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Economic Impact of Health Expenditures: Panel Data Analysis for Selected Economies

Sağlık Harcamalarının Ekonomik Etkisi: Seçilmiş Ekonomiler için Panel Veri Analizi

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ABSTRACT

It is estimated that healthcare services will increasingly strain public healthcare expenditures in the near future. Public health expenditures yield more effective outputs than household expenditures do. Due to its direct impact on human capital, public health displays a positive correlation with labor productivity, personal expenditures, and GDP indicators. In welfare economics theory, the examination of economic and social welfare focuses on the analysis of the distribution of economic resources among social actors. During the 2003-2016 timeframe in Turkey, Ukraine, Moldova, Poland, and South Korea, this research examined several health care expenditures. These included the proportion of the population spending more than 10 pct of their household consumption or income on out-of-pocket health care expenses, current health expenditure per capita, domestic general government health expenditure per capita, and domestic private health expenditure per capita. To conduct the panel data analysis, the "domestic private health expenditure per capita" data was utilized. Based on the research findings, an increase in domestic government health expenditures in certain countries results in an escalation of household health expenditures, while an increase in private sector health spending leads to a reduction in household health expenditures.

Keywords: Social Impact, Health Expenditures, Panel Data Analysis, Turkey, South Korea, Poland, Ukraine, Moldova

JEL Code: C23, D31, E27, I11

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ÖZ

Sağlık hizmetlerinin yakın gelecekte kamu sağlık harcamalarını giderek daha fazla zorlayacağı tahmin edilmektedir. Kamu sağlık harcamaları, hane halkı harcamalarından daha etkili çıktılar sağlamaktadır. Beşeri sermaye üzerindeki doğrudan etkisi nedeniyle kamu sağlığı, işgücü verimliliği, kişisel harcamalar ve GSYİH göstergeleri ile pozitif bir korelasyon göstermektedir. Refah ekonomisi teorisinde, ekonomik ve sosyal refahın incelenmesi, ekonomik kaynakların sosyal aktörler arasındaki dağılımının analizine odaklanmaktadır. Bu araştırmada, 2003-2016 döneminde Türkiye, Ukrayna, Moldova, Polonya ve Güney Kore'de çeşitli sağlık harcamaları incelenmiştir. Bunlar arasında hane halkı tüketiminin veya gelirinin yüzde 10'undan fazlasını cepten sağlık harcamalarına harcayan nüfusun oranı, kişi başına düşen cari sağlık harcaması, kişi başına düşen yurtiçi genel devlet sağlık harcaması ve kişi başına düşen yurtiçi özel sağlık harcaması yer almaktadır. Panel veri analizini gerçekleştirmek için "kişi başına düşen yurtiçi özel sağlık harcaması" verileri kullanılmıştır. Araştırma bulgularına göre, bazı ülkelerde devletin sağlık harcamalarındaki artış hanehalkı sağlık harcamalarında artışa neden olurken, özel sektör sağlık harcamalarındaki artış hanehalkı sağlık harcamalarında azalmaya neden olmaktadır.

Anahtar Kelimeler: Toplumsal Etki, Sağlık Harcamaları, Panel Veri Analizi, Türkiye, Güney Kore, Polonya, Ukrayna, Moldova

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Introduction

The rise in household health expenses in numerous nations raises apprehensions regarding the affordability of competent healthcare services. The primary issues are centered around economic challenges. Hence, it is crucial to consider many elements while examining the economic aspect of advancements in the healthcare industry. Various factors can potentially impact the health sector and consequently the economic well-being of society. These factors include general health expenditures, the fiscal strain caused by deficits in social insurance institutions, the import and export of medical devices and drugs, health tourism, and the accessibility of domestically produced medical products in global markets. These influences can have both positive and negative effects on the overall development of the health sector. The issue of high health expenses is a pervasive concern on a global scale. At present, numerous nations over the globe are compelled to allocate substantial financial resources towards healthcare provisions. According to the OECD (2023), there has been a contrasting pattern in health care expenditure between Turkey and OECD nations. While OECD countries are projected to allocate an average of ten percent of their total national income to health services in 2022, Turkey has experienced a decline in this rate over the past decade, decreasing from five percent to 4.4 percent. The progressive advancement of medical technologies throughout the course of time generates heightened economic expansion demands in order to fulfill the growing aspirations of a maturing population. Based on the data released by the Organisation for Economic Co-operation and Development (OECD), there has been a notable increase in health expenditures in recent years, surpassing the average growth rate of the economy. It is noteworthy that numerous countries have experienced a reduction in the quality of health services despite the rising expenditures in this sector. Several recent studies have indicated that the health sectors in Australia, the USA, Canada, New Zealand, and the United Kingdom encounter challenges in delivering services despite receiving public financial support.

