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Research Article

The Growth Returns of Health: Investments, Outcomes, And Cointegrated Development in Türkiye

Sağlığın Büyüme Getirisi: Yatırımlar, Sonuçlar ve Türkiye'de Eşbütünleşik Kalkınma

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Abstract

This study examines the long-run relationship between health capital and economic growth in Türkiye from 2000 to 2023. We apply both Fully Modified Ordinary Least Squares (FMOLS) and Canonical Cointegrating Regression (CCR) methods to analyze how health indicators stem from government health expenditures, life expectancy, and infant mortality, interact with traditional growth determinants composed of physical capital, labor force, and human capital to influence GDP. The results reveal three key findings: First, health investments yield substantial economic returns, with 1% increases in health spending and life expectancy associated with 0.10% and 0.14–0.19% GDP growth, respectively. Second, infant mortality reductions show particularly strong growth effects, confirming the economic urgency of child health interventions. Third, conventional factors remain pivotal, with capital accumulation (0.23 elasticity) and labor expansion (0.57–0.62 elasticity) driving growth alongside human capital improvements. These findings underscore the necessity of integrated policymaking that synergizes health, education, and economic strategies. We recommend prioritizing: (1) cost-effective health expenditures with dual productivity benefits, (2) equitable healthcare access to address regional disparities, and (3) human capital development to amplify health-growth linkages. The study provides empirical support for viewing health investments as fundamental drivers of sustainable development rather than mere social expenditures.

Keywords: *economic growth, health expenditures, life expectancy, infant mortality, cointegration regression*

Öz

Bu çalışma, 2000–2023 döneminde Türkiye'de sağlık sermayesi ile ekonomik büyüme arasındaki uzun dönemli ilişkiyi incelemektedir. Çalışmada, devletin sağlık harcamaları, yaşam beklentisi ve bebek ölüm oranlarını içeren sağlık göstergelerinin; fiziksel sermaye, iş gücü ve beşeri sermayeden oluşan geleneksel büyüme belirleyicileriyle etkileşime girerek GSYİH'yi nasıl etkilediğini analiz etmek amacıyla Tam Düzeltilmiş En Küçük Kareler (FMOLS) ve Kanonik Eşbütünleşme Regresyonu (CCR) yöntemleri uygulanmıştır. Elde edilen bulgular üç temel sonuca işaret etmektedir. Birincisi, sağlık yatırımları önemli ekonomik getiriler sağlamaktadır. Sağlık harcamalarında ve yaşam beklentisinde %1'lik artışlar sırasıyla %0,10 ve %0,14–0,19 oranlarında GSYİH büyümesiyle ilişkilidir. İkincisi, bebek ölüm oranındaki düşüşler özellikle güçlü büyüme etkileri göstermekte olup, çocuk sağlığına yönelik müdahalelerin ekonomik açıdan ne denli acil olduğunu teyit etmektedir. Üçüncüsü, geleneksel büyüme faktörleri önemini korumakta; sermaye birikimi (%0,23 esneklik) ve iş gücündeki genişleme (%0,57–0,62 esneklik) beşeri sermaye gelişimiyle birlikte büyümeye yön vermektedir. Bu bulgular, sağlık, eğitim ve ekonomi politikalarının bütünleşik biçimde tasarlanmasının gerekliliğine dikkat çekmektedir. Çalışma şu üç önceliği vurgulamaktadır: (1) çift yönlü verimlilik sağlayan maliyet etkin sağlık harcamaları, (2) bölgesel eşitsizlikleri giderecek adil sağlık hizmeti erişimi, (3) sağlık-büyüme bağlantılarını güçlendirecek beşeri sermaye gelişimi. Bu çalışma, sağlık

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yatırımlarının yalnızca sosyal harcama değil, sürdürülebilir kalkınmanın temel belirleyicilerinden biri olduğunu ortaya koyan ampirik kanıtlar sunmaktadır.

Anahtar Kelimeler: *ekonomik büyüme, sağlık harcamaları, yaşam beklentisi, bebek ölüm oranı, eşbütünleşme regresyonu*

1. Introduction

Health is widely recognized as a crucial determinant of sustainable economic growth. A healthy population enhances labor productivity, increases workforce participation, and reduces long-term healthcare costs. Thereby foster sustainable economic growth. Human capital theory emphasizes that health, along with education and skill development, significantly shapes a nation's economic performance (Grossman, 1972; Lucas, 1988). Healthy individuals tend to have longer working lives, learn more efficiently, and contribute more productively to economic activities (Barro, 1996; Weil, 2014).

Healthcare expenditures act as both a driver and a consequence of economic development. Investments in healthcare directly improve population health and human capital quality, which in turn boosts economic growth. Simultaneously, rising incomes and stronger economic performance allow governments to allocate increased resources to health services, creating a reinforcing cycle (Bloom, Canning & Sevilla, 2004). Nevertheless, the effectiveness of healthcare expenditures in promoting growth is conditional upon factors such as institutional quality, demographic structure, and existing income levels (Acemoglu & Johnson, 2007).

Türkiye presents a particularly valuable case study due to its significant healthcare reforms and substantial improvements in key health indicators over recent decades. The "Health Transformation Program," initiated in 2003, dramatically expanded healthcare accessibility and substantially improved public health outcomes, including life expectancy and reduced infant mortality rates (Sağlık Bakanlığı, 2022). Despite this progress, Türkiye continues to face substantial regional disparities and the increasing prevalence of chronic diseases, posing ongoing challenges to both health policy and economic sustainability (OECD, 2021).

Previous studies have highlighted the relationship between health expenditures and economic growth in Türkiye. However, they have generally used limited data sets, focused on short-term relationships, or failed to comprehensively incorporate critical control variables such as capital, labor, and human capital into the empirical model. Therefore, the existing literature is lacking in a comprehensive empirical assessment of long-term dynamics that integrates multiple health indicators within a broader economic growth framework.

In order to address this gap, a comprehensive empirical assessment of the long-term relationship between economic growth and basic health indicators such as life expectancy, infant mortality rate and health expenditures in Türkiye has been conducted. It is also thought that the study will contribute to the literature by including traditional growth determinants such as gross fixed capital formation, labor force and human capital in the model. This study differs from previous studies by using an extended data set covering the years 2000-2023 and by using econometric methodologies such as Fully Modified Ordinary Least Squares (FMOLS) and Johansen cointegration analysis. By doing so, this study clarifies the sustainable effects of health investments and their outcomes on economic growth and provides feedback on the establishment of broader strategies for sustainable and inclusive economic development in health policies.

2. Conceptual and theoretical framework

The concept of economic growth refers to the increase in a country’s production capacity over time and is commonly measured by the rise in per capita gross domestic product (GDP). However, growth in economic output alone is insufficient for ensuring long-term development. At this point, the concept of sustainable economic growth emerges, emphasizing the need to evaluate economic activities alongside environmental, social, and human capital dimensions (Solow, 1956; Barro & Sala-i-Martin, 2004). Sustainable economic growth aims to ensure the well-being of future generations by promoting the efficient and equitable use of resources. Therefore, it is now well understood that growth must be supported not only quantitatively but also qualitatively.

