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The Impact of Healthcare Expenditure and Healthcare Sector Growth on Co2 Emission using Dynamic Panel Data System GMM Estimation Model during COVID 19 Crisis

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Abstract. The striking global transmission of COVID-19 has empowered numerous governments to intervene in order to keep the contamination at bay. Medical tourism could be a developing marvel with arrangement ideas for wellbeing frameworks, particularly in goal countries. Medical tourism, a rapidly growing industry, has been identified as a potential source of financial diversification by a number of countries. This study proves that government expenditure is significantly affected by C02 emission and sectors, all in contributions to pollution. Despite the fact that Indonesia is one of the most popular destinations for therapeutic tourism, research into its competitiveness has been limited and limited in scope. This case study employs a quantitative approach to identify and analyse the variables that position Indonesia as a viable medical tourism destination. Based on an all-inclusive approach, this investigation discovered that coordinating various procedures for restorative tourism advancement with sound government arrangements and proactive administration practises has resulted in significant positive results toward shared victory of Indonesia's tourism and healthcare segments.

Keywords: Covid-19, Fiscal Policy, Healthcare expenditure, healthcare sector growth, CO2 emission, dynamic panel model, Malaysia.

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INTRODUCTION

Affordability of health care, faster access to healthcare services, and increasingly personalized care, accessibility of treatment, or significantly more prominent protection and confidentiality in the case of cosmetic surgeries are all advantages of medical tourism. Patients travelling from Western countries to developing countries, on the other hand, may be deterred by legitimate concerns such as travel and surgical risks, continuity of care, particularly in cases of medical complications, dealing with foreign hospitals that are not in compliance with the Health Insurance Portability and Accountability Act, and dealing with foreign legal systems in cases of medical negligence and malpractice. Indonesia is currently best known for its spa treatments and vacation destinations. This is about to change, as a Memorandum of Understanding (MoU) was signed on September 26 – 27, 2017 at the Tourism National Coordination Meeting III between the tourism ministry and the health ministry for the development of international medical tourism. The Indonesian Investment Coordinating Board (BKPM) appears to be planning to relax medical tourism laws by removing it from the Negative Investment List. Several studies have revealed that Indonesia is one of the most appealing medical tourism destinations in Asia. Medical tourism destinations are attributed to their key upper hands remembering greatness for medicinal services quality, dependability, safe medical practices, and the accessibility of numerous universally authorized of internationally accredited hospitals. To give you an idea of what this could mean for the economy, Thailand is well-known for medical tourism, attracting international visitors to undergo surgeries in world-class facilities, which resulted in 3.2 billion dollars in foreign exchange in 2011. Furthermore, the Indonesian government has played an important role in attracting medical tourists and investors by advancing and supporting critical coordinated effort among various partners and agreeing to agreements with Middle Eastern nations for the provision of medical services. In 2006, it was estimated that 350,000 Indonesians received medical treatment in other countries, with a total cost of $500 million. Similarly, the government of Indonesia, like the governments of India, Malaysia, Thailand, and the Philippines, views medical tourism as an important resource for economic and social development, with medical tourism revenues having a significant impact on the economies of these Asian countries. According to the most recent estimates, 600,000 Indonesians travelled abroad for medical treatment, spending 1.4 billion dollars. Both services will form a taskforce with clinic, spa, and other wellness affiliation agents to help push private divisions build driving upscale healing centers and traditional wellness offices. Developing and expanding these offices will result in more significant investment in the Indonesian private sector, as well as the repatriation of Indonesians' overseas health-care investments. Patients will continue to seek treatment in Indonesia if they can access world-class and experienced specialists and professionals in complex cases. Some of the disadvantages of relocating to places like Bali in the past included feeling isolated from family and friends, as well as the healthcare system. However, changes to the framework and offices may have an impact on property values if Bali becomes more appealing for speculation. The incorporation of the tourism and health care industries provides the legislature with a channel for broadening its economy, attracting distant foreign exchange speculation, advancing job creation, and fortifying the healthcare insurance industry. The benefits of medical tourism to destination economies' health care systems, in particular, have been well documented. However, some argue that medical tourism has harmed the people of a target country in three ways: For starters, providing health care to medical tourists reduces the availability of health care facilities and doctors to the nation's poor. Second, because it limits a government's ability to implement its own health-care policy, potentially increasing the disparity in health-care access between private and public systems. Western countries are also aware of the benefits and drawbacks of medical tourism. Countries in this region are capitalizing on their popularity as tourist destinations by combining high-quality medical care at reasonable prices with tourist packages. By 2010, three decades later, the Malaysian diaspora in Indonesia had reached 385,979.19, and Indonesia had benefited from Malaysian talent employed across a wide range of sectors in the country. Malaysia received nearly 12.4 million tourist arrivals from Indonesia in 2017, making the city-state by far the most important source of visitor arrivals. Demographic change, particularly population ageing and older people's increased need for medical services, combined with epidemiological change, i.e. longer wait times or rising costs of health-care services at home, combined with the availability of cheaper alternatives in developing countries, has led to an influx of new healthcare consumers, or medical tourists, seeking treatment abroad. In the years 2006-2007, an estimated 2 million medical tourists visited Indonesia, Malaysia, and Thailand alone, earning these countries more than US$ 3 billion in the medical tourism sector. Southeast Asia's health sector is rapidly expanding, owing to rapid growth in the private sector and, in particular, medical tourism, which is emerging as a lucrative business opportunity.

