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Impact of Health Expenditures on Economic Growth in Selected South and East Asian Countries

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Abstract
Efficient and equitable health spending is crucial for achieving universal health coverage and promoting health and well-being for all. This study aims to examine the impact of health expenditures on economic growth in selected South Asian (India, Pakistan, Sri Lanka, and Bangladesh) and East Asian (China, Japan, Korea, and Malaysia) countries and analyze the long-run association between health expenditures and economic growth. The data has been retrieved from the World Development Indicators for the years 2000-2021. The econometric techniques (panel Ordinary Least Square (OLS), Fully Modified OLS, and Dynamic OLS) have been applied to examine the association between healthcare expenditures and economic growth. The results show that in both sets of nations, a long-run association exists between health expenditures and economic growth. South Asian countries show a unidirectional causality between health expenditures and economic growth, whereas East Asian countries do not exhibit any causal relation between the two variables. Health expenditures have a positive and significant impact on economic growth in South Asian countries. The association between health spending and economic growth is insignificant in East Asian countries. The study presents some thought-provoking ideas, policy recommendations, and implications for policymakers, planners and researchers, especially in the context of developing economies.

Keywords: *Health expenditure; Human capital; Economic growth; South-East Asian Nations*

JEL Classification: *I15, J24, O47, O53*

1. Introduction

The Endogenous growth models emphasize that human capital has great importance in achieving development and economic growth (Romer, 1990a). The well-being of the population is a crucial factor that significantly influences economic development by enhancing productivity and per capita income (Ridhwan et al., 2022). Numerous studies have documented the significance of human capital in fostering economic growth, emphasizing its pivotal role as a driving force for promoting economic development (Langelett, 2002; Pelinescu, 2015). The theory of health-led growth elucidates the global impact of health spending on economic growth (Mushkin, 1962; Piabuo & Tieguhong, 2017). According to the theory, health is conceptualized as a type of capital. From this standpoint, making investments in health can boost labor productivity, raise incomes, and ultimately improve the overall welfare of the population. Existing literature clearly demonstrates that individuals who are in good health are more motivated to acquire new skills and knowledge, as they anticipate long-term advantages and benefits (Mason et al., 2022). Nonetheless, in situations where a significant portion of the labor force consists of unhealthy or sick employees, productivity tends to decline. This discrepancy in productivity helps to elucidate the variations in economic growth observed across different parts, globally (Cole & Neumayer, 2006). Roughly half (50%) of the disparity is observed in economic growth between developed and developing nations and it can be attributed to the presence of poor health conditions and low life expectancy (Miladinov, 2020).

The past three decades have seen significant transformations within East Asian healthcare systems. These changes highlight unique accomplishments and present distinctive challenges within each country. China embarked on an ambitious and challenging journey in 2009, striving to overhaul its healthcare system. Government spending on health had doubled from 2009 to 2019, demonstrating the country's dedication to this mission. Additionally, China attained universal health insurance coverage, reflecting significant strides in healthcare accessibility. China implemented numerous reforms to address inefficiencies in its healthcare delivery system. These changes focused on streamlining service delivery and provider payments to curtail wasteful spending and enhance efficiency. Meanwhile, Japan was navigating its own health-care reforms over the past two decades. These adjustments spanned the provision and financing of health-care services, particularly within hospitals. Despite facing unique challenges, the Japanese population began to witness some of the best health outcomes globally, signifying the success of their healthcare reforms. In contrast, Korea's strategy centered around the implementation of a universal health insurance framework. This system was inclusive, encompassing Korean residents and offering entitlements to foreigners as well, illustrating Korea's commitment to broad-based healthcare access. On the other hand, Malaysia's healthcare system enhancements, while notable, highlighted areas requiring further improvement. The country grappled with healthcare workforce shortages, escalating healthcare expenditure, and the need to improve the quality of healthcare in rural regions.

South Asia presented a different narrative, characterized by significant variation within the region. On average, South Asian countries allocate a smaller portion of their budget to healthcare, compared to other regions. However, there's been an upward trend in healthcare sector funding corresponding to the rise in per capita income. South Asian nations like Pakistan, India, Bangladesh, and Sri Lanka have implemented various healthcare sector reforms over the past four to five decades. Sri Lanka stood out, boasting the highest public healthcare spending and the strongest financial protection measures in the region. In contrast, Bangladesh, India, and Pakistan's governments spend less than 1% of their GDP on healthcare. Sri Lanka's healthcare approach has yielded impressive results, including life expectancy over 75 years, nearly universal immunization, and achievement of the Sustainable Development Goal (SDG) mortality rate targets. However, other South Asian countries are still primarily reliant on out-of-pocket spending for healthcare financing. In Bangladesh, for instance, this accounts for a hefty 72% of total healthcare expenditure. This high out-of-pocket spending is indicative of the hefty healthcare burden borne by households due to inadequate government-provided health services. Pakistan, in particular, shows alarming underweight and death rates, despite improvements in immunization rates and skilled attendance at delivery, underlining the pressing need for increased investment in maternal and child healthcare.

Healthcare financing within these countries faces numerous challenges, primarily attributed to their chosen financing methods. Over 40% of total healthcare spending consists of direct payments by households, an inequitable and financially burdensome approach to financing healthcare. This approach has led to greater financial barriers to accessing healthcare and an increased risk of impoverishment. Consequently, healthcare financing deficiencies have contributed to inefficiencies and inequalities in the distribution of healthcare services, both across and within countries.

The objective of this study is to examine how health expenditure affects economic growth in several countries in East Asia (China, Japan, Korea, and Malaysia) and South Asia (India, Pakistan, Sri Lanka, and Bangladesh). Using panel econometric approaches, it examines the causal relationship between health expenditure and economic growth, as well as the long-run relationship between the two variables.

By providing a comparative analysis of the impact of health expenditure on economic growth between South Asian and East Asian economies. This study uses panel econometric approaches (panel OLS, FMOLS, and DOLS) to provide robust evidence on the long-run relationship between health expenditure and economic growth in two different regions, unlike other studies that mainly focus on single-country analysis. The study also emphasizes the various impacts of health expenses in South and East Asia, showing that, although health spending is considerably accelerating economic growth in the countries of South Asia, its Influence is statistically non -significant in Eastern Asian countries. This gap highlights how health spending and the

effectiveness of policy implementation vary depending on institutional and economic context. The findings provide important policy insights, especially for developing countries seeking to maximize health financing for long-term economic growth.

