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RESEARCH PAPER

The Three Gaps Phenomenon in Pakistan: Evidence and Implications

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ABSTRACT

The study analyzes the three gap trends namely the trade deficit, fiscal deficit, and saving-investment gap, and their implications for the Pakistan economy using time series data from 1976 to 2020. The three gaps have interlocking transmission mechanisms that become difficult to devise a prescription for them separately. The stabilization reforms needed then are supposed to have simultaneous reactionary forces that can correct or at least curtail these deficits. This two-pronged analysis first workout the evidence of the link among these three balances/deficits and then draws out the implications on the economy of the twin deficits and saving investment gap over time to achieve sustained growth and economic development. For this purpose, there have been estimated ARDL and cointegration carried out for causality analysis. The results reveal the presence of short-run. A bi-directional causality is supported between external debt, current account, and fiscal balances/deficits. These two deficits are also closely associated with macroeconomic variables.

Introduction

The phenomenon of twin deficits gained significance in empirical literature during the 1980's when many developing and developed countries experienced increasing deficits in fiscal and trade accounts (Kulkarni and Erickson, 2001). The United States one of that experienced episodes of fiscal and trade deficits at one time while on another the deficit in one account was accompanied by the surplus in other account. This controversy led to the debate of twin divergence or twin deficit (Kim and Roubini, 2008). The pattern of the saving-investment gap provides an explanation as the budget deficit leads to a current account deficit as long as the saving-investment gap remains stable. However, the role of saving investment imbalance in this transmission mechanism is not much investigated (Eldemerdash et. al., 2014).

Macroeconomic variables play an important role in the transmission mechanism between budget deficit, saving investment gap and current account deficit. The existence of twin deficits has serious implications for an economy as other macroeconomic variables are also affected in an undesirable way. The ultimate impact of deficit financing depends on the way the deficit spending is used and is being financed. The financing of deficit affects other macroeconomic variables in the economy such as exchange rate, interest rate, inflation, investment, consumption and GDP growth rate. Thus, the implications of deficit financing are to be investigated to evaluate the desirability of any fiscal policy action.

Although the phenomenon of fiscal deficit and saving investment imbalance is shared by both developing and developed countries but the correlation tends to be more frequent in the former case (Eldemerdash et. al., 2014). Pakistan being a developing country offers a valuable research case as having an extensive history of deficits (Aqeel and Nishat, 2001). The budget deficit has varied between 2% to 9% since 1970 and correspondingly, the current account has also remained in deficit for most of the periods. The decades of budget deficit have accumulated debt stock to the extent that is difficult to sustain with the current state of growth. The prudent use of deficit spending and its allocation to unproductive opportunities has deteriorated the process of economic growth while rising the debt stock. Many studies have been conducted so far to investigate twin deficits in case of Pakistan (Khalid & Guan 1999; Siddiqui, 2010)

The objective of this paper is to investigate the correlation and causality of saving investment gap, budget deficit and current account deficit in Pakistan for the period of 1976 to 2020 using annual data. The implications of budget deficit for the economy are also investigated by analyzing the impact of budget deficit on other macroeconomic variables. Investigating twin deficit in the presence of saving investment gap will be a valuable addition in case of Pakistan. Such investigation will address the issue of using fiscal tools for external adjustment and the extent of its contribution to other macroeconomic issues and imbalances.

The results based on certain econometric and estimation techniques like Autoregressive Distributed Lag (ARDL) cointegration, and Granger causality for the evidence of 'three gaps model' and corresponding implications for Pakistan economy suggest the existence of Ricardian equivalence hypothesis. The variables or indicators considered for the analysis include GDP, unemployment, inflation debt, consumption, exchange rate etc. There has been found only a short-run relationship among the three gaps or balances a short-run while the long-run association among them does not exist. The results also indicate the link of these deficits with some other macroeconomic variables such as saving and consumption. The bi-directional causality is observed for external debt and current account deficit as well as fiscal/budget deficit. For all other cases, either one-way causality or no causality has been found between the variables.

The paper is organized into 5 sections. Section 2 contains s review of the literature followed by the section on material and methods given in Section 3. The results and discussion are covered in Section 4 while the conclusion and policy implications are provided in the last section.

