RESEARCH ARTICLE

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Scrutinizing Public-Private Sector Investment Spending and Budgetary Deficit in the Health Sector of Pakistan: A Time Series Approach

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Abstract: *The public and private sector spending is crucial for appropriate resource allocation. Private sector spending makes the government to be lenient since the obligations to provide facilities to the general public are shared with the private sector. Meanwhile, public sector spending rests at the allocation of the budget. A heavy budgetary deficit can cause the government to reduce its spending. This study attempted to evaluate the interplay of private-sector spending, budgetary deficit, and public-sector spending in the health sector of Pakistan within the period from 1980 to 2023. The standard econometric technique of Autoregressive Distributed Lag (ARDL) is incorporated to find the desired results. Based on the empirical results, it is found that private and public sector spending on the health sector is a substitute for each other. At the same time, the budgetary deficit is found to increase government spending on the health sector. The study suggests that the private sector is sufficient in covering health-related issues; thus, the government can locate another sector that needs financial support. Also, a manageable budgetary deficit is not harmful if spending is carried out in the health sector.*

Key Words: Private-Public Sector, Budgetary Deficit, Health Expenditure, ARDL, Pakistan

Introduction

The economy of Pakistan has been volatile for an extended period toward maintaining sustained economic growth. After every few years, the economy faces issues of falling currency and payment of debt payments at the back of heavy borrowing to cover internal financial needs and because of deficits in trade. It is not analogous to the countries that grow at higher rates for longer time periods. The core reason for this state of the economy is the propelled consumption expenditure of private and public sectors unbacked with sufficient investment.

It is crucial to maintain a balance between public and private investment in various sectors of the country. If there is overspending in either sector, it leads to the wastage of resources. In this regard, the private sector is more vigilant and sensitive than the public sector. One of the reasons is that the private sector works for profit, but the public sector is not for profit but for the materialization of the welfare of the general public. Still, it is crucial to understand that any investment that is more than the desired one, instead of doing good, brings harm to the economy.

The share of private sector investment has been falling since fiscal year 2018. This low investment is causing a decline in labor productivity, along with pressures from downturns on economic growth. The

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shrinking private sector investment is of particular concern because it suggests that the nation will not be able to grow at a higher pace, and the sectors, especially health, education, jobs, labor market, and trade, will have a disaster in a nutshell.

To rectify this problem, Pakistan needs to implement several reforms at the macro level in order to increase the public and private sector's needful investment in the sector, especially health, where the objective is to nurture health-related facilities for the public at large. Unfortunately, falling economic growth, heavy debt payments settlements, and budgetary deficit are not letting public sector investment trigger. Susceptible economic situations do not let foreign investors find it easy to invest in such countries. Therefore, it is crucial to fulfill the investment needs, especially in the health sector, from the private sector. The population growth rate also needs to be controlled in order to reduce the requirement of heavy investment in the health sector, particularly from the side of the government, since the channels of foreign aid, debt, grants, investments, and frequently announced deficit budget are mostly dried-up because they are already overused.

The government of Pakistan also needs to bring financial discipline to curtail the expenditure of public sector enterprises. Also, the tax reforms are required to be more accurate and clearer in order to transfer the facilities to the taxpayers who have paid sufficient taxes from their various income heads, for instance, with respect to better health facilities. The buoyant economic situation requires the government to wipe out retrogressive taxes since they are discouraging the business and investment environment. To do so, the government announces a deficit budget and keeps a maximum portion of its spending on various sectors such as health.

Given the shortfall in domestic savings, the China-Pakistan Economic Corridor is useful in covering the breach caused by foreign capital. Supplementary support is required in this regard in the shape of restructuring the investment environment and reducing the tax burden on the private sector, mainly the one that is supportive of the government in the health sector.

An increasing number of countries have stepped in to initiate the public and private sector partnership in order to sufficiently meet the infrastructure requirement for rendering the services to the country's nationals. To be straightforward, social infrastructure such as health care is found to be neglected for strong investment by the private and public sectors. This is because projects such as roads, highways, ports, railways, and power are more promising in terms of revenue to investors. Secondly, the user charges on the economic infrastructure are high and, therefore, are felt to be better places for investment. Thirdly, the economic infrastructure is a better-developed market for the bundling of construction and the provision of services than the social infrastructure like the health sector. Still, public sector spending is always required, especially in a country like Pakistan, where the majority of people are fond of getting medical treatment from the domain of public sector health units.