2. Literature Review

Considerable research has been carried out in both developing and developed countries to explore the association between government spending on public health and GDP growth. However, experts have not yet reached a consensus on this matter. Heshmati examined the link by utilizing the Solow growth model and found a positive association between health spending and GDP growth (Heshmati, 2001). In order to confirm, Onuoha, Oyeyemi, and Agbede employed the co-integration method and investigated that, investment in infrastructure, health, and education positively influences economic growth, with approximately 2%, 6%, and 2% impact respectively (Onuoha et al., 2019). However, it was observed that only infrastructure expenditure showed statistical significance in the analysis. As a result, they discovered a contradictory connection among health spending and GDP growth. Another study performed a comparable analysis and found negative relationship in Russia, Brazil, India, South Africa, China and Turkey, from 2000 to 2018 (Canbay & Kırca, 2022). Similarly, after analyzing a broader time period from 2006 to 2013, positive a relationship found to exist in Turkey (Kurt, 2015).

Huber and Orosz analyzed 30 OECD countries between 1990 and 2001 and found that healthcare spending (as a share of GDP) has risen to an unprecedented level, mostly because of rising spending and a general slowdown in the economy (Huber & Orosz, 2003). Elmi and Sadeghi tested panel co-integration causality by employing vector error correction model to confirm the connection, analyzing developing nations spanning from 1990 to 2009. Their findings revealed short-term association among GDP and health spending, along with a long-term bidirectional connection among the two variables (Elmi & Sadeghi, 2012). Similarly, Baldacci et al. examined the influence of health expenditure on a growth, in a panel of 120 developing nations. Their investigation indicated that health expenditure has a significant impact, while lagged periods did not demonstrate any result (Baldacci et al., 2004). Bloom et al. combines capital stock, human capital, and labour capital in the analysis and their analysis led to the conclusion that health expenditure exhibits a positive and statistically significant influence on nation's GDP growth rate (Bloom et al., 2004). Taking inspiration from the Solow model, Kwak conducted a study to investigate the effect of health expenditure on economic growth, distinguishing between public and private health spending. By including countries from both the OECD and developing nations in the sample, Kwak's research demonstrated that public health expenditure has a more pronounced positive effect compared to private health expenditure (Kwak, 2009). Guisan and Arranz also conducted an analysis by using 24 OECD nations and found that health spending has a significant impact in improving individuals' overall well-being, as it contributes to a larger portion of personal consumption and overall productivity (Guisan & Arranz, 2003).

Khan et al. employed an augmented Solow Growth model to investigate the relationship in Pakistan spanning from 1985 to 2013, providing empirical evidence on this association (Khan et al., 2018). The study employed the Johansen co-integration technique and the error correction model and found a positive and significant association among GDP growth and health spending in both the short and long term. Bloom et al. investigated the correlation among health and GDP growth variables by employing a non-linear two-stage least square model on a sample of 104 countries spanning from 1960 to 1990. The findings of their study showed that having good health has a statistically significant and favorable impact on economic development. Furthermore, the researchers emphasized that the impact of life expectancy variable in economic growth regression models was determined to be a real labor economic output effect, rather than a mere proxy for worker experience (Bloom et al., 2004)

Between 1970 and 1990, another study investigated the impact of nation's health on economic development in 13 European, 16 American, 11 Asian, and 12 African countries covering four continents (Aguayo-Rico et al., 2005). Through the application of ordinary least square model, the researchers observed a significant influence of health capital on economic growth. Dreger and Reimers similarly investigated the

correlation among health care spending and GDP growth and revealed a long-run association among healthcare spending, GDP growth, and medical progress (Dreger & Reimers, 2005).

Between 1990 and 2009 the research findings highlighted the significant long-term influence of income in developing countries along with the confirmation of the hypothesis of health-driven economic growth (Elmi & Sadeghi, 2012). Another study examined the association among healthcare spending and GDP growth of Nigerian economy. In their analysis, ordinary least squares multiple regression was employed as the chosen methodology. The findings of the study confirmed positive association between the two variables. The researchers suggested that Nigerian policymakers should consider about increasing the annual budget in health sector (A.S & Sanmi, 2011).

It is clear from the empirical data shown above that there are differences in how health spending impacts economic growth and development of countries. These studies also demonstrate a difference between the short and long run directions of associations among healthcare spending and nation's economic growth. Given the contrasting perspectives presented, it becomes imperative to examine the impact of healthcare spending on economic growth in the selected South East Asian countries (SEAC). A vast number of empirical researches explored the link between the two by employing various methods such as the Granger causality test and other approaches to examine long term associations (Bloom et al., 2004; Erdil & Yetkiner, 2004; Baldacci et al., 2004), however, to the best of our understanding, no study has been conducted to examine the relationship between health expenditure and economic development in the selected SEAC region.

The present study aims to address that research gap by conducting a rigorous comparative analysis. It seeks to enhance our comprehension of the intricate connection between health expenditure and nation's economic growth by examining variations, patterns, and potential factors within the selected SEAC region. This study will investigate whether there is a long run association exists among economic growth and public healthcare spending, as well as the direction of causality between the two.

Recognizing the growing consensus worldwide, the importance of good health is increasingly acknowledged as a vital element of individual and national development, as well as economic well-being. This is evidenced by a number of measures implemented by south and east Asian nations to increase health spending to attain the healthcare benchmarks outlined in the Sustainable Development Goals (SDGs). Leaders from South Asian countries (Pakistan, India, Sri Lanka, and Bangladesh) and leaders from east Asian countries (China, Japan, Korea, and Malaysia) have expressed this trust through different policy actions to improve outcomes of their respective countries.

The literature review revealed that the majority of available studies focus on examining the relationship between health spending and economic growth in developed nations, specifically those belonging to organizations like the OECD and the European Union. Limited research exists concerning developing countries, possibly due to the scarcity of data in this regard. Similarly, empirical investigations into both classical and new growth theories predominantly pertain to developed economies, with only a small fraction delving into the context of developing nations. Scant attention has been given to studies that consider factors on a geographical, organizational, or regional basis.