Literature Review

The phenomenon of twin deficits has been investigated in numerous empirical studies but these studies have not reached any consensus regarding the causal relationship between the two (Eldemerdash *et. al.*, 2014). The Keynesian argument favours a unidirectional relationship with causality running from budget deficit to trade deficit. Domestic absorption as a result of fiscal expansion leads to increased import demand and current account deterioration (Keynes, 2003). The Mundell Fleming model postulated that deficit financing pushes up the domestic interest rate thereby leading to capital inflows and exchange rate appreciation which then results in current account deterioration (Mundell, 1961). Latif-Zaman and DaCosta (1990) using the granger causality technique and quarterly data of the US economy concluded that the causality runs from budget deficit to trade deficit. Saleh *et. al*. (2005) also concluded a long-run relationship between two deficits thus supporting the Keynesian view. Siddiqui (2010) studied the relationship in the case of Pakistan using the Johansen cointegration and rolling window method and concluded the same Keynesian results.

Conversely, the Ricardian equivalence hypothesis establishes that rational individuals keep in view their future tax liabilities therefore any increase in government expenditures or cut in taxes do not alter the consumption and investment pattern. Evans and Lee (1990) supported this view for G7 countries; similar results supporting the Ricardian view are concluded by Islam (1998) for Brazil and for Indonesia and Pakistan by Khalid and Teo (1999). Vamvoukas (1997) using yearly data for Greece has reached the same conclusion. A Similar relationship was supported by Acaravci, et. al., (2008).

Third hypothesis supports again a unidirectional causality but in reverse where current account deficit leads to fiscal account deterioration. The deficit in the current account slows down the process of economic growth resulting in decreasing tax revenues and fiscal deficit. Summers (1988) termed it as "current account targeting" as it is founded on the belief that fiscal instruments can achieve external stability. The empirical studies of Islam (1998), Anoruo and Ramchander (1998), Khalid and Teo (1999) and Bagheri and Keshtkaran (2012) supported this causality from current account deficit to budget deficit.

Lastly, these two deficits may correlate as a budget deficit may lead to the trade deficit and vice versa. An Empirical investigation of the USA economy by Darrat (1988) concluded bi-directional causality; while that of Kearney and Monadjemi (1990), Mukhtar et al. (2007) and Normandin (1999) have also revealed the bi-directional causality in empirical analysis. Mukhtar et al. (2007) used co-integration and Granger causality test for quarterly data of Pakistan and have supported the bi-directional causality. Lau and Haw (2003) supported the bi-directional causality for Malaysia however in the case of Thailand, Keynesian unidirectional causality prevailed. Chowdhury and Saleh (2007) used the autoregressive distributive lagged approach (ARDL) in the case of Sri Lanka and provided evidence for the Keynesian view.

The empirical studies in the case of Pakistan are also numerous but they have reached a different conclusion. Kulkarni and Erickson (2001) supported that the causality runs in opposite direction where trade deficit leads to the budget deficit. Khalid and Guan (1999) while analyzing twin deficits in the case of Pakistan and Indonesia supported the Ricardian Equivalence Hypothesis. Javid et. al., (2010) revealed twin divergence in the case of Pakistan supporting the Ricardian view. The bi-directional causality for twin deficit in Pakistan is supported by Mukhtar et. al., (2007) in an empirical study.

Apart from the interplay of these deficits, the impact of deficit spending on macroeconomic variables is also investigated in various studies. The budget deficit not only leads to saving investment imbalance and current account deficit but depending on the way it is financed, leads to other imbalances as well (Aqeel and Nishat, 2001). Higher deficit in public accounts are usually associated to higher inflation particularly in case when such deficits are financed by money printing. Easterly and Hebbel (1993) in their study of developing countries have concluded that inflation rose significantly in case of money financing of a budget deficit.

