

PUBLIC-PRIVATE SECTOR INVESTMENT COLLABORATION IN HEALTH SECTOR OF PAKISTAN: DO TAXES ON PRODUCER AND GOVERNMENT EFFECTIVENESS MATTER?

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ABSTRACT

A collaboration between public and private investment is always looked forward for efficient services to the country's citizens, especially in the health sector. If the public sector is reluctant to address investment needs, the private sector can replace it for good. However, government effectiveness and taxes on producers can sway away the motivation of the private sector towards fruitful investment. This study was initiated in Pakistan to address these concerns based upon empirical analyses ranging from 1980 to 2023 through the methodology of Autoregressive Distributed Lag (ARDL). Findings confirm public investment and taxes on producers to reduce private sector investment in both time horizons. On the contrary, government effectiveness is found to encourage private sector investment in both time horizons. Therefore, it is suggested the concerned authorities be careful in initiating public sector investment as it is a substitute for private investment. Moreover, taxes must be progressive in nature so that private investment is not discouraged. Finally, the government's effectiveness is suggested to be strengthened for better standing of private investment.

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INTRODUCTION

The public-private partnership in the emerging economies holds a potential to addressing the socioeconomic challenges such as economic growth, trade, poverty, unemployment, and particularly the

sector of education and health. Such partnerships for countries like Pakistan can serve as a best practice to accord the quality services to the citizens. When done rightly, such investment collaborations assist to overcome the structural barriers within the national frontiers. Strong public-private investment strategies help to create jobs therefore protect the national interests at large. It is important here to record that the stakeholders are more likely to prioritize the societal goals such as health sector facilities to be created in a diverse manner for quality and affordable services to the country citizens. However, somewhat often the public-private collaborations cause to create competitions between the two and leads to act against each other therefore affecting the sufficiency and efficiency of services to the citizens (World Economic Forum, 2022).

Private sector investments are pledged in terms of Foreign Direct Investment (FDI), which, according to Organization of Economic Cooperation and Development (OECD), are meaningful towards the emerging economics like Pakistan. Such investment capital is found domination the significant positive growth during the early 21st century and hereafter the phase of COVID-19.

At the same time, the government of the state is also required to harden the market powers for the incentivization of the market needs. The public-private investment collaborations are none other than the attempts to forge the market-based programs in order to create the demand for the goods and to spur the creativity of either investment base to meet the shared goals of betterment and efficient services to the country nationals at large. Today, for countries like Pakistan, it is a time for siloed thinking for appropriate public-private investment collaboration to solve the problems, especially in the health sector of Pakistan. It is time to be collaborative to promote social good and positive and systematic investment strategies in the large interest of the general public. The private sector needs to speak for the social change, and the public sector to establish economic incentives to harden the innovations of private sector and expertise to address the challenges of the society.

However, it is noticed that private sector is replicated by the public sector, especially in the areas where the goal of investment expenditure is less confined towards the profit motive rather much of the weightage and investment goals are to provide the services at large. Therefore, private sector who finds health sector to be less promising towards profit making neglects it for good given public sector is there to facilitate the country citizens at large. To private sector, the projects like roads, highways, sea ports, power generation, and railways are more encouraging in swelling business revenue. Therefore, more often, the user charges are higher on economic infrastructure thus initiate private sector to be swept away from carrying out heavy investment in the sectors like health. Though knowing these facts, private sector investment is still required because significant number of pupils do not worry accessing the costly private health facilities for better health treatments. It is also important to notice the over spending by either sector leads to not more than the wastage of the resources and unhealthy business competition. In this regard, private sector is more sensible to smell the number of running public sector project in the relevant area therefore steps back since the slogan of welfare and cheap health facilitations attract the people at large.

At the other end, taxes being a source of government revenue is to narrow down the gap between revenue and cost of production thus make private sector to feel passive towards the investment initiatives. In non-documented economies like Pakistan the tax policy is an art of possible rather than a pursuit of an optimal. But still, taxes on producer are beyond the doubt malignant for a private producer. To International Monetary Fund ((IMF), 2001), there is no statistical approach to compare the tax level between the developing and industrious economies. However, though the taxes in the developing-undocumented-economies are less than those levied in the industrious countries still are destructive for the private investor. The problem emanates when the state government fails to allocate the tax-based-savings on the sectors where the taxes caused private sector to step down from the business thus making the general public to be the ultimate sufferer.