The expenditure on health and nutrition falls under the sustainable development goals. In this category, overall, Pakistan's index score is 63.5. However, this score is based upon sectoral achievements, one of which is health sector improvement. In order to make substantial progress, the Government of Pakistan gives priority to the health sector, particularly after COVID-19. However, the increasing demand for public health services is putting pressure upon the government to have a significant number of hospitals, dispensaries, and maternity child health centers, which also include beds, registered doctors, and dentists. Also, the other important utensils which are important in any good hospital. Table 1 shows that health expenditure has increased by 57.97 percent during the last four years.

Table 1

Government Health Expenditure (In Million Rupees)

Year	Health Expenditure
2018	416,000
2019	421,778
2020	505,411
2021	657,185

Source: Ministry of Finance, 2023.

A healthy population is always considered a good contributor to the progress of a nation. With the increase in population, the government, although overburdened with heavy external debt, is successfully breaking out plans to change health expenditures to promote quality health services to the masses. The government is committed to reducing malnutrition by expanding the overall healthcare facilities in the country at large. However, because of low finance and weak governance, the health department has been found to lag behind in sorting out solutions for the primary healthcare problem. There is a need to develop concrete plans for the long-run achievement targets.

The public and private sector spending is crucial for appropriate resource allocation. Private sector spending makes the government to be lenient since the obligations to provide facilities to the general public are shared with the private sector. Meanwhile, public sector spending rests at the allocation of the budget. A heavy budgetary deficit can cause the government to reduce its spending.

The novelty of the study is to find out whether the private sector, which aims at profit-making, is substituted or complemented in carrying out investment activities in the health sector of Pakistan. Also, the research gap is filled by exploring the fact that the budgetary deficit, which is unwelcome in countries like Pakistan, helps motivate the public sector to launch spending, especially in the health sector.

Literature Review

This study envisages the impact of private-sector spending over public-sector spending in Pakistan's health sector. Such spending complements and substitutes of each other. The impact of budgetary deficit on public sector spending is also explored. The empirics, though few, attempted to locate such a relationship between public and private spending.

The effects of private and public sector spending are vast. Researchers have traced the impacts of this spending on ecological footprints, energy, economic growth, technological innovations, agriculture, and trade openness (Chunling et al., 2021; Dogan, et al., 2020; Kirikkaleli et al., 2021; Yang et al., 2021; Ahmad & Raza, 2020; Adebayo et al., 2021; Martiniello et al., 2020; Morea & Balzarini, 2019; Morea & Gebennini, 2021).

Public and private investment partnership is analyzed for the environmental impacts by Khan et al. (2020) and Shahbaz et al. (2020) for China, Kirikkaleli and Adebayo (2021) in the case of India and Waqih et al. (2019) in the case of South Asia Association for Regional Cooperation. The impacts are mostly significant. This means the environmental damages are recorded at the back of private and public sector investment.

The investment partnership between the public and private sectors has also been found to have influenced the transport sector, environmental emissions, and renewable energy consumption (Ahsan et al., 2021). Asian economies with such investment partnerships have an impact on economic growth (Lin & Omoju, 2017). The findings are mixed as researchers like Xue et al. (2017a; 2017b), and Cruz and Karz-Gerro (2016) found an improved environment at the back of public-private investment altogether in technology improvement. Since renewable energy, rate of economic growth, and environmental degradation are integrated, Qiao et al. (2019) scrutinized that investment in renewable sources lessens environmental degradation and fosters the spell of economic growth.

In this regard, Hassan et al. (2011) explored the public and private sector investment sustenance in Malaysia in the agriculture, manufacturing, and service sectors. The panel regression technique came up with the findings that public and private investments favor various sectors of Malaysia. The investment partnership of the private and public sectors is also viewed in energy, transport, water, sanitation, telecommunication, health, and education (Fabre & Straub, 2023). Findings confirm the trade-off between public and private sector investments. On a similar ground, such investments are found to pledge their contributions in the country of origin (Maluleke et al., 2023).