Another important variable influenced by deficit spending is real interest rate. The transmission mechanism of Mundell Fleming model suggested that budget deficit leads to crowding out of private investment by raising the domestic interest rate in case it is financed by domestic borrowing. Such financing channels the domestic savings to public sector thereby reducing their availability to the private sector pushing up the domestic interest rate (Easterly 1989). Easterly and Hebbel (1993) in their study supported that debt financing leads to higher interest rate. The capital inflow will result in appreciating the domestic currency and current account deficit. Easterly and Hebbel (1993) have reached the same conclusion in their empirical analysis of developing countries however Kim and Roubini (2008) have found evidence for exchange rate depreciation leads to budget deficit in the empirical study of US economy.

The household decision of consumption and investment are also influenced by deficit financing however the theory offers no consensus on what the ultimate impact would be in this case. The Keynesian argument supports that deficit spending financed by domestic borrowing will lead to increased consumption by wealth effect of government bonds held by the individuals. The Ricardian Equivalence Hypothesis suggested that consumer will act to offset the changes in government spending. Easterly and Hebbel (1993) supported that in case of developing countries, the fiscal deficit financed by domestic borrowing increased private consumption while it reduced private investment. Their study revealed mixed effect on growth of economy as it depends on the relative size of fiscal multiplier and crowding out effects.

Material and Methods

The model specification, data description, and econometric methodology are explained in the following sections.

Model Specification

The national income account identity shows the total output as the sum of consumption, investment, government expenditure, and net exports.

$$Y = C + I + G + NX \qquad (1)$$

Where Y shows gross domestic product, C stands for private consumption, I shows private investment, G for government consumption, X for exports and M for imports. The sum of C, I and G is called domestic absorption which can be represented by Z.

$$Z = C + I + G$$

$$X - M = Y - Z \qquad (2)$$

The equation shows that net exports or current account balance is the difference between GDP (domestic output) and aggregate demand. It explains that external imbalance arises from the difference between the monetary value of domestic production and domestic absorption or demand. Any effort to correct external imbalance should be focused on the matching of revenues with the expenditure in the economy.

Taxes being a revenue component of government account are to be added in this identity as consumption is carried out of disposable income only after meeting the obligation of taxes. Therefore, the equation becomes

$$Y - Z - T = X - M - T$$

Since budget deficit is the difference between government revenue and expenditures and savings equal disposable income less private consumption, using

$$Y - C - I - G - T = X - M - T$$

$$(Y - T - C) - I - G = X - M - T$$

$$S - I = (X - M) + (G - T) \qquad (3)$$

This equation shows that saving investment gap and fiscal imbalance contributes to external imbalance. The excess of investment demand over aggregate savings lead to current account deficit If investment is assumed to equal savings then deficit in fiscal account results in current account deficit. This equation forms the basis for testing the empirical relationship

$$CAB = SI + FB$$

This equation explains that the relationship of current account balance and fiscal balance depends on how saving investment gap behaves in the identity. If budget deficit is supported by saving investment gap, then current account deficit would result. However, if budget deficit is offset by movement in saving investment gap, then current account will show surplus balance.

The tri deficit has economy wide implications which provide the guidelines to a country. For this purpose the understanding of 'Open Economy Macroeconomics' is inevitable where we study the interactions of national economies and world-wide influence on patterns of the economy. There are especially four aspects to be examined carefully such as unemployment, savings, trade imbalance, money, and prices. The expenditure that makeup GDP/GNP or National Income (NI) are linked up to the employment of the factors of production such as capital, labor, and others.

$$NI = Y = C + I + G + (X - M)$$

$$CA = X - M$$

It has implications for change in direction of consumption, saving and investment as well. We have already mentioned that CA deficit implies borrowing and it indicates that when we borrow, we spend more than our means. Similarly, if we consume more, our next generation will consume less (unless they are more productive). Another important side is savings and current account dynamics. In a closed economy, by definition, savings (S) must be equal to investment (I). In an open economy they (S, I) may not be equal

$$S = I + CAB \rightarrow S \neq I.$$

As we know that the three Gaps model: CA= (SP-I) + (T-G) explains the link among current account (balance), resource gap (excess of private savings over private investment) and budget surplus. From the above equitation of three Gaps model, we can see that the CA is linked with resource gap and budget surplus/deficit and it can be explained as a function as written below.

$$CAB = f\,[(SP - I), (T - G), \ldots\ldots]$$

The regression equation for the above relationship can be written as follows.

$$CAB_t = SI_t + FB_t + \varepsilon_t \qquad (4)$$

It is important to note here that the above link is not based on theory of economic behavior but based on the definitional equation. But the relationship given above among current account balance, investment, and private and government saving is very useful for thinking about the results of economic policies and events. Interestingly, the effects of government deficit on current account are difficult to forecast due to offsetting effects among the variables such as government expenditures and taxes. Historically, such twin deficits phenomenon can be studied and comprehended through economic conditions in U.S.A during Reagan Regime.