Another important determinant of private investment is the quality of governance (The World Bank, 1994). The good governance is central in creating and sustaining the socioeconomic issues by the mean of strong and equitable development. Government which makes the rules to run the country with harmony are based upon the target of realizing working efficiency and to address the market failures (The World Bank, 1992). Therefore, a fool-proof system of accountability, reliable information, and efficient resource management are the key elements to foster and strengthen the bonding of private sector investments, especially in the sector that is not out spoken in terms of rendering profit (The World Bank, 1994).

This study is novel to emplacing the collaboration of public-private investment in the health sector of Pakistan together with the effects of taxes on producers and government effectiveness on the private sector.

LITERATURE REVIEW

This study visualizes the impact of public sector investment together with the trace out of government effectiveness and taxes on producer to posit the impact on the private sector investment in the health sector of Pakistan. The empirics, though fewer, endeavored to discover such relationship between public and private investment.

The complementary relationship between public and private investment is vast and not limited to just health sector. The empirics also explored the effects of such spending on the ecological foot prints, the economic growth, energy, technological innovations, trade across the national frontiers, and sector like agriculture, manufacturing, and services (Dogan, et al., 2020; Kirikkaleli, et al., 2021; Yang et al., 2021; Adebayo, et al., 2021; Morea & Balzarini, 2019; Morea & Gebennini, 2021; Chunling, et al., 2021; Hassan, et al., 2011).

The environmental affectations are also analyzed by Khan et al. (2020) on Pakistan, Kirikkaleli and Adebayo (2021) on India, and on China by Shahbaz et al. (2020). Also, Waqih et al. (2019) traced these effects on South Asia. Not only this, but the amalgamations of public and private sector investments are located on the transport sector, renewable energy consumption, and environmental emission (Ahsan et al., 2021). The economic growth resting upon these two investment platforms is traced by Lin and Omoju

(2017). However, though mixed are the findings posted by Xue et al. (2017a; 2017b) and by Cruz and Karz-Gerro (2016) who explored that the improved environment at the back of private and public investment ventures are established with respect to technological improvement. The environmental hazards, economic growth, and renewable energy are related and either of the investment in the renewable sources do not worsen the environmental and also help fostering the economic growth (Qiao et al., 2019) Hassan et al. (2011), discovered the public-private sector investment sustenance in Malaysia in manufacturing, agriculture, and service sector. The panel regression technique to find favorable results of public-private investments. The investment partnership of private and public sector is also viewed in water, energy, sanitation, transport, telecommunication, education, and health by Fabre and Straub, 2023). Findings approved a trade-off between public-private investments. On the similar ground, such collaborative investments are also found to initiate their contributions in the country of origin (Maluleke et al., 2023).

Public-private investment partnership is not away from the global health sector. Storeng et al. (2021) examined the relationship of such investment collaborations in the health sector. Findings affirmed that public-private investment strategies are welcoming for creating investment challenges which are associated with public and private sector alone. The result of the study of Storeng et al. (2021) assured limited success at the back of limited charities working in the society especially in the global health sector. Such investment partnerships are initiated in the medicines for tuberculosis, HIV/AIDS, and malaria. To Gavi (2020), the business know-how and technical expertise are the main factors to distillate upon for the positive results of public and private investment collaborations. According to Buse and Harmer (2004;2007), the corporate sector issues and governing bodies affect such investment partnerships. However, such investment collaborations are located to making piecemeal exertions to redressing the disparities by the mean of evolving the civil societies and increasing the number of board members for better investment outcome (Puyvallee & Storeng, 2017; Storeng, 2014).

Under the charter of joint venture investments, medicines are acquired from the foreign vendors with the expectation of fall in the prices (Stein, 2021; Eccleston-Turner & Upton, 2021). Usher (2021) and Toronto Sun (2021) examined G7 countries as purchasing vaccines through COVEX, with the entitlement of self-financing member. In this regard, Stein (2021) discovered that the public sector subsidies are understood to as extensively persuading factor for the inspiring innovation for the favorite outcome. Fair-price and substantial funding promises are the steps taken to reinforce public-private investment collaborations (Gavi, 2021; Gavi, 2020; The Guardian, 2021, Fortune, 2020). Though the vague inadequacies are apparent (Storeng & Puyvallee, 2018; Buse & Harmer, 2007). Private sector, inclination with public sector, for fund outlay activities is globally recognized for the healthier investment outcomes, exclusively for the consolidation of the health sector (Holzscheiter et al., 2016; Bartsch, 2011; Bull & McNeill, 2007; 2019).

