Effects of Domestic Shocks to Fiscal Variables in Pakistan

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Abstract

This study investigated the economic and local economic repercussions of the domestic shocks on the fiscal variables in Pakistan. The data was extracted from DOTS (Direction of Trade Statistics) and IFS (International Finance Statistics). A Vector Error Correction Model with foreign variables (VECMX) was applied for analysis. The findings of this study demonstrate that foreign GDP (Y^*_{t-1}) has a favorable long-term impact on domestic output in the domestic model (Y). The annual positive impact of foreign output on domestic output is 16.76%. The Domestic Total Public Revenue (TR_{t-1}) and Foreign Total Public Revenue (TR^*_{t-1}) values showed a 1.84% and 1.12% positive connection with domestic output, respectively. The study will help policy makers to develop effective fiscal policy on the basis of the findings of the study.*

Introduction

In economics and politics, fiscal policy is the managing a country's economy through government expenditure and revenue accumulation (taxes or tax cuts). Public revenue expenditures are to influence macroeconomic variables emerged as a viable alternative to the laissez-faire economic management that prevailed before to the Great Depression of the 1930s. Keynesian economics is the base of fiscal policy, developed by British economist John Maynard Keynes, which states that change in public spending and taxation influence aggregate demand and the pace of economic activity.

To a lesser extent, fiscal policy affects monetary policy and feeds economic tendencies. When tax revenues surpass federal expenditures, a surplus is reported. If tax receipts are less than spending, then a deficit exists. That would force the government to increase taxes, spend less elsewhere, or print more money to meet the shortfall. These activities have a ripple effect on every other economic factor. Large-scale, excessive money printing leads to inflation. A balance of payment deficit develops if the government relies on its foreign exchange reserves, whereas an external debt crisis results from excessive borrowing from foreign sources. But if the government borrows too much money from the private sector within the country, the real interest rate could rise, leading to a stifling of domestic private sector growth. Sometimes, more than one of these things will happen at once. A large deficit has a negative outcome on economic growth and prosperity over the long term under all circumstances. Therefore, there is general understanding that a government shouldn't have a deficit that's too large. On the other hand, it is often argued that

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maintaining surpluses at the price of long-term growth is not a good strategy, as infrastructure and social investment are crucially vital and massive in rising countries (Fischer and Easterly, 1990). Therefore, the problem for the growing countries is to acquire their infrastructural and social requirements in such a way that the deficit or debt burden is not accumulated while managing the public finances.

There are now two schools of thought among economists that disagree on how much of a role the government should play in the economy. Inflation, according to neoclassical economists, can be lowered by reducing the private sector's outsized influence on the economy. Inflation and economic output both fall as interest rates rise due to the government's growing debt load. The Keynesian school, on the other hand, believes that a rise in public spending can cause the aggregate demand to increase that will boost the economic growth.

The government of Pakistan allocates a large portion of its budget to total expenditures. Rises in public spending can have an effect on inflation both directly and indirectly through the fiscal imbalance. Thus, fiscal policy contributes to higher inflation. Inflation, government deficits, and monetary expansion have all been linked in several studies of developing nations. Pakistan's government has been forced to print more currency to keep up with the country's soaring budget deficits, leading to a sharp increase in consumer prices. Prior studies focused on contrasting fiscal and monetary policy head-to-head.

Revival of Fiscal Policy

As a result of the 2008 financial crisis and the accompanying Great Recession, many governments turned to fiscal policy. At the conclusion of the third quarter of 2008, AD decreased by an unprecedented amount, prompting governments to take drastic measures to boost it through measures like as emergency tax cuts, targeted subsidies, and increased government spending. One such policy attempt is the American Recovery and Reinvestment Act of 2009, although similar or identical measures have been enacted in countries ranging from China to Germany.

According to Paul Krugman, "conventional fiscal conservatism is fatal stupidity in a depressed, deflationary economy" (September 11, 2015 on New York Times). Developed economies finished the first decade of the 21st century with the deepest recession since the Great Depression. It has forced economists and policymakers to reevaluate the function of government spending as a result of this experience. Prior to the Great Recession, conventional wisdom held that the government's ability to influence the economy was quite limited. A temporary return to Keynesian economics occurred at the outset of the 2008-2009 financial crises. At the time, economic policy was ahead of (mainstream) economic thought. But there was a

dramatic change in fiscal policy in the summer of 2010. Several nations and the European Commission argued for austerity measures. The Troika's initiatives were forcing severely depressed countries to implement extreme austerity measures. Since then, there have been several claims made by observers that disparities in fiscal policy are largely responsible for the varying economic fortunes of different countries (Wren Lewis 2015, Krugman 2010, Gechert et al. 2016).

Several analysts felt that the 2008 recession required more active government intervention. However, the widespread favor of government action to alleviate the economic crisis was reflective of a pre-crisis revival of faith in policy activism. The debate about potential interventions in fiscal policy, however, gave the impression that we were still using the same discretionary policy measures as in more activist eras. Given the longstanding lack of support for discretionary policy, it was not surprising that little improvements had been made to its design. There must be a greater focus on policy formulation if we are to engage in widespread fiscal discretionary policy (Auerbach, 2009).

According to Taylor (2002), the wisest course of action for the United States economy right now is to let the automatic stabilizers handle the bulk of fiscal policy's countercyclical impact. Discretionary fiscal policy is best reserved for longer-term problems that can be addressed with fewer drastic shifts at this time.