In light of advancements in medical technology, it is foreseeable that there will be an increased strain on public health expenditures in the foreseeable future (Huber & Orosz, 2003). In recent years, there has been a noticeable rise in the number of research endeavors aimed at quantifying this phenomenon within the body of literature. In a study conducted by Keehan et al. (2015), the authors forecast health expenditures in the United States based on economic growth and population aging.

Their findings indicate an anticipated average annual growth rate of approximately six percent from 2014 through 2024. Based on the findings of the study, it is projected that the proportion of healtcare expenditures in the overall US gross domestic product (GDP) will experience a rise, reaching roughly twenty percent over the course of the upcoming decade. The findings of Sisko et al. (2019) closely align with the rates mentioned. Similar findings are evident in empirical research conducted in several industrialized and developing nations, as documented in the existing literature.

The present study investigates the correlation between the societal impacts and financial outcomes of healthcare spending. This observation highlights that the decline in human well-being has broader socio-economic implications that extend beyond just medical concerns. It underscores that the rise in health issues can have adverse impacts on the economic and financial indicators of a given society. Formulating a conclusive assessment about the economic ramifications of the ideal magnitude of healthcare expenses presents a challenging task. Existing research examining the relationship between expenditures, resource allocation, and economic growth indicates that public health expenditures exert a favorable influence on the overall health status of a given country. Based on the theoretical framework, the provision of health services and investments in this domain are posited to enhance individuals' quality of life and labor productivity. Moreover, these endeavors are believed to contribute to economic growth and national development, which can be assessed by monitoring several indicators, including the human development index. The health-led growth hypothesis provides an explanation for the economic implications of health spending. Endogenous growth models emphasize the significance of human capital in the process of economic growth. Health expenditures, akin to investment expenditures that foster the development of physical capital, contribute to the development of human capital. The health status of the population is a significant determinant that enhances productivity since a robust workforce actively contributes to the expansion of national wealth. Insufficient health infrastructure and expenditures have a detrimental impact on economic growth, as they result in decreased labor-hour and productivity levels, falling short of their full potential. Healthcare expenditures at the national level, similar to other types of expenditures, are influenced by the level of national income, which is subject to fluctuations due to changes in economic growth. Hence, the growth rate and stability of a nation have an impact on the allocation of resources for healthcare objectives (Bayraktutan & Alancıoğlu, 2020).

Nevertheless, it is important to note that an agreement regarding the dynamics of this connection and the allocation of financial responsibilities among the involved parties has yet to be reached in the existing body of literature. The fundamental principle of economics, namely the limited availability of material resources, underscores the imperative for the efficient utilization of resources within the healthcare system. This condition has a direct impact on the quality of healthcare services, as increasing healthcare costs might result in adverse repercussions, such as a reduction in resources available for other essential needs. Consequently, this can contribute to economic imbalances. The research employed data from Turkey, Ukraine, Moldova, Poland, and South Korea spanning the years 2003-2016 to conduct a comparative analysis of the social impacts of health spending. Panel data analysis is more effective in managing heterogeneity compared to time series and cross-sectional analyzes. Due to this rationale, the study opted for panel data analysis since it offers superior and more advantageous outcomes in terms of managing heterogeneity between individuals, regions, or enterprises. The primary objective of this study was to examine the social ramifications and economic implications associated with healthcare costs.