Private sector is greeted by the state-run governments to take hold of the government organizations at the

potential of executing quality services to the inhabitants of Saudi Arabia. Rahman (2020) prescribed that Saudi government to reinforce public health sector for affordable, accessible, and quality services. However, the privatizing the state organization raises the cost of services but on the other end improvises population health services (Tu, 2013; WHO, 2000). Governments do suggest free of cost services but ever-growing financial challenges hinder to offer these subsidized services for long (Young, 2018; Young, 2015). Thus, the literature highlights that the efforts are to fulfill social needs of possibly quality health services with the collaboration of private sector that is an artiste heavily engaged in health sector through managerial and financial services (Uplekar, 2000; Rahman, 2019).

Public-private sector investment collaborations are advocated by World Health Organization and The World Bank as a path to improve health care services for the population (Buse, 2001; The World Bank, 1993). According to Colliers (2018); Roehrich et al. (2014); Rahman (2019), and Alghamdi (2014), private sectors' contribution in health services increases with the passage of time and also let the government to step back progressively because of the lack of confidence of patients on public sector medications. Consequently, heavy dependance on health care goods and private sector financial services is evident (Rahman, 2020; Rahman, 2019).

Besides the favorable outcomes, more than a few empirics attempted to highlight about the complaints which are filled against health services by the private sector including; low quality equipment, unregistered poor infrastructure, obscuring service conditions, low qualification of the personnels, overuse of technology for money making, service based upon commissions, heavy cost treatment, wrong diagnosis, excessive prescription of drugs, missing business ethics, profit motivation, negligible attention to the patient care, and deficient service quality which are analogous to those drawn on public sector (Rahman, 2007; Bhate-Deosthali et al., 2011).

Private sector can possibly cause the governance issues if the financial crises get to be intensified (Williams, 2020). Because of costly treatment, Kenya and India experience insurers to capping the amount of finance for patients those are intended to have treatment with the private sector health institutes (Mirror Online, 2020; Bhuyan, 2020; Nazari, 2020). It is explored by Ang (2020), Limpot (2020), Ara (2020), and Ying (2020) that the beds are kept concealed from the state authorities and patients of Africa, Asia, India, and Latin American. Here Boonbandit (2020), Antara (2020), Loo (2020), and Tiglao (2020) found that the treatments of COVID-19 patients are mostly handled by private sector in Egypt, Philippines, Malaysia, and Indonesia. On the contrary, Hellowell et al. (2020) and Kruse and Jeurissen (2020) explored that the outdoor service is adjourned in emergency situations. The insurance premiums are also found unhealthy in supporting the treatments of the patients in private sector hospitals (Dhara, 2020; Hellowell et al., 2020). In this regard, Orissa Post (2020a; 2020b; 2020c) discovered high-cost medication in the private sector hospitals.

Empirics of Onis and Kutlay (2021) and Ayhan Ustuner (2022) recognized that public-private sector investment collaborations deliver cost shared services and infrastructure with sharing. Aptly managed

institutional framework, transparent procurements, and effective regulatory policies promise to bring service quality to the citizens (whiteside, 2020; Ayhan &, Ustuner, 2022). In the meantime, as a rebuttal to this opinion, Onis and Kutlay (2021) and Bedirhanoglu (2021) found that politicization, centralization, and personalization replaces depoliticized economic management together with discretion as well as lack of accountability. Thus, in the questionnaire-based research of Aydin (2021), it is found that only 39.8 percent of the respondents consider such investment collaborations as viable.

Number of questions regarding public-private investment are still unaddressed. The thorough look of the literature reveals number of gaps and shortcomings that are found to still persist before giving a verdict whether private investment is in collaboration with public sector or there is a crowding out effect between the two, especially in the health sector which is a matter of concern to people who intend to stay healthy but do bother for the high expenses whereas the others are faced with no any financial constraints. Being a business of due concern, the utmost necessity is of a supplementary study in order to entirely comprehend the significant tents of public-private investment, whether substitute or complimentary of each other.

At this point, government effectiveness and taxes on producers are also required to be evaluated for whether both variables are transposable into favoring private sector investment spending in the health sector of Pakistan, where the literature is missing. Therefore, the individuality of this study is situated on addressing of the lacking scientific literature which highlights the domain of public-private sector investment collaborations altogether with either of the affectations of taxes on producers and government effectiveness.