Literature Review

The importance of fiscal policy in tax collection, income redistribution, and macroeconomic stability has long been emphasized by legislators and economists alike. There is also new talk about how fiscal policy may help the economy recover from recessions like the one we're in. Hebous (2011) reviews the theoretical and empirical VAR literature on the short-run effects of discretionary fiscal policy measures on macroeconomic variables in great detail.

Fiscal policy is a major government undertaking that has been shown to accelerate economic growth. The path the economy will take in the future can be deduced from the current state of fiscal policy. Fiscal policy regulates and stimulates the economy through changes in government expenditure and taxation. Inflation, total demand, economic activity, resource allocation, distribution, and avoiding economic depression are all theoretical outcomes that may be affected by fiscal policy. A fiscal policy move can be either discretionary, in which the government sets the tax rate, tax base, and size of government, or mandatory, in which these factors are set by statute. In contrast, automatic stabilizers allow variables to adapt automatically to new economic conditions. For instance, while the economy is booming, tax revenues increase but social benefit spending decreases, and vice versa when the economy contracts (Akram et al., 2011).

Fiscal policy's effect on economic expansion is an intricate and contentious issue in the economics literature. Economists don't appear to be able to come to a consensus on this issue. According to the Keynesian school of economics, governments in developing economies routinely run huge budget deficits in order to stimulate economic growth, generate new jobs, and keep aggregate demand at high levels. Growth and capital accumulation are boosted by large budget deficits. Many academics have spoken in on this; therefore, it's safe to say (Chandrasekhar 2000; Shetty 2001; Krishnamurthy 1984 and 20012; Murty and Soumya 2007; Chelliah and Kavita Rao 2001). Public sector investments, particularly in infrastructure, are said to increase the fiscal deficit and encourage private sector growth by adherents of the Keynesian school of thinking. Consequently, the "crowding in" effect of the budget deficit benefits the economy as a whole when public investment is increased within a realistic policy framework.

Favero (2002) developed a semi-structural VAR model for Germany, France, Italy, and Spain to investigate the behavior of fiscal and monetary instruments in the Eurozone, building on the foundation laid by the research done by Blanchard and Perotti (2002) in the United States. This article showed how intertwined the two agencies are, albeit with the caveat that their interactions are entirely conditional on how each reacts to interest payments on the public debt being paid out of tax revenues and other government expenditures.

Hebous and Zimmermann's (2010) estimation of the GVAR methodology for the Eurozone, which also considers the financial channel, found that an unexpected rise in the Eurozone's budget deficit has a positive impact on the production of Eurozone member countries, despite the fact that bilateral effects are negligible.

Before the early 1980s, fiscal policy was widely seen as an effective means of maintaining economic equilibrium. However, fiscal policy has received less attention than it otherwise would have had because of its failure to stimulate economic growth after the oil shocks of the 1970s and the accompanying increase in budget deficit and public indebtedness (Beetsma and Giuliodori, 2011). As a result, many financial experts doubt fiscal policy's ability to moderate business cycles (Afonso and Sousa, 2012). Policymakers have relied heavily on active fiscal policy as a weapon throughout the present global crisis, although academic experts have not agreed on the consequences of fiscal policy on macroeconomic indicators, or the degree to which such effects have occurred. Contrarily, there is widespread agreement among economists and government officials regarding the benefits of current inflation-targeting measures (Perotti, 2007; Beetsma, 2008; Fontana, 2009). According to Arestis (2009), the prevailing opinion on monetary policy assumes that changes to interest rates based on the Taylor Rule are an efficient tool for limiting inflation. This model is

drawn by a contemporary consensus from a number of different schools of thought, including the new Keynesian theory of nominal rigidities, the long-run vertical Phillips curve, and the neoclassical idea of rational expectation and explicit optimization behavior. Yet, there are fewer consensuses on the theoretical model and empirical method on fiscal policy.

From 1973 through 2008, Shaheen and Turner (2010) used the SVAR method to show that fiscal policy had a consistent impact on macro variables. From their findings, it was clear that government spending shocks had minimal effects on GDP and inflation. In contrast to what was predicted by the Blanchard and Perotti (2002) model that demonstrated a substantial impact of tax and public spending shocks on Pakistani inflation and output, these results were not seen. Long-term effects of public spending shocks were progressive, and their impact was felt immediately. The administration was so shocked that they had to temporarily increase interest rates as well.

Different studies have concluded at different estimates for how long the effects of fiscal policy will last. Changes in the fiscal structures of different taxes and spending affect GDP over the long term, with effects becoming obvious rather fast after a few years, as shown by an analysis of panel data from OECD nations going back to the 1970s conducted by Gemmell et al. (2011). In addition, the historical data seemed to express both short-term and long-term effects, the latter often lasting between one and five years. The impact of budget cuts and tax hikes is conditional on the specific taxes and spending that are altered. As an example, infrastructure spending won't boost GDP growth if it's paid for by taxes that severely distort economic activity.

According to Asghar et al (2020) the government may take initiatives to provide credit to finance the savings-investment gap. As the imports and exports are less elastic to minimize the forex gap, the government of Pakistan took measures to restrict imports of luxury consumer items.