Analysis of the Social Impact of Health Expenditures from an Economic Perspective

The decline in human health, alongside medical issues, gives rise to adverse socio-economic impacts that have direct repercussions on overall quality of life. In the context of welfare states, the provision of transfer payments to those who are unable to engage in employment due to illness incurs significant expenses. As the number of individuals unable to participate in the workforce increases, there is a corresponding decrease in the income base available for the public to finance transfer

payments. A decrease in income results in a corresponding decrease in the financial resources available for individuals to allocate towards healthcare expenses. The escalation in the prevalence of health issues within a given society exerts a detrimental impact on financial metrics. Aslan, Menegaki, and Tugcu (2016) assert that the rising trend in health expenditures in high-income countries is influenced by various factors, including declining birth rates, an aging population, chronic diseases, and the expenses associated with advanced medical technologies. These factors have prompted significant concerns among states and governments regarding the long-term financial sustainability of healthcare financing. The individual highlights the presence of significant challenges. The challenges posed by short-term recessions and global economic crises, which have a direct impact on public income sources, exacerbate the difficulties in optimizing the quality and efficiency of services in the health sector and achieving financial sustainability. Hence, in several nations, the utilization of strategies such as increased borrowing or taxation becomes necessary in order to fund healthcare expenditures.

The adverse aspects of healthcare services are directly manifested in other economic factors. The labor market is an illustrative example of a market that is directly impacted by this phenomenon. The field of public health inherently possesses the capacity to directly influence the quality of human capital. Theoretically, health is considered to be a determinant of both human capital and labor productivity. Hence, it is imperative to regard health expenses as an investment in human capital. In the study conducted by Mehrara and Musai (2011), it was found that the rise in health expenditures has a favorable impact on both labor supply and productivity. The occurrence of deficiencies or inadequacies within the realm of health care in societies has the potential to diminish productivity in both individual and collective production. According to Üzümcü and Söğüt (2020), nations that possess the capacity to augment their healthcare spending and deliver efficient healthcare services are more likely to exhibit favorable health-related indicators. Based on the theoretical framework, advancements that have a beneficial influence on the well-being of the general population are posited to have a constructive effect on the expansion of the economy, primarily through the augmentation of human capital productivity. Nevertheless, it is important to acknowledge the inherent challenge in reaching definitive conclusions regarding the ideal level and economic impact of health spending. The consideration of the socio-economic dimension of health expenditures is seen as a significant concern within the field of economics, as each new scenario presents unique challenges and potential problems. Halıcı-Tülüce, Doğan, and Dumrul (2016) assert that the existing body of literature is primarily concerned with determining the direction of causality, as the data typically indicate a positive relationship between health and economic growth. The adverse effects of health expenses on the formation of physical capital have a predictable and detrimental influence on economic growth. Hence, the identification of the underlying connection between two occurrences holds significant implications for policymakers. Hence, there exist theoretical frameworks that examine the growth of the overall production function by incorporating the accumulation of human capital. Additionally, a body of empirical research has emerged, which primarily investigates the causal relationship and the direction of causality, often employing the cointegration methodology.

The field of welfare economics theory examines the allocation of economic resources among social actors and its impact on economic and social well-being. The examination of the influential elements that contribute to the enhancement of global or national economic well-being is a matter of significant interest for the broader society. The economic well-being of individuals is contingent upon the advantages derived from the consumption of goods and services, while the overall societal well-being is determined by the aggregate total of these advantages (Eroğlu, 2004; Pigou, 1951). Several studies have been conducted in the health sector that utilize theoretical frameworks to study resource allocation. These studies primarily focus on examining the allocation of spending within the health sector and assessing the resulting effects on economic welfare. In their study, Raghupathi and Raghupathi (2020) investigate the correlation between the health sector and economic growth. Specifically, they explore the association between public health expenditures and economic performance in the United States. The authors utilize various economic indicators and health-related data spanning the period from 2003 to 2014. Their findings indicate