Notably absent are specific studies addressing the impact of health expenditure on economic growth in developing countries, particularly those in the South-East Asian region. Consequently, there is an urgent need to evaluate the relationship between health spending and economic growth within these developing nations. Drawing comparisons between developing countries like Bangladesh and Sri Lanka and highly developed nations like the USA or UK lacks meaningfulness. It is essential to conduct comparisons among groups of countries that share similar economic and geographical circumstances. Hence, for this study, eight countries from East and South Asia were chosen to represent developing nations – four from South Asia (India, Pakistan, Sri Lanka, and Bangladesh), which exhibit slower progress in the health sector, and four from East Asia (China,

Japan, Korea, and Malaysia), known for making advancements toward achieving universal health coverage (UHC) under Sustainable Development Goal 3 (SDG 3).

These selected countries share almost identical conditions and situations, including economic activities, geographical factors, and levels of development. The chosen eight nations are anticipated to become fast-growing and emerging economies in the future. Furthermore, these selected countries emerged on the global stage under similar circumstances during the 1950s, with the exception of Bangladesh.

The literature points to a research gap in the paucity of empirical studies on this topic, especially in developing countries such as Southeast Asia. Recognizing the importance of health expenditure in economic development, this study aims to fill this gap by investigating the causal and long-run relationship between public health expenditure and GDP growth in several South and East Asian countries. These countries, which include China, Japan, Korea, Bangladesh, India, Pakistan, Sri -Lanka and Malaysia, were chosen from their similar geographical and economic circumstances. In order to contribute to political discussions to achieve the goals of sustainable development in the region, the study is aimed at increasing awareness of the role that health care costs play in economic growth in developing countries.

3. Methodology and Model

3.1 Theoretical Framework

Endogenous growth models provide an explanation for the mechanisms by investments in public health affects economic development. These models emphasize the value of human capital in fostering nation's economic growth and development. Neoclassical growth driven models describe nation's economic development in terms of savings and population expansion. Solow emphasized that, all else being equal, nations with greater savings rates will have higher per capita incomes. According to Solow's model, the population and rate of savings are the two most important elements influencing per capita income globally. In 1965, Buchanan devised a theoretical model that encourages governmental authorities to enhance the health-care spending regardless of demand. According to this notion, the identification of inefficiency in healthcare provision should focus only not on the absence of healthcare services, but also on the indicators of inadequate infrastructure, congestion, and unequitable distribution of personnel.

Multiple models have been formulated to elucidate the influence of human capital on the progress of economic development. Human capital, according to Romer and Barro, is crucial element in fostering economic growth (Romer, 1990b). Barro's theoretical foundations about human capital are still highly relevant in the literature today. The augmented Solow model also highlighted the substantial contribution of human capital in fostering economic development of nation. Human capital is not treated as a constant variable in these endogenous models. They are instead based on human capital's ability to impact both short- and long-term growth. The theoretical approach of this research highlights association between nation's economic growth and healthcare spending, recognizing the significance of healthcare spending as a vital element of human capital.

$$Economic\ Growth = f\ (Health\ Expenditures, Health\ Indicators) + (trade, Household\ Consumption)$$

In this research, the following econometric relationship will be assessed:

$$\begin{aligned} GDP\ Per\ Capita_{it} &= \alpha + \beta_i Health\ Expenditure\ Per\ Capita_{it} \\ &+ \gamma_i Household\ Consumption\ Per\ Capita_{it} + \delta_i Life\ Expectancy_{it} \\ &+ \omega_i Labour\ Force_{it} + \theta_i Trade_{it} + \varepsilon_{it} \end{aligned}$$

Where i = individual country

t = time period from 2000 to 2022

$\beta_i, \gamma_i, \delta_i, \omega_i, \theta_i$ represent the coefficients for our various independent variables while ε_{it} represents the error term in the equation.

Indicators such as healthcare expenditure, life expectancy, and population participating in economic activities are used to quantify health as a type of human capital. These measures provide insights into the role of health in shaping human capital. In addition, the present study underscores the significance of trade in the development of nation economy. Scholars have hypothesized that a solid foundation of human capital can contribute to enhanced labor productivity, thereby stimulating output growth. Furthermore, in a favorable business environment, this can lead to rise in the value contributed to the goods and services being manufactured. Expenditures on household consumption is given equal consideration due to its significant role in developing countries, where a substantial portion of family income is allocated towards consumption expenditures. This indicates the extent of domestic demand, which has a multiplier impact on the value added by industries and thereby contributes to economic development. The aim of this study is to uncover causal evidence between health expenditure and economic growth, and to establish the presence of co-integration, indicating long-term correlations between the variables under examination. To validate the findings and address the limitations associated with a single approach, various methods were employed, including the panel co-integration test, granger causality test, panel ordinary least squares (OLS), panel dynamic ordinary least squares (DOLS), and panel fully modified ordinary least squares (FMOLS) models. Unit root tests were used to ascertain the stationarity of a series. If the probability distribution of a series remains constant over time, it is considered to be stationary. The present study utilized Augmented Dickey Fuller (ADF) test, along with the other tests like Pesaran and Shin (IPS) and Fisher.

The Johansen's approach is commonly employed to determine the long-term association among healthcare spending and economic growth. Nevertheless, with a limited sample size, the effectiveness of the Johansen test could be significantly affected. Therefore, to address this issue, it is crucial to incorporate both time series and cross-sectional data. As a result, panel co-integration tests were utilized in this study to address this concern. Kao (1999), developed the test of Residual Cointegration to investigate the presence of cointegration in a multivariate context. These proposed statistical tests, examined the null hypothesis of no co-integration against the alternative hypothesis of co-integration. Regrettably, the pooling time series data has led to a significant loss of heterogeneity among individual time series. Hence, it is crucial to retain maximum heterogeneity when pooling time series data. The methodology used for testing co-integration among the key independent variables should allow for maximum variation within the panel of different countries. Common slope coefficients are generated if homogeneous panel co-integration theory is used to analyze the pooled data. According to Pesaran and Smith, if a common estimate is chosen, considering the observed differences among the selected countries, it implies a lack of co-integration between health expenditures and economic growth (Pesaran & Smith, 1995).