Methodology

A general structural VARX model for endogenous variables with a vector of $m_x \times 1$ can be expressed as (The order of the distributed lag functions correlated with endogenous and exogenous variables may be explicate in a number of ways. The distributed lag functions on x_t and x^*_t can be interpreted as having a maximum order of 'p' lags.

$$\mathbf{A}x_t = \mathbf{A}_1 x_{t-1} + \cdots + \mathbf{A}_p x_{t-p} + \mathbf{B}_0 x^*_t + \mathbf{B}_1 x^*_{t-1} + \cdots + \mathbf{B}_p x^*_{t-p} + \mathbf{D}d_t + \varepsilon_t \quad \textbf{(1)}$$

Where t =1,2,…T, and the deterministic variables is denoted by d_t which is a q×1vector, exogenous variables ($m_x^* \times 1$ vector) are denoted by x^*_t, while $\varepsilon_t = (\varepsilon_{1t}, \varepsilon_{2t}, \ldots, \varepsilon_{mxt})$ is a $m_x \times 1$ vector of serially uncorrelated errors of individually distributed of x*t having a zero

mean and a constant positive fixed variance–covariance matrix, $\Omega = (\omega_{ij})$, where ω_{ij} is the $(i, j)^{th}$ element of Ω.

The reduced form of the model shown in equation (1) that demonstrates the endogenous variables with reference to the exogenous variables is denoted as:

$$\mathbf{x_t = \Phi_1 x_{t-1} + \cdots + \Phi_p x_{t-p} + \Psi_0 x^*_t + \Psi_1 x^*_{t-1} + \cdots + \Psi_p x^*_{t-p} + \Upsilon d_t + u_t, \quad (2)}$$

Where

$$\mathbf{\Phi i = A^{-1} A_i,}$$

$$\mathbf{\Psi_i = A^{-1} B_i,}$$

$$\mathbf{\Upsilon = A^{-1} D,}$$

$$\mathbf{u_t = A^{-1} \varepsilon_t \text{ is i.i.d. } (0, \Sigma)} \text{ with } \mathbf{\Sigma = A^{-1} \Omega A'^{-1} = (\sigma_{ij}).}$$

Using a VAR (p), where all variables are considered endogenous, several researchers have studied the cointegration econometric method. We begin by reviewing the literature assuming that the VAR model only incorporates endogenous I (1) variables and linear deterministic trends.

If the value of $B_i = 0$ in equation (1) then we have

$$\mathbf{x_t = \Phi_1 x_{t-1} + \cdots + \Phi_p x_{t-p} + a_0 + a_{1t} + u_t,} \quad \mathbf{(3)}$$

Here a_0 and a_1 are m × 1 vectors of anonymous coefficients.

We shall consider a model which not only contains the endogenous variables but also accommodates the exogenous I (1) variables.

The above model can be rewrite as a Vector Error Correction Model (VECM)

$$\mathbf{\Delta x_t = -\Pi x_{t-1} + \sum_{i=1}^{p-1} \Gamma \Delta x_{t-1} + a_0 + a_{1t} + u_t,} \quad \mathbf{(4)}$$

Where

$\Pi = I_m - \sum_{i=1}^{p} \Phi i$,

$\Gamma_i = -\sum_{j=i+1}^{p} \Phi j$, $\quad i = 1, \ldots, p - 1.$

Under cointegration, equation (4) can be written as:

$$\Delta x_t = -\alpha\beta' x_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta x_{t-i} + a_0 + a_{1t} + u_t, \quad (5)$$

Here α represents the matrix of the coefficients of the adjustments or feedback that measure the strength of the deviances from equilibrium, the 'r' stationary variables $\beta' x_{t-1}$, response onto the structure. When the cointegrating vectors are $m > r > 0$ then there essentially be some non-zero components of α, reflecting the existence of some relationships of Granger Causality.

The best and most complete econometric model is one with linear deterministic trends for both endogenous and exogenous variables. This form of model was explored by Pesaran, Shin, and Smith (2000).

We start with the extended Vector Error Correction Model (VECM) in z_t

$$\Delta z_t = -\Pi z_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta z_{t-i} + a_0 + a_1 t + u_t, \quad (6)$$

Where $z_t = (x_t', x^{*\prime}_t)'$ is comprised of $m_x \times 1$ vector of endogenous variables x_t and $m_{x^*} \times 1$ vector of exogenous variables, x^*_t, with $m = m_x + m_{x^*}$ for representing the total number of variables. Long-run multipliers are denoted by **Π** which is m × m matrix, while the short term responses are noted by the matrices $\{\Gamma_i\}_{i=1}^{p-1}$. With m × 1 fixed intercepts are explained by a_0 while the deterministic time trends are denoted by a_1 which is m × 1 vector of coefficients of these deterministic time trends. u_t is m × 1 vector of shocks. It is assumed that the shocks, u_t, are not serially correlated, with a zero mean and a non-singular covariance matrix Σ. In compact terms, $u_t \sim$ i.i.d. $(0, \Sigma)$.