that public health expenditures have a positive impact on human capital development, thereby contributing to economic growth. It has been found that there exists the possibility for an increase in production. Based on quantitative data, there exists a robust positive correlation between health expenditures and key economic indicators, including income, GDP, and labor productivity. Conversely, the relationship between health expenditures and multi-factor productivity exhibits a negative association. However, health expenditures demonstrate a positive relationship with labor productivity, personal expenditures, and GDP indicators. The research findings demonstrate a significant correlation between the rise in healthcare spending and economic outcomes. In an effort to assess Turkey from a comparable standpoint, Erçelik (2018) undertakes an examination of the correlation between GDPs per capita and aggregate health expenditures spanning the years 1980 to 2015. The study posits that there exists a positive relationship between overall health expenditures and GDP per capita. In a similar vein, Mehrara and Musai (2011) conducted a study that investigated the correlation between health expenditures and GDP in Iran. Their analysis was based on annual data spanning from 1970 to 2008. The findings of their study revealed the presence of a sustained association between GDP and health expenditures. It is noteworthy that subsequent to the 1979 revolution, the research highlights a notable disparity between the growth rates of health expenditures and GDP in Iran, with the former exhibiting a more rapid increase. Comparable outcomes are achieved when the breadth of the study is broadened. Nevertheless, it is important to acknowledge that certain quantitative studies in the existing body of literature indicate that it is not possible to establish conclusive relationships between health expenditures and economic variables in countries with diverse economic structural characteristics (Hitiris & Posnett, 1992).

In countries lacking a welfare state, the provision of health services may initially appear to be an optional economic consideration, but they constitute a fundamental necessity. Nevertheless, it is important to note that a definitive consensus on this matter is lacking among the existing body of scholarly literature. Certain studies highlight the correlation between the rise in global income and the corresponding increase in health expenditures, suggesting a natural association. Conversely, other empirical investigations provide evidence supporting the assertion that access to healthcare is progressively transforming into a privilege (Rana, Alam, & Gow, 2020). According to Rodríguez and Nieves Valdés (2019), in their comparative analysis of OECD and Latin American countries, they contend that health expenditures should be considered a necessity rather than a luxury. Nevertheless, the primary issue at hand pertains to the equitable distribution of the financial responsibility associated with healthcare expenditures. The act of sharing can have a direct impact on the efficiency of expenditures.

Effectiveness of Health Expenditures and Economic Components

When health systems, which are influenced by social and environmental elements, attain a satisfactory degree of efficacy, they assume the dual role of being a constituent and a driver of sustainable development. According to Evans, Marten, and Etienne (2012), a rise in the efficiency levels of health systems is associated with a corresponding increase in the development levels of countries. The significance of health expenditures is in their impact on the cost and quality of health services, with the aim of reducing costs and enhancing service quality. The enhancement of productivity within the sector facilitates the provision of a greater quantity of proficient health services to a larger population. Hence, it is imperative to exercise prudence in the allocation and utilization of constrained financial assets. Based on studies from the World Health Organization, it is projected that there would be a rise in both out-of-pocket health expenditures and catastrophic health expenditures. Out-of-pocket healthcare expenses refer to the direct financial contributions made by individuals or households to cover various aspects of healthcare costs. These charges often include cost sharing, co-payments, self-care fees, and other related expenditures. In broader terms, these charges refer to the costs incurred by individuals who directly bear the financial burden of the health services they utilize (Atasever, 2014).

Given the limited availability of health care in numerous countries, it follows that as the proportion of family disposable income allocated to these services rises, there is a corresponding decrease in the consumption of other products and services, including food, education, transportation, and

entertainment. (Callander, Fox, and Lindsay, 2019). The impact of this phenomenon on sectors of the economy other than the health sector tends to be predominantly negative. Insufficient allocation of financial resources, often prevalent in underdeveloped nations, hinders adequate investment in healthcare due to factors such as resource scarcity. This phenomenon has a detrimental impact on the overall well-being of the general population. When additional challenges, such as limited availability to essential nutrients and suboptimal living conditions, are introduced with existing determinants, the prevalence of negative outcomes is amplified (Şaşmaz, Odabaş, & Yayla, 2019). Hence, the presence of financial challenges, such as inadequate healthcare expenditures, which have a direct or indirect impact on human development, poses a significant barrier to the progress of numerous nations. In a study conducted by Mirahsani (2016), the author explores the relationship between total health expenditures and the Human Development Index (HDI) in a sample of 25 southwest Asian nations during the period of 2000-2008. The study used the panel data analysis method to analyze the data. The study's findings lead to the conclusion that there is a positive correlation between the rise in health expenditures and the increase in the Human Development Index. In their study, Yalçın and Çakmak (2016) examined the relationship between public health expenditures and the level of human development in Turkey from 1991 to 2013. Employing the regression analysis approach, the researchers determined that public health expenditures had a noteworthy influence on the level of human development. In a study conducted by Şaşmaz, Odabaş, and Yayla (2019), the authors investigated the correlation between health expenditures and development in a sample of 34 OECD countries from 2000 to 2015. Employing panel data analysis, the researchers discovered a positive association between health expenditures and development. Furthermore, their findings indicated the presence of a bidirectional causality relationship between expenditures and development.