On the implications side of the deficits careful considerations are needed while studying the changes government deficits, private saving and investment behavior. The European case in this regard is quite imperative. In short, causal link among the three balances/deficits explained in three Gaps model and economy wide repercussions require to incorporate the variables like GDP/GNP, unemployment/employment, Inflation, saving,

investment, consumption, exchange rate, debt, reserves etc. along with current account balance, resource gap and budget surplus/deficit.

In this study we will study this causal link and analyze the three deficits and their implications for the Pakistan economy. Interestingly, in case of Pakistan where we have observed deficits for the most of its history, it is worth mentioning that Government is mostly culprit in dissaving i.e. (SP-I) > 0 but it is going down whereas T<G.

Data Description

The time series annual data from 1983 to 2020 used to investigate the links required for analysis in Pakistan. Data was collected from WDI, Pakistan Economic Survey (PES), and State Bank of Pakistan (SBP). The description of the variables along-with source is provided in the Table 1.

Table 1
Variables used in the Model

Variable	Characteristic	Source
CAB	Current account balance as percentage of GDP	World Bank Database
SI	Saving investment gap as percentage of GDP. It shows excess of private savings over private investment	World Bank Database
FB	Budget Deficit as a percentage of GDP	Pakistan Economic Survey

Econometric Methodology

In time-series analysis there always remains suspicion about spurious relationships because of non-stationarity data series. (Nelson and Plosser, 1982) claim that most of the macroeconomic time series have unit root/non-stationarity. (Yule, 1926) pointed out that using the time series data often includes the possibility of obtaining spurious or nonsense regression. The variables included in the model are tested for stationarity/unit root. For this purpose, Augmented Dickey-Fuller (ADF) proposed by (Dickey and Fuller, 1979) and Phillips-Perron (PP) recognized by (Phillips and Perron, 1988) tests are employed. If variables have mixed order of integration i.e. I (0) and I(1) then Auto-Regressive Distributed Lag (ARDL) is the appropriate estimation technique, which is also known as the bound testing approach, introduced by Pesaran *et al.* (2001). This approach also involves the short-run dynamics in the estimation of long-run parameters (Bhatti *et al.*, 2018).

Results and Discussion

Table 1
Results of ADF and PP Unit Root Tests

Variable	ADF		PP		
	Level	Δ	*Level*	Δ	*Conclusion*
CAB	-2.35	-5.74***	-2.51	-5.75***	I(1)
SI	-3.27**	-8.38	-3.23**	-11.57	I(0)
FB	-2.96**	-6.81	-3.16	-6.86	I(1)

Note: *** and ** denotes the significance levels of 1% and 5% respectively and Δ denotes first difference.

ADF and PP tests show the presence of unit roots at levels for CA, therefore, CA is non-stationary at level but stationary at first difference. While SI and FB are found to be stationary at level.

As variables have mixed order of integration i.e. I (0) and I(1) therefore Auto-Regressive Distributed Lag (ARDL) is the appropriate estimation technique, which is also known as the bound testing approach, introduced by Pesaran *et al.* (2001). This approach also involves the short-run dynamics in the estimation of long-run parameters (Bhatti *et al.*, 2018). The calculated F statistic is compared with critical value proposed by Pesaran, *et al*. (2001). The vector autoregression (VAR) of order ρ (VAR (ρ)), following Pesaran et al. (2001), for the given function can be written as:

$$CAB_t = \alpha + \sum_{i=1}^{\rho} \beta_i \, CAB_{t-i} + \sum_{i=1}^{\rho} \beta_i \, SI_{t-i} + \sum_{i=1}^{\rho} \beta_i \, FB_{t-i} + \varepsilon_t \quad (5)$$