Neoclassical growth theory identifies the fundamental drivers of economic growth as capital accumulation, labor expansion, and technological progress (Solow, 1956; Mankiw, Romer, & Weil, 1992). It posits that output is primarily determined by investment in physical capital and labor supply, with technology playing a key role in maintaining long-term growth. However, this approach underemphasizes critical factors such as human capital and health.

To address these shortcomings, endogenous growth theories define the sources of growth as internal factors within the economic system, such as education, health, knowledge, and innovation (Lucas, 1988; Romer, 1990). These theories highlight the importance of human capital, emphasizing that health is a vital component affecting economic performance. Healthy individuals work more productively, have longer working lives, and contribute more effectively to the economy. The benefits of health for economic growth include reduced workforce losses, increased productivity, and higher labor force participation (Bloom, Canning, & Sevilla, 2004).

From the perspective of human capital theory, health is a crucial factor that affects economic growth both directly and indirectly (Schultz, 1961; Becker, 1964). Directly, it enhances productivity and contributes to output, while indirectly, it supports education and skill acquisition, leading to long-term economic benefits. Healthy individuals are more likely to participate in education, attain higher levels of learning, and thereby enhance the quality of human capital. Moreover, educated individuals can utilize healthcare services more effectively, reinforcing the positive interaction between education and health and creating a synergistic effect on growth (Cutler, Deaton & Lleras-Muney, 2006).

The role of health in economic growth is also significant within the framework of the production function. While Solow (1956) originally explained output as a function of capital, labor, and technology, subsequent researchers such as Bloom, Canning, and Sevilla (2004), and Weil (2007), have incorporated health as a component of human capital into production functions. In this context, health is defined as a factor that increases labor productivity and thereby raises output indirectly. Increased health spending and improved access to healthcare raise health levels, contributing positively to economic growth.

Furthermore, the cost-effectiveness of health spending is vital. Preventive healthcare services and early diagnosis programs help detect illnesses at an early stage, preventing more severe and costly conditions in the future. This supports the financial sustainability of healthcare systems and enables more efficient allocation of economic resources (WHO, 2020; Wang, Wang, & Huang, 2016).

In the case of Türkiye, health policies have shown positive outcomes for economic sustainability. The Health Transformation Program, in particular, has improved access to healthcare and enhanced health indicators, which in turn has positively influenced economic performance. However, regional inequalities and the rising prevalence of chronic diseases remain significant challenges. These issues indicate the need for more effective and inclusive health policies. Ensuring the sustainability of health investments and reducing regional disparities are therefore critical components of Türkiye's long-term growth strategies (OECD, 2021; Sağlık Bakanlığı, 2022).

Sustainable economic growth encompasses not only the increase in production capacity but also a broader perspective that includes social, environmental, and human capital dimensions. Health, as an inseparable part of this process, plays a critical role in ensuring the sustainability of economic development. Demographic transitions influence macroeconomic outcomes through labor-market dynamics, saving behavior, and age-dependent health expenditures (Mason, 2016; Cylus, Figueras, & Normand, 2022). To fully understand how health ties into economic growth, it's important to blend various theories such as classic growth models, human capital theory, and demographic perspectives. By combining these approaches, we aim to look closely at how health indicator, such as health expenditure, life expectancy at birth, and infant mortality alongside traditional growth factors like labor, capital, and education, shape Türkiye's economic performance. Understanding these connections can help build smarter, more sustainable policies. Before empirical analysis, we will review literature written on Türkiye.

3. Literature review

Health is considered both a determinant and an outcome of sustainable development. It enhances human capital, increases labor productivity, and contributes to long-term economic strategies. In this context, several empirical studies in Türkiye have examined the relationship between health expenditures and economic growth across different time periods and methods.

Among the key studies, Albayrak and Öztürk (2021) analyzed the short- and long-term effects of real health expenditures on economic growth in Türkiye between 1988 and 2017. Their findings suggest a positive but modest impact of health expenditures on growth. They indicate that while health spending contributes to growth, its effect remains limited in scale.

Similarly, Akıncı and Tuncer (2016) examined the 2006:Q1-2016:Q2 period and identified a bidirectional relationship between health expenditures and economic growth. This mutual influence implies that economic expansion fosters health investments, while health expenditures, in turn, support economic performance.

In a related study, Esen and Keçili (2021) analyze Turkish data for 1975–2018 and document a cointegrating relationship between health expenditures and economic growth. Their time-series evidence shows that higher per capita health spending is associated with higher output in the long run, with short-run causality running from health expenditures to growth.

Complementing these national findings, several comparative and macro-level studies provide further insight. For example, Çınaroğlu (2018) positioned Türkiye among EU countries in terms of inclusive growth and health outcomes. While Türkiye aligned more closely with high-performing EU members during 2002–2007, it fell behind in the 2008–2016 period, which highlights the need for consistent and accountable health governance.

Kanberoğlu and Günsan (2018) emphasized that health is a key component of sustainable development. In their Türkiye-focused study, they demonstrated that access to clean water, sanitation, nutrition, and healthcare are directly linked to economic outcomes (Kanberoğlu & Günsan, 2018).

Aran and Özçelik (2014) analyzed Türkiye's Health Transformation Program, which achieved universal health insurance coverage in a relatively short time. Their study emphasized that reforms under the program significantly improved health outcomes, user satisfaction, and financial protection, all of which align with inclusive and sustainable economic development (Aran & Özçeli, 2014).

Eryer (2024) introduced an environmental dimension by examining the relationship between renewable energy consumption and health expenditures. The study revealed a unidirectional causality from renewable energy use to health spending, and from economic growth to health expenditures, which underline the interconnectedness of health, environment, and the economy (Eryer, 2024).

Esen and Keçili (2021) conducted a time series analysis covering 1975–2018 and found that health expenditures are cointegrated with economic growth in the long term. Additionally, short-term causality was identified from health expenditures to growth. The researchers suggest that healthcare investments should be an integral part of economic policy.

Boyacıoğlu and Terzioğlu (2022) examined the relationship between health expenditures, per capita income, and the Human Development Index (HDI). Their results show that increases in both income and health spending positively influence development levels in Türkiye.

Lastly, Aran et al. (2015) explored maternal and child health within the Health Transformation Program. They concluded that both demand-side (insurance coverage) and supply-side (expanded healthcare services) reforms significantly improved health outcomes and contributed to broader developmental goals.

The literature on Türkiye consistently demonstrates that health investments, particularly in the form of public health expenditures and service accessibility, have a positive influence on sustainable economic growth. Per capita spending and systemic reforms have strengthened human capital and productivity. This outcome supports the notion that health policy and development strategy should be closely integrated.