CO2 Emission & Healthcare Sector

According to Chemiwchan (2012), in a study that contradicts the one mentioned above, key industrial pollutants in the developed world have reduced their emission levels over the last 30 years, while emission levels in developing countries have increased. Zhang et al. (2013) provided support by discovering that a large proportion of water waste pollution is caused by export embodied industrial emissions. Recycling waste water is estimated to be less expensive than producing fresh water via reverse osmosis of sea water. It is assumed that economic growth contributes to industrial development, and that industrial development plays an important role in regulating CO2 emissions. According to the study, there is a significant variation in industrial pollutant emission intensities depending on the time frame and countries studied. According to the findings of the variance decomposition analysis, economic growth contributes significantly to changes in future carbon emissions. The findings of the empirical studies demonstrated that we had accomplished the goal of this study, with the majority of the findings indicating that economic growth had a positive effect on pollution. Recycling of reject water for grey water uses, such as irrigating lawns or flushing toilets, has been advocated for and tried in some settings. Colombia, a developing country, as well as Germany and Sweden, both developed countries, demonstrated that an increase in economic indicators does not necessarily imply an increase in CO2 emissions. This study demonstrates that C02 emissions and sectors, all of which contribute to pollution, have a significant impact on government spending. Much of that water is discarded during the reverse osmosis process that produces dialysis fluid, and it is referred to as reject water. The findings revealed that the causality direction runs from the healthcare sector and CO2 emissions to government spending. From 2006 to 2019, CO2 emissions increased by 27 percent, amounting to an increase of 28,782.283kt, with only a slight decrease in 2002. However, CO2 emissions are not the only source of pollution in the healthcare sector; healthcare sector output, on the other hand, would come from healthcare sectors. Hospitals use energy to power medical equipment, lighting, heating, hot water, and air conditioning. It is virtually bacteria-free, with pH, turbidity, and electrolyte properties similar to municipal and industrial water supplies. The first four years appeared to show a dramatic drop in the amount of CO2 emitted, with the amount dropping from 125,374.730kt to as low as I 07,934.478kt, a 13.9 percent drop. The total amount of carbon dioxide (CO2) emissions emitted by Malaysian industries from 2006 to 2009. They also generate waste from waste water as well as single-use disposable supplies. According to the findings of this study, the effects of and pollution in Malaysia vary depending on the variables, with each having its own impact on the others. CO2 emissions appear to be highly volatile throughout the observation period. When relating it to the researcher's topic of interest, this study employs three distinct variables.