The partnership investment spending by the public and private sectors is also observed in the global health sector. In particular, Storeng et al. (2021) looked into bringing the public and private sectors closer to each other in health sector-relate-investment. Findings confirmed that such investment partnerships amplify the investment challenges associated with the public and private sectors. Moreover, the results

also assured the limited success of such partnerships due to the limited charity-based partnership model, especially in the global health sector.

Such spending partnerships are found in the medicines for HIV/AIDS, tuberculosis, and malaria. According to Gavi (2020), technical expertise and business know-how are the primary factors to concentrate upon for the solid results of public and private partnerships. According to Buse and Harmer (2004;2007), the governing bodies and corporate sector issues affect such investment partnerships. However, such investment collaborations are found to make piecemeal efforts to redress the imbalances by means of increasing the number of board members and evolving the civil societies for better investment outcomes (Storeng, 2014; Puyvallee & Storeng, 2017). Under the banner of joint venture investments, medicines are purchased from foreign vendors with the expectation of a fall in prices (Eccleston-Turner & Upton, 2021; Stein, 2021). Toronto Sun (2021) and Usher (2021) found G7 countries purchasing vaccines through COVEX under the entitlement of self-financing members. According to Stein (2021), public sector subsidies are understood to be a widely influential factor in the impressive innovation of the desired outcome. Heavy funding and fair-price promises are the steps initiated to strengthen such investment collaborations (Gavi, 2020; Gavi, 2021; The Guardian, 2021; Fortune, 2020). Though the unresolved shortcomings are evident (Buse & Harmer, 2007 & Storeng & Puyvallee, 2018).

The private sector, in line with the public sector, for fund spending activities is globally known for better investment outcomes, especially in strengthening the health sector (Bartsch, 2011; Holzscheiter et al., 2016; Bull & McNeill, 2007, 2019).

The private sector is welcomed by the state governments to take control over the government organizations with the promise of rendering quality services to the citizens of Saudi Arabia. Rahman (2020) prescribed that the Saudi government strengthen the public health sector to provide accessible, affordable, and quality services. However, the privatization of the organizations leads to a rise in expenses and improves population health services (WHO, 2000; Tu, 2013). The government does offer free-of-cost services, but growing financial challenges have hindered the provision of such services for a long time (Young, 2015; Young, 2018). Thus, the literature highlights the attempts to fulfill social demands of possible quality health services via the private sector, that is, an actor increasingly engaged in the health sector through financial and managerial services (Rahman, 2019; Uplekar, 2000).

Public and private sector partnership is advocated by The World Bank and World Health Organization as a route to improve health care services to the population (The World Bank, 1993; Buse, 2001). According to Roehrich et al. (2014), Colliers (2018), Alghamdi (2014), and Rahman (2019), the private sector's contribution towards health services increases with the passage of time and let the government step back gradually due to a lack of confidence of patients on public sector medications. Therefore, heavy reliance on private-sector financial services and healthcare goods is evident (Rahman, 2019; Rahman, 2020).

Besides the plus points, several empirics have attempted to highlight that the complaints are filed against private sector health services, which include unregistered poor infrastructure, low-quality equipment, low qualification of the personnel, obscuring service conditions, heavy cost treatment, wrong diagnosis, service based upon commissions, excessive prescription of drugs, overuse of technology for money making, profit motivation, negligible attention to the patient care, missing business ethics, and deficient service quality which are similar to those traced on public sector (Bhate-Deosthali et al., 2011; Rahman, 2007).

The private sector can cause governance issues when the financial crisis intensifies (Williams, 2020). Due to costly treatment, India and Kenya experience insurers capping the amount of finance for patients who intend to get treatment in private sector health centers (Bhuyan, 2020; Mirror Online, 2020; Hisamudin, 2020; Nazari, 2020). As explored by Ang (2020), Ara (2020), Limpot (2020), and Ying (2020), somewhat often, even beds are kept hidden from patients and government authorities in Asia, Africa, Latin America, and India. Here, the findings are paradoxical. According to Boonbandit (2020), Loo (2020), Antara (2020), and Tiglao (2020), issues of COVID treatments are mostly tackled by private-sector health institutes in Egypt, Malaysia, the Philippines, Thailand, and Indonesia. On the other side, as found by Hallowell et al. (2020) and Kruse and Jeurissen (2020), outdoor services are canceled in case of emergency

situations. Insurance premiums do not allow patients to receive treatments from private sector hospitals (Hellowell et al., 2020; Dhara, 2020). In this regard, Orissa Post (2020a; 2020b; 2020c) also found a high cost of medication in private sector health units.

