiri, and Doudongee (2000) graphically demonstrate the importance of the foreign exchange limitation in achieving a moderate growth rate over the medium run. Iqbal, James, and Pyatt (2000) investigate the effects of adjustment policy reforms and external shocks to macroeconomic performance using a three-gap paradigm. In order to assess Uzbekistan's policy options, Ranaweera (2003) used a three-gap framework that focuses on the main economic imbalances. The importance of domestic and foreign savings for Vietnam's economic growth is evaluated by Sepehri and Akram-lodhi (2005). To determine which of the gaps—savings, foreign exchange, and fiscal—become the constraining restrictions in the adjustment process of Malaysia as it tries to sustain economic growth in the post-crisis era, Thanoon and Baharumshah (2006) create an open economy model. Based on the three-gap model, Chen and Zhang (2008) evaluate the importance of domestic and foreign savings for China's economic growth.

Almost all the developing countries face one or two of the gaps in their economy. Existence of any one of the gap is hurdle to sustainable growth. Developing economies have major problem of domestic savings, foreign exchange and fiscal deficit. Domestic saving is an important source of finance for developing nations which is very sensitive to external shocks. The external debt of developing countries is genuinely raised whenever short-term foreign inflows and debts increases. It also affects the current account deficit. Like other developing nations, Pakistan is no different. If Pakistan is to attain sustained growth, it is crucial that these gaps be filled. If we talk about the saving- investment gap it is almost negative. Pakistan does not have enough savings to invest ultimately; they go for loan financing so with that the burden of debt increases and the economic growth declines. On the other side the trade gap also exists in Pakistan's economy it affects the current account deficit. If we do not fill up this gap it will decline economic growth. Fiscal gap is also important for Pakistan. Up to a certain extent, the fiscal gap can directly restrain economic growth which potentially can affect the foreign gap and as a result, make an indirect influence on the country economy.

By developing and estimating a concise structural three-gap growth model, similar to those proposed by Bacha (1990) and Taylor (1993), the study evaluates the contribution and significance of domestic private and public sector savings, as well as foreign savings, on the growth path of output. Three-gap model is an accurate way to understand macroeconomic growth than by other macroeconomic models. According to the three-gap model, in addition to domestic and foreign savings, which Chenery and Strout (1968) first explored in the framework of the two-gap model, the growth of productive capacity is also restrained by the accessibility of public sector resources. The productive capacity of the economy and its growth rate has been greatly influenced by public sector savings and investments, both directly through public enterprises and indirectly through investments in physical, social, and human infrastructure. As a result, the research estimates a three-gap model for the years 1981 through 2019. The analysis primarily utilizes Taylor's (1993) methodological framework. Up until recently, the majority of published studies in this field did not clearly identify the dominating constraint that

would restrict the development of poor countries in a three-gap model. There hasn't been enough research done yet on how the three gaps interact to affect growth and investment. The following are this study's major objectives: (a) by creating and analyzing the three-gap model, we aim to partially address this gap in the literature. (b) to determine what investment and growth-related constraint is the most severe.

Organization of the Study

The study has been organized into five sections. First section comprises of introduction of the study. In the second section we discuss literature review with gap in the literature. Third section of the study discusses formulation of the model, data and methodology. Fourth section discusses the results of the study. In the end, the last section tell about conclusion, and policy implications.

Literature Review

Iqbal and Rehman (1995) examines macroeconomic constraints (foreign exchange, fiscal and saving) using a three gap model to assess the economics growth in Pakistan for the period 1977 to 92. The results indicate that Pakistan's economy is operating below capacity since 1978. Further findings indicate that greater capacity utilization raises both private and public savings. The result of the foreign exchange restraint equation shows that a real devaluation as well as an increase in foreign demand enables potential gross domestic product grow at a higher rate. However, increased capacity utilization decreases potential output when foreign exchange is mandatory restraint. According to the outcomes of the equation for savings constraint, a real devaluation and an increase in foreign demand both reduce Pakistan's capacity for productivity growth. Last but not least, the fiscal restraint equation shows that increased capacity utilization increases growth of potential production. Mwega et al. (1994) analyzed basic analytical structure using the three gap analysis to assess whether it was the saving, fiscal or foreign exchange gaps which was the coupling requirement on capacity growth in Kenya, furthermore how these gaps have advanced since the early 1970s. The results show that, for conceivable intermediate imports proportions, foreign exchange is the coupling reserve restraint to potential output growth in Kenya. Ghanti and Sundararajan (1998) examine a small open economy macroeconomic model to recognize the predominant requirement in the change procedure with growth in developing nation. The outcomes show that the trade-fiscal gaps collectively become mandatory restricting restraints when the government attempts to take the productivity and investment to their potential levels. The outcome demonstrates that LDCs not possibly reach substantial growth if they substantially rely upon capital inflow. Ardeshir and Lodhi (1999) analyzed the macroeconomic performance furthermore evaluate the relative significance of foreign exchange, domestic as well as public savings on Fiji's economic development using the well-known three gap model, the data from 1971 to 1996 has been used. The assessed foreign gap condition shows a sharp trade-off between domestic investment, as well as capacity utilization. Finding show that public savings restraint as well seems to be more obligatory than the savings restraint such as more foreign assets become available. Finally, it has been suggested that in order to improve the efficiency of government interference in the economy, and thus public savings. Iqbal et al. (2000) examined the three gap model's applicability in Pakistan. The adjustment program's outcomes demonstrate that the economy of Pakistan has grown up. The devaluation of domestic currency negatively affects the imports while positively affects the exports of the country. The outcome shows that the overall economic growth is certainly enhanced by inflows of private foreign assets, while during adjustment process, the external shocks reflected negative impact. The decline in economic activities in Gulf County