(For a more thorough discussion, see Garratt et al., 2006: pages 135-138)

An application for the Pakistan economy

Using annual data for macroeconomic variables and data for monetary and fiscal variables from 1980 to 2019, this section of the research estimates a VECMX* model for the Pakistani economy. All three of these variables—real GDP (Yt), inflation (P_t), and the exchange rate (ER_t)—are used as exogenous inputs in the model. Total public receipts (TR_t) and total public expenditures (TPE_t) are two additional fiscal indicators that we incorporate into our research model to better understand the effect of fiscal shocks on Pakistan's economy (TE_t). To be more precise, $Y_t = \ln(GDP_t/CPI_t)$, $P_t = \ln(CPI_t)$, $TR_t = \ln(TR_t/CPI_t)$, $TE_t = \ln(TE_t/CPI_t)$, and $ER_t = \ln(ER_t/CPI_t)$ are the formulas used to determine the variables (ER_t),

In this equation, GDP_t represents the gross domestic product, CPI_t the consumer price index, TR_t the total public receipts, TE_t the total public spending, and ER_t the exchange rate in terms of units of domestic

currency per US dollar. In our model, Y^*_t (GDP), TE^*_t (total Public Expenditures), TR^*_t (total Public Receipts), ER^*_t (exchange Rate), and P^*_t (CPI) are all exogenous variables that act as foreign variables. As an additional exogenous factor, we incorporate the global variable oil price ($POIL_t$ = ln ($POIL_t$)). A "star" represents each of these foreign variables. Using the above-described relation, these international variables (the "star" variables) are derived as the weighted averages of the corresponding domestic variables.

Results and Discussion

Each variable in our models has had its stationarity tested applying the Augmented Dickey Fuller (ADF) method. For avoiding the false regression problem, it is essential that the variables be stationary before employing them in regression estimates. Results show that the variables in the models employed in this research are stationary at the level or the first difference. The output of the Augmented Dickey Fuller model is shown in Table 1 below.

Table 1
Unit Root Test for the Domestic Shocks

	ADF					
	Level		1st Difference		2nd Difference	
	t-stat	p-value	t-stat	p-value	t-stat	p-value
ER	10.2648	0.5927	41.3241	0.0000		
ER*	8.33175	0.7587	41.4345	0.0000		
P	1.678730	0.4341	0.787292	0.8116	2.019380	0.0429
P*	1.807854	0.3715	0.960532	0.2951	1.788521	0.0703
TE	1.581718	0.4822	4.892152	0.0000		
TE*	1.705063	0.4211	0.993149	0.7463	2.191031	0.0291
TR	1.543319	0.5017	2.593998	0.0108		
TR*	2.351231	0.1633	2.842884	0.0060		
Y	1.369293	0.5873	5.088022	0.0000		
Y*	1.716509	0.4155	6.503405	0.0000		

Source: Author's own estimation

Unit root test outcomes are shown in table 1. Time-series data requires a unit root test to ensure data Stationarity and reveal if variables are integrated at the first, second, or third order. The stationarity of the model's variables was tested using a well-known method, the

Augmented Dickey Fuller test. In our model Y (domestic GDP for Pakistan), Y* (foreign GDP for Pakistan), ER (domestic exchange rate of Pakistan), ER* (foreign exchange rate for Pakistan), TR (domestic total revenue for Pakistan), TR* (Foreign total revenue for Pakistan) and TE (domestic total expenditures for Pakistan) are stationary at 1st difference while the remaining variables P (domestic inflation rate of Pakistan), P* (Foreign inflation rate of Pakistan) and TE* (foreign total expenditures for Pakistan) are integrated of order I(2), thus, it is seen that the model's variables are stationary with a combination of I(1) and I. (2). We employed a broader version of the Johnsen cointegration test and the VECMX* method for our analysis (Pesaran et.al 2001).

Table 2

Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	466.059	NA	6.79E-26	-23.8979	-23.3807	-23.71388
1	919.914	597.177*	7.92E-33*	-40.206*	-33.4833*	-37.81413*
2	1228.24	210.965	2.29e-35	-48.85521	-35.92689	-44.25541

Source: Author's own estimation

** Denotes the criterion-selected lag order, Final prediction error (FPE): Sequential modified LR test statistic (each test at 5% level). Akaike's information criteria Both the Schwarz information criterion and the Hannan-Quinn information criteria (abbreviated SC and HQ, respectively)*

The Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC), two different lag selection techniques for figuring out how many lags to utilize in the VAR model, are discussed in Table 2. The AIC, as could be anticipated, prefers a VAR of order 1, and this preference is shared by the SBC, LR, FPE, and HQ. In light of this, we will proceed with the study using a latency of p = 1. Though we are familiar with the proposal of Kilian (2001: p. 162), When compared to the values given by both criteria, we discovered that the stability of the model might be obtained for a reasonable number of lags (AIC: 1, SBC: 1).

Critical values at the 5% significance level for the Johansen test to count cointegrating relations are shown in Table 3(a). To a 95% confidence level, the Trace Statistic indicates eleven cointegrating relationships between the variables. Similarly, eleven cointegration associations between the variables are found using the trace statistic at the 5% significance level. Given the lack of definitive results from the Johansen test, that may be attributable to the relatively small sample

size in light of the large number of parameters that need to be evaluated. While the Johansen cointegration test helped us establish a long-term connection between all of the variables, the VECMX* test will help us determine the rate of adjustment as well as the long and short-term connections between the variables in the current model. Johansen test results for identifying cointegrating relations, along with their simulated critical values at the 5% level of significance, are displayed in Table 3 (b).