LITERATURE REVIEW

The majority of previous research on the relationship between economic sector growth and government spending has found that government spending can positively influence sector growth in a variety of ways. The findings revealed that the effect of economic growth on CO2 is negative before it reaches the threshold value of economic growth, and that the disproportionality only existed in these countries from 2000 to 2007 as an inverse Kuznets U-shaped curve. Despite the fact that a carbon tax is insufficient to dissociate emissions from economic growth, it is regarded as a critical policy tool for reducing emissions in relation to the real oil price effect. (2011), the resources allocated to healthcare sectors and education are increasing healthcare sector growth, and the government should implement policies to encourage private investment more in health and education. In Senegal and Morocco, economic growth plays a large role in contributing to changes in future carbon dioxide emissions, whereas in Ghana, it is technical efficiency. Furthermore, many of the literatures on this topic are conflicting, and the relationship between government spending and economic growth is still unclear. Baffes and Shah (2013) first attempted to establish a link between various types of government spending and military sector growth.

The study they conducted suggested that economic growth affects emission intensities rather than absolute emissions, as previous studies have claimed. According to Knack and Keefer (1995) and Keefer and Knack (1997), government spending on contract enforcement and a legal system for consumer protection is important. Government spending on healthcare can boost growth by providing public goods that are a major component of aggregate demand. Meanwhile, Piaggio and Padilla (2012) used co-integration analysis to study the relationship between CO2 emissions and economic activity in 31 countries from 1950 to 2006: 28 OECD and the remaining China, Brazil, and India. However, once the countries have reached the threshold value, it proves to be contradictory: the effect of economic growth on CO2 is positive. Fiscal policy, according to Keynesian and Endogenous growth theories, plays a critical role in accelerating economic development. According to the findings of the study, high sector growth in the global economy can be achieved by investing more in human resource development and less in military and other non-development activities. Productivity growth reduces only energy intensity, whereas real oil price decreases both energy and carbon intensities. Ireland and France demonstrated that economic growth has a positive effect on CO2 emissions using the graphical hypothesis of the Kuznets Curve.

The findings confirm the importance of taking into account country differences in the relationship between air pollution and economic activity in order to avoid void estimates and conclusions. Regarding the variables, it is assumed that economic growth influences CO2 emissions. As a result, studies were conducted to determine the relationship between economic growth and CO2 emissions. al. (2013) used the vector error correction model as their empirical specification to analyse the potential misspecification of energy consumption as a controlled variable as well as the relationship of the carbon Kuznets curve. The goal was to investigate the short-run causal relationship as well as the long-term equilibrium relationships between CO2 emissions and technical efficiency. The findings indicated the existence of multiple long-term relationships for Ghana and Senegal, but only one long-term equilibrium relationship for Morocco. Because of a lack of medical supplies, the cost of healthcare benefits increased during Coivid 19. In this paper, it is demonstrated that climate policy affects capital accumulation over the long term rather than the short term. Each country's long-run relationships were estimated, and functional equality, specific parameters, and turning points 'when appropriate' were rejected. From 1973 to 2007, their paper examines the determinants of energy and carbon intensity, as well as scale effects, for ten economies: eight developed economies and two emerging economies. et al. (2012) conducted a study in Ghana, Senegal, and Morocco using three related methods: the Bounds Co-integration approach, the Toda and Yamamoto granger causality test, and variance decomposition analysis. As a result, a large amount of government spending was obtained in order to implement a stimulus package focused on the healthcare industry. Lane (2011) conducted a paper to demonstrate how close the link between equivalent emissions and economic development is over time and across countries, using emission data from the Energy Information Administration and calculating coefficients on GDP data both longitudinally and cross-sectionally. Most studies used the unit root test, co-integration test, and granger causality test to investigate the relationship between the three variables in various countries, including Asian countries. It is claimed that focusing on conversion factors would be a good way of stabilising CO2 emissions because the paper demonstrated clear and Juggernaut-type connections between energy economics and output CO2 emissions. These extensive literature reviews on this topic of interest provide evidence on variations in the causality relationship that exists between government spending, CO2 emissions, and manufacturing output. The links between energy, output, and pollution: the conversion factor is estimated between economies over time and is currently claimed to be too high, implying global climate change. The technical result was that it is extremely difficult to coordinate the global environment, due to a combination of poor governance when it comes to making policies and implementing them, not to mention the massive nature of the PD game. The Unit Root Test Johansen co-integration methodology was used in this study. The majority of previous literatures had studied the tJ1e relationship of these variables separately. African countries and OECD countries Previous studies frequently used the Vector Error Correction Model (VECM) and Granger Causality methods.