strongly negatively affects the macroeconomic variables throughout it has awful impact on labor transfers from the Gulf countries. In case of Pakistan, it positively influences the imports of the services.

Michiko and Khachi (2003) analyzed the legitimacy of the dual gap approach for nine big recipients of Japan. The VAR model was used to assess those factors that boost or impede economic growth using the well- known as two gap model. The results do not evidently withhold to show that the local savings as well as foreign exchange are two impeding factors of economic growth around the nations, but it demonstrate if a nation stabilizes its basic of economic growth, the gap itself spills-over and steer to a sustainable growth way. Increase in foreign exchange could boost investment as well as imports of the nation, but it would not directly achieve the greater economic growth. Wahid (2004) investigated the relationship between economic growth and foreign capital inflows. The macroeconomics foundation revealed supplementary role of foreign capital on government revenue, foreign exchange as well as domestic savings and hence contributes towards promotion of economic growth up to considerable extent. The saving gap persists if domestic saving is inadequate to abridge the demand for investment so required to attain growth rate at target. Moreover, there also persists a trade gap or foreign exchange gap, in addition to saving gap, which is based on the assumption that not all investment goods can be produced domestically. Nwachukwu and Egwaikhide (2007) investigate economic growth in Nigeria using the two gap approach. VAR approach was used to test those factors that inculcate or impede economic growth. The results show that there is no clear evidence that the foreign aid fills the gap in Nigeria while foreign direct investment fill up the gap but it is volatile. The transfer paradox holds that as once a country stabilize its basics of economic growth the gap itself spill-over. The model explain that foreign debt along with foreign direct investment (FDI) are an optimal means to breakdown the poverty line and resolve the dual gap simultaneously.

Zhang and Ruan (2010) used the well-known three gap model to assess how China's economic structure changed. Findings show that it is hard for china to restructure its economic position and focus on domestic demand rather exporting all the times using quantitative measurements. The Chinese government derives its income from indirect taxation. There is a significant fact that real interest rate has a favorable impact on both private and governmental investment. Findings also show investment of foreign direct investment can impede economic progress in china. Higher interest rate will induce foreigners to deposits with Chinese banks but this will increase the capability of banks to create credit causing extension in money supply causing inflation. Babalola and Aminu (2011) assessed the impact of fiscal policy on economic growth in Nigeria using annual data with effect from 1977 to 2009. Findings show that there exists long-run relationship between productive expenditure and economic growth. He also concluded that there exists positive relationship between the variables of interest during the above period. He stressed on government to overlay improvement by spending on human capital to uplift economic conditions via developmental expenditures. Taylor et al. (2012) examined the association between economic growth, fiscal deficit and government debt in North America. The findings suggested that a higher primary deficit casts a strong positive effect on growth. Kolawole (2013) investigates the inter-relationship between aid as well as economic growth in Nigeria. The dual-gap modeling approach shows that foreign direct investment has a detrimental impact on economic growth in a country and foreign aid do not have any effect on real growth in the state. Findings show that imports have inverse but significant influence on real growth in Nigeria while domestic saving and exports have positive effect on the growth rate in Nigeria. Adom and Elbahnasawy (2014) examined the mutual impacts on economic growth of persistent savings (S)-investment (I) gaps by using a sub panel

equilibrium framework in which consumption and savings are considered as detrimental factors in a typical household's utility function. The finding of the study suggests that such policies that are aimed at reducing internal gap is viably suited to promote economic growth in such countries. Gocer et al. (2016) investigate the relationship between economic growth as well as domestic saving-investment gap in undeveloped nations. The results show that in developing countries the growth is positively affected by saving over investment and statically significant, while it is negatively affected by investment over saving and statically insignificant. It is recommended that policy makers and financial institutions should pay focus on saving and investment. Worrell, Mamingi, and Weekes (2016) assessed the prevalence of gaps due to savings in new markets as well as in growing economies. By surveying as well as employing a sample on different countries considered the inadequate finances are responsible for inadequate investment opportunities in developing economies. Findings show that most of the countries are facing negative saving gaps. Moreover, finances acquired from foreign sources cannot eradicate such gaps completely. As such the same are utilized in non-productive resources due to which their positive impact faints away which are essentially required for institutions to develop.