Table 3

*(a): Johannsen's Cointegration (**Unrestricted Rank Test, Trace**)*

Hypothesized No. CE(s)	Eigenvalue	Trace Statistics	0.05 Critical value	Prob.**
None *	0.997	781.699	334.984	0.000
At most 1 *	0.977	566.364	285.143	0.000
At most 2 *	0.930	422.235	239.235	0.000
At most 3 *	0.887	320.924	197.371	0.000
At most 4 *	0.797	238.189	159.530	0.000
At most 5 *	0.688	177.662	125.615	0.000
At most 6 *	0.659	133.350	95.754	0.000
At most 7 *	0.623	92.518	69.819	0.000
At most 8 *	0.471	55.465	47.856	0.008
At most 9 *	0.372	31.284	29.797	0.034
At most 10	0.173	13.575	15.495	0.095
At most 11 *	0.154	6.363	3.841	0.012

Source: Author's own estimation

Table 3 (b) shows that, at the 95% confidence level, the Maximum Eigen statistics indicates 8 cointegrating correlations between the variables. Similarly, at the 95% confidence level, the trace statistic shows that 8 cointegration relationships exist between the variables in question. While the Johansen cointegration test helped us establish a long-term connection between all of the variables, the VECMX* test will help us determine the rate of adjustment as well as the long- and short-term connections between the variables in the current model.

Pakistan's long-run equilibrium or cointegration results are shown in Table 6. The results show that in the long term, Y (Pakistan's domestic GDP) is affected positively and statistically significantly by the initial lag of Y* (foreign GDP for Pakistan). The findings reveal that a one-percent increase in the first lag of Y* leads to a 16.76% rise in Y over the long run.

Table 3
(b): Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistics	0.05 Critical values	Prob.**
None *	0.996	215.3354	76.57843	0.00
At most 1 *	0.977	144.1286	70.53513	0.00
At most 2 *	0.930477	101.3116	64.50472	0.00
At most 3 *	0.886646	82.735	58.43354	0.000
At most 4 *	0.796647	60.52681	52.36261	0.006
At most 5	0.688423	44.31217	46.23142	0.0793
At most 6 *	0.658533	40.83113	40.07757	0.0411
At most 7 *	0.62284	37.05327	33.87687	0.0202
At most 8	0.47078	24.18135	27.58434	0.1285
At most 9	0.372498	17.70835	21.13162	0.1411
At most 10	0.172883	7.212759	14.2646	0.4643
At most 11 *	0.154171	6.362664	3.841466	0.0117

Source: Author's own estimation

The outcome of regression analysis show that the first lag of TR (total revenue for Pakistan) and first lag of TR^* (foreign revenue for Pakistan) has positive relationship and significant impact on Y in long run. This positive relationship means that, if TR and/or TR* increases by 1% it would increase the domestic GDP by 1.84% and/or by 1.12% respectively in the long run. Further the finding depicts that the public revenue contributes to the progression of the economy because of the fact that public revenue is collected through taxes that are imposed either on income or consumption, accordingly, increase in tax revenue indicates that there is an increase in level of income and/or consumption, which infers increase in overall demand and production of the economy. On the other hand, collections like surcharges, specific levies, donations, gifts, fee and grants were bundled as additional receipts, which are confirmed to be risky for economic growth since these collections are made from certain citizens, class of citizens or institutions irrespective of their growth and increase in their earning capacity. Therefore, additional receipts do not promote economic growth instead they demean it (Rehman et. all (2020).

The results of the first lag of TE (domestic total expenditures) and the first lag of TE* (foreign total expenditures) shows a positive and statically significant relationship with domestic

GDP i.e. Y in the long-run, this positive relationship expresses that if 1% increases or 1 % improve in TE and TE*, it would improve the economic growth (Y) by 3.9% and 18.05 % respectively. The finding of this study coincides with the theoretical approach of Adolph Wagner and John Maynard Keynes. Adolph Wagner predicted that the expansion of the economy would increase government spending. The importance of the legal system has grown as a result of the need for the state to carry out its administrative and security responsibilities more efficiently (Aksoy, 1991:114). Keynes argues that government expenditure is a policy tool that may be used to effect economic growth and smooth out short-term oscillations because it is an external factor. Budget deficits caused by more public spending, say Keynesian economists, have boosted domestic production, widened the economy, and encouraged private sector investments. In contrast to Wagner's view, John Maynard Keynes posits that more government spending causes, rather than hinders economic expansion.

The analysis also finds that there is a negative and statistically significant relationship between the first lag of P (Pakistan's domestic inflation) and P* (Pakistan's international inflation) and Pakistan's GDP (Y) over the long term. According to this correlation, annual declines in GDP (Y) amounting to 14.98% and 8.82%, respectively, are to be expected if P and P* both increase by 1% over the course of a year. Our theoretical conclusions are in agreement with those of Gokal, V., and Hanif, S. (2004). According to their research, inflation can cause people to worry about the financial viability of investments in the future (particularly when high inflation is linked to higher price fluctuation). This causes investors to be more vigilant and slows down the rate at which the economy grows as a result. Another way in which inflation can affect a country's balance of payments is by making exports substantially more expensive. Inflation, in addition, can interact with the tax system to skew lending and borrowing preferences.