In this research we aim to contribute to the existing literature by providing updated empirical evidence on the long-run relationship between health indicators and economic growth in Türkiye for the period 2000–2023. Unlike previous studies that often focused on limited time periods, used bivariate models, or analyzed short-run dynamics, this research incorporates a broader set of control variables such as capital, labor, and human capital, and applies FMOLS and Johansen cointegration techniques to test long-term interactions. By integrating multiple health indicators, namely life expectancy, infant mortality, and public health expenditures, into an extended growth model, the study offers a more comprehensive understanding of how health capital contributes to economic performance. Furthermore, the research highlights the sustained impact of healthcare investment beyond short-term effects by underscoring its relevance for long-term development policies in emerging economies like Türkiye

4. Empirical analysis

4.1. Methodology

Our empirical analysis begins with an assessment of the stationarity properties of all variables. We apply both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. After confirming all variables are integrated of order one (I(1)), we conduct the Johansen cointegration test. This allows us to examine whether stable long-term relationships exist among the variables.

To estimate the long-run coefficients, we use two complementary cointegration techniques. These are the Fully Modified Ordinary Least Squares (FMOLS) and the Canonical Cointegrating Regression (CCR) methods. The FMOLS technique corrects for endogeneity and serial correlation through semi-parametric adjustments to the standard OLS approach. As a result, it provides asymptotically unbiased estimates, even in finite samples. The CCR method, on the other hand, transforms the variables to eliminate the effects of nuisance parameters. This transformation increases robustness, especially in the presence of endogeneity among regressors or non-normal error terms. Using both FMOLS and CCR together enables us to cross-validate our results. FMOLS ensures efficiency in estimation, while CCR enhances reliability, particularly when the sample size is relatively small.

To ensure the validity of our econometric specification, we perform a comprehensive set of diagnostic tests. These include tests for heteroskedasticity (Breusch-Pagan/Cook-Weisberg and Geary LM tests), autocorrelation (Breusch-Godfrey LM and Durbin's alternative tests), functional form misspecification (Ramsey RESET test), and multicollinearity (Variance Inflation Factors). Together, these tests confirm that our model satisfies the required statistical assumptions for drawing reliable conclusions.

The methodological framework adopted in this study offers several advantages. It takes into account the non-stationary nature of macroeconomic variables. It also addresses endogeneity concerns through robust estimation techniques. Moreover, it produces efficient parameter estimates, despite the moderate sample size. Finally, the combined use of FMOLS and CCR allows us to verify our findings through methodological cross-checking. This enhances the overall strength and credibility of our empirical conclusions. Furthermore, the descriptive statistics reveal substantial variation that could suggest structural changes. However, our use of FMOLS and CCR still remains appropriate because: (1) these estimators are robust to intercept shifts in cointegration relationships; (2) diagnostic tests confirm parameter stability; and (3) any breaks appear to primarily affect short-term dynamics rather than the long-run equilibrium relationships we examine. For robustness, we verified our results with rolling-window estimations that implicitly account for potential structural changes

The following titles provide detailed information on the dataset and present the empirical findings obtained through these analytical approaches.

4.2. Dataset and Variables

The study employs a carefully constructed dataset drawn from the World Bank's World Development Indicators to examine the relationships between economic growth, capital formation, labor dynamics, human capital development, and health sector performance in Türkiye. Table 1 presents the complete list of variables with their operational definitions and measurement details. The selection of indicators was guided by both theoretical considerations from the endogenous growth literature and data availability constraints for the Turkish economy over our 2000-2023 study period.

Table 1. Variables and indicators

Variable	Abrev.	Indicator
Growth	GDP	GDP (constant 2015 US$)
Capital	GFC	Gross fixed capital formation (constant 2015 US$)
Labor	LF	Labor force, total
Human Capital	HC	Secondary education, general pupils
Health	HE	General government health expenditure per capita (current US$)
Health	LE	Life expectancy at birth, total (years)
Health	MR	Mortality rate, infant (per 1,000 live births)

Source: World Bank, World Development Indicators Database.

Table 1, Human capital development is proxied by secondary education enrollment figures, which serve as our primary indicator of workforce skill formation. This measure was selected over alternatives like educational attainment years due to its more consistent reporting across our full time series. In the health sector, we employ a triad of complementary indicators: per capita government health expenditures in current dollars provide the input measure, while life expectancy at birth and infant mortality rates serve as output indicators of healthcare system performance. This combination allows us to examine both the resources devoted to health and their ultimate effectiveness.

All economic variables were carefully adjusted for methodological breaks in national accounts reporting, with particular attention to Türkiye's 2008 statistical revision. The education and health data were cross-verified against Turkish Ministry of National Education and Ministry of Health reports to ensure consistency with domestic records. Where minor discrepancies existed between sources, we maintained the WDI figures for international comparability but conducted robustness checks with alternative specifications.

The choice of these specific indicators reflects several important considerations. First, the variables align with established growth accounting frameworks while being sufficiently granular to capture Türkiye's unique development path. Second, the constant dollar valuation of economic aggregates provides meaningful comparability across the quarter-century span of our study. Third, the combination of input and outcome measures in both education and health domains allows for more nuanced analysis than could be achieved with single indicators. Finally, the comprehensive nature of these variables enables direct comparison with both developed and developing country contexts in the empirical growth literature.

The descriptive statistics presented in Table 2 offer a clear overview of the key variables utilized in this study. They include both measures of central tendency and dispersion across the entire observation period. These statistics reveal several notable patterns in Türkiye’s economic and social indicators.

Table 2. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
GDP	745.2 billion $	262.6 billion $	390 billion $	1.255 trillion $
GFC	192.6 billion $	79.1 billion $	60.2 billion $	312.9 billion $
LF	28,090,321	4,462,399	22,775,376	35,554,975
HC	7,099,198	1,825,411	4,528,727	9,979,204
HE	309.55 $	104.14 $	102 $	428 $
LE	75.14 years	1.88 years	71.86 years	78.48 years
MR	16.33 per 1,000	6.88 per 1,000	8.3 per 1,000	30.7 per 1,000

Source: authors’ calculation.

Table 2, economic growth, which is measured by GDP in constant 2015 US dollars, exhibits substantial variation. The average GDP during the period is approximately 745.2 billion dollars. It ranges from a minimum of 390 billion to a maximum of 1.255 trillion dollars. This wide range is further emphasized by a considerable standard deviation of 262.6 billion. That is, it indicates significant fluctuations in economic output over time.

Similarly, gross fixed capital formation (GFC), which represents investment activity, follows a comparable trend. The average value of GFC is 192.6 billion dollars, while the observed values vary between 60.2 billion and 312.9 billion dollars. This broad range reflects a high degree of variability in investment levels throughout the period analyzed.