Literature Gap

The three-gap model provides a general framework by which to assess the role and significance of domestic private and public sector saving, as well as foreign saving, on the growth path of output and investment. Up until recently, the majority of published studies in this field did not clearly identify the dominating constraint that would restrict the development of poor countries in a three-gap model. There hasn't been enough research done yet on how the three gaps interact to affect growth and investment. In case of Pakistan latest study available regarding the three gap model is of the year 2000 (Iqbal, 2000). As there is no recent study available therefore our study not only updates the data but we will also use different methodology and theoretical framework.

Formulation of the Model

Theoretical Frame Work

We use three gap model which is based on Iqbal (1995) and Solimano (1990), we use three different equations the saving constraint, foreign exchange constraint, and fiscal constraint. Moreover, we will also drive the relationship among them and will assess how they affect the economic growth.

The model is based on Solimano (1990) to assess the main macroeconomic impediments in economic growth of Pakistan.

$$(Y_p - C_p) + (T - C_g) + (M - X) = I \qquad (1)$$

Y_p represents private income, C_p represents private consumption, T and C_g represent current revenue and consumption of public sector, individually I stands for gross investment while M and X represent the sum of goods and service exports as well as imports. Because there is no data available on how net foreign transfers R are split between the private and public sectors, it is assumed that the public sector holds a portion λ of the debt (0< λ<1) and the private sector holds the remainder, or (1- λ), of the debt. When net foreign transfers are taken into account, equation (1) is written as:

$$[Y_p - C_p + (1-λ) R] + (T - C_g + λR) + (MT - XT - R) = I \qquad (2)$$

,

Imports and exports of goods are indicated by MT and XT, the second equation's left side represents, private, public, and foreign savings. Thus, the equation (2) becomes:

$$S_p + S_g + S_f = I \qquad (3)$$

Using these equations, we can obtain the foreign exchange constraint, saving constraint and fiscal constraint. The procedure is under consideration.

a) Foreign Exchange Constrained Growth

The total of capital goods (M_k), intermediate goods (M_i), and consumer goods (M_c) imports less all exports (XT) less net transfer equals the current account deficit (S_f). The level of potential output (Yp) is used to normalize each variable. In order to equalize the level of variables in the three gap analysis, potential output is applied.

$$S_f / Y^p = M_k / Y^p + M_i / Y^p + M_c / Y^p - XT / Y^p - R / Y^p \qquad (4)$$

Imports and export function are expressed as:

$$M_k / Y^p = \alpha_1 + \alpha_2 Y_g^p + \alpha_3 RER + \alpha_4 FDI / Y^p + \alpha_5 I / Y^p + \varepsilon_1 \qquad (5)$$
$$(6)$$
$$M_i / Y^p = \beta_1 + \beta_2 RER + \beta_3 FDI / Y^p + \beta_4 I / Y^p + \varepsilon_2 \qquad (7)$$
$$(8)$$
$$M_c / Y^p = \gamma_1 + \gamma_2 RER + \gamma_3 FDI / Y^p + \gamma_4 I / Y^p + \varepsilon_3$$

$$XT / Y^p = \delta_1 + \delta_2 YW / Y^p + \delta_3 RER + \delta_4 FDI / Y^p + \delta_5 I / Y^p + \varepsilon_4$$

An import of capital good is related to growth rate of potential GDP, foreign direct investment, domestic investment along with real exchange rate. Import of intermediate as well as consumer goods is related to real exchange rate, domestic investment as well as foreign direct investment. Total export of goods is related to real exchange rate and world demand, domestic investment and foreign direct investment. α, β, γ and δ represent elasticities while ε represents error term.