The empirical work of Ayhan and Ustuner (2022) and Onis and Kutlay (2021) documented that public and private sector investment collaboration delivers infrastructure and cost-shared services with sharing. Appropriately managed institutional framework, effective regulatory policies, and transparent procurements promise to deliver service quality to the population (Ayhan & Ustuner, 2022; Whiteside, 2020). Meanwhile, as a rebuttal to this point, Onis and Kutlay (2021) and Bedirhanoglu (2021) exclaimed that depoliticized economic management is gradually replaced by centralization, politicization, and personalization together with discretion as well as lack of accountability. Therefore, Aydin (2021) illuminated that only 39.8 percent of the respondents consider such investment partnerships as viable.

A number of questions regarding public and private investment feasibility have remained unaddressed. A harder look into the literature, however, reveals that a number of gaps and shortcomings are still there in an attempt to initiate research if crowding out effect is there between public and private investment spending, especially in the health sector, which is composed of people who live to stay healthy and do not bother for the high expenses whereas the others are faced with the financial constraints. Being an important state of business, the utmost need is for an additional study in order to understand more completely the key tents of public and private investment spending, whether complimentary or substitute of each other. At this point, the deficit budget also needs to be evaluated to determine whether it is transposed into favoring public sector investment spending in the health sector of Pakistan, where the literature is missing. Therefore, the uniqueness of this study is situated in addressing the lack of scientific literature that highlights the domain of public–private sector investment spending and budgetary deficit in the health sector of Pakistan.

Methodological Framework

The aim of the study is to explore the tradeoff between public and private sector investment spending and budgetary deficit in the health sector of Pakistan. For the purpose of analysis, the variables included in this study are described in Table 2.

Table 2
Description of the variables

Variable	Measurement
Government Health Expenditure (GHE)	Percentage of GDP
Private Health Expenditure (PHE)	Percentage of GDP
Budgetary Deficit (BGD)	In Billion Rupees
Government Tax Revenue (GTR)	Percentage of GDP
Poverty (PVR)	Based on the International Poverty Line

Data Collection

This study is based on time series analyses. The data is collected from the Ministry of Finance (Pakistan), World Bank Development Indicators, and the State Bank of Pakistan.

Model Specification

The following model is prescribed to offer the empirical analyses to meet the objective of the study.
GHE = f (PHE, BGD, GTR, PVR) [1]
The econometric form of the model is given in Equation [2].

$$GHE_t = \beta_0 + \beta_1 PHE_t + \beta_2 BGD_t + \beta_3 GTR_t + \beta_4 PVR + \varepsilon_t \qquad [2]$$

They β_i are the coefficients and ε_t the error term.

Test of Stationarity

For the precision of coefficient measurements, Dickey-Fuller introduced the stationarity test in 1979. The test version was enhanced later and named Augmented Dickey-Fuller in 1981. This test is widely used in time series analysis (Khursheed et al., 2023).

The Augmented Dickey-Fuller test operation is given in Equation [3] and Equation [4].

$$\Delta y_t = b_1 + b_2 t + \partial y_{t-1} + \beta_t \sum_{t=1}^{m} \Delta y_{t-1} + \varepsilon_t$$

[3]

The residual white noise term is ε_t, and the Yt is a sequential predictor; however, ∂ it does not change, and

$$\Delta y_{t-1} = (y_{t-1} - y_{t-2}), \Delta y_{t-2} = (y_{t-2} - y_{t-3})$$

[4]

The test statistic, which is less than the critical value, classifies the variable to be stationary. When the results are in I(0) and I(1), the ARDL technique is used.

Bound Test

The Bound Test is established by Pesaran et al. (2001). It is a statistical tool to trace long-run cointegration between the time series variables. Bound Test proceeds with ordinary least square for computing Wald Test F-Statistic. The H₀ is if;

$$\sigma_1 = \sigma_2 = \sigma_3 = \sigma_4 = \sigma_5 = \sigma_6 = \sigma_7 = \sigma_8.$$

Alternatively, the H₁;

$$\sigma_1 \neq \sigma_2 \neq \sigma_3 \neq \sigma_4 \neq \sigma_5 \neq \sigma_6 \neq \sigma_7 \neq \sigma_8$$ represents long-run cointegration if the computed F-Statistic is held greater than the upper bound critical value.