METHODOLOGICAL FRAMEWORK

This study aims to investigate tradeoff between public-private investment spending and effects of government effectiveness and taxes on producers on the private investment spending in the health sector of Pakistan. For analytical results, the variables included in this study are described in Table 1.

Table 1

Description of the Variables

Variable	Measurement
Private Health Expenditure (PHE)	Current Expenditure at Consumer Purchasing Power Parity
Government Health Expenditure (GHE)	Current Expenditure at Consumer Purchasing Power Parity
Inflation (INF)	Consumer Price Index
Population Growth (PGR)	Population Increase Within Mid-Point of the Year and Prior Point
Poverty (PVR)	Based on International Poverty Line
Government Effectiveness (GEF)	Estimate of governance Effectiveness; -2.5 (weak) to -2.5 (strong)
Taxes on Producer (TOP)	In Million & Local Currency Unit

Data Collection

For the detailed empirical analyses, time series variables are recorded from the domain of Handbook of State Bank of Pakistan and World Bank Development Indicators. The observations are recorded from 1980 to 2023.

Model Specification

To meet the objective of the study, following models are prescribed to offer the empirical analyses.

$$PHE = f(GHE, PGR, INF) \quad [1a]$$

$$PHE = f(GHE, PGR, GEF) \quad [1b]$$

$$PHE = f(GHE, INF, TOP) \quad [1c]$$

The econometric form of the model is given in Equation [2a, 2b, 2c].

$$PHE_t = \beta_0 + \beta_1 GHE_t + \beta_2 PGR_t + \beta_3 INF_t + \varepsilon_t \quad [2a]$$

$$PHE_t = \beta_0 + \beta_1 GHE_t + \beta_2 PGR_t + \beta_3 GEF_t + \varepsilon_t \quad [2b]$$

$$PHE_t = \beta_0 + \beta_1 GHE_t + \beta_2 INF_t + \beta_3 TOP_t + \varepsilon_t \quad [2c]$$

The coefficients are β_i and ε_t is the error term.

3.3 Test of Stationarity

For the accuracy of the measurements of coefficient, Dickey-Fuller introduced stationarity test in 1979. The test version is later enhanced and termed Augmented Dickey-Fuller in 1981. This test is extensively used in time series analysis (Mehmood, 2023).

The formation of Augmented Dickey-Fuller test is given in Equation [3] and Equation [4], respectively.

$$\Delta y_t = b_1 + b_2 t + \delta y_{t-1} + \beta_t \sum_{t=1}^m \Delta y_{t-1} + \mu_t \quad [3]$$

The residual white noise term is μ_t and the sequential predictor is Y_t however, δ represents the status of stationarity.

$$\Delta y_{t-1} = (y_{t-1} - y_{t-2}), \Delta y_{t-2} = (y_{t-2} - y_{t-3}) \quad [4]$$

The test statistic that is less than the critical value categorizes the variable to be stationary. When the results are in mixture of I(0) and I(1) both, the regression technique of ARDL is used.

Bound Test

The Bound Test, established by Pesaran et al. (2001), is a statistical tool to find long run cointegration between the time series variables. Bound Test goes along with ordinary least square for computing Wald Test F -Statistic. The null hypothesis of no cointegration $(H)_0$ is if;

$\sigma_1 = \sigma_2 = \sigma_3 = \sigma_4 = \sigma_5 = \sigma_6 = \sigma_7 = \sigma_8$. On the other hand, the alternate hypothesis $(H)_1$;

$\sigma_1 \neq \sigma_2 \neq \sigma_3 \neq \sigma_4 \neq \sigma_5 \neq \sigma_6 \neq \sigma_7 \neq \sigma_8$ that represents long run cointegration if the computed F -Statistic is held to be not than the upper bound critical value.

Autoregressive Distributed Lag

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

Long run Coefficient Estimation

The variables are found for mixed level of integration such as I(0) and I(1). Therefore, ARDL is 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 [5a, 5b, 5c]

$$\Delta PHE_t = \alpha + \beta_1 PHE_{t-1} + \beta_2 GHE_{t-2} + \beta_3 PGR_{t-3} + \beta_4 INF_{t-4} + \sum_{i=0}^{P_1} \delta_1 PHE_{t-i} + \sum_{i=0}^{P_2} \delta_2 GHE_{t-i} + \sum_{i=0}^{P_3} \delta_3 PGR_{t-i} + \sum_{i=0}^{P_4} \delta_4 INF_{t-i} + \varepsilon_t \quad [5a]$$