METHODOLOGY

Model Specification

The approach of production function is used in this study to explain the interrelationships between healthcare expenditure and growth, inflation rate, interest rate, and unemployment rate. Cobb-Douglas already extended this approach when he developed the production framework to better understand and investigate the relationship between those independent variables: healthcare growth, healthcare expenditure, inflation rate, interest rate, and unemployment rate. Specifically, the following extended by Cobb-Douglas is the production function:

Model 1

$$Y=EK^{\alpha}E^{\lambda}\ L^{\beta}\ e^{u}$$

Model 2

$$Y=HK^{\alpha}E^{\lambda}\ L^{\beta}\ e^{u}$$

The function is explained in terms of Y, which stands for energy consumption, and E, K, and L, which stand for real income, capital stock, and labour force, respectively. While the terms E and H refer to healthcare expenditure and growth, respectively, e is the incorrect term. The production elasticities are represented by, which stands for real income, capital stock, and labour force. After Cobb-Doughlas technology was limited to (+ + =1), constant returns to scale could be obtained. In this study, the model is resurrected by incorporating the Y (CO2 emissions) into healthcare expenditure and growth, which are both endogenously affected by all independent variables (inflation rate, interest rate and unemployment rate).

Model 1 Healthcare Expenditure & CO2 Emission

$$CO2 = f (HE, INF, INT, UNP)$$

Model 2 Healthcare Sector & CO2 Emission

$$CO2 = f (HG, INF, INT, UNP)$$

The logarithmic value of healthcare expenditure and growth is the dependent variable in this study. This study examines the growth and expenditure on healthcare in five Asian countries: Indonesia, the Philippines, Thailand, China, and Malaysia. While 'HE' stands for healthcare spending, 'INF' stands for inflation, 'INT' stands for interest rate, and 'UNP' stands for unemployment rate. The data for all variables are gathered in a single developing country in the Asia region. All of the relationships can be specified as follows based on the theoretical and empirical reviews that have been presented:

Model 1 Healthcare Expenditure & CO2 Emission

$$CO2\ Emission_t = \alpha - \beta^1 HE_t + \beta^2 INF_t - \beta^3 INT_t - \beta^4 UNP_t + C_t$$

Model 2 Healthcare Sector & CO2 Emission

$$CO2\ Emission_t = \alpha - \beta^1 HG_t + \beta^2 INF_t - \beta^3 INT_t - \beta^4 UNP_t + C_t$$

According to the equation, a positive sign of 'HE' indicates that there is a significant value of CO2 emission towards healthcare expenditure and growth. It has been demonstrated that as healthcare expenditure and the healthcare sector grow, so will CO2 emissions. In this case, the relationship between CO2 emissions, healthcare expenditure, and HG can be positive. The components of healthcare expenditure are related to FDI and healthcare growth. Government policies in the healthcare sector, aided by political insecurity and a poor investment climate in the country, have had an impact on CO2 emissions (Chingarande, 2012). The positive sign of 'INF' represents the inflation rate, which affects CO2 emissions in a number of Asian countries. Inflation is a continuous rise in the price level, which is the index of all prices in the economy. And this phenomenon will be referred to as 'inflation' when the price level increment occurs as a result of continuous rising. This situation also shows that aggregate supply is shifting up in the short run while aggregate demand remains constant, implying that the price level will rise. Many researchers and practitioners have hypothesised the inflation phenomenon in order to change and improve countries' economic growth.