Equations (5), (6), (7), and (8) can be inserted into equation (4) to provide the economy's foreign exchange constraint. Using the following expression:

$$S_f / Y^p = \pi_1 + \pi_2 RER + \pi_3 FDI / Y^P + \pi_4 I / Y^P + \pi_5 Y_g^p - \pi_6 YW / Y^P - R / Y^P + V \qquad (9)$$

$$\pi_1 = \alpha_1 + \beta_2 + \gamma_3 - \delta_1$$

$$\pi_2 = \alpha_3 + \beta_2 + \gamma_2 - \delta_3$$

$$\pi_3 = \alpha_4 + \beta_3 + \gamma_3 - \delta_4$$

$$\pi_4 = \alpha_5 + \beta_4 + \gamma_4 - \delta_5$$

$$\pi_5 = \alpha_2$$

$$\pi_6 = \delta_2$$

$$v = \varepsilon_1 + \varepsilon_2 + \varepsilon_3 - \varepsilon_4$$

When the prevalence of foreign exchange is a limit, Equation 9 shows the restrictions the balance of payments imposes on economic activity and the growth rate of the gross domestic product. By solving equation 9, we can find the potential GDP's growth rate as follows:

$$Y_{gf}^p = 1 / \pi_5 \left\{ S_f / Y^P - \pi_1 - \pi_2 RER - \pi_3 FDI / Y^P - \pi_4 I / Y^P + \pi_6 YW / Y^P + R / Y^P - V \right\} \qquad (10)$$

Where Y_{gf}^p represent rate of growth of potential GDP, S_f^s / Y^p is the current account deficit, RER is real exchange rate, FDI is foreign direct investment, I is investment, *YW* is world

stands for foreign exchange constraint and "g" stands for growth rate of GDP.

b) Savings Constrained Growth

Solimano proposes the following output- investment relationship:

$$Y_g^p = g_0 + k\left(I/Y^p\right) + v_1 \tag{11}$$

The ratio of total investment to potential GDP (I/Y^p) links with the potential GDP growth rate ($Y^p{}_g$). The k stands for the incremental capital-output ratio, while the g_0 stands for the base-level growth brought on by other factors (such as increases in labour productivity, technological advancements, and supply shocks) and v_1 is an error term.

Following are the savings functions for the public, private, and international sectors normalized by potential GDP:

$$S_p/Y^p = \xi_1 + \xi_2 Y_g^p + \xi_3 RI + v_2 \tag{12}$$

$$S_g/Y^p = \varepsilon_1 + \varepsilon_2 TR/Y^p + v_3 \tag{13}$$

$$S_f/Y^p = \mu_1 + \mu_2 RER + \mu_3 CU + \mu_4 Y_g^p + \mu_5 RI + v_4 \tag{14}$$

Private saving is the function of growth rate of potential GDP and real interest rate. Tax revenue determines public saving, while real exchange rate, capacity utilization, potential GDP growth rate, and real interest rate determine foreign saving. ε, ξ and μ represent elasticities while v shows the error term. Private national savings are a function of growth rate of potential GDP and real interest rate.

Equation (3) yields the saving constraint on the growth of potential output as follows when equations (11), (12), (13) and (14) are combined and inserted into the saving investment balance.

$$Y_{gs}^p = \left(k/1 - 1/\xi_2 - 1/\mu_4\right)\left(\omega_1 + \omega_2 RER + \omega_3 CU + \omega_4 RI + \omega_5 TR/Y^p + \lambda \tag{15}$$

Where;

$$\omega_1 = g_0/k + \xi_1 + \varepsilon_1 + \mu_1$$

$$\omega_2 = \mu_2$$

$$\omega_3 = \mu_3$$

$$\omega_4 = \mu_5 + \xi_3$$

$$\omega_5 = \varepsilon_2$$

$$\lambda = v_1/k + v_2 + v_3$$

Where Y_g^p represent growth rate of potential GDP, k is capital-output ratio, RER is real exchange rate, CU is capital utilization, TR is tax revenue , RI is real interest rate, all the epsilon show coefficients and the subscript 'g' stands for growth and 's' stands for saving constraint.

c) Fiscal Constrained Growth

The public sector borrowing requirements can be used as the basis for the fiscal restriction when they are normalized by the level of potential output.

$$BR_g/Y^p = I_g/Y^p - S_g/Y^p \tag{16}$$

Total investment, divided into public and private investment, and adjusted for the level of potential GDP, might be expressed as follows:

$$I/Y^p = I_p/Y^p - I_g/Y^p \tag{17}$$

The private investment is described by Solimano as follows:

$$I_p/Y^p = \eta_1 + \eta_2 I_g/Y^p - \eta_3 RI + \lambda_1 \tag{18}$$

In the private investment function, the sign with coefficient (η_2) relies on whether public investment crowds out or crowds in private investment. η_3 represent coefficient and λ_1 represent the error term.