The present study employed the Granger causality test to confirm the direction of causation between the variables under study, with specific focus on the relationship between healthcare expenditure and economic growth. The Granger causality test is highly influenced by the number of lags employed, and it can yield four possible outcomes: a) no causality, b) unidirectional causality from variable a to b, c) unidirectional causality from variable b to a, d) mutual causality. Multiple approaches can be employed to estimate co-integration in a panel framework, such as Ordinary Least Squares (OLS), Dynamic OLS (DOLS), Fully Modified OLS (FMOLS), and Pooled Mean Group (PMG) methods. In co-integrated panel regression analysis, approaches such as the DOLS or FMOLS estimator produced more suitable results. The FMOLS estimator is commonly utilized in traditional time series models as it is assumed to address issues of endogeneity and serial correlation. Nevertheless, a study conducted by Kao & Chiang (2000), revealed that both the FMOLS and OLS estimators are prone to small sample bias. In contrast, the DOLS estimator demonstrated superior performance in their analysis. In this present study, we used three estimators with error correction to examine the association between health expenditures and economic growth: Panel OLS, DOLS, and FMOLS.

3.2 Data Source

Time series data from the World Development Indicators, spanning the years 2000 to 2022, were retrieved in order to meet the paper's study objectives.

Given the significant prevalence of out-of-pocket and catastrophic health expenditures in developing nations, the database employed in this study is regarded as the most dependable data source. This choice was influenced by the research conducted by Mandiefe and Chupezi, which focused on the examination of GDP per capita which is used as an indicator of economic growth (Mandiefe & Chupezi, 2015). The variables related to healthcare expenditure examined in this present study include logged health expenditure per capita and life expectancy. Furthermore, this analysis considers additional control variables such as logged household consumption per capita, logged labor force, and trade. The World Development Indicators database provides the data for all of these variables, and the analysis was conducted using EViews version 11 software. Four East Asian and four South Asian nations make up the sample for this study, making it quite small sample, therefore generalizations may lead to faulty inferences. Table 1 displays the two categories of countries included in our sample.

Table 1: Two groups of countries used in the study

East Asian Countries	South Asian Countries
Japan	Pakistan
Korea, Rep.	Bangladesh
China	India
Malaysia	Sri Lanka

4. Results

4.1 Trends in Current Health Expenditures

Current health expenditure trend shows that EACs have positive trend in increasing healthcare expenditures over the years, with an average of 7.0% of GDP allocated to healthcare in 2019. In contrast, SACs, particularly India, shows a decreasing trend in health expenditures, with only 3.2% of GDP allocated to healthcare in 2019. The growth rate of health expenditures is significantly higher in EACs compared to SACs, with EACs investing more than double the amount in their healthcare sector. These findings underscore the divergent approaches and priorities in healthcare spending between the two regions. The data reveals that EACs are more dedicated to increasing healthcare investments, while SACs, especially India, are experiencing declining health expenditures. The significant gap in healthcare spending between two regions highlights disparities in healthcare access and resources and emphasizes the need for focused efforts to address healthcare challenges.

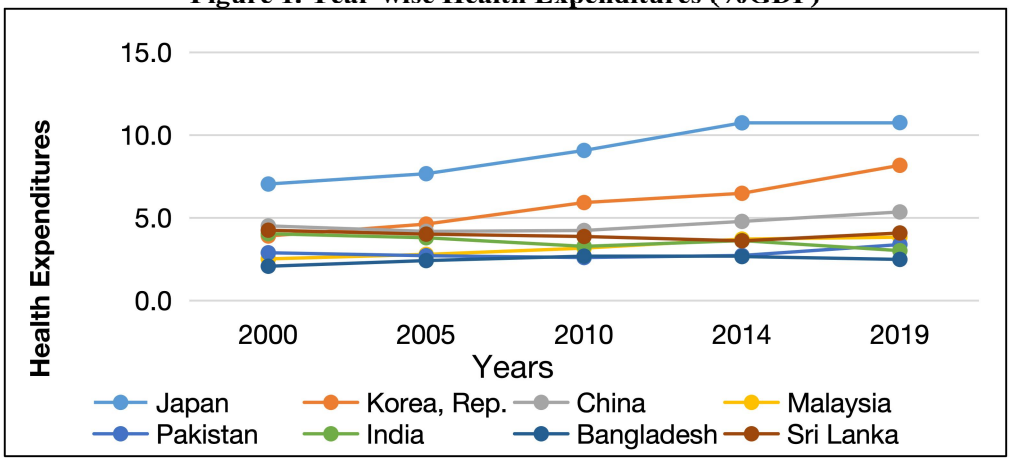
South Asia's low health expenditures (as a proportion of total government spending) can be ascribed to the fact that these nations are still developing and suffer economic issues when compared to the EACs covered in this study. It is possible that extreme poverty in South Asia is to blame for the region's low public health spending. This raises severe concerns about the projected health effects for the region.

Table 2: Trend in Current health expenditure (% of GDP) over the years for selected regions form East and South Asia

Country Name	2000	2005	2010	2014	2019
EACs					
Japan	7.0	7.7	9.1	10.7	10.7
Korea, Rep.	3.9	4.6	5.9	6.5	8.2
China	4.5	4.2	4.2	4.8	5.4
Malaysia	2.5	2.8	3.2	3.7	3.8
Average	4.5	4.8	5.6	6.4	7.0
SACs					
Pakistan	2.9	2.7	2.6	2.7	3.4

India	4.0	3.8	3.3	3.6	3.0
Bangladesh	2.1	2.4	2.7	2.7	2.5
Sri Lanka	4.2	4.0	3.9	3.6	4.1
Average	3.3	3.2	3.1	3.2	3.2

Figure 1. Year-wise Health Expenditures (%GDP)



Correlation matrix demonstrates that the greatest association exists among all variables for GDP and Health Expenditures for both sets of nations. It demonstrates the importance of health spending in economic development (see Table 4). Furthermore, the cross-correlation shown valuable in identifying delays in health expenditures, which are a useful predictor of GDP in both groups of nations. It suggests that spending on health sectors in countries may help improve growth and development for many years, as seen in Table 5 by the long-term influence on GDP.