where CAB^t, SI^t and FB^t are the same as defined above in the data part while *t* is a time variable. Further from following Pesaran *et al*. (2001) the VECM is given as follows:

$$\Delta CAB_t = \alpha + \beta t + \gamma CAB_{t-1} + \sum_{i=1}^{\rho-i} \theta_t \, \Delta SI_{t-i} + \sum_{i=1}^{\rho-1} \lambda_t \, \Delta FB_{t-i} + \varepsilon_t \quad (6)$$

where Δ is the first-difference operator. In sum, the ARDL techniques take care of nonstationary, endogeneity, and serial correlation issues (Pesaran and Shin, 1999; Siddiqui, 2010). Equation (1) is generalized using the standard ARDL framework and cited below.

$$\Delta CAB_t = \beta_0 + \beta_1 CAB_{t-1} + \beta_2 SI_{t-1} + \beta_3 FB_{t-1} + \sum_{i=1}^{p} \beta_4 \, \Delta CAB_{t-i} + \sum_{i=0}^{q} \beta_5 \, \Delta SI_{t-i} + \sum_{i=0}^{r} \beta_6 \, \Delta FB_{t-i} + \varepsilon_t \quad (7)$$

The above equation can be viewed as an ARDL of order (p, *q*, *r*). The critical value has been tabulated by Pesaran *et al.,* (2008). The long-run relationship exists if the calculated value of F-statistics is higher than the upper bound critical value at a specific significance level. In this case, the null hypothesis of no long-run relationship is rejected, cointegration relationship exists, Haq *et al.*, (2017). The reverse, if the calculated value of F-statistics is smaller than the lower bound critical value then the null hypothesis of no long-run relationship cannot be rejected, cointegration not exist, Razmi *et al.,* (2020). If the calculated value of F-statistics lies within the lower and upper critical bound values, then the result would be inconclusive, Bhatti *et al.*, (2018). Bound testing results are summarized in the following table 2.

Table 2
Bound test results

Calculated Values		**Critical Values***	
F-statistic	Significance Level	Lower bounds	Upper bounds
3.45	10%	2.63	3.35

***** Critical values of upper and lower bounds are from Pesaran (2001) with unrestricted intercept and no trend.

The calculated value of F statistic (3.45) is greater than the upper bound critical value (3.45) at 10% level of significance, which indicates the poor or non-existence of long-run relationships among CA, FB, and SI in Pakistan. While, the coefficient term (ECM) confirms the short-run relationship between the variables. Its value should be negative and less than 1 for a stable error-correction process. The estimated value of ECM (speed of adjustment) coefficient is -0.33 which indicates that 33% of disequilibrium is adjusted

towards equilibrium within a year (single period). The results of other diagnostic tests like the LM test for Autocorrelation, Ramsey RESET test for model specification, Jarque-Bera (JB) test for normality, CUSUM, and CUSUMSQ given as in figure 1, demonstrate that the coefficients/parameters are stable, are presented in figure 1 and table 2 respectively as follows,