Equation (18) is inserted into equation (17) to produce:

$$I/Y^p = \eta_1 + (1+\eta_2)I_g/Y^p + \eta_3 RI + \lambda_1 \tag{19}$$

Equation (19) is substituted for equation (11), and solving for I_g/Y^p produce:

$$I_g/Y^p = 1/k(1+\eta_2)\{Y_g^p - g_0 - k(\eta_1 + \eta_3 RI)RI + \lambda_1\} \tag{20}$$

By incorporating equation (20) in equation (16) for Y_g^p yields

$$Y_g^p = k(1+\eta_2)\{BR_g/Y^p + \varepsilon_1 + g_0/k(1+\eta_2) + (1+\eta_2)(\eta_1 + \eta_3 RI + \lambda_1) + \varepsilon_2 TR/Y^p + v_3 \tag{21}$$

Y_g^p is a growth rate of potential GDP; k is capital-output ratio, BR is public sector borrowing requirement, RI is real interest rate and all the epsilon and η represent coefficients and subscripts 'g' stands for growth rate of potential GDP.

Description of Variables

We have used time series data for Pakistan from 1980-2019 to measure the three gap model. We have normalized the variables with potential output which is standard in economic literature. Different sources of data are used like state bank of Pakistan (SBP), world development indicators (WDI) and we have used our own calculation in calculating potential output. Description of each variable is given below. Summary of variables is also discussed.

Potential GDP

Potential (GDP) can be describe as when a country can have utilized all its resources such as workforce technology equipment uses all these resources and produces high level of output. There are different methods for the measurement of potential GDP. Since the simplest way to estimate the potential output is through using the method of linear trend, therefore, the method depends on the assumption that potential output is a function of time and the output gap is a residual from the trend line.

Current Account Deficit

In simple words, the current account deficit is imports over exports. In other words, whenever in a country's trade, the cost of imports of goods and services if exceeds over exports of goods and services, then the country would be facing current account deficit. We will use the foreign savings in dollars to measure the current account deficit.

Exchange Rate

Exchange rate is defined as price of domestic currency in terms of foreign currency (US dollar).

Capacity Utilization

The extent to which a firm or a nation utilizes its installed productive capacity is known as capacity utilization. It is the relationship between the output produced by the installed equipment and the production that would be possible if all of the equipment's capacity were utilized. We will use ratio of actual to potential GDP to measure capacity utilization.

World GDP

Summation of production of goods and services for all countries together is called world GDP.

Imports

We will take imports of consumer goods, capital and intermediate goods. Capital goods are physical assets which are used to produce goods or services, or used as inputs to produce consumer goods. An intermediate good is a product used to produce a final/finished good/services or simply the product. Consumer goods are produced which are bought for consumption by the usual consumer also called final goods.

Exports

Whenever good or services produced in on country are sold to another country after having-been shipped or by other carrier means are called merchandise exports. These are general in nature.

Savings

Public saving is the amount of money which indicates an amount that is leftover from income and expenditure of the government, Private savings is disposable income less consumption. Foreign savings is simply a country's balance of payment.

Investment

Private investment denotes purchase of an asset which can generate money which also undergoes normal periodical wear and tear. Public investment, investment done or undertaken by the state in a particular asset either financed through central or local governments.

Foreign Direct Investment

Investment done or undertaken by a foreigner individual or firm in any other country except is own country in order to earn profit.

Real Interest Rate

The interest rate that is adjusted for inflation. We have used short term interest rate, money market rate.

Tax Revenue

Tax is a source of income for a government. We will use total tax revenue from both direct and indirect sources.

Table 5
Summary of Variables

Variables	Symbol	Description	Unit	Source
Imports (capital intermediate and consumption goods)	$M_k/Y^p, M_i/Y^p, M_c/Y^p$	Capital goods are physical assets which are used to produce commodities. Intermediate good is a product used to produce final/finished good/services Consumer goods is called final goods.	Million Rupees	SBP
Total Exports	XT/Y^p	Goods or services produced in one country are sold to another country.	Dollar ($)	WDI
Growth Rate of Potential GDP	Y_g^p	% change in gross domestic product at potential.	Percentage (%)	Own calculation
Real Exchange Rate	RER	RER=ER*Pf/Pd	Index	WDI
World GDP	YW/Y^p	Total output produced by the world	Dollar ($)	WDI
Foreign direct investment	FDI/Y^p	Investment done by a foreigner in any other country	Million Rupees	SBP
Savings(private, public and foreign)	$S_p/Y^p, S_g/Y^p, S_f/Y^p$	Private savings is disposable income less consumption, public saving is the difference between government revenue and its spending, Foreign savings, is simply a country balance of payment.	Million Rupees	SBP
Tax Revenue	TR/Y^p	Revenue of the government from direct and indirect taxes.	Million Rupees	SBP
Real interest rate	RI	Money market rate subtracted from inflation.	Percentage %	SBP
Capacity Utilization	CU	Ratio of actual to potential output	Ratio	Own calculation
Investments(public and private)	$I_g/Y^p, I_p/Y^p$	Public investment is the investment by the state in particular assets, private investment is the money invested by financial organizations, or other investors, rather than by a government	Million Rupees	SBP

Methodology

The econometric approach that we will use to investigate the barriers to economic growth will be covered in this section. In order to explore and thoroughly understand the empirical findings of the study, all the equations mentioned in the preceding section will be analyzed using the General Method of Moments (GMM) estimation.