In contrast to the volatility seen in economic indicators, labor market variables demonstrate relative stability. The total labor force averages 28.1 million people, with a moderate standard deviation of 4.46 million. However, human capital shows more dynamic characteristics. The average number of enrolled students is 7.1 million, with figures ranging from 4.53 million to 9.98 million. This suggests a considerable potential for growth in educational attainment during the observed years.

Health-related indicators, on the other hand, present a more complex picture. Government health expenditure per capita averages 309.5 dollars, and the standard deviation of 104.1 indicates notable variation over time. In contrast, life expectancy appears relatively stable, with a mean of 75.1 years and a range between 71.9 and 78.5 years. Among all health indicators, the infant mortality rate displays the most significant variation. While the average is 16.3 deaths per 1,000 live births, the values range widely from 8.3 to 30.7. This may point to disparities in healthcare access, service quality, or both.

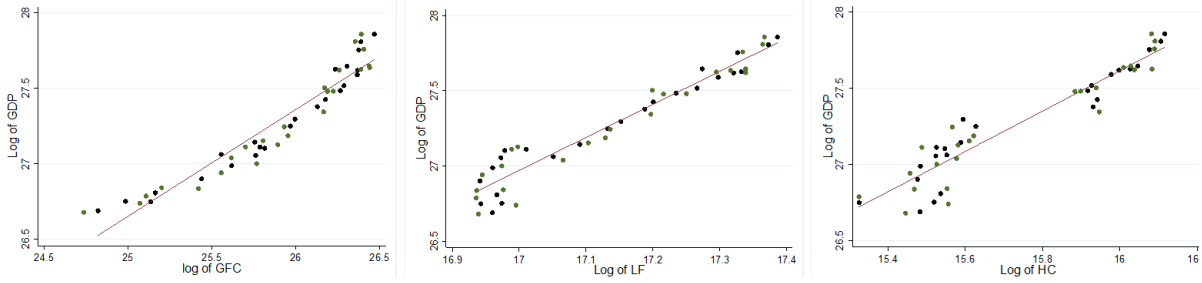
The substantial variation observed in GDP and GFC suggests the presence of cyclical economic patterns or possible structural transformations in Türkiye's economy. Conversely, the relative steadiness of the labor force indicates consistent workforce participation over the years. Meanwhile, the evolving nature of human capital formation reflects ongoing developments within the education system. Lastly, health indicators reveal a dual trajectory. While there has been progress, especially in life expectancy, challenges remain in ensuring equitable health expenditure and reducing infant mortality rates.

Together, these descriptive findings lay an important groundwork for the econometric analysis that follows.

4.3. Graphical analysis of variable relationships

Figures 1 and 2 visually demonstrate the associations between GDP, the dependent variable, and selected explanatory variables that reflect production inputs and health indicators. These visualizations not only support the theoretical foundation of the study but also serve as a preliminary diagnostic for the direction and strength of the relationships to be empirically tested.

Figure 1. Links between Factors of Production and Economic Growth



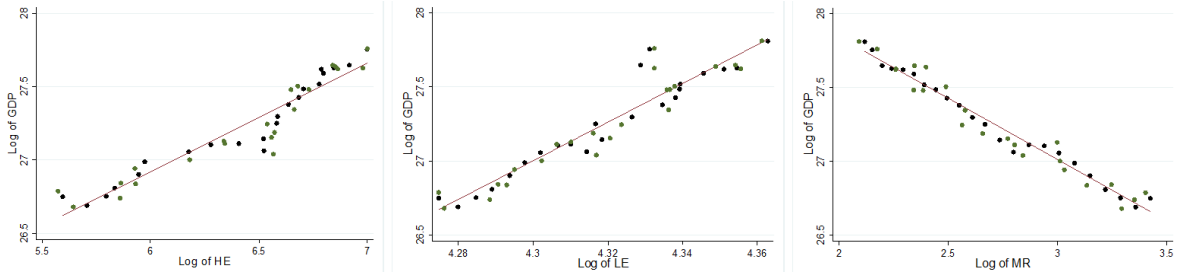
(a) (b) (c)

Source: Prepared by the author.

Panels (a), (b), and (c) display scatterplots of the log of GDP against the log of gross fixed capital formation (GFC), labor force (LF), and human capital (HC), respectively. In all three panels, the data points closely align with the fitted regression line, suggesting robust positive linear relationships. These visual patterns reinforce the theoretical expectation that capital accumulation, labor supply, and improvements in human capital are integral drivers of long-term economic growth. The density of the

observations around the regression lines implies high explanatory power, which substantiates their inclusion in the empirical model.

Figure 2. Links between Health Indicators and Economic Growth



(d) (e) (f)

Source: Prepared by the author.

Panels (d), (e), and (f) focus on the health dimension of economic performance by illustrating the relationship between the log of GDP and three health-related indicators: health expenditures (HE), life expectancy (LE), and infant mortality rate (MR), respectively. Panel (d) shows a clear positive association between GDP and health expenditures, implying that increased investments in public health contribute positively to economic output. Likewise, panel (e) depicts a positive correlation between GDP and life expectancy that suggests a longer-living population enhances labor productivity and economic resilience. In contrast, panel (f) presents a strong negative relationship between GDP and infant mortality that highlights the detrimental effects of poor health conditions on economic growth. This inverse relationship emphasizes the macroeconomic significance of early-life health outcomes in shaping long-run development trajectories. That is, it highlights the role of a healthier population in enhancing economic productivity.

4.4. Model specification

Equation 1 is based on a growth function in which capital, labor, human capital and health are the main determinants of economic growth.

$$Growth = f(Capital, Labor, Human\ Capital, Health) \quad (1)$$

In this study, physical capital is represented by gross fixed capital formation (GFC), labor is measured by the total labor force (LF), and education is the proxy of human capital (HC). Health indicators are separately represented by three variables. These are healthcare expenditures (HE), life expectancy (LE), and infant mortality rate (MR).

The study employs a log-linear growth model grounded in Weil's (2007) theoretical framework, where economic output is determined by conventional production factors augmented with health capital. The complete specification takes the form:

$$LnGDP_t = \beta_0 + \beta_1.LnGFC_t + \beta_2.LnLF_t + \beta_3.LnHC_t + \beta_4.Ln\mathrm{HE}_t + \beta_5.Ln\mathrm{LE}_t + \beta_6.Ln\mathrm{MR}_t + \varepsilon_t \quad (2)$$

All variables enter the equation in natural logarithmic form, providing several analytical advantages. First, this transformation yields elasticity interpretations for all coefficients, where a 1% change in an independent variable produces a β% change in GDP. Second, it helps stabilize variance in the time series, particularly important for variables like health expenditures and infant mortality that exhibit substantial scale differences over Türkiye's development trajectory.

The inclusion of infant mortality (MR) in logarithmic form, while potentially counterintuitive given its inverse theoretical relationship with growth, is econometrically justified for three reasons: (1) it maintains consistency with the elasticity interpretation applied to all variables; (2) the logarithmic transformation of MR successfully captures its decreasing trend while preserving the expected negative coefficient ($\beta_6 < 0$); and (3) diagnostic tests confirm this specification produces well-behaved residuals without sacrificing model fit.