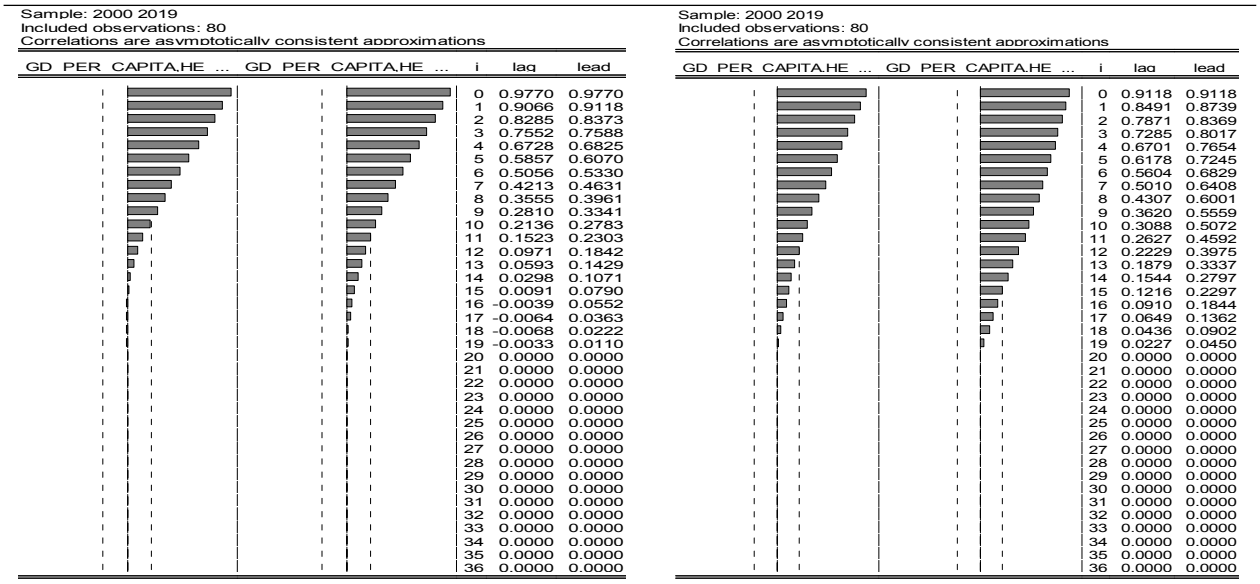
Table 4: Correlation Matrix for East and South Asian Countries

East Asian Countries						
	GDP	HE	HC	LE	LF	Trade
GDP	1					
HE	0.96	1				
HC	0.29	0.35	1			
LE	0.95	0.92	0.39	1		
LF	-0.50	-0.40	0.52	-0.37	1.0	
Trade	-0.05	-0.01	0.87	0.13	0.72	1
South Asian Countries						
	GDP	HE	HC	LE	LF	Trade
GDP	1					
HE	0.95	1				
HC	0.05	-0.03	1			
LE	0.83	0.82	-0.03	1		
LF	-0.16	-0.17	0.87	-0.24	1	

GDP=GDP per capita, HE=Health Expenditure, HC=Household Consumption, LE= Life Expectancy, LF=Labor Force

Table 5: Cross Correlation Matrix for East and South Asian countries

South Asian Countries	East Asian Countries



4.2 Lag Selection Criteria

In order to achieve accurate and meaningful results in panel cointegration, the careful selection of the optimal lag length is of utmost importance for time series analysis. There are various criteria for lag selection, and their outcomes are shown in Table 6. For East Asian countries (EACs), the lag selection criteria, namely FPE, LR, and AIC, consistently pointed towards the 2nd lag as the most appropriate choice. On the other hand, SC and HQ criteria suggested the 1st lag for these countries. Conversely, for South Asian countries (SACs), the majority of the tests, including FPE, AIC, SC, and HQ, indicated that the 1st lag is the preferable option. According to the previous studies, the impact of health expenditure on economic growth and development gradually reduces over a period of approximately four or five years (Rahman et al., 2018). Taking this into consideration, our study favors the adoption of the 1st lag for SACs and the 2nd lag for EACs. By doing so, study aims to better account for the developing relationship between health expenditure and economic growth in each region.

Table 6: VAR Lag Order Selection Criterion for East and South Asian Countries

EACs						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	540.5	NA	0.0	-15.7	-15.5	-15.6
1	1270.0	1308.8	0.0	-36.1	-34.7*	-35.6*
2	1318.5	78.4*	5.9e-24*	-36.5*	-33.9	-35.5
3	1352.9	49.5	0.0	-36.4	-32.7	-35.0
4	1376.3	29.7	0.0	-36.1	-31.2	-34.1
5	1407.5	33.9	0.0	-35.9	-29.9	-33.5
6	1454.8	43.1	0.0	-36.3	-29.0	-33.4
SACs						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	367.7	NA	0.0	-10.6	-10.4	-10.6

1	1026.0	1181.1	1.0e-20*	-28.9*	-27.6*	-28.4*
2	1041.3	24.7	0.0	-28.3	-25.8	-27.3
3	1071.0	42.8	0.0	-28.1	-24.4	-26.7
4	1106.5	44.9	0.0	-28.1	-23.2	-26.2
5	1154.6	52.3*	0.0	-28.5	-22.4	-26.1
6	1204.5	45.5	0.0	-28.9	-21.7	-26.0

*Indicates lag order selected by the Criterion

LR: Sequential Modified LR test statistic (each test at 5% level)

FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

Endogenous variables: GDP per capita, Health Expenditures, Household Consumption, Life Expectancy, Labor Force, and Trade

4.3 Stationarity Test

To understand the long-term relationship between economic growth and health expenditure, this study employed the Augmented Dickey-Fuller (ADF) test to examine the stationarity of the time series data. In Table 7, the analysis revealed that most variables in both East and South Asian countries shown non-stationary behavior at the level, including trends and intercepts. This non-stationarity indicates that the mean, variance, and autocorrelation of the time series data vary over time. However, after applying the first difference to the data, all series were transformed into a stationary state. This crucial finding strongly suggests the presence of a long-term association between economic growth and healthcare expenditures in both regions.