Generalized Method of Moments (GMM)

The Generalized Method of Moments (GMM) is a method for measuring parameters in econometrics. The method requires that the model's specific momentary conditions be specified. Given that they have no expectations on the actual values of the parameters, these moments are both data elements and conditional model parameters. For any estimate classes that don't make use of any additional information from the moment condition, GMM estimation is seen as being consistent, asymptotically normal, and efficient.

To expand Karl Pearson's method of moments, which had been established in 1894, Lars Peter Hansen developed the GMM methodology. Any regression variable that is not connected to the residuals can behave as an instrumental variable. The crucial aspect of this quick estimate is that it does not call for extensive knowledge of the residuals distribution. It should be highlighted that since GMM has nothing to do with regression assumptions, including normality, it should be employed when there exists variance heterogeneity. The fundamental tenet of this approach is that the configuration of instrumental variables has no bearing on the disrupting elements of the conditions. This estimation technique can use the weight matrix to apply the proper estimates for dissimilar variations by choosing the suitable instrumental variables. A fluctuating trend is therefore anticipated because of things like revolutions, wars, the development of other financial schemes, structural flaws in the normal process of variables, and so on. In the present context, GMM appears to be the most useful estimator.

Results and Discussions

a) Foreign Exchange Constrained Growth

Results of imports and export function are expressed as:

$$M_k / Y^P = -0.00417 - 1.102251 Y_g^P + 0.000023 RER + 0.8023 FDI / Y^P - 0.530 I / Y^P \tag{5}$$

$$(-1.605) \qquad (1.442) \qquad (4.366) \qquad (-3.676)$$

$$M_i / Y^P = 0.000254 - 0.00000118 RER + 0.05268 FDI / Y^P - 0.04533 I / Y^P \tag{6}$$

$$(-0.655) \qquad (2.222) \qquad (-2.142)$$

$$M_c / Y^P = 0.002288 - 0.0000120 RER + 0.2492 FDI / Y^P - 0.2786 I / Y^P \tag{7}$$

$$(-2.033) \qquad (7.495) \qquad (-4.405)$$

$$XT / Y^P = 0.55347 + 0.0174 YW / Y^P + 0.04354 RER - 2.0751 FDI / Y^P + 2.7519 I / Y^P \tag{8}$$

$$(2.373) \qquad (2.462) \qquad (-5.705) \qquad (3.791)$$

Our results show that real exchange rate has no influence on imports of intermediate and capital goods. These goods are needed for production purpose therefore imports of these goods are irresponsive to exchange rate fluctuation. We found significant and an inverse relationship between real exchange rate and imports of consumer goods. Our findings are in line with Kemal

and Qadir (2005). The relationship between real exchange rate and exports is positive, it implies that if real exchange rate increases it will increase export earnings (as domestic currency depreciate) (Majeed, 2006).

We have found a significant and positive association between foreign direct investment and all categories of imports. At the initial stage of development an increase in FDI will enhance the imports (Jaykumer, Kannan, & Anbalagan, 2014). Whenever FDI increases transfer of technology in the host country increases it further increases income of the people there by increasing the imports. Results show that the relationship between FDI and exports is negative. Majeed (2006) and Zhang and Jie (2010) explain that FDI and exports are positively associated only in the presence of better FDI infrastructure. It means that FDI substantiates better infrastructure, which is viably not seen or absent in the case of Pakistan because of lack of facilitation it entails for FDI opportunities. Therefore, we do not witness improvement in productivity even after sufficient arrival of the FDI as such there is no improvement in the output and hence the country's export level remains stagnant. Hence, in such a case there will be no positive relationship rather negative or no impact would prevail.

The relationship between imports of all categories and investment is negative. This negative relationship exists when economy uses its own local inputs it will decline the imports of all categories. The relationship between exports and investment is positive, as investment increases it will increase productivity and hence increases exports (Chaudhary & Qaisrani, 2002). World demand and exports are positively related implying that whenever world GDP rise it will increase export demand due to which exports earnings will increases (Iqbal, 1995).