Autoregressive Distributed Lag

The ARDL model is used to examine the coefficients in the long run and short time.

Long-run Coefficient Estimation

The variables are found for mixed levels of integration, such as I(0) and I(1). Therefore, ARDL is a valid approach to find cointegration and measurement of short-run and long-run coefficients. Thus, the unrestricted error correction model for Eq [1] is structured in Equation [5]

$$\Delta GHE_t = \alpha + \beta_1 GHE_{t-1} + \beta_2 PHE_{t-2} + \beta_3 BGD_{t-3} + \beta_4 GTR_{t-4} + \beta_5 PVR_{t-4}$$

$$+ \sum_{I=0}^{P_1} \delta_1 GHE_{t-i} + \sum_{I=0}^{P_2} \delta_2 PHE_{t-i} + \sum_{I=0}^{P_3} \delta_3 BGD_{t-i} + \sum_{I=0}^{P_4} \delta_4 GTR_{t-i} + \sum_{I=0}^{P_5} \delta_5 PVR_{t-i} + \varepsilon_t$$

[5]

Short-run Coefficient Estimation

The short-run coefficient estimation is carried out, in a sequel to the long-run coefficient estimation, using an error correction model. The representation of the short-run model is given in Equation [6]

$$\Delta GHE_t = \alpha + \sum_{I=0}^{P_1} \lambda_1 \Delta GHE_{t-i} + \sum_{I=0}^{P_2} \lambda_2 \Delta PHE_{t-i} + \sum_{I=0}^{P_3} \lambda_3 \Delta BGD_{t-i} + \sum_{I=0}^{P_4} \lambda_4 \Delta GTR_{t-i} +$$

$$\sum_{I=0}^{P_5} \lambda_5 \Delta PVR_{t-i} + \partial ECM + \varepsilon_t$$

[6]

They λ_i are the estimated short-run coefficient and ∂ the coefficient of ECM, which represents the speed of adjustment in the long-run equilibrium.

Diagnostic Checking

The statistical computations are checked for reliability. In this case, the Breusch-Pagan-Godfrey LM, RAMSEY RESET, heteroskedasticity, histogram normality, and CUSUM and CUSUM$_{Squared}$ are employed. The changes that occur in the regression model specifications are viewed by the Breusch-Pagan-Godfrey LM

test. The RAMSAY RESET test checks the functional form of the regression. The heteroskedasticity test is to detect the heteroskedasticity. Furthermore, the normal probability plot is linear if the histogram indicates the moderate-tailed distribution, showing that the residuals are normally distributed.

Results and Discussions

In this section, the results of descriptive statistics and empirical analyses are given.

Descriptive Analyses

Table 3

Descriptive statistics

	PHE	GHE	BGD	GTR	PVR
Mean	69.54	26.89	−732.67	554.96	24.30
Maximum	80.48	37.89	−13.30	1355.27	34.60
Minimum	57.49	16.27	−5259.90	31.26	17.32
Std. Dev.	3.87	4.08	1128.32	457.49	3.60
Skewness	−0.45	0.44	−2.22	0.38	1.20
Kurtosis	5.29	4.46	8.11	1.66	4.66
Jarque-Bera	10.87	5.19	82.15	4.27	15.23
Prob.	0.00	0.07	0.00	0.12	0.00

The comprehensive descriptive statistical analyses are given in Table 3. The mean values of GHE and PHE show a significant allocation of funds every year. In the case of BGD, the mean and standard deviation are widened. It shows significant variation in budgetary deficit during the specific length of years. Similarly, the GTR figure shows a sufficient amount of tax collection by the government every year. Likewise, the average figure of PVR looks challenging, being at a significant height. GTR is also recorded for major differences in minimum and maximum range. The negatively skewed variables are PHE and BGD. Except for GTR, all variables are leptokurtic. Finally, Jarque-Bera results confirm GTR to have normally distributed residuals.