$$\Delta PHE_t = \alpha + \beta_1 PHE_{t-1} + \beta_2 GHE_{t-2} + \beta_3 PGR_{t-3} + \beta_4 GEF_{t-4} + \sum_{i=0}^{P_1} \delta_1 PHE_{t-i} + \sum_{i=0}^{P_2} \delta_2 GHE_{t-i} + \sum_{i=0}^{P_3} \delta_3 PGR_{t-i} + \sum_{i=0}^{P_4} \delta_4 GEF_{t-i} + \varepsilon_t \quad [5b]$$

$$\Delta PHE_t = \alpha + \beta_1 PHE_{t-1} + \beta_2 GHE_{t-2} + \beta_3 INF_{t-3} + \beta_4 TOP_{t-4} + \sum_{i=0}^{P_1} \delta_1 PHE_{t-i} + \sum_{i=0}^{P_2} \delta_2 GHE_{t-i} + \sum_{i=0}^{P_3} \delta_3 INF_{t-i} + \sum_{i=0}^{P_4} \delta_4 TOP_{t-i} + \varepsilon_t \quad [5c]$$

Short run Coefficient Estimation

The estimations of short run coefficients are carried out, in sequel of the estimation of long run coefficient, by the mean of error correction model. The illustration of the short run model is given in Equation [6a,6b,6c].

$$\Delta PHE_t = \alpha + \sum_{i=0}^{P_1} \lambda_1 \Delta PHE_{t-i} + \sum_{i=0}^{P_2} \lambda_2 \Delta GHE_{t-i} + \sum_{i=0}^{P_3} \lambda_3 \Delta PGR_{t-i} + \sum_{i=0}^{P_4} \lambda_4 \Delta INF_{t-i} + \partial ECT + \varepsilon_t \quad [6a]$$

$$\Delta PHE_t = \alpha + \sum_{i=0}^{P_1} \lambda_1 \Delta PHE_{t-i} + \sum_{i=0}^{P_2} \lambda_2 \Delta GHE_{t-i} + \sum_{i=0}^{P_3} \lambda_3 \Delta PGR_{t-i} + \sum_{i=0}^{P_4} \lambda_4 \Delta GEF_{t-i} + \partial ECT + \varepsilon_t \quad [6b]$$

$$\Delta PHE_t = \alpha + \sum_{i=0}^{P_1} \lambda_1 \Delta PHE_{t-i} + \sum_{i=0}^{P_2} \lambda_2 \Delta GHE_{t-i} + \sum_{i=0}^{P_3} \lambda_3 \Delta INF_{t-i} + \sum_{i=0}^{P_4} \lambda_4 \Delta TOP_{t-i} + \partial ECT + \varepsilon_t \quad [6c]$$

The estimated short run coefficients are shown by λ_i and ∂ is the coefficient of ECT that represents the speed of adjustment of the long run equilibrium.

Diagnostic Checking

The statistical computations are needed to be observed for the reliability. In this manner, the Breusch-Pagan-Godfrey LM, RAMSEY RESET, heteroskedasticity, histogram normality, and CUSUM and CUSUM_{Squared} are exercised. The changes that occur in the specific regression model are viewed by Breusch-Pagan-Godfrey LM test. The RAMSAY RESET test is to know the correctly specified functional form of the regression model. The heteroskedasticity test is to perceive the existence of heteroskedasticity. Additionally, the normal probability plot is said to be linear if the histogram indicates the moderate tailed distribution thus showing the normally distributed residuals.

RESULTS AND DISCUSSIONS

This section discusses the results of descriptive statistics and empirical analyses.

Descriptive Analyses**Table 2****Descriptive Statistics**

	GHE	PHE	PGR	INF	GEF	TOP
Mean	26.89	69.54	2.57	8.19	-0.52	47894.77
Minimum	16.27	57.49	1.20	2.53	-0.81	2392.60
Maximum	37.89	80.48	4.42	20.29	-0.26	194474.40
Std. Dev.	4.08	3.87	0.84	3.67	0.17	49396.23
Skewness	0.44	-0.45	0.14	0.66	-0.33	1.23
Kurtosis	4.46	5.29	2.16	3.91	1.73	3.62
Jarque-Bera	5.19	10.87	1.41	4.62	3.67	11.45
Prob.	0.07	0.00	0.49	0.00	0.16	0.00

The detailed descriptive statistical analyses are given in Table 2. Wide dispersions from the respective mean values are evident on GHE and PHE. In case of PGR also the situation is not different. However, the TOP is recorded to have consistency in the data records when minimum, maximum, mean, and standard deviation are observed. There are two variables which are PHE and GEF those are negatively skewed. Rest are positively skewed variables. Apart from PGR and GEF, all the variables are platykurtic and have normally distributed residuals.