Figure 1: CUSUM and CUSUMSQ

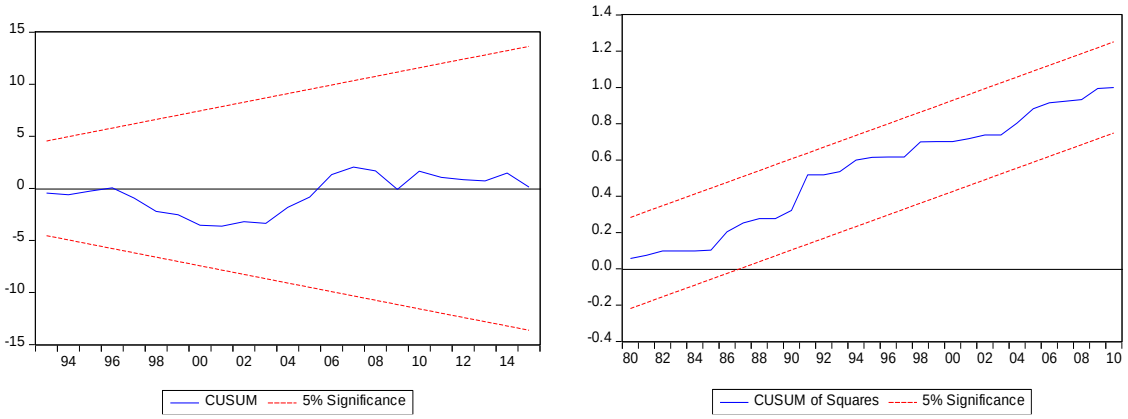

Table 2
Diagnostic test of ARDL Model

F-statistic		0.603	Prob. F (5, 38)	0.6975
Obs*R-squared		3.237	Prob. Chi-Square (5)	0.6634
Jarque-Bera		2.749	Probability	0.2528
Rasey RESET test	t-stat =	1.239	Probability	0.2229
	f-stat =	1.536	Probability	0.2229

Similarly, the long run results are presented in the following table 3.

Table 3
Long run results: Dependent variable FDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
FB	-0.118	0.746	-0.158	0.875
SI	-35.709	57.15	-0.624	0.535
C	-1.921	3.767	-0.509	0.613

Note: *** and ** show significance level at 1% and 5% respectively.

The long run estimates are statistically insignificant showing no long run relationship between the variables. It can also be seen as given below that the error correction term is insignificant as well.

The signs/impact of short-run dynamics. The results of short-run dynamics are provided in table 4 below. In case of short run, all the three deficits are interlinked. Both financial deficit and saving investment deficit hits the trade deficit but the direction is different. The lag value of current account deficit positively hits the deficit, and it is significant at 1% level of significance. The first difference operator term of fiscal deficit hits negatively but the lag value of fiscal deficit positively hits the current account deficit at 1% level of significance. While the saving investment gap negatively affect the trade deficit and it is significant at 1% level of significance.

Table 4
Short run Dynamics: Dependent variable FDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ΔCA(-1)	0.66	0.14	4.71	0.000***

ΔFB	074	0.25	2.94	0.005***
ΔFB(-1)	-0.78	0.24	-3.25	0.002***
ΔSI	28.05	14.61	1.91	0.062*
ΔSI(-1)	-40.08	14.38	-2.78	0.008***
C	-0.64	1.19	-0.54	0.591
ECM	-0.33	0.08	-3.86	0.000***
R-squared	0.58	**Akaike info criterion**		4.15
Adjusted R-squared	0.52	**Schwarz criterion**		4.39
S.E. of regression	1.81	**Hannan-Quinn criteria**		4.24

Note: ***, ** and * show significance level at 1%, 5% and 10% respectively.

Conclusion

The study aims to analyze the trends of fiscal deficit, trade deficit and saving-investment gap for the Pakistan economy from 1976 to 2020. In this two-pronged analysis there has been exercised the link among the current account balance/deficit, the saving investment gap and the fiscal/budget balance/deficit and also drawn out the implications of these three variables on the economy by examining the effects on selected macroeconomic variables i.e., GDP, unemployment, inflation and debt etc.

The results based on ARDL cointegration reveal the presence of short run linkages among twin deficits (current account and fiscal/budget) and saving investment gap in accordance with Keynesian view but there has not been found the long run stable relationship among them supporting the Ricardian equivalence hypothesis (REH). On the other side from Granger causality a bi directional causality is supported between external debt, current account and fiscal balances/deficits. These two deficits are also closely associated with the macroeconomic variables like saving, investment and reserves etc. The rest of the pairs confirm to null hypothesis in the granger causality test showing independence or no causality between the variables.

Recommendations

It can be concluded that Government is main culprit and causing current account deficit significantly as (S-I) is positive though it is shrinking overtime. The effects on other macroeconomic variables are also obvious while feedback effects in case of debt have severe implications for the economy. SMEs have a potential not only to reduce unemployment but also provide the exportable surplus. Thus , Government should chalk out such policies that can aid the allocation of right mix of both public and private resources for the production of right combination of goods is a prerequisite for the sustained growth and development.

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