Table 7: Unit Root Test

	At Level (Trends & Intercept)		At First Difference (Trends & Intercept)		Decision
EACs	Stat	P Value	Stat	P Value	
GDP per capita	4.3	0.83	30.0	0.00	I(1)
Health expenditure per capita	1.7	0.99	26.1	0.00	I(1)
Household consumption expenditure per capita	3.2	0.92	27.6	0.00	I(1)
Labor force	12.7	0.12	16.8	0.03	I(1)
Life expectancy	7.5	0.48	44.2	0.00	I(1)
Trade	1.9	0.98	41.0	0.00	I(1)
SACs					
GDP per capita	4.0	0.86	36.4	0.00	I(1)
Health expenditure per capita	6.9	0.55	36.8	0.00	I(1)
Household consumption expenditure per capita	7.2	0.52	37.2	0.00	I(1)
Labor force	21.4	0.01	27.7	0.00	I(0)

Life expectancy	26.0	0.00	24.1	0.00	I(0)
Trade	2.1	0.98	33.7	0.00	I(1)

4.4 Panel Co-integration Results

This study conducted a panel co-integration test to further demonstrate the presence of a long-term association between economic growth and health spending after validating the stationarity of the time series data by the ADF test in both the East and South Asian countries. The panel cointegration test was performed using two regularly utilized methods, including the Kao residual test and the Johansen Fisher Panel cointegration test. The results in Tables 8(a) and (b) show that the selected variables are co-integrated. These test statistics presented evidence that the variables under study had a stable and long-term association throughout time. The co-integration of these variables implies that changes in health spending can have a long-term influence on economic growth in both East and South Asian nations. The study has strengthened understanding of the interconnectedness between economic growth and health expenditure by using panel co-integration tests, providing valuable insights into their enduring relationship and potential mutual influence in the context of the both regions studied.

Table 8(a): Kao Residual Cointegration Test

Null Hypothesis: No cointegration	EACs		SACs	
	t-Statistic	Prob.	t-Statistic	Prob.
ADF	-2.67	0.00	-2.81	0.00

Table 8(b): Johansen Fisher Panel Cointegration Test

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

	EACs				SACs			
Hypothesized No. of CE(s)	Fisher Stat.* (From trace test)	Prob.	Fisher Stat.* (From max-eigen test)	Prob.	Fisher Stat.* (From trace test)	Prob.	Fisher Stat.* (From max-eigen test)	Prob.
None	5.5	0.70	5.5	0.70	374.3	0.00	668.5	0.00
At most 1	4.2	0.84	22.6	0.00	153.7	0.00	75.2	0.00
At most 2	1.4	0.99	56.7	0.00	91.8	0.00	46.3	0.00
At most 3	0.0	1.00	73.7	0.00	51.9	0.00	29.1	0.00
At most 4	73.7	0.00	73.7	0.00	29.1	0.00	23.2	0.00
At most 5	32.7	0.00	32.7	0.00	13.8	0.09	13.8	0.09

* Probabilities are computed using asymptotic Chi-square distribution.

4.5 Results from Granger Causality Test

In this study, to investigate the presence of causality between the study variables and determine whether it is unidirectional or bidirectional, pairwise Granger causality tests were employed on unrestricted vector autoregression models (VARs). The purpose was to understand the influence of health expenditure on GDP per capita and vice versa. The results of these tests are presented in Table 9 for both EACs and SACs. In SACs, the analysis revealed a significant unidirectional relationship, indicating that changes in health expenditure can influence GDP per capita. This finding suggests that increasing healthcare spending in SACs could play a crucial role in enhancing the quality of human capital, which, in turn, may contribute to promoting economic growth. However, in the case of EACs, the causality relationship between health expenditure and GDP per capita was

found to be not significant. This means that the impact of changes in health spending on economic growth in EACs is not as clear-cut as in SACs. These results emphasize the potential importance of investing in healthcare in SACs to foster economic development. However, it is essential to recognize that the relationship between increased health spending and economic growth is multifaceted and reliant on other factors, such as the efficiency of institutions and the absence of corruption in facilitating economic progress.

Table 9: Result of Pairwise Granger Causality Tests

	EACs			SACs		
Null Hypothesis	Obs	F-Stat	Prob.	Obs	F-Stat	Prob.
Health Expenditures does not Granger Cause GDP per capita	84	0.6	0.54	88	3.2	0.08
GDP per capita does not Granger Cause Health Expenditures		1.3	0.28		1.7	0.20
Household Consumption does not Granger Cause GDP per capita	84	1.2	0.30	88	0.1	0.80
GDP per capita does not Granger Cause Household Consumption		7.9	0.00		0.2	0.67
Life Expectancy does not Granger Cause GDP per capita	84	0.4	0.64	88	0.2	0.68
GDP per capita does not Granger Cause Life Expectancy		1.1	0.35		2.1	0.15
Labor Force does not Granger Cause GDP per capita	84	2.6	0.08	88	0.0	0.95
GDP per capita does not Granger Cause Labor Force		12.6	0.00		7.2	0.01
Trade does not Granger Cause GDP per capita	84	1.1	0.34	88	0.1	0.77
GDP per capita does not Granger Cause Trade		5.0	0.01		6.2	0.01
Household Consumption does not Granger Cause Health Expenditures	84	0.6	0.56	88	2.6	0.11
Health Expenditures does not Granger Cause Household Consumption		13.8	0.00		0.2	0.63
Life Expectancy does not Granger Cause Health Expenditures	84	1.9	0.15	88	0.6	0.43
Health Expenditures does not Granger Cause Life Expectancy		2.0	0.14		3.3	0.07
Labor Force does not Granger Cause Health Expenditures	84	0.2	0.81	88	1.2	0.29
Health Expenditures does not Granger Cause Labor Force		12.1	0.00		15.2	0.00
Trade does not Granger Cause Health Expenditures	84	0.1	0.88	88	0.8	0.38
Health Expenditures does not Granger Cause Trade		3.9	0.02		5.2	0.03
Life Expectancy does not Granger Cause Household Consumption	84	5.2	0.01	88	0.1	0.81
Household Consumption does not Granger Cause Life Expectancy		0.5	0.60		0.2	0.68
Labor Force does not Granger Cause Household Consumption	84	15.4	0.00	88	3.1	0.08
Household Consumption does not Granger Cause Labor Force		12.3	0.00		1.3	0.26
Trade does not Granger Cause Household Consumption	84	0.4	0.67	88	1.4	0.24
Household Consumption does not Granger Cause Trade		1.0	0.36		1.8	0.18
Labor Force does not Granger Cause Life Expectancy	84	0.8	0.48	88	0.3	0.57
Life Expectancy does not Granger Cause Labor Force		11.9	0.00		15.3	0.00
Trade does not Granger Cause Life Expectancy	84	1.6	0.20	88	0.0	0.99
Life Expectancy does not Granger Cause Trade		2.8	0.07		5.6	0.02
Trade does not Granger Cause Labor Force	84	3.3	0.04	88	13.6	0.00
Labor Force does not Granger Cause Trade		14.5	0.00		9.5	0.00