Test of Stationarity

The assessment of the status of stationarity, given in Table 3, indicates that PGR, INF, and GEF are integrated of order I(0) whilst the rest are integrated of order I(1).

Table 3**Test of Stationarity**

Variable	t-Statistic	Prob.	Conclusion
GHE	-6.91	0.00	I (1)
PHE	-7.36	0.00	I (1)
PGR	-4.17	0.01	I (0)
INF	-3.12	0.03	I (0)
GEF	-4.69	0.00	I (0)
TOP	-6.86	0.00	I (1)

Bound Test

The long run relationship between public-private sector investment in health sector is inspected through Bound Test. If the H_0 is not rejected, there is no any long run relationship. However, the rejection of H_0 suggests long run relationship between the variables of interest.

Table 4**Bound Test**

Model-I		
	Computed Value	K
F-Statistic	14.07	3
Critical value at I(1) 3.99*		
Model-II		
	Computed Value	K
F-Statistic	8.93	3
Critical value at I(1) 3.90*		
Model-III		
	Computed Value	K
F-Statistic	5.24	3
Critical value at I(1) 4.13*		

*Recorded at 5 percent level of significance

The results published in Table 4 qualify to approve potential long run relationship between public-private sector investment in the health sector of Pakistan. which is the core objective of the study. The computed *F*-statistic is above the upper bound critical value *I*(1) and also significant at 5 percent level of significance.

Long Run Coefficients

The long run coefficient estimates in each model are given in Table 5. The long run coefficient of GHE assures negative relationship with PHE. Therefore, it is interpreted as; any of the one unit increase in GHE is to reduce PHE by -1.02, -0.97, and -1.05 units. Hence the significant deduction is that; public-private sector investment on health sector is substitute of each other and not complementary. Therefore, findings go with those of Aydin (2021) that any fruitful public-private partnership is less viable. Findings also go away from those recorded by Khursheed et al. (2023) and Hassan et al. (2011). The results disapprove any understandable business between public-private sector, exclusively in the health sector as suggested by the empirics such as; Holzscheiter et al., (2016), Bartsch (2011), Bull and McNeill (2007; 2019).

Table 5

Long Run Coefficients

Model-I			
Variable	Coefficient	Std. Error	t-statistic
GHE	-1.02*	0.05	-19.80
PGR	0.32*	0.18	1.76
INF	-0.11*	0.05	-2.33
C	97.08*	1.82	53.25
Model-II			
Variable	Coefficient	Std. Error	t-statistic
GHE	-0.97*	0.03	-38.49
PGR	0.65*	0.21	3.11
GEF	6.12*	1.02	6.02
C	100.53*	1.34	75.07
Model-III			
Variable	Coefficient	Std. Error	t-statistic
GHE	-1.05*	0.07	-15.66
INF	-0.14*	0.06	-2.15
TOP	-0.00	0.00	-0.57
C	99.06*	2.11	46.83

*Shows significant at 5 percent.

The negative collaboration between public-private investment is observed in a way that the state government is found cheaper and better source of health-related service provider as compared to private sector thus private sector investment in health sector move away by the arrival of any incremental investment spending in the same sector by the side of government. Private sector is found discouraged in carrying out investment at the back of excessive government investment. This is however observable that what people think about this reduction in private sector health-related investment. These results make the

concerned authorities to think if the government's latest health sector investments are of good quality or otherwise. If former is true, it is not to negatively affect the demands of the general public but the confusion remains there since government of Pakistan is already indebted to large extent thus it is felt that in such a situation it is hard to focus on quality health service provisions as are usually available at the platform of private sector.

From the other dimension, public sector is found to give receptions to the private sector to taking part in the provisioning of health facilities, notwithstanding of the fact that people are worry less about the rising expenses but instead go to avail quality medication (WHO, 2000; Rahman, 2020; Tu, 2013). Apart from the consequences that whether people prefer to move to public or private health treatments, the state of business positions merged with the private sector health centers are not encouraging as found by Mirror Online (2020), Bhuyan (2020), Ying (2020), Limpot (2020), Dhara (2020); Hellowell et al. (2020).