Correlation Matrix

Table 4

Correlation matrix

	PHE	GHE	BGD	GTR	PVR
PHE	1.00	−0.95	−0.24	0.17	0.31
GHE		1.00	0.34	−0.26	−0.27
BGD			1.00	−0.80	0.05
GTR				1.00	−0.02
PVR					1.00

Correlation values range from −1 to +1, which show perfect correlation, either negative or positive. A strong negative correlation is found between GHE PHE and GTR with BGD. However, a moderate correlation is evident within the rest of the variables.

Test of Stationarity

The test of stationarity indicates the existence of a unit root problem among the series of variables. In this regard, the Augmented Dickey-Fuller test is incorporated. The findings show that PVR is integrated with the order I(0), while the rest are integrated with the order I(1).

Table 5

Test of Stationarity

Variable	t-Statistic	Prob.	Conclusion
PHE	−6.91	0.00	I(1)
GHE	−7.36	0.00	I(1)
BGD	−5.87	0.00	I(1)
GTR	−5.31	0.00	I(1)
PVR	−3.06	0.03	I(0)

Bound Test

The long-run relationship between public and private sector investment in the health sector is examined by the mean of the Bound Test. If the H_o is rejected, there is no long-run relationship. However, the lack of rejection of H1 suggests a long-run relationship between the variables of interest.

Table 6
Bound test

.	Computed Value	K
F–Statistic	4.01	4
Critical value at I(1) 3.50*		

*Recorded at a 5 percent level of significance

The results published in Table 6 settle the potential long-run relationship between public and private sector investment in Pakistan's health sector. The computed F-statistic is above the upper bound value I(1) and also significant at a 5 percent level of significance.

Long Run Coefficients

Long-run coefficient results are given in Table 7. The long-run coefficient of PHE assures a negative relationship with GHE. Therefore, any one-unit increase in PHE reduces GHE by –0.98 units. Hence, the important conclusion is that public and private sector expenditure on the health sector is a substitute for each other and not complementary. Therefore, any fruitful public and private partnership is less viable (Aydin, 2021). Findings go away from those recorded by Khursheed et al. (2023) and Hassan et al. (2011). The results disapprove of any apprehensible partnership between the public and private sector, especially in the health sector, as suggested by the empirics (Bartsch, 2011; Holzscheiter et al., 2016; Bull & McNeill, 2007, 2019).

Table 7
Long run coefficients

Variable	Coefficient	Std. Error	t–statistic
PHE	–0.98*	0.09	10.89
BGD	0.002*	0.001	2.00
GTR	0.001	0.001	1.00
PVR	0.18*	0.09	2.00
C	91.67*	7.48	12.25

*Shows significance at 5 percent.

The negative association is looked at in a way that the state government welcomes the private sector to take part in the provisioning of health facilities, despite the fact that people worry less about the rising expenses rather than fetch quality medication (Rahman, 2020; WHO, 2000; Tu, 2013). Apart from the consequences of whether people prefer to move to private health treatments or not, the state of business positions merged with the private sector health centers as found by Bhuyan (2020), Mirror Online (2020), Limpot (2020), Ying (2020), Hellowell et al. (2020) and Dhara (2020) are not encouraging.

Moreover, BGD is accounted to be meek in impact; however, it is found to favor the government expenditure carry-outs in the health sector. Thus, there is no hesitation to write that GHE and BGD are causal in relation. An increase in budget deficit is explored to trigger public sector expenditure on health care. For instance, such expenditures of governments are also a cause of posting undue pressure on the budget.

Additionally, the variable of poverty is found to have a positive and significant relationship with GHE. Therefore, any increase in the poverty rate is addressed by the government by increasing the expenditure initiative on the health sector. In the case of GTR, the findings are insignificant.

The constant of the model is significant. This means that the omitted variables are positive and have a significant effect on GHE.

Short Run Coefficients

The results of the short-run coefficients are given in Table 8. The coefficient of PHE is found to have mixed results. Only in the current year is the effect negative on GHE. It means that in the short run, unlike in the long run, public and private sector health expenditures are not found to be a substitute for each other. The result of BGD is positive. It shows that in the short run, the funds allocated by the government in the annual budget are also used to deliver health services to the citizens. The findings of GTR are located to post a significant negative impact on GHE in the short run. Therefore, the conclusion is that any tax collection is kept away from expenditure on the health sector. In the case of PVR, the results are similar to those found in the long run. Thus, it is confidently said that the government is motivated to entertain the poor people by reasonable expenditure on the health sector in both time horizons. Significantly the coefficient of error correction term is significant and correctly specified. The conclusion is that any of the long-run disequilibrium is adjusted at the rate of 66 percent in a year.