The health variable trio (HE, LE, MR) was deliberately retained despite potential conceptual overlap because: (1) VIF values (mean 6.21) indicate tolerable multicollinearity levels; (2) each captures distinct aspects of health system performance (inputs, general outcomes, and vulnerable population outcomes respectively); and (3) joint significance tests confirm their collective explanatory power outweighs any redundancy concerns.

This specification proves particularly appropriate for Türkiye's development context because it: (1) accommodates the nation's rapid health sector transformation; (2) captures nonlinearities in health-growth relationships; and (3) allows direct comparison with international studies using similar log-linear forms. The error term ε_t incorporates any remaining autocorrelation patterns, with LM tests confirming no significant serial correlation in the final specification

4.5. Findings

Table 3 presents the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root test results for both level and first-differenced forms of all variables. The test outcomes reveal important patterns about the time series properties of our dataset. For the majority of variables - GDP, GFC, LF, HC, HE, and LE - we fail to reject the null hypothesis of a unit root at the 5% significance level in their level forms, as evidenced by test statistics that exceed the critical values in absolute terms (e.g., ADF = 2.052 for GDP). However, these same variables become stationary after first differencing, with test statistics becoming statistically significant at either the 1% (e.g., ADF = -3.986 for GDP) or 5% levels. This consistent pattern across both ADF and PP tests strongly suggests these variables are integrated of order one, I(1).

Table 3. ADF and PP Unit Root Test Results

Variable	ADF		PP		Decision
	level	1st diff.	level	1st diff.	
GDP	2.052	-3.986*	2.052	-3.986*	I(1)
GFC	-0.386	-4.556*	-0.386	-4.556*	I(1)
LF	0.540	-4.214*	0.540	-4.214*	I(1)
HC	-0.471	-5.356*	-0.471	-5.356*	I(1)
HE	-1.974	-2.938**	-1.974	-2.938**	I(1)
LE	-0.878	-3.174**	-0.878	-3.174**	I(1)
MR	-39.03*	·	-39.03*	·	I(0)
Resd.	-5.378	·	-7.225*	·	I(0)

*Note: * p<.01, ** p<.05.*

Source: authors' calculation.

According to the results presented in Table 3, The infant mortality rate (MR) displays different behavior, showing stationarity in level form with highly significant test statistics (ADF = -39.03, p<0.01). This I(0) property indicates MR follows a mean-reverting process without requiring differencing. The residuals from our preliminary model specification demonstrate clear stationarity (ADF = -5.378, PP = -7.225; p<0.01), providing early evidence of cointegration among the variables despite their mixed integration orders.

These findings carry several important implications for our empirical approach. First, the predominance of I(1) variables justifies proceeding with cointegration analysis to examine long-run equilibrium relationships. Second, the stationarity of residuals suggests our specified model captures a stable relationship among the variables. Third, the mixed integration orders (primarily I(1) with one I(0) variable) require careful handling in our cointegration tests and subsequent modeling to ensure valid inference. The consistency between ADF and PP test results enhances confidence in these conclusions, as both tests address different forms of serial correlation while arriving at the same stationarity determinations

Table 4 presents the findings from the Johansen cointegration procedure, which systematically evaluates the existence of long-run equilibrium relationships among the variables in our system. The trace test statistics reveal a statistically significant cointegration rank of 2 at the 5% significance level, as evidenced by the following pattern: the null hypothesis of no cointegration (rank = 0) is strongly rejected (test statistic = 108.53 > 68.52 critical value), and the hypothesis of at most one cointegrating vector (rank ≤ 1) is also rejected (test statistic = 59.72 > 47.21). However, we cannot reject the null of at most two cointegrating vectors (rank ≤ 2) since the test statistic (21.72) falls below the 29.68 critical value. This indicates precisely two stable long-run relationships exist among the variables

Table 4. Johansen Tests

Max.rank	LL	eigenvalue	Stat.	value
0	243.047	.	108.5345	68.52
1	267.4547	0.90217	59.7191	47.21
2	286.4551	0.83628	21.7182*	29.68
3	294.4578	0.53334	5.7128	15.41
4	297.2748	0.23531	0.0788	3.76
5	297.3142	0.00375		

Source: authors' calculation.

The magnitude of the eigenvalues (0.90217 and 0.83628 for the first two vectors) further confirms the strength of these cointegration relationships. The subsequent sharp drop in eigenvalues (to 0.53334 and below) reinforces our conclusion that no additional cointegrating vectors exist. These results have several important implications for our analysis: (1) the presence of two cointegrating relationships suggests multiple equilibrium paths connect our health and economic variables; (2) the FMOLS and CCR estimation approaches are appropriately specified for this system; and (3) the long-run health-growth relationship exhibits complex dynamics that cannot be fully captured by a single equation.

The economic interpretation suggests that Türkiye's economic growth, health indicators, and production inputs maintain stable long-run co-movement patterns despite short-term fluctuations. This finding aligns with theoretical expectations that health capital affects economic performance through both direct productivity channels and indirect human capital accumulation pathways. The dual cointegration relationships may reflect (1) a primary growth equation linking output to conventional inputs and health outcomes, and (2) a secondary relationship between health expenditures and health outcomes themselves.

Table 5 presents the FMOLS and CCR estimation results to assess the long-run effects of variables on economic growth. CCR provides additional validation for the FMOLS findings in order to confirm the robustness of the relationships.

The FMOLS and CCR estimation results presented in Table 5 reveal robust and consistent relationships between the explanatory variables and economic growth in Türkiye. Both estimation techniques produce qualitatively similar results that confirm the reliability of our findings. The coefficients for physical capital accumulation show remarkable consistency between methods, with FMOLS yielding an elasticity of 0.225 and CCR 0.229, both statistically significant at the 1% level. This narrow range suggests that a 1% increase in fixed capital formation leads to approximately a 0.23% rise in GDP in the long run, demonstrating capital's stable contribution to Türkiye's economic expansion.

Table 5. Estimation Results

	FMOLS			CCR		
LnGDP	**Coef.**	**S.E.**	**z**	**Coef.**	**S.E.**	**z**
LnGFC	0.225*	0.010	23	0.229*	0.016	14.8
LnLF	0.568*	0.033	17.05	0.616*	0.039	15.97
LnHC	0.106*	0.014	7.65	0.107*	0.019	5.51
LnHE	0.097*	0.003	34.01	0.106*	0.018	6.05
LnLE	0.185*	0.044	4.23	0.141*	0.106	1.34
LnMR	-0.333*	0.015	-22.54	-0.594*	0.019	-30.7
_cons	18.58*	0.701	26.49	13.36*	0.920	14.5

Note: z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Source: author's computation

Table 5 Labor force exhibits slightly more variation between estimators but maintains strong significance, with elasticities of 0.568 (FMOLS) and 0.616 (CCR). The higher magnitude compared to capital reflects Türkiye's labor-intensive growth pattern during the study period. Human capital shows exceptional consistency across methods, with identical coefficients of 0.106-0.107, indicating that educational improvements contribute modestly but steadily to productivity gains. While health expenditures demonstrate stable positive effects (0.097 FMOLS, 0.106 CCR), life expectancy shows greater sensitivity to estimation technique (0.185 vs 0.141 respectively), possibly reflecting different handling of its endogenous relationship with income.