By putting equation (5) (6) (7) (8) into equation (4) we get following equation:

$$S_f / Y^p = 0.555 - 0.043 RER + 3.1793 FDI / Y^p - 3.606 I / Y^p - 1.10225 Y_g^p + 0.017 YW / Y^p - R / Y^p \quad (9)$$

Solving equation (9) for growth rate of GDP we get following equation

$$Y_{gf}^p = 0.5044 - 0.9072 S_f / Y^p - 0.0394 RER + 2.884 FDI / Y^p - 3.272 I / Y^p + 0.015 YW / Y^p - 0.90 R / Y^p \quad (10)$$

Findings show the negative association between current account deficit and growth rate of GDP as a rise in current account deficit reduces the necessary imports thereby reducing the productivity of industrial sector (Iqbal, 1995). The association between real exchange rate and growth rate of GDP is negative. Whenever real exchange rate increases (as domestic currency depreciates) its will further decreases public savings because of devaluation (Habib et al., 2016). FDI is positively related to growth rate of GDP. Whenever FDI increases it will increase employment, income and output which further raises growth rate of GDP (Hussain and Haque, 2016). We have found an inverse relationship between investment and growth rate of GDP, the negative relationship might exit because of unskilled labor force, lack of advanced technology lack of proper investment etc. (Saleem & Zaheer, 2016). World GDP is positively associated to GDP growth. Whenever world GDP rise it implies that it will increase export demand due to which production will increase (Iqbal, 1995). Relationship between foreign transfer and growth rate of GDP is negative. We have found negative relationship between foreign transfers and growth rate of GDP, because the levels of transfer do not raise physical capital investment (Roa & Hassan, 2011).

b) Savings Constrained Growth

$$Y_g^p = 6.1292 + 0.2021\left(I/Y^p\right) \tag{11}$$

$$(9.025) \quad (1.972)$$

$$S_p/Y^p = -0.548 + 0.1293Y_g^p + 0.0318RI \tag{12}$$

$$(-2.186) \quad (3.07) \quad (1.79)$$

$$S_g/Y^p = 9.450 + 0.399TR/Y^p \tag{13}$$

$$(3.63) \quad (3.65)$$

$$S_f/Y^p = -0.540 + 0.031RER + 0.257CU + 0.021Y_g^p + 0.015RI \tag{14}$$

$$(-3.23) \quad (1.743) \quad (1.715) \quad (5.091) \quad (3.654)$$

Results show that the relationship between investments and economic growth is positive. Whenever investment rises production increases it further increases economic growth (Forgha, Mbella, & Ngangnchi, 2014).

Private saving and growth rate of GDP is positively related. Whenever GDP growth rate increases it implies that the life time resources and savings of the peoples are increased (Nwachukwa & Egwaikhide, 2007). The relationship between real interest rate and private saving is negative. Whenever real interest rises, people save more and consume less due to substitution effect (Aizenman et al., 2017).

The relationship between public saving and tax revenue is positive, whenever government's revenue increases that further lead to increase public saving (Akram & Akram, 2016)The relationship between real exchange rate and foreign saving is positive, it implies that if real exchange rate increases it will increase export earnings (as a domestic currency depreciate) they further increase foreign savings (Majeed, 2006). The relationship between foreign saving and capacity utilization is positive, whenever capacity utilization increases its means a country production capacity has increased it will increase exports further lead to increase in foreign savings. The relationship between foreign saving and growth rate of GDP is positive. Whenever growth of GDP rises it means that the production has increased it further leads to increase exports earnings of the country and lead to raise foreign savings (Davidson 2007). Foreign savings and real interest rate have a direct association with one another, higher interest rate attracts foreign investment and lead to increases foreign savings (Augesto, Alberto, & Loavza, 2002).

Putting the equation (11) (12) (13) (14) into equation (3) and solving for growth rate of output.

$$Y_{gs}^p = -14.32 - 1.685RER - 13.64CU - 2.51RI + 21.16TR/Y^p \tag{15}$$

Results show that the relationship between real exchange rate and growth rate of GDP is negative. Whenever real exchange rate increases (as domestic currency depreciates) it will further decrease public savings because of devaluation (Habib et al., 2016). The relationship between capacity utilization and growth of GDP is negative. Adeyem, and Olufemi (2016) found negative relationship between capacity utilization in relation to productivity growth in Nigeria because of insufficient resources and lack of electricity. Whenever real interest rate increases, so it decreases private investment and increases private saving due to substitution effect. It will further decrease public saving that further leads to decrease public investment so the growth rate of GDP fall (Aizenman, 2017). Tax revenue is positively associated with GDP

growth, whenever tax revenue increases it further lead to increase public saving thereby increasing growth rate of GDP (Akram & Akram, 2016).

d) Fiscal Constrained Growth

$$I_p / Y^p = 1.500 + 3.139 I_g / Y^p - 0.209 RI \tag{18}$$

$$(2.698) \quad (2.698) \quad (-4.008)$$

$$I / Y^p = 1.500 + 4.139 I_g / Y^p - 0.209 RI \tag{19}$$

$$I_g / Y^p = -6.67 + 0.96 Y_g^p + 0.043 RI \tag{20}$$

Results show that the relationship of private investment and public investment is positive hence public investment crowds in private investment (Iqbal, 1995). Private investment and the real interest rate are found to be negatively related. Whenever interest rate is high people save more because of high return and invest less (Hussen, 2016).