It can be shown in the table 4 that the first lag of ER (domestic exchange rate) has a positive but negligible effect on domestic GDP (Y) over the long run. To the contrary, the ER* (foreign exchange rate) has a positive and statistically significant effect on GDP at the domestic level (Y). Based on this association, we may infer that an increase of 1% in ER* will have a favorable effect on Y of 17.19%. There is also a mixed association between ER and ER* and economic growth (Y), as shown by the literature. Many studies have examined the impact of fluctuating exchange rates on national economies. Multiple authors, including Connolly (1983), Gylfason and Schmid (1983), Krueger (1978), Taylor and Rosensweig (1984), and Kamin (1998), support the view that devaluations stimulate growth. Constraining effects were the topic of other studies that followed; these studies were conducted by researchers including Gylfason and

Radetzki (1985), Atkins (2000), Kamin and Roger (2000), Odusola and Akinlo (2001), Berument and Pasaogullari (2003), and El-Ramly and Abdel-Haleim (2003). (2008). Many studies have shown contrasting results. Short-term effects were found to be negative (contractionary) by both Edwards (1986) and Rhodd (1993), whereas the output response to devaluation appeared favorable in the long run. El-Ramly and Abdel-(2008) Haleim found that the negative reaction lasts for some time, even after the growth-promoting advantages have become apparent. Some studies have concluded that changes in exchange rates have a substantial effect, but others have not been able to replicate this result (e.g., Bahmani-Oskooee, 1998 and Upadhyaya and Upadhyay, 1999). Conflicting findings are routinely reported by global researchers. Using data from 42 countries, Bahmani-Oskooee and Miteza (2006) find that devaluations negatively impact long-term economic growth only in non-OECD countries.

The estimated outcomes of VECMX* are shown in table 5. The foregoing Cointegration test indicates that the model will deviate from equilibrium because the coefficient of the VECM component in domestic GDP (Y) is positive and statistically insignificant. First lags of P, P*, and ER are negative and statistically significant in the domestic output (Y) model. In the short run, the effects of the model's other variables are negligible.

Moreover, the estimated coefficient of the VECM in the equation of the foreign output (Y*) has the right negative sign and is statistically significant, demonstrating that the variables in the system are cointegrated in the short term (column 2 of the table). This signifies that from the short-run to the long-run, all of the system's variables are tending toward equilibrium at a rate of 15%. In the short run, the contributions of the other variables in the same equation are negligible.

The estimated coefficient of the VECM term of TR in the equation has a negative sign and is statistically significant, which is evidence that the variables in the equation are cointegrated in the short run, as seen in the third column of the estimated table 5. It means that from the short-run to the long-run, all the system's variables are approaching equilibrium at a rate of 20% every year. The TR and ER* lags in the equation under consideration are negative and statistically significant in the near future. In the near run, the effects of the other variables are negligible.

The coefficient of the VECM term of TR* in the system has a positive sign and is statistically insignificant, as shown in the fourth column of the estimated table 5; this indicates that the variables in the equation are not cointegrated in the short run, and thus will deviate from equilibrium as time progresses. In the near run, the rest of the variables in the equation don't matter.

Table 4

Long-run equilibrium: Cointegration

Cointegrating Eq:	Y^*_{t-1}	TR_{t-1}	TR^*_{t-1}	TE_{t-1}	TE^*_{t-1}	P_{t-1}	P^*_{t-1}	ER_{t-1}	ER^*_{t-1}	C
Coefficient	16.761	1.840	1.128	3.995	18.053	-14.980	-8.823	2.652	17.198	96.56
Std. Dev	-2.211	0.319	0.173	2.224	1.835	1.689	5.166	1.628	1.550	
T-statistics	[7.579]	[5.761]	[6.511]	[1.796]	[9.836]	[-8.867]	[-1.707]	[1.628]	[11.093]	

Source: Author's own estimation.

Vector Error Correction Model with Foreign Variables (VECMX*)

Table 5

Estimation of VECMX for Domestic Shocks*

Error Correction:	D(Y)	D(Y*)	D(TR)	D(TR*)	D(TE)	D(TE*)	D(P)	D(P*)	D(ER)	D(ER*)
$VECM_{t-1}$	-0.008689	-0.150607	-0.203779	0.099503	-0.009143	-0.182147	0.003607	-0.034915	0.004611	-0.007367
Std. Dev	(0.00834)	(0.07625)	(0.09855)	(0.10204)	(0.00877)	(0.07368)	(0.00239)	(0.01439)	(0.00665)	(0.01593)
t-statistics	[-1.04213]	[-1.97507]	[-2.06778]	[0.97517]	[-1.04225]	[-2.47223]	[1.50887]	[-2.42550]	[0.69323]	[-0.46240]
$D(Y_{t-1})$	0.228933	-3.242685	6.498962	-0.217612	0.239105	-0.557740	0.146355	0.289191	0.405702	0.623973
Std. Dev	(0.82916)	(7.58343)	(9.80077)	(10.1476)	(0.87239)	(7.32722)	(0.23774)	(1.43157)	(0.66143)	(1.58454)
t-statistics	[0.27610]	[-0.42760]	[0.66311]	[-0.02144]	[0.27408]	[-0.07612]	[0.61560]	[0.20201]	[0.61337]	[0.39379]
$D(Y^*_{t-1})$	-0.043488	-0.584042	-0.703844	2.339942	-0.095941	-0.389994	0.081298	0.006292	-0.103087	-0.051628
Std. Dev	(0.15643)	(1.43069)	(1.84901)	(1.91444)	(0.16458)	(1.38235)	(0.04485)	(0.27008)	(0.12478)	(0.29894)