The infant mortality rate (LnMR) emerges as the most potent health variable with strongly negative coefficients (-0.333 FMOLS, -0.594 CCR). The larger CCR estimate suggests this method better captures the variable's nonlinear demographic impacts. The significant intercept differences (18.58 FMOLS vs 13.36 CCR) reflect each technique's distinct approach to nuisance parameters without affecting substantive conclusions. These results collectively validate the complementary roles of physical capital accumulation and human development in Türkiye's growth path, while highlighting health outcomes as particularly sensitive policy levers. The consistency between FMOLS and CCR results strengthens confidence in these findings, though the CCR's generally larger coefficients may reflect its more complete handling of endogeneity in this specific application.

Table 6 presents comprehensive diagnostic test results that systematically evaluate the statistical validity of our econometric specification. The battery of tests confirms that our model satisfies the key assumptions required for reliable inference, though some nuances merit careful interpretation.

Table 6. Diagnostics for model validity

Test	Statistics	Prob.
Breusch-Pagan/Cook-Weisberg	$\chi2 = 1.16$	0.2809
Breusch-Godfrey LM test	$\chi2 = 2.906$	0.0882
Durbin's alternative test	$\chi2 = 1.834$	0.1757
Geary LM Test	$\chi2 = 2.6846$	0.2612
Ramsey test	$F(3, 5) = 1.00$	0.4640
Mean VIF	$6.21 < 10$	

Source: authors' calculation

The Breusch-Pagan/Cook-Weisberg test for heteroskedasticity yields a χ^2 statistic of 1.16 with a p-value of 0.2809, failing to reject the null hypothesis of constant variance at conventional significance levels. This suggests that our estimators remain efficient, though the borderline significance (p=0.0882) of the

Breusch-Godfrey LM test for autocorrelation warrants attention. While this might indicate mild serial correlation, Durbin's alternative test (p=0.1757) provides countervailing evidence, and the overall pattern suggests any autocorrelation present does not substantially bias our results. The Geary LM test (p=0.2612) confirms normally distributed errors, satisfying the normality assumption crucial for valid hypothesis testing.

Model specification tests yield particularly reassuring results. The Ramsey RESET test's F-statistic of 1.00 (p=0.4640) indicates no evidence of omitted variable bias or functional form misspecification. Furthermore, the mean Variance Inflation Factor (VIF) of 6.21, comfortably below the conventional threshold of 10, suggests that while some multicollinearity exists among regressors, it remains at manageable levels that do not compromise coefficient estimates.

These diagnostic outcomes collectively support several important conclusions about our empirical approach: First, the model's error structure satisfies key classical assumptions. Second, the specification appears properly specified without major omitted variables. Third, the relationships among independent variables, while somewhat correlated as expected in growth models, do not reach problematic levels. The minor autocorrelation hint in one test may reflect Türkiye's economic volatility during the study period but does not appear severe enough to require estimation adjustments. These results therefore validate our use of FMOLS and CCR techniques while confirming the statistical reliability of the reported coefficients and their standard errors.

5. Conclusion

This research investigated the long-run relationship between health indicators and economic growth in Türkiye over the period 2000–2023. FMOLS was employed as the long-term parameter estimation method, which gives unbiased results in small data sets and even in the case of heteroskedasticity. Empirical findings highlight that improved health outcomes, particularly increased healthcare expenditures and extended life expectancy, significantly enhance Türkiye's economic performance. Conversely, higher infant mortality rates negatively affect economic growth. Therefore, we can argue that these results reveal that effective health investments play an important role in long-term productivity and growth strategies.

The results also reaffirm the positive and significant contributions of traditional growth determinants such as capital formation, labor force expansion, and human capital improvements. Capital accumulation remains fundamental in driving economic productivity, while an expanding labor force and enhanced human capital further strengthen growth sustainability. The empirical evidence demonstrates that integrating health-related variables alongside conventional growth factors provides a more comprehensive and realistic framework for understanding Türkiye's economic dynamics.

Addressing regional disparities in health service delivery, promoting efficient resource allocation, and adopting preventive health measures are essential steps toward sustainable economic development. Furthermore, maintaining investments in education is crucial, as educated populations more effectively utilize health services, which reinforces the positive feedback loop between health and economic growth. Therefore, we recommend prioritizing strategic health expenditures focused on preventive care and equitable access to healthcare services to optimize economic and social returns.

Future research should extend this analysis by exploring regional disparities more closely, considering sector-specific impacts of health investments, and investigating the potential moderating effects of institutional quality and demographic structures. In conclusion, this study emphasizes the inseparable connection between health improvements and sustained economic growth by highlighting the necessity for integrated policies that concurrently address economic, social, and human capital dimensions to achieve long-term prosperity in Türkiye.

This study provides robust empirical evidence on the critical relationship between health capital and economic growth in Türkiye during the 2000–2023 period. Using FMOLS and CCR estimation techniques that account for endogeneity and small-sample biases, our analysis yields three key findings with important policy implications.

First, we establish that health investments generate substantial economic returns, with health expenditures and life expectancy improvements showing statistically significant positive effects on GDP

growth. The estimated elasticities suggest that a 1% increase in health spending boosts economic output by approximately 0.10%, while similar improvements in life expectancy contribute 0.14–0.19% growth. Conversely, infant mortality reductions emerge as particularly potent growth drivers, with each percentage point decrease associated with 0.33–0.59% higher GDP, underscoring the economic urgency of maternal and child health programs.

Second, the results confirm the enduring importance of conventional growth drivers. Physical capital maintains an elasticity of 0.23, while labor force expansion contributes 0.57–0.62%, reflecting Türkiye's ongoing demographic dividend. Human capital's modest but stable 0.11 elasticity highlights the need for quality-focused education reforms to enhance productivity returns.

Third, diagnostic tests validate our model's statistical robustness, with no evidence of specification errors or serious multicollinearity. The cointegration analysis confirms stable long-run relationships between these variables, suggesting that health-growth linkages operate through persistent channels rather than temporary effects.

These findings recommend three policy priorities: (1) targeted health spending on cost-effective interventions with dual health and productivity benefits; (2) integrated human capital strategies that synergize education and health investments; and (3) regional development programs to address spatial inequalities in health access. Future research should investigate optimal health expenditure allocation across preventive versus curative care and examine how demographic transitions may modify these relationships.