Source: Author's own calculations

The study's findings for EACs indicate various causal relationships between different economic indicators. It was observed that there is a unidirectional causality from GDP to household consumption (HC) and from GDP to trade. Additionally, there is bidirectional causality between Labor Force (LF) and GDP, HC and Health Expenditure (HE), LF and HC, as well as between trade and LF. Moreover, unidirectional causality was revealed from GDP to HC, GDP to trade, HE to LF, HE to trade, Life Expectancy (LE) to HC, LE to LF, and LE to trade. On the other hand, the findings for SACs show a different pattern of causal relationships. The study revealed bidirectional causality only between trade and LF. Unidirectional causality was observed from HE to GDP, GDP to LF, GDP to trade, HE to LE, HE to LF, HE to trade, LF to HC, LE to LF, and LE to trade over the estimated period of the study.

These findings provide important insights into the interdependence and impacts of major economic indicators in both areas. GDP and household spending, as well as GDP and trade, appear to be unidirectionally driven in EACs, but other variables display bidirectional causation, implying a more complicated interaction. Relationships appear to be more unidirectional in SACs, with trade and LF exerting bidirectional effect. Understanding these causal processes can help policymakers plan successful economic growth, development, and investment strategies in each location.

4.6 Panel Regression Results

Various approaches may be used to determine the long-run connection in the context of the co-integration framework. This study employs three-panel regression models including, panel Ordinary Least Squares (OLS), Fully Modified OLS (FMOLS), and Dynamic OLS (DOLS). Table 10 summarizes the findings of these panel regressions, which show that all three models have high explanatory power, with R-squared and modified R-squared values above 95%. This means that the independent factors explain more than 95% of the variation in the dependent variable. As a result, the study highlights the critical significance of healthcare spending in nurturing human capital and promoting economic growth over the timeframe.

DOLS is the most and best suitable model to examine co-integration in panel regression, and this work focuses on the DOLS estimate in both regions. The association between health spending and economic growth is negligible in the EACs, with a 0.01 coefficient, whereas other independent variables such as household consumption, labor force, and trade are significant at the 5%, 5%, and 10% levels, with coefficients of 1.02, -1.38, and -0.16, respectively. This suggests that a one-unit shift in household consumption in EACs will result in a 1.02% increase in economic growth. Similarly, one unit change in labor force or trade leads to 1.38% and 0.16% decreases in economic growth, respectively. Life expectancy is also positively related with economic growth, but insignificantly at the 5% and 10% among EACs.

Health spending for SACs is substantially co-integrated with economic growth and large at 5%. It demonstrates that one-unit shift in health expenditure leads to 1.31% economic growth. In the DOLS model, the other independent variables are not significantly co-integrated, while they are highly associated with economic growth in the panel OLS model. Similarly, in the panel OLS form, household consumption, labor force, and trade are substantially connected with economic growth in EACs. The FMOLs also demonstrated that household consumption, labor force participation, and trade are all co-integrated and significant at 5%. The magnitude of labor force is inversely related to economic growth in EACs and SACs. However, the trade produces mixed outcomes among the three regressions in both regions. Trade is small for SACs, but it is strongly detrimental for EACs in the long term, whereas FMOLS and panel OLS show a favorable relationship with economic growth.

Table 10: Results from Panel Regression

GDP per Capita	EACs					
	Panel OLS		FMOLS		DOLS	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Health Expenditure	0.02	0.85	0.04	0.73	0.01	0.96
Household Consumption	0.76	0.00	0.80	0.00	1.02	0.00
Life Expectancy	1.50	0.21	1.25	0.44	6.18	0.11

Labor Force	-0.82	0.00	-0.85	0.00	-1.38	0.00
Trade	0.22	0.00	0.15	0.00	-0.16	0.06
C	-4.04	0.08				
R-squared	0.997		0.998		0.99	
Adjusted R-squared	0.997		0.997		0.99	
Long-run variance			0.000862		6.76E-06	

GDP per Capita (Dependent Variable)	SACs					
	Panel OLS		FMOLS		DOLS	
Variable	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
Health Expenditure	0.45	0.00	0.87	0.00	1.31	0.00
Household Consumption	0.43	0.00	0.05	0.58	-0.17	0.22
Life Expectancy	2.70	0.00	2.74	0.02	2.86	0.38
Labor Force	-0.40	0.00	-0.30	0.32	1.42	0.10
Trade	0.01	0.92	0.08	0.32	-0.28	0.23
C	-4.31	0.00				
R-squared	0.96		0.98		0.99	
Adjusted R-squared	0.96		0.97		0.98	
Long-run variance			0.003254		0.000129	

5. Discussion

A steady overall trend may be seen when comparing economic growth and health spending across many models, although substantial variances can be seen in the impact of unrelated factors like household consumption, the labor force, and trade. Due to its capacity to account for small sample and endogeneity biases by including the leads and lags of first-differenced regressors, the DOLS and FMOLS approaches are preferred over classic OLS. Due to its organized methodology and improved interpretability, the parametric DOLS technique is favored over the non-parametric FMOLS. These observations are important for macroeconomic theory because they help formulate successful policies by illuminating the factors that contribute to economic growth. The interaction of the factors highlights the significance of precisely identifying links, assisting policymakers in promoting long-term economic growth.