In case of PGR, the results are significant and positive. Therefore, it goes out of question that with ever growing population, health sector investment spendings by private sector are to move alike. The findings on the variable of inflation are negative and statistically significant. Any rise in the price level of the economy discourages people to move to high-costed private sector health institutions. Therefore, looking into this fact, private sector investment on health sector is to fall at the back of increase in the prices.

At particular to GEF and TOP, the results assure that private sector investment on health sector is reliant on quality of governance and effective implementation of government plans. The 6.12 unit increase in private sector investment on health sector is recorded if there's one unit increase in the GEF. However, the impact of TOP is though negative but very minute and insignificant. Thus, it is argued that TOP is not to affect the investment decisions of the private sector towards carrying out fund endowments in the health sector.

The constant of each model is also significant. which means that the omitted variables are positive and significant in their effect on PHE.

Short Run Coefficients

The results of short run coefficients are given in Table 6. The coefficient of GHE is mostly found to have similar results at each model. Only at the lag of one year, the status of the relationship of GHE with PHE is positive. It means that in short run, like long run, the public-private sector health investment collaborations are found to be substitute of each other. The result of PGR is positive in Model-I and Model-II. Therefore, with every increase in population growth, the investment spending by private sector is initiated in short run. The effects of INF are consistent, statistically significant, and negative on PHE. Importantly, the affectations recorded on GEF are encouraging for PHE as found in long run. Since it is confirmed that strong dependance is there between government effectiveness and private sector health sector investment program. However, the results of TOP are similar like those recorded in long run.

The coefficient of error correction term in each model is significant and correctly specified but case of Model-II, there is found some oscillatory convergence. The concluding fact is that in case of Model-I and Model-III any of the long run disequilibrium is adjusted at the rate of 98 and 94 percent, respectively.

Table 6
Short Run Coefficients

Model-I			
Variable	Coefficient	Std. Error	t-statistic
D(GHE)	-0.80*	0.04	-18.89
D(PGR)	1.54*	0.57	2.69
D(INF)	-0.11*	0.04	-2.50
ECT (-1)	-0.98*	0.11	-8.26
Model-II			
Variable	Coefficient	Std. Error	t-statistic
D(PHE(-1))	0.17*	0.10	1.69
D(GHE)	-0.65*	0.04	-16.18
D(GHE(-1))	0.31*	0.12	2.47
D(PGR)	1.10*	0.54	2.05
D(PGR(-1))	0.05	0.65	0.07
D(PGR(-2))	1.60*	0.62	2.56
D(GEF)	10.43*	1.56	6.64
D(GEF(-1))	5.26*	1.53	3.44
ECT (-1)	-1.54*	0.21	-7.15
Model-III			
Variable	Coefficient	Std. Error	t-statistic
D(GHE)	-0.80*	0.04	-18.11
D(INF)	-0.12*	0.04	-2.64
D(TOPAD)	-0.00*	0.00	-1.72
ECT (-1)	-0.94*	0.12	-7.74

*Shows significant at 5 percent.

Diagnostic Checking

Table 7
Diagnostic Checking

Model-I		
Diagnostics	F-Statistics	H₀
Breusch-Pagan-Godfrey LM	0.03 (0.97)	No auto correlation
Heteroskedasticity	6.67 (0.87)	Heteroskedasticity is not found
RAMSEY RESET	3.87 (0.17)	Model is correctly specified
Histogram-Normality	0.71 (0.70)	Normally distributed residuals
Model-II		
Diagnostics	F-Statistics	Conclusion
Breusch-Pagan-Godfrey LM	2.49 (0.10)	No auto correlation
Heteroskedasticity	6.67 (0.54)	Heteroskedasticity is not found
RAMSEY RESET	0.58 (0.12)	Model is correctly specified
Histogram-Normality	0.72 (0.58)	Normally distributed residuals
Model-III		
Diagnostics	F-Statistics	Conclusion
Breusch-Pagan-Godfrey LM	0.28 (0.75)	No auto correlation
Heteroskedasticity	1.61 (0.44)	Heteroskedasticity is not found
RAMSEY RESET	1.18 (0.26)	Model is correctly specified
Histogram-Normality	0.76 (0.51)	Normally distributed residuals

Probabilities are in parenthesis

The outcomes of diagnostic checking are given in Table 7. The findings confirm absence of the issue of auto correlation, heteroskedasticity, wrong specification of the model, and the abnormal distribution of the residuals.