According to Türkseven (2019), the occurrence of adverse trends in indices that assess fundamental aspects of development in a nation, including living conditions, working conditions, and education level, gives rise to significant social, political, and economic challenges. The World Health Organization (WHO) establishes specific objectives, referred to as Universal Health Coverage (UHC), with the aim of addressing underlying issues and resolving difficulties. These goals involve the restructuring of healthcare systems based on principles of equity and fairness. Universal Health Coverage (UHC) is a concept that encompasses the provision of essential health services to individuals within a society, without imposing financial hardships. It is founded upon three fundamental principles: (i) Ensuring equal access and utilization of health services for all individuals, (ii) Promoting fairness in the distribution of financial responsibilities and ensuring comprehensive financial protection, (iii) Enhancing the overall health status of the population by maintaining high-quality health services (World Health Organization, 2014). Nevertheless, there remains ambiguity over the sector that should assume a more prominent role in effectively achieving these objectives.

Health expenditures are widely recognized as a crucial instrument for enhancing resource allocation and addressing market flaws (Afonso, 2004). Nevertheless, there exists a divergence of opinions regarding the allocation of financial responsibility for healthcare expenditures between the public and households' sectors, as well as the potential efficacy of each approach. Several studies in the existing literature, while with variations across countries, indicate that public health expenditures yield more efficacious outcomes in comparison to household expenditures. In their study, Rana, Alam, and Gow (2020) conducted an analysis of the relationship between income levels and health expenditures in 161 countries. Their findings reveal a consistent correlation between GDP and the upward trajectory of health expenditures. Consequently, the authors propose that public expenditures will have a more impactful role in fostering the advancement of the health sector. Moreover, there exist research that arrive at comparable conclusions through the examination of distinct economic and social variables. In a recent study conducted by Martin, Longo, Lomas, and Claxton (2021), an examination of various categories of public health expenditure in England and Wales revealed that the impact of increased social care spending surpasses that of increased health spending by a factor of two. Furthermore, the researchers identified that the deceleration in the rate of progress in life expectancy can be attributed to financial limitations within the health and social

care domains. The detection of the source is performed. In a similar vein, Halıcı-Tülüce, Doğan, and Dumrul (2016) conducted a study with the objective of addressing the issue in both poor and high-income nations. Their findings indicate that the upward trajectory of private health expenditures has a detrimental impact on economic growth. There has been a notable increase in public health expenditures, particularly in industrialized nations since 1950s. The proportion of public expenditures in relation to total health expenditures is approximately 58.2 pct. The augmentation of public provision of health care leads to a decrease in individual and family expenditures on health services. Moreover, it is observed that bureaucrats within public organizations tend to augment expenditures in order to enhance their remuneration and attain elevated social standing. According to Khan and Ul Husnain (2019), this phenomenon results in an overabundance of public expenditure.

The involvement of the state in the healthcare industry extends beyond the realm of public spending. In contrast to certain other industries, the healthcare sector significantly impacts social welfare and inequities through factors such as risk and uncertainty, asymmetric knowledge, imperfect competition, and pervasive externalities. These reasons also contribute to the extensive utilization of other state intervention techniques that are not specifically targeted at expenditures. Public authorities play a significant role in the intervention of health systems by employing several strategies, including the establishment of rules, initiatives to tackle information dissemination challenges, financial support for private health systems, and the direct provision of health services through public institutions and personnel (Çevik, 2013).