Correlation of Variables in Study

The correlation of the factors in the connection between each variable incorporated the relationship between the dependent variable and the independent variable that is being studied in this research study. The relationship between medical tourism and the performance of the Asian countries: Indonesia, the Philippines, Thailand, China, and Malaysia medical sector is known as correlation.

Table 1: Correlation of variables in study

	CO2 emission	Healthcare Spending	Inflation	Unemployment Rate
CO2 emission	1			
Healthcare Spending	0.795350	1		
Inflation	0.722554	0.287871	1	
Unemployment rate	0.885489	0.568321	0.701863	1

A strong correlation is defined as a correlation value between 0.7 and 0.9. The variables are the CO2 emission, which has a inflation of 0.72, healthcare spending of 0.79, and the unemployment rate, which has a CO2 emission of 0.88. Furthermore, table 1 demonstrates that there is a low or poor correlation between two variables in this research paper. The weak correlation value ranges from less than 0.3 to greater than 0.3. healthcare Spending and the inflation have a low correlation value relationship with a value of 0.288. Overall, the findings indicate that all of the variables are important to the study.

MEDICAL TOURISM POLICY ON COVID 19

Medical tourism is a fast-growing industry as globalization has made it easy for patients to travel to another country for healthcare. Its spillover effects to other industries provide a good source of revenues to any economy. It is now lagging behind Thailand and Malaysia for medical patients from Indonesia and the Middle East. The changing landscape of medical travel over the years has posed tremendous challenges to Indonesia's economy. However, there is a wealth of literature on the impact of the inflation rate itself. For example, (Li, 2006) contends that one of the most significant macroeconomic controversies is the existence and nature of the inflation-economic growth nexus. Furthermore, Omankhanlen (2011) stated that inflation is hypothesised to distort the tax system, discouraging investors in the long run due to money illusion. Obiamaka P.E. (2011), on the other hand, stated that, despite the consensus among many researchers and practitioners regarding the negative relationship between inflation and CO2 emission, inflation itself could have a positive impact on CO2 emission and thus growth if it does not exceed a certain threshold. Furthermore, the last positive sign of the 'UNP' represents the unemployment rate. The unemployment rate is the percentage of people in a country who are able to work but are not. In a normal situation, when a country's economy is growing, the unemployment rate should fall. However, if the situation is reversed, it will result in higher unemployment and decreased CO2 emission productivity. According to Irpan (2016), Malaysian researchers have studied the factors that lead to a lower unemployment rate by reducing CO2 emissions. The government should reallocate and prioritise its expenditure on law and order in order to achieve success in eliminating the law and order situation faced by the demand on the health system, which can prevent health systems from becoming overburdened, and mortality from Covid 19 will be significantly lower. This implies that government spending on human capital and community services should be prioritised in order to promote Malaysia's health sector growth. The equitable and proper delivery of health care services is regarded as critical in achieving health-related government spending objectives. The government should reduce its spending on subsidies because it is inflationary and causes other economic and social problems in the country, impeding the process of economic growth. Government spending on law and order and sector growth may be related in either a positive or negative way. Effective policies for promoting human capital formation, economic and community services in Malaysia are required to be developed and implemented for this purpose. Numerous studies have found a positive relationship between health and economic growth. A stable legal and political environment protects individual and property rights, attracts FDI, and provides strong incentives for domestic investors to invest.

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