CUSUM-CUSUM_{SQUARED} TEST

The CUSUM and CUSUM_{SQUARED} results are given in Figure 1. The traceable paths substantiate the accuracy of the parameters of the models in short run and long run and the stable intercept. Moreover, the coefficients are also found to be stable. Since the H_0 is not rejected, the conclusion is that the models are consistent, stable, and have no any structural break.

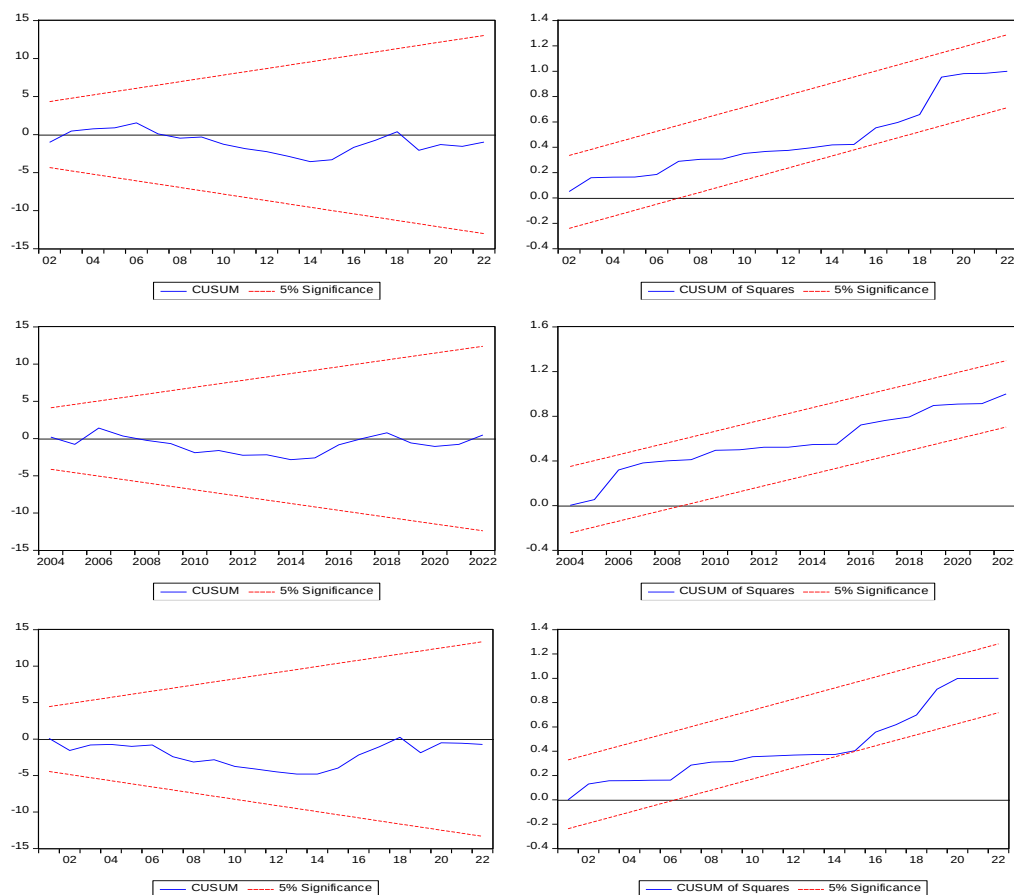


Figure 1

CUSUM-CUSUM_{Squared} Test

CONCLUSION & POLICY RECOMMENDATION

Public-private sector investment collaborations are essential for the suitable resource allocation. For the countries like Pakistan which are considered as a host for valuable health service provisions to the citizens, such collaborative investments are not of cursory importance. However, it is important to understand that private sector investment is not always initiated by the public sector investment. Sometimes, the foot prints of public investments are not followed by private sector rather are viewed as substitutes instead. This study went with checking the impact of public sector investment spending on health sector on the private sector investment spending on this very sector. Time series-based results confirm negative relationship of the two in short run and long run. Therefore, concluding that both bases of investment spendings are substitute of each another.

Further to that, government effectiveness is found to initiate private sector investment spending on health sector. Thus, effectiveness of government is the key to trigger such valuable investments. And the taxes on producers are found to post negative effects on such worthy investments. It is thus indispensable to

evaluate if such heavy tax impositions are worthy of being kept in a line of trend as they are and to let the burden be beard by the government to take hold of initiating investment by itself whilst as a substitute factor, private sector is available which offers quality services to the citizens at large.

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