Measuring the Effect of Economic Components on Health Expenditures

Developing countries often have challenges in providing the evolving societal expectations for health services, primarily due to financial constraints, such as limited resources for paying healthcare costs. Hence, it is imperative to prioritize efficiency in the allocation and utilization of scarce financial resources. According to the World Health Organization (WHO), around 40 pct of health system resources are utilized inefficiently, resulting in a substantial economic burden over 500 billion dollars for the global health sector. According to Chisholm and Evans (2010) and the World Health Organization (2014), an estimated 150 million individuals globally have significant financial burdens as a result of their healthcare expenditures annually, while 100 million individuals continue to live below the poverty threshold due to these expenses. Hence, it is imperative to incorporate studies that assess the efficacy of expenditures while conducting analyses pertaining to the financial aspect of healthcare systems. A health system characterized by inefficient utilization of financial resources, resulting in suboptimal benefits, will always require additional funding (Türkseven, 2019). The phenomenon will have a direct impact on all economic indicators within the nation.

Numerous empirical studies within the existing body of literature have been conducted to examine the correlation between a nation's per capita public health expenditures and its per capita GDP. The impact of economic growth on public health-related metrics and its significance in public health expenditures is particularly pronounced in developing nations (Bokhari, Gai, & Gottret, 2007). In contrast to industrialized nations, developing countries exhibit a more pronounced correlation between public health expenditures and their resultant influence on public health. The division of income classes in these nations is directly manifested in public health indices. The effect of augmenting public health spending is comparatively diminished in industrialized nations, but it is more pronounced in emerging nations. In developing nations, those belonging to low-income demographics exhibit a greater reliance on public funding for healthcare expenses and are identified as the primary beneficiaries of public health services. Hence, it is crucial to consider both the magnitude and content of public health expenditures when assessing their influence on health outcomes. Several empirical research have demonstrated that the impact of public health expenditures on health indicators is significantly greater for individuals with lower incomes compared to those with higher incomes (Bidani & Ravallion, 1997; Gwatkin, 2000). Nevertheless, the scarcity of resources indicates that the public sector has significant challenges in shouldering this responsibility independently in numerous nations. Consequently, a portion of the financial

responsibility for healthcare costs is transferred to the broader society.

Numerous empirical studies have been conducted to investigate the relationship between health expenditures and national income. In the context of comparative analysis research, economic growth rates are typically regarded as the preferable economic component (Fedeli, 2015). Within this framework, the coefficient offers valuable information to policy makers regarding the proportion of income growth that will be allocated towards healthcare expenses. Specifically, it assists in determining the optimal level of healthcare expenditure (Karasoy & Demirtaş, 2018). The examination of the relationship between economic growth and health expenditures encompasses two distinct techniques. In their study, Güven and Tunalı (2023) identify two key factors to consider when examining health care: (i) defining the categorzation of health care as either necessary or luxury by assessing the income elasticity of health expenditures, and (ii) investigating the causal relationship between the two variables to determine if one variable can effectively predict the other. Several research indicate that when the elasticity exceeds one, healthcare might be classified as a luxury good. In this scenario, the provision of health care is exclusively facilitated by the mechanism of the free market. According to Di Matteo (2003), when the elasticity is less than one, health services are considered to be an essential good, implying that it is advisable for the government to assume a more proactive role in delivering the service. The examination of the causality relationship is conducted through the consideration of two distinct categories: direct causality and reverse causality. The concept of Direct Causality elucidates the relationship between changes in per capita income and per capita health expenditures. Conversely, Reverse Causality refers to a causal connection that arises from health expenditures to income. Reverse causality is classified as follows: There are two possible ways in which health expenditures can have a positive impact on income. Firstly, health expenditures can contribute to the accumulation of human capital by supporting the continuity of the education process. Secondly, health expenditures can enhance income by increasing labor productivity, improving access to preventive and therapeutic health services, and promoting participation in the workforce. The explanation is provided using two distinct ways as outlined by Erdil and Yetkiner (2009).