The previous studies suggest that there is well-reputed evidence indicating a strong correlation between health expenditures and economic growth in both developing and developed nations. Influence of healthcare spending on human capital and economic growth reveal that healthcare spending significantly influences nurturing human capital and promoting economic growth over time, especially for SACs. While it does not have a significant influence on economic growth for EACs. Instead, other factors like household consumption, labor force, and trade play a more crucial role in influencing economic growth for EACs. The findings of this study are consistent with the results of previous research conducted by, Piabuo & Tieguhong (2017) and Mandiefe & Chupezi (2015), especially concerning developing and poor nations.

The previous studies also found that health spending has a positive and substantial influence on economic growth over a specific time period. The health-led growth hypothesis, which views health as a form of capital. According to this hypothesis, investing in health can lead to increased productivity, higher income per capita, and economic growth (Piabuo & Tieguhong, 2017). Healthier people with longer life expectancies are more likely to acquire human capital skills, which can positively impact economic growth (Hansen, 2013). The

EACs are described as dynamic regions with significant investment, trade, and a different political system compared to SACs. The EACs region is seen as having a well-performing economy with relatively good health outcomes despite modest expenditures on health. Total health expenditures as a share of GDP have increased moderately in this region over the past decade, primarily driven by sustained increases in public sector spending in countries like China, Japan, and Malaysia.

SACs are described as facing scarcity in terms of health expenditure, health system infrastructure and economic growth. This suggests that these countries may lack adequate resources and infrastructure to support robust health systems and promote sustained economic growth. Therefore, there is a positive relationship between health expenditure and economic growth in SACs. Specifically, it states that a small change in health expenditure leads to higher increase in economic growth in over time. This implies that investing in healthcare can contribute to economic development and prosperity in these countries. The previous studies conducted in developing countries, including Dreger and Reimers (2005), Elmi and Sadeghi (2012), Baldacci et al (2004), and Bloom et al (2004) found co-integration between health expenditures and proxies of health with economic growth. Co-integration suggests that these factors are interrelated and influence each other over time.

The most significant finding of this research revolves that household consumption or fiscal space is extremely important for EACs but not for SACs. The ramifications of this discrepancy provide insights into these areas' economic processes. One explanation of this difference is rooted in SACs' reliance on import and consumption-driven economic models. Over the last decade, these countries have faced slowing economic development as a result of internal economic structural flaws and external obstacles such as rising fuel prices, pressure on foreign reserves, and continued external debt payments. These factors have all contributed to the slow rate of economic progress in SACs. EAC economies, on the other hand, rely heavily on exports and indigenous industry. This distinguishing feature emphasizes the critical significance of home demand in generating domestic supply and driving economic growth inside these economies.

A notable relationship develops between the labor force and EAC economic growth. This link may be understood in the perspective of a technologically sophisticated economy with reduced reliance on market-driven labor forces and demographic changes. These cultures are seeing slower population growth, higher life expectancy, and an increase in the old population. As a result, a strain is expected to fall on the working-age demographic, which will soon be responsible for sustaining roughly twice as many old people as in the current scenario (Bloom et al., 2010). Technological developments, notably automation, have been highlighted as a significant contributor to this drop. While automation improves the economy as a whole, it has also had an influence on the labor supply of various worker groups, accounting for a portion of the decline in prime-age male participation (Binder & Bound, 2019).

6. Conclusion and Policy Implications

This study carefully examined the relationship between health spending, economic growth, and several influencing factors in different locations. The results shed insight on the connections between labour force dynamics, household consumption, trade, and health spending, emphasizing how these factors differ in their implications on economic development for SACs and EACs. The finding confirms earlier research that found a strong correlation between economic development and health spending, particularly in developing nations like SACs. The significance of health as a form of capital that increases economic growth and productivity is highlighted by evidence supporting the health-led growth hypothesis. The study identifies distinct trends in SACs and EACs, highlighting the importance of health spending for SACs and the critical relevance of factors like household consumption and labour force dynamics for EACs.

Furthermore, by comparing the EACs and SACs, this work provides analytical insight into the distinctive patterns that emerge. It highlights, in particular, how important factors like household spending and the intricate interplay of labour force dynamics have been in shaping the economies of EACs. The report also emphasizes how important health spending is in influencing how SACs' economies develop. This duality, which has implications beyond merely financial ones, emphasizes the critical role that various factors play in determining the economic outcomes of different locations.

The study's conclusions essentially provide a thorough framework for understanding the mutually reinforcing relationship between health spending and economic growth while also outlining the various approaches taken by different regions to capitalize on these synergies for the benefit of their overall prosperity. The results of the study also reveal that impact of health expenditure on economic growth and development is higher in SACs as compare to EACs. This indicates that the EACs have achieved optimum level in universal health coverage, while the SACs are still lagging behind in achieving optimum level in UHC. Therefore, SACs should invest more on UHC for better health and economic growth.

These findings lead to several recommendations for policymakers and researchers;

- Policies in SACs should priorities raising health expenditures in order to boost the economy and improve human capital.
- To solve infrastructural and resource challenges, SACs could think about boosting health expenditure, which may lead to better health outcomes and long-term economic growth. This can include shifting funds from other industries or looking for outside help.
- Policymakers in EACs should give top priority to initiatives that support household spending and handle labor force issues, such fostering skill development while taking the ageing factor into account. To maintain economic development despite a shifting labor force structure, EACs should engage in technology adaptation and training programs as a proactive response to demographic changes.
- The complex interrelationships between health spending, economic growth, and influencing variables should be further investigated, particularly in light of shifting demographic and technology trends.

Following are policy implications of study:

- The South Asian countries should invest on health sector to achieve the optimum level, nurturing human capital and resultantly enhancing economic growth and development over the timeframe.
- The SACs pooled their funds to 5% of GDP as recommended by WHO. By enhancing public financing and cultivating public health services for all may reduce out-of-pocket payments.
- Solely through public funding can equitable participation in the country's budget be guaranteed, ideally accomplished via progressive taxation, while healthcare is accessible to everyone based on their medical requirements.
- Making investments in health can boost labor productivity, raise incomes, and ultimately improve the overall welfare of the population.

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