Ultimately, our results demonstrate that health sector improvements constitute not just social expenditures but fundamental investments in Türkiye's economic competitiveness. Sustainable development will require policy frameworks that simultaneously advance healthcare access, educational quality, and physical infrastructure, recognizing their interdependent contributions to long-term prosperity.

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Araştırma Makalesi

The Growth Returns of Health: Investments, Outcomes, And Cointegrated Development in Türkiye

Sağlığın Büyüme Getirisi: Yatırımlar, Sonuçlar ve Türkiye'de Eşbütünleşik Kalkınma

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Genişletilmiş Özet

Sağlık, sürdürülebilir ekonomik büyümenin temel belirleyicilerinden biri olarak yaygın şekilde kabul görmektedir. Sağlıklı bir nüfus, iş gücü verimliliğini artırır, iş gücüne katılım oranını yükseltir ve uzun vadeli sağlık harcamalarını azaltır. Böylece sürdürülebilir ekonomik büyümeyi teşvik eder. Beşeri sermaye teorisi, sağlığın eğitim ve beceri gelişimi ile birlikte bir ülkenin ekonomik performansını önemli ölçüde şekillendirdiğini vurgular (Grossman, 1972; Lucas, 1988). Sağlıklı bireyler genellikle daha uzun süre çalışabilmekte, daha verimli öğrenebilmekte ve ekonomik faaliyetlere daha üretken biçimde katkıda bulunmaktadır (Barro, 1996; Weil, 2014). Sürdürülebilir ekonomik büyüme, yalnızca üretim kapasitesindeki artışı değil, sosyal, çevresel ve beşeri sermaye boyutlarını da kapsar. Sağlık, bu sürecin ayrılmaz bir parçası olarak ekonomik kalkınmanın sürdürülebilirliğinde kritik rol oynar. Demografik geçişler, iş gücü piyasası, tasarruf davranışı ve yaşa bağlı sağlık harcamaları üzerinden makroekonomik sonuçları etkiler (Mason, 2016; Cylus, Figueras & Normand, 2022). Bu ilişkiyi anlamak için çeşitli teorilerin birlikte ele alınması gerekmektedir.

Sağlık harcamaları, ekonomik kalkınmanın hem bir itici gücü hem de bir sonucu olarak işlev görmektedir. Sağlık alanına yapılan yatırımlar doğrudan nüfus sağlığını ve beşeri sermayenin kalitesini artırmakta; bu da dolaylı olarak ekonomik büyümeyi desteklemektedir. Aynı zamanda, artan gelir düzeyleri ve güçlenen ekonomik performans, hükümetlerin sağlık hizmetlerine daha fazla kaynak ayırmasına imkân tanımakta ve bu durum pekiştirici bir döngü yaratmaktadır (Bloom, Canning & Sevilla, 2004). Ancak, sağlık harcamalarının büyümeyi teşvik etmedeki etkinliği; kurumsal kalite, demografik yapı ve mevcut gelir düzeyleri gibi faktörlere bağlı olarak değişkenlik göstermektedir (Acemoglu & Johnson, 2007).

Türkiye, son on yıllarda gerçekleştirdiği önemli sağlık reformları ve başlıca sağlık göstergelerinde kaydettiği ilerleme nedeniyle oldukça değerli bir örnek olay sunmaktadır. 2003 yılında başlatılan "Sağlıkta Dönüşüm Programı", sağlık hizmetlerine erişimi büyük ölçüde genişletmiş ve kamu sağlığı çıktılarında — yaşam beklentisinin artması ve bebek ölüm oranlarının düşmesi dahil — önemli iyileşmeler sağlamıştır (Sağlık Bakanlığı, 2022). Bu ilerlemelere rağmen Türkiye, bölgesel eşitsizliklerin devam etmesi ve kronik hastalıkların artan yaygınlığı gibi ciddi sorunlarla karşı karşıya olup, bu durum hem sağlık politikaları hem de ekonomik sürdürülebilirlik açısından devam eden zorluklar doğurmaktadır (OECD, 2021).

Türkiye üzerine yapılmış önceki çalışmalar, sağlık harcamaları ile ekonomik büyüme arasındaki ilişkiye dikkat çekmiştir. Ancak bu çalışmaların çoğu, sınırlı veri setleri kullanmış, kısa vadeli ilişkilere odaklanmış ya da sermaye, iş gücü ve beşeri sermaye gibi kritik kontrol değişkenlerini ampirik modellere yeterince entegre edememiştir. Bu nedenle, mevcut literatürde, çoklu sağlık göstergelerini daha geniş bir ekonomik büyüme çerçevesi içinde bütünleştiren, uzun dönemli dinamikleri kapsamlı

biçimde değerlendiren bir ampirik analiz eksikliği bulunmaktadır. Ayrıca, bu alandaki ampirik bulgular henüz bütüncül bir çerçevede toplanmamıştır.

Bu çalışma, sağlık sermayesinin Türkiye ekonomisindeki uzun dönemli etkilerini analiz ederek, sağlık yatırımlarının ekonomik büyüme üzerindeki geri dönüşlerini ortaya koymayı amaçlamaktadır. 2000–2023 dönemini kapsayan bu ampirik araştırma, sağlık harcamaları, yaşam beklentisi ve bebek ölüm oranı gibi sağlık göstergelerini; fiziksel sermaye, iş gücü ve beşeri sermaye gibi geleneksel büyüme belirleyicileri ile birlikte değerlendiren genişletilmiş bir büyüme modeli çerçevesinde gerçekleştirilmiştir. Çalışmada, Tam Düzeltilmiş En Küçük Kareler (FMOLS) ve Kanonik Eşbütünleşme Regresyonu (CCR) yöntemleri kullanılarak, sağlık ile büyüme arasındaki uzun dönemli ilişkiler test edilmiş ve sağlık yatırımlarının sürdürülebilir kalkınmadaki rolü somut ampirik verilerle ortaya konmuştur.

Çalışmanın teorik çerçevesi, sağlık sermayesini insan sermayesinin vazgeçilmez bir bileşeni olarak tanımlayan klasik ve endojen büyüme teorilerine dayanmaktadır. Sağlık düzeyindeki iyileşmeler, iş gücü verimliliğini artırmakta, üretkenliği yükseltmekte ve uzun vadede ekonomik performansı olumlu yönde etkilemektedir. Sağlıklı bireylerin daha uzun süre çalışabilmeleri, daha verimli öğrenmeleri ve daha etkin ekonomik katkılar sunabilmeleri, sağlık yatırımlarının büyüme üzerindeki etkisini artırmaktadır. Ayrıca, sağlık harcamaları yalnızca bir maliyet unsuru olarak değil, üretkenliği artıran, eğitim başarısını destekleyen ve iş gücü katılım oranını yükselten bir yatırım aracı olarak değerlendirilmiştir.