One salient aspect pertaining to health expenses is their relatively modest share in the overall national GDP. According to Yavaş and Yıldırım's (2009) study, the Johansen cointegration analysis reveals that the value of health expenditures is shown to be quite low, namely at 0.01. Nevertheless, it is of more significance that the value maintains a positive magnitude, despite its diminutive nature. This finding aligns with the theoretical framework, as it demonstrates that health expenditures have a positive impact on income generation. In empirical study, several noteworthy variables include average life expectancy, the ratio of individuals who are needy or dependent within the entire population, the inflation rate, and the composition of the health system within the country. According to Hitiris (1997), an increase in variables such as average life expectancy, the fraction of the population in need, and the inflation rate is likely to result in an increase in health costs.

Quantitative Data Set Used in the Research

The dataset utilized in this study encompasses the period from 2003 to 2016. It comprises various indicators, namely the proportion of the population allocating more than 10 pct of their household consumption or income towards out-of-pocket healthcare expenses, the current health expenditure per capita in US dollars, the domestic general government health expenditure per capita in purchasing power parity (PPP) international dollars, and the domestic private health expenditure per capita in PPP international dollars. The data pertaining to Turkey, Ukraine, Moldova, Poland, and South Korea was acquired by collating information from the "World Health Organization and World Bank 2021 Global Monitoring Report on Financial Protection in Health 2021" study, as conducted by the authors. The series utilized in the study consist of annual data. The table below presents the definitions of the variables employed in the study. To decrease variance, the natural logarithm was applied to all variables.

Table 1. Explanations of variables

Variables	Title	Explanation	Type
LNHCE	Health expenditures	Those who allocate more than 10 pct of their income to health expenditures	Ratio
LNDGHE	Health expenditures made by the government	Public expenditure on health from domestic sources per capita in USD according to PPP	Ratio
LNDPHE	Health expenditures by the private sector	Private expenditure on health per capita in US dollars according to PPP	Ratio
LNX	Exports	Export rate of the relevant country	Ratio
LNM	Imports	Import rate of the relevant country	Ratio
LNOPE	Out-of-pocket health expenditures	Ratio of out-of-pocket health expenditures to current health expenditures	Ratio

Note: PPP indicates purchasing power parity, LN indicates natural logarithms of the variables.

Descriptive test statistics of the variables used in the study are shown in the Table 2 below.

Table 2. Descriptive statistics of variables

Variables	Minimum	Maximum	Standard Error	Jarque-Bera (Normality Test)
LNHCE	1.62	1.90	0.07	3.77 (0.15)
LNDGHE	2.01	3.19	0.27	2.98 (0.22)
LNDPHE	2.05	3.06	0.23	4.87 (0.08)***
LNX	0.47	3.56	0.72	8.56 (0.01)**
LNM	1.69	3.81	0.59	18.28 (0.00)*
LNOPE	1.16	1.68	0.15	6.02 (0.04)**

Note: *,**,*** denote 1 pct, 5 pct and 10 pct significance levels, respectively. Values in parentheses are probability values of the Jarque-Bera test.

As can be seen from the table above, there are no outliers in the distribution of variables and the standard errors are quite reasonable.

Methodology and Method of the Research

Panel data analysis is more effective and advantageous for controlling heterogeneity across individuals, countries, or firms compared to time series and cross-sectional analyses. Panel data offers less multicollinearity, more degrees of freedom, and efficiency, making it a superior choice (Baltagi, 2005). Following these criteria, panel data techniques were utilized in the model.

The F test was conducted to test for the presence of unit effects. The selection between fixed effects and random effects estimators in panel data analysis is made using the Hausman test. The Pesaran CD test, developed by Pesaran (2004), is utilized to examine the model's deviations from its underlying assumptions and to determine correlations between units. The Pesaran CD test rejects the null hypothesis of no correlation between units, indicating the presence of correlations. The MWald test serves as a heteroscedasticity test. Since the MWald value χ^2 is statistically significant, the null hypothesis of no heteroskedasticity is rejected, indicating the presence of varying variance in the studied model. To test for autocorrelation, both the Durbin Watson (DW) and Baltagi Wu autocorrelation tests, developed by Durbin and Watson (1971) and Baltagi and Li (1991), respectively, were employed. Given that both DW and Baltagi-Wo LBI values are less than 2, the null hypothesis of no autocorrelation is rejected. Autocorrelation is present in the model, according to the test results. Given the Hausman test outcomes, the fixed effects model is efficient and reliable. Therefore, the fixed effects Driscoll-Kray estimator is used to estimate the model because it can produce effective

and reliable outcomes despite heteroskedasticity, autocorrelation, and inter-unit correlation. The equation below shows the model.