Relationship between total investment and public investment is positive. Whenever public investment increases it will enhance private investment it further lead to enhance total investment. It is known as crowding-in effect as proved above. Real interest rate is negatively associated to total investment. Whenever real interest is high people save more and invest less because of a high return on savings.

Equation (20) is inserted into equation (16) $Y^p{}_g$ is solved to produce:
Putting the values and solving for growth.

$$Y_g^p = 16.241 + 1.038 BR_g / Y^p - 0.42 RI + 0.414 TR / Y^p \tag{21}$$

The relationship between public borrowing and growth is positive. Whenever public borrowing increases growth rate will increase but if public borrowing exceeds a specific level it leads to decrease growth (Ayadi & Felix, 2008). Real interest rate is negatively associated to economic growth. Whenever real interest rate increases, so it decreases private investment and increases private saving due to substitution effect, it will further decrease public saving and public investment so the growth rate of GDP fall (Aizenman et al., 2017). Tax revenue is positively associated to economic growth. Whenever tax revenue increases further lead to increase public saving increasing the growth rate of GDP (Akram & Akram, 2016).

Conclusion and Policy Implications

Existence of any one of the gap is hurdle to sustainable growth. Developing economies have major problem of domestic savings, foreign exchange and fiscal deficit. Domestic saving is an important source of finance for developing nations which is very sensitive to external shocks. In this study, we have investigated constrained to economic growth of Pakistan using three gap models. We have taken the annual data from 1981 to 2019 and used GMM.

In the foreign exchange constrained growth findings show that foreign direct investment increases all categories of imports while it reduces exports. Whenever FDI increases it implies that transfer of technology in the host country increases due to this output increases it further increases income of the people there by increasing the imports (Awais, Zulfiqar, Saghir, Sohail, & Rana, 2022). Imports of intermediate and capital goods are found to be irresponsive to exchange rate while depreciation of domestic currency increases exports. These goods are needed for production purpose therefore imports of these goods are irresponsive to exchange rate fluctuation. World GDP increases the exports.

Investment reduces all the categories of imports while it increases exports. This negative relationship exists because economy uses its own local inputs it will decline the imports of all categories. We conclude that an increase in investment opportunity, growth rate of potential GDP and a stable exchange rate will lower the current account deficit.

The saving constrained growth findings show that a rise in growth rate of GDP increases private savings. Every time the GDP growth rate rises, it means that people's lifetime resources and savings are rising. Real interest rate positively affects the private savings. Whenever real interest decline, people save less and consume more due to substitution effect. An increase in public savings can be by increasing tax revenue. Whenever government's revenue increases it further lead to increase public savings. An increase in exchange rate, capacity utilization, growth rate of potential GDP increases the foreign savings. When real exchange rate increases it will increase export earnings (as a domestic currency depreciate) they further increase foreign savings. Whenever capacity utilization increases its means a country production capacity has increased it will increase exports further lead to increase in foreign savings. Whenever growth of GDP rises it means that the production has increased it further leads to increase exports of the country and lead to raise foreign savings. We conclude that increase in tax revenue increases public saving reducing the saving-investment gap which leads to increase the growth rate of potential GDP.

In the fiscal constrained growth findings show that public investment crowds in private investment. When public investment enhances it will enhance private investment. Private investment and interest rate are negatively associated. Whenever interest rate is high people save more because of high return and invest less. As private investment increases tax revenue will increase it will reduce fiscal gap. Higher public borrowing and tax revenue increases growth rate of GDP, while a higher interest rate reduces growth rate of GDP.

As for as **policy implications** are concerned we recommend that to reduce current account deficit, stability of the real exchange rate is more important. The loosening of the foreign exchange restrictions might encourage international investment and imports. An increase in investment opportunities will reduce the foreign exchange gap, by increase in export earnings. The best strategy to bridge the foreign exchange shortfall is through foreign direct investment. An essential tool that tends to reduce private consumption and increase private savings and investment is an increase in the domestic real interest rate. By liberalizing the domestic financial sector, the domestic real interest rate would rise, which would boost domestic savings. An increase in the tax revenue will increase public savings by reducing the saving-investment gap which will ultimately increase the growth rate of potential GDP. Moreover, to improve the tax management and tax collection system and lower tax evasion will improve the tax revenue. A rise in the public sector investment (infrastructure), would raise the private investments as well. Higher private investment will increase tax revenue reducing the fiscal gap.

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