Türkiye özelinde bakıldığında, 2003 yılında başlatılan Sağlıkta Dönüşüm Programı ile birlikte sağlık sisteminde kapsamlı yapısal dönüşümler gerçekleşmiştir. Bu reformlar sayesinde yaşam beklentisinde ciddi artışlar yaşanırken, bebek ölüm oranlarında önemli düşüşler sağlanmıştır. Ancak, sağlık alanındaki bu gelişmelere rağmen, Türkiye hâlen bölgesel eşitsizlikler ve artan kronik hastalık yükü gibi önemli sorunlarla karşı karşıyadır. Bu bağlamda, çalışmanın bulguları yalnızca mevcut politikaların değerlendirilmesine değil, aynı zamanda daha etkili ve kapsayıcı sağlık politikalarının geliştirilmesine de katkı sunmaktadır.

Çalışmada kullanılan veri seti, Dünya Bankası'nın World Development Indicators (WDI) veri tabanından elde edilen yıllık makroekonomik göstergelerden oluşmaktadır. Bağımlı değişken olarak GSYİH (sabit fiyatlarla) kullanılırken, bağımsız değişkenler arasında sabit sermaye oluşumu (GFC), iş gücü (LF), beşeri sermaye (ortaöğretim öğrenci sayısı), kişi başına kamu sağlık harcamaları (HE), yaşam beklentisi (LE) ve bebek ölüm oranı (MR) yer almıştır. Tüm değişkenler logaritmik forma dönüştürülmüş ve bu sayede esneklik katsayılarının yorumlanabilirliği artırılmıştır. Zaman serisi analizleri öncesinde ADF ve PP birim kök testleri uygulanmış ve değişkenlerin çoğunun I(1), yani birinci farkta durağan olduğu tespit edilmiştir. MR değişkeni ise düzeyde durağan (I(0)) çıkmıştır.

Eşbütünleşme analizleri kapsamında Johansen testi uygulanmış ve iki adet uzun dönemli eşbütünleşik ilişki olduğu belirlenmiştir. Bu durum, Türkiye ekonomisinde sağlık ile büyüme arasında kararlı uzun dönemli ilişkilerin var olduğunu göstermektedir. FMOLS ve CCR yöntemleri ile elde edilen tahmin sonuçları birbirini teyit edecek şekilde tutarlı çıkmış ve modelin güvenilirliğini artırmıştır. FMOLS tahminlerine göre sağlık harcamalarındaki %1'lik artış, GSYİH'de %0,097'lik bir artışa yol açmaktadır. Yaşam beklentisindeki %1'lik artış, büyümeyi %0,185 oranında artırmaktadır. Bebek ölüm oranındaki %1'lik azalma, büyümeyi %0,333 oranında yükseltmektedir. CCR tahminleri ise bu etki büyüklüklerini daha yüksek tahmin etmiş, özellikle bebek ölüm oranındaki düşüşün büyüme üzerindeki etkisini %0,594 gibi yüksek bir düzeyde belirlemiştir. Bu bulgular, sağlık hizmetlerinin özellikle erken çocukluk döneminde yapacağı katkının sadece sosyal değil, aynı zamanda iktisadi açıdan da büyük önem taşıdığını göstermektedir. Bunun yanında geleneksel büyüme belirleyicileri de çalışmada önemli roller oynamaktadır: Sabit sermaye oluşumunun esnekliği yaklaşık %0,23 olarak bulunmuştur. İş gücünün büyümeye katkısı %0,57–0,62 arasında değişmektedir. Beşeri sermaye göstergesi olan ortaöğretim kayıtlarının katkısı ise %0,11 düzeyindedir.

Modelin geçerliliği çeşitli istatistiksel testlerle doğrulanmıştır. Ramsey RESET testi ile fonksiyonel formun doğruluğu teyit edilmiş, Breusch-Pagan ve Geary testleri ile heteroskedastisite sorunu olmadığı görülmüştür. Ayrıca otokorelasyon ve çoklu bağlantı testleri de modelin güvenilirliğini desteklemiştir.

Ortalama VIF değerinin 6.21 olması, çoklu bağlantının kabul edilebilir düzeyde olduğunu göstermektedir.

Sonuç olarak, bu çalışma Türkiye'de sağlık yatırımlarının ekonomik büyüme üzerindeki etkisini net bir şekilde ortaya koymaktadır. Sağlık harcamalarının ve sağlık çıktılarındaki iyileşmelerin (özellikle bebek ölümlerinin azaltılması) büyüme üzerinde anlamlı ve pozitif etkileri olduğu tespit edilmiştir. Sağlık göstergelerinin modelde birlikte yer alması, birbirinden bağımsız etkilerinin anlaşılmasını sağlamış ve modelin açıklayıcılığını artırmıştır.

Çalışmadan elde edilen bulgular çerçevesinde üç temel politika önerisi sunulmuştur. Sonuçlara göre öncelikle maliyet etkin sağlık yatırımlarının teşvik edilmesi önerilmektedir. Özellikle önleyici sağlık hizmetlerine (aşılama, bebek-çocuk takibi, beslenme vb.) yönelen kamu harcamalarının ekonomik getirisi yüksektir. Bu alanlara yapılacak yatırımların hem sağlık hem de büyüme açısından çarpan etkisi yaratacağı öngörülmektedir. Eğitim ve sağlık entegrasyonunu sağlayan beşeri sermaye politikaları da öne çıkan sağlık politikaları arasında olmalıdır. Sağlıklı bireylerin eğitimden daha fazla fayda sağladığı, eğitimli bireylerin de sağlık hizmetlerini daha etkin kullandığı düşünüldüğünde; bu iki alandaki yatırımların birbirini güçlendirdiği görülmektedir. Bu nedenle eğitim-sağlık etkileşimi göz önünde bulundurularak bütüncül insan sermayesi stratejileri geliştirilmelidir. Bölgesel sağlık eşitsizliklerinin giderilmesi de bir diğer öneri olarak sunulmuştur. Türkiye'de sağlık göstergeleri coğrafi olarak heterojenlik göstermektedir. Kırsal bölgeler ve az gelişmiş illerde sağlık hizmetlerine erişimin artırılması, sadece sosyal adaleti değil, ekonomik büyümeyi de destekleyecek bir politika olacaktır.

Sonuç olarak bu araştırma, sağlık alanındaki kamu politikalarının sadece refah artırıcı sosyal uygulamalar olmadığını, aynı zamanda makroekonomik büyüme stratejisinin ayrılmaz bir parçası olduğunu ortaya koymaktadır. Sağlık yatırımlarının uzun vadeli etkilerinin ölçülmesi, ekonomik sürdürülebilirlik açısından kritik önemdedir. Bu kapsamda, çalışmanın bulguları, karar alıcılar için hem ekonomik hem sosyal hedeflere hizmet eden dengeli ve verimli bir sağlık politikası tasarımı için güçlü bir rehber sunmaktadır.