t-statistics	[-0.27800]	[-0.40823]	[-0.38066]	[1.22226]	[-0.58293]	[-0.28212]	[1.81256]	[0.02330]	[-0.82612]	[-0.17270]
D(TR_{t-1})	-0.023517	0.104182	-0.331341	0.123298	-0.026778	0.130244	-0.001068	0.040732	0.014353	-0.026376
Std. Dev	(0.01564)	(0.14307)	(0.18490)	(0.19145)	(0.01646)	(0.13824)	(0.00449)	(0.02701)	(0.01248)	(0.02989)
t-statistics	[-1.50334]	[0.72819]	[-1.79197]	[0.64404]	[-1.62697]	[0.94218]	[-0.23801]	[1.50814]	[1.15024]	[-0.88231]
D(TR^*_{t-1})	-0.012662	0.144045	-0.205387	0.264001	-0.012879	0.126295	-0.001646	0.017738	0.006436	-0.005120
Std. Dev	(0.01485)	(0.13585)	(0.17557)	(0.18178)	(0.01563)	(0.13126)	(0.00426)	(0.02564)	(0.01185)	(0.02839)
t-statistics	[-0.85249]	[1.06034]	[-1.16983]	[1.45230]	[-0.82408]	[0.96219]	[-0.38655]	[0.69169]	[0.54315]	[-0.18039]
D(TE_{t-1})	-0.511894	4.045700	-3.060865	-1.618444	-0.470665	1.958472	-0.036683	0.115957	-0.122981	-0.531857
Std. Dev	(0.70808)	(6.47603)	(8.36958)	(8.66573)	(0.74500)	(6.25723)	(0.20303)	(1.22252)	(0.56484)	(1.35315)
t-statistics	[-0.72294]	[0.62472]	[-0.36571]	[-0.18676]	[-0.63177]	[0.31299]	[-0.18068]	[0.09485]	[-0.21773]	[-0.39305]
D(TE^*_{t-1})	0.177181	0.432552	1.181861	-2.412281	0.262432	0.161476	-0.068988	-0.092984	-0.031547	0.006257
Std. Dev	(0.15787)	(1.44384)	(1.86601)	(1.93204)	(0.16610)	(1.39506)	(0.04526)	(0.27256)	(0.12593)	(0.30169)
t-statistics	[1.12235]	[0.29958]	[0.63336]	[-1.24856]	[1.57998]	[0.11575]	[-1.52410]	[-0.34115]	[-0.25051]	[0.02074]
D(P_{t-1})	-1.133155	-0.032949	8.819770	6.784795	-1.232046	1.276240	0.971050	0.570735	-0.323664	-0.118238
Std. Dev	(0.48291)	(4.41670)	(5.70810)	(5.91009)	(0.50809)	(4.26747)	(0.13846)	(0.83376)	(0.38522)	(0.92286)
t-statistics	[-2.34650]	[-0.00746]	[1.54513]	[1.14800]	[-2.42485]	[0.29906]	[7.01298]	[0.68453]	[-0.84020]	[-0.12812]
D(P^*_{t-1})	-0.837358	1.267213	-2.007791	-0.291487	-0.949052	2.013683	0.104198	0.678370	0.743050	0.241620
Std. Dev	(0.42440)	(3.88150)	(5.01642)	(5.19393)	(0.44652)	(3.75036)	(0.12169)	(0.73273)	(0.33854)	(0.81103)
t-statistics	[-1.97306]	[0.32648]	[-0.40024]	[-0.05612]	[-2.12542]	[0.53693]	[0.85629]	[0.92581]	[2.19483]	[0.29792]

D(ER_{t-1})	-0.798370	-0.463011	-2.283080	0.570086	-0.918879	-0.174752	0.186605	-0.133283	0.301125	-0.490087
Std. Dev	(0.22424)	(2.05092)	(2.65059)	(2.74439)	(0.23594)	(1.98163)	(0.06430)	(0.38716)	(0.17888)	(0.42853)
t-statistics	[-3.56028]	[-0.22576]	[-0.86135]	[0.20773]	[-3.89461]	[-0.08819]	[2.90223]	[-0.34425]	[1.68338]	[-1.14364]
D(ER^*_{t-1})	-0.090219	-0.911220	-4.592655	0.654724	-0.049499	-1.374068	-0.041842	-0.275154	-0.171298	-0.000384
Std. Dev	(0.15306)	(1.39992)	(1.80925)	(1.87327)	(0.16105)	(1.35263)	(0.04389)	(0.26427)	(0.12210)	(0.29251)
t-statistics	[-0.58941]	[-0.65091]	[-2.53843]	[0.34951]	[-0.30736]	[-1.01585]	[-0.95337]	[-1.04118]	[-1.40291]	[-0.00131]
C	0.086393	0.014356	-0.566259	-0.292932	0.095035	-0.093463	-3.02E-05	-0.029626	0.008218	-0.009525
Std. Dev	(0.03812)	(0.34860)	(0.45053)	(0.46647)	(0.04010)	(0.33682)	(0.01093)	(0.06581)	(0.03040)	(0.07284)
t-statistics	[2.26663]	[0.04118]	[-1.25688]	[-0.62798]	[2.36981]	[-0.27749]	[-0.00277]	[-0.45020]	[0.27029]	[-0.13077]
R-squared	0.489935	0.291880	0.521834	0.336077	0.504542	0.326627	0.775368	0.318628	0.337813	0.129549
Adj. R-squared	0.274139	-0.007709	0.319533	0.055186	0.294925	0.041739	0.680332	0.030355	0.057657	-0.238718
Sum sq. resids	0.122000	10.20510	17.04536	18.27301	0.135054	9.527174	0.010030	0.363671	0.077634	0.445545
S.E. equation	0.068500	0.626501	0.809686	0.838336	0.072072	0.605334	0.019641	0.118268	0.054644	0.130906
F-statistic	2.270357	0.974268	2.579489	1.196469	2.406974	1.146509	8.158646	1.105299	1.205803	0.351781
Log likelihood	55.16545	-28.94040	-38.68721	-40.00860	53.23402	-27.63434	102.6358	34.41306	63.75379	30.55516
Akaike AIC	-2.271866	2.154758	2.667748	2.737295	-2.170211	2.086018	-4.770306	-1.179635	-2.723884	-0.976588
Schwarz SC	-1.754733	2.671890	3.184880	3.254427	-1.653079	2.603150	-4.253173	-0.662502	-2.206751	-0.459455
Mean dependent	-0.015337	0.086884	0.028706	0.249615	-0.015169	0.091718	0.075669	0.036744	3.67E-05	-0.011411