Table 8
Short run coefficients

Variable	Coefficient	Std. Error	t-statistic
D(PHE)	–1.12*	0.058	–19.33
D(PHE(–1))	0.11*	0.06	1.78
D(BGD)	0.002*	0.0003	6.67
D(GTR)	–0.003*	0.001	–3.00
D(GTR(–1))	–0.004*	0.001	–4.51
D(PVR)	0.16	0.09	1.67
ECT(–1)	–0.66*	0.11	–5.62

*Shows significance at 5 percent.

Diagnostic Checking

Table 9
Diagnostic checking

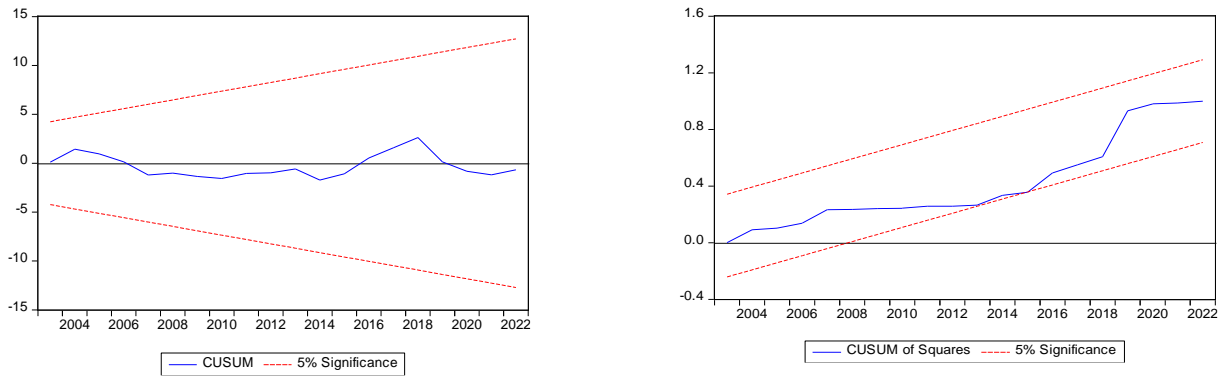| Diagnostics	F–Statistics	Conclusion
Breusch–Pagan–Godfrey LM	0.42 (0.65)	No autocorrelation
RAMSEY RESET	0.39 (0.53)	The model is correctly specified
Heteroskedasticity	0.57 (0.17)	Heteroskedasticity is not found
Histogram–Normality	3.00 (0.22)	Normally distributed residuals

Probabilities are in parenthesis.

The outcomes of diagnostic checking are given in Table 9. The findings confirm no evidence of autocorrelation, wrong specification of the model, heteroskedasticity, and abnormal distribution of the residuals.

CUSUM–CUSUM$_{SQUARED}$ TEST

The CUSUM and CUSUM$_{SQUARED}$ results are given in Figure 1. The traceable paths confirm that the parameters of the models are accurate in the long run and short run and that the intercept is stable. Furthermore, the coefficients are also found to be stable. Therefore, since the H_0 is not rejected, the conclusion is that the model is consistent, stable, and has no structural break.

Figure 1

CUSUM–CUSUM$_{Suared}$ Test

Conclusion & Policy Recommendation

Public and private sector investment spending is essential for the appropriate resource allocation. In the case of the health sector, countries like Pakistan are always considered to be hosts for the offering of valuable health services to the citizens. However, it is important to understand that the public sector is not always a source of motivation for the private sector to carry out investment spending, nor does the public sector trigger investment spending on the footprints of the private sector. This study went with checking the impact of private sector investment spending on the health sector on the public sector investment spending in this very sector. Time series-based results confirm the negative relationship of the two in both time horizons. Therefore, both bases of investment spending are substitutes for each other. Further to that, the budgetary deficit is found to initiate public sector investment spending in the health sector. However, it is essential to evaluate if such investment spending is worth being one of the contributors to a budgetary deficit where the private sector is available to substitute the public sector.

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