$$LNHCE_{it} = \alpha_{it} = B_1 LNDGHE_{it} + B_2 LNDPHE_{it} + B_3 LNX_{it} + B_4 LNM_{it} + B_5 LNOPE_{it} + \mu_{it} \qquad (1)$$

In the equation above, α_it represents the constant term, with i=1,…,N and t=1,…,T representing the unit and time dimension, respectively. Meanwhile, μ_it represents the error term with a constant mean and variance.

Table 3. Regression Analysis Results

LNHCE (Dependent Variable)	Coefficient	Drisc/Kraay Std. Error	t	P>|t| Probability Value	95 pct Confidence Interval	
LNDGHE	0.41*	0.04	8.31	0.00	0.27	0.54
LNDPHE	-0.38*	0.04	-8.12	0.00	-0.51	-0.25
LNX	-0.02**	0.01	-4.48	0.01	-0.04	-0.01
LNM	0.01	0.01	0.80	0.46	-0.02	0.04
LNOPE	0.04	0.09	0.46	0.67	-0.21	0.30
Constant term(α)	1.60*	0.15	10.01	0.00	1.15	2.04

Other Tests for Regression Models									
Observations	Units	$F (H_o:\beta_i =0)$	R^2	$F (\mu_i =0)$	MWald			DW	Baltagi Wu	Pesaran CD Test
70	5	F (5,4) 455.73	0.90	F(4,60) 12.30 [0.00]*	$\chi^2(5)$ 595.02* [0.00]	$\chi^2(4)$ 28.83 [0.00]*		0.89	1.10	-1.47 [1.85]

Note: *, ** denote 1 pct and 5 pct significance levels, respectively, and [ ] denotes probability values.

According to the table, when LNDGHE increases by 1 pct, LNHCE increases by 0.41 pct. However, when LNDPHE and LNX increase by 1 pct, LNHCE decreases by 0.38 pct and 0.02 pct respectively. LNM and LNOPE do not show statistical significance. The model has an R^2 of 0.90, indicating a robust regression model fit.

Conclusion

In recent decades, there has been a growing need to examine the significance of health expenditures and their economic implications. This is primarily due to factors such as the substantial global population growth, the rise in average life expectancy, and the undeniable influence of human capital on long-term growth in the current information age. In contemporary academic discourse, it is noteworthy that endogenous growth models have emerged as prominent frameworks. Within this literature, numerous empirical investigations have shed light on the ramifications of health expenditures on the economy, uncovering predominantly beneficial indirect and direct consequences. The correlation between health expenditures and economic development or growth is not one-sided. As economic growth progresses, there is a corresponding rise in the proportion of individuals' money allocated for healthcare, which can be attributed to the concurrent increase in income levels. In summary, the rise in production levels is directly proportional to the escalation of healthcare expenditures. Furthermore, the escalation of health costs can be attributed to the growing demand pressure for healthcare services. As commonly understood, healthcare expenditures can be covered by the government, certain private health insurance entities, or individuals themselves. The focus of this study is to examine the influence of one of these factors on health expenses. This study demonstrates a positive correlation between state-funded health expenditures and the health expenditures of individuals who allocate more than 10 pct of their income towards healthcare expenses. This phenomenon could potentially be attributed to the elevated costs of health insurance premiums inside state-provided healthcare systems, as well as the practice of individuals personally

financing a portion of their healthcare expenditures, which is also prevalent within our nation.

Conversely, private health expenses exhibit a comparable reduction in individuals' healthcare spending. This scenario demonstrates the efficacy of the private health insurance premium and application mechanism. Exports also exert an impact, albeit of such minimal magnitude that it can be disregarded. The findings of the analysis indicate that a comprehensive evaluation of the state-supported insurance system is warranted, as it appears to lack effectiveness as a mechanism. The empirical evidence indicates that private sector health expenditures have a negative impact on individuals' health expenditures.

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