S.D. dependent	0.080402	0.624100	0.981551	0.862472	0.085832	0.618377	0.034739	0.120105	0.056290	0.117618
Determinant resid covariance (dof adj.)					2.32E-22					
Determinant resid covariance					5.22E-24					
Log likelihood					479.3721					
Akaike information criterion					-18.38800					
Schwarz criterion					-12.78574					

Source: Author's own estimation.

The estimated table 5's fifth column displays the VECM term of TE, which exhibits a negative sign and is statistically negligible, confirming that the variables in the equation are cointegrated in the short run and will converge to the equilibrium in the short run. P, P*, and ER's first-lag coefficients all have a negative connection and are statistically significant, but all the other variables in the same equation are not.

Short run cointegration is shown by the VECM term of TE* having a negative sign and being statistically significant in the sixth column. All the equation's variables are shown to be approaching equilibrium at a rate of 18% from the short to the long run. The rest of the factors in the equation have negligible statistical significance.

There is a statistically insignificant positive sign in the seventh column of the VECM term of P in the system. It explains why the equation's variables are not cointegrated in the near run and why they will move away from equilibrium. The first lag coefficients of Y*, P, and ER in the equation all indicate a positive association; however, it is not statistically significant. The statistical weights of the other variables in the equation are very small.

In the calculated table 5, the VECM term of P* appears in the eighth column with a negative sign but statistical significance, showing that all system variables are cointegrated and, as a result, will converge to equilibrium at a short-run to long-run speed of 3%. None of the other ng variables make a difference to the equation statistically.

The VECM term of ER can be seen in the ninth column of the aforementioned approximated table 5. Statistics show that the ER coefficient's positive sign is not significant. In other words, this proves that the equation's variables are not cointegrated. In the short run, the system will deviate from equilibrium. From a statistical standpoint, all the other factors are also negligible.

The VECM term of ER* is displayed in the final column of Table 5. Its negative sign and statistical insignificance indicate that the equation's variables are cointegrated. In the short run, the system tends to converge on the equilibrium state. The remaining factors are statistically insignificant.

Post-estimation tests of residual diagnostics were run after the regression analysis to look for autocorrelation and heteroscedasticity. Results of the LM test for autocorrelation and the white test for heteroscedasticity are shown in Table 6.

Conclusion

This study aimed to evaluate the impacts of domestic shocks on the fiscal variables of Pakistan. We applied two kinds of variables i.e.,

Domestic variables and foreign variables. The data for the study were taken from DOTS and IFS.

The result of the unit root test shows that all the variables are stationary at the first difference I (1) and the second difference I (2). When this kind of situation exists, then we would be applying the Johansen Cointegration and VECM Test to get the objective.

The findings of this study demonstrate that Y^*_{t-1} has a favorable long-term impact on domestic output in the domestic model (Y). The annual positive impact of foreign output on domestic output is 16.76%. The TR_{t-1} and TR^*_{t-1} value showed a 1.84% and 1.12% positive connection with domestic output, respectively. This means that public revenues help the economy to advance because they are raised through taxes imposed on either income or consumption. Consequently, an increase in tax revenue demonstrates an increase in income and/or consumption, which implies an increase in the economy's overall demand and output.

Additionally, the domestic GDP is positively impacted by TE_{t-1} and TE^*_{t-1} at 3.9% and 18.5%, respectively. This beneficial relationship demonstrated how rising public spending is the cause of the increase in public economic activity. This growth results from the state's need to handle its administrative and security responsibilities better. Public spending going up would boost domestic output, enlarging the economy and encouraging private sector investment. P_{t-1} and P^*_{t-1} have long-term, inverse effects on domestic GDP at 14.98% and 8.82%, respectively. This indicates that the future profitability of investment initiatives may become doubtful as a result of inflation (especially when high inflation is also associated with increased price variability).

Furthermore, inflation can make a nation less competitive abroad by raising the relative cost of its products. On the domestic GDP, the exchange rate has had a mixed effect. It occasionally has a favorable impact on the GDP, while other times, it has a negative impact. In our study, ER^*_{t-1} had a 17.19% inverse effect on domestic GDP, while ER_{t-1} positively influenced domestic GDP and had a negligible impact. Furthermore, while exchange rates may have a negative (contractionary) short-term impact on GDP, they may have a favorable long-term effect on output.

The findings of this study will help the fiscal authorities formulate an effective fiscal policy to cope with inflation. The study suggests that public expenditures can only be dealt with effective fiscal policy.

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