



THE EFFECT OF HEALTH AND EDUCATION EXPENDITURES ON THE EMPLOYMENT: EMPIRICAL EVIDENCE FROM TÜRKİYE

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Abstract

This research delves into the influence of human capital investments on employment in Türkiye between 2000 and 2021. We first employ the Autoregressive Distributed Lag (ARDL) method to assess both the short and long-term impacts of human capital investments on employment. Then, the Pairwise Granger Causality test is applied to explore the causality among the variables. According to the long run coefficient, a 1% rise in government education and health expenditures and GDP growth rate leads to a 1.27%, 1.17% and 0.76% increase in employment in Türkiye, respectively. Additionally, The Pairwise Granger Causality test results show that government education expenditure on human capital influences employment in Türkiye and vice versa as well as a causal relation between the employment rate and inflation rate. In conclusion, Türkiye should increase its expenditure on health and education as these investments serve as a vital role in enhancing the level of human capital and welfare of the population.

Keywords: Human Capital, Employment, Health Expenditure, Education Expenditure

Jel Classification: C22, H51, H52, J21

SAĞLIK VE EĞİTİM HARCAMALARININ İSTİHDAM ÜZERİNDEKİ ETKİSİ: TÜRKİYE'DEN AMPİRİK BULGULAR

Öz

Bu çalışma, 2000-2021 yılları arasında Türkiye'deki beşeri sermaye yatırımlarının istihdama olan etkisini araştırmaktadır. İlk olarak, beşeri sermaye yatırımlarının istihdam üzerindeki kısa ve uzun vadeli etkilerini tahmin etmek için ARDL modeli kullanılmaktadır. Ardından, Pairwise Granger nedensellik testini kullanarak değişkenler arasındaki nedensellik incelenmektedir. Uzun dönem katsayılarına göre, Türkiye'de kamu eğitim ve sağlık harcamaları ve GSYİH büyüme hızındaki %1'lik artışın sırasıyla istihdamda %1.27, %1.17 ve %0.76'lık artışa yol açtığı görülmektedir. Ayrıca, Pairwise Granger nedensellik testi sonuçlarına göre çift yönlü olarak kamu eğitim harcamalarının Türkiye'deki istihdamı etkilediği ve ayrıca istihdam oranı ile enflasyon oranı arasında nedensel bir ilişki olduğunu göstermektedir. Sonuç olarak, Türkiye, beşeri sermaye düzeyini ve nüfusun refahını artırmada önemli bir rol oynadığı için sağlık ve eğitim harcamalarını artırmalıdır.

Anahtar Kelimeler: Beşeri Sermaye, İstihdam, Sağlık Harcamaları, Eğitim Harcamaları

Jel Sınıflandırması: C22, H51, H52, J21

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INTRODUCTION

The focus on improving productivity for a long time was based on extrinsic factors, such as incorporating advances in machinery and technology in the production of goods and provision of services. Researchers later explore that in order to optimize productivity, investments should not only be channelled to material advancements but should be shared also for human capital which is acquired through education and health. The notion of human capital encompasses to the abilities and skills of people within a nation but human capital formation involves the process of gaining and expanding the pool of individuals who possess the necessary skills, good health, education and experience. Consequently, investments in education and health are regarded as endeavours for the enhancement of human capital (Sharma and Sahni, 2015). They are considered as core components of economic growth and development. More specifically, expanding the proportion of the population of healthy people will contribute to production more, enhance productivity and lead to higher levels of production. Moreover, if an individual is healthy, this will increase the life expectancy of people and then this will lead to higher savings and greater private investment in education (Kurt, 2015). On the other hand, a rise in the volume of non-healthy people in a country will decrease the labor supply, productivity and economic growth. All these things will affect people's living standards and welfare. Therefore, the government should assign a considerable share of its budget on health and education to arrange better health and education services.

The neoclassical growth theory focuses on physical capital accumulation as a fundamental catalyst for economic development. Therefore, this theory ignores the significance of human capital accumulation on economic development. However, human capital has garnered substantial significance in theories of economic growth after the seminal paper of Romer (1986). Endogenous growth theory focuses on the factors and mechanism that drive long run economic growth within a country (Romer, 1990). This theory proposes that investing in education has a substantial role in the advancements of human capital, which contributes to economic growth in the development process. Based on this theory, investing in human capital, for example, education will enhance the knowledge, skills, and abilities of workforce and this will make them more productive in the labor market. Hereby, workers will become more desirable to employers, yielding increased employment opportunities. Furthermore, as technological advancements and innovation become increasingly important drivers of economic growth, businesses require a skilled workforce to adapt to new technologies, which causes increased demand for skilled workers. The importance of health in enhancing human capital was largely overlooked during the initial stages of endogenous growth theory. However, health, just like education, has a key role in the formation of human capital (Barro, 2013). Therefore, the volume of research and studies exploring the connection between health and economic development has risen in subsequent years, giving rise to a distinct research field known as the "Health-led Growth Hypothesis" Based on this hypothesis, expenditure on health increases economic development by facilitating the accumulation of human and physical capital (Erdoğan and Erdoğan, 2023). These authors also explain that improving people's health results in higher working hours and productivity, thereby enhancing the overall efficiency of the workforce and leading to a rise in labor productivity and all these will boost their earnings and overall well-being. Reflecting the concept of the theory of human capital, a rise in human capital eventually generates a rise in productivity in both the market and non-market sectors (Grossman, 1999). Indeed, the individuals in good health are more prone to engage in educational and employment opportunities.

Education is an imperative element of human capital investment. A well-educated and knowledgeable population raises productivity and efficiency, which can contribute to the overall development and success of the nation. Cazes and Verick (2013) express that if an individual spends more time in education, this person might have a higher chance of getting a job. In addition, increasing health expenditure will improve one's health, which raises work productivity. To have a stronger level of employment opportunities, the countries should have strong human capital investments. Based on the World Bank data, Türkiye's Human Capital Index (HCI) is 0.65, positioning it as the 48th country out of 174 countries on a scale of 0-1. It means that a child born today is projected to achieve approximately 65 percent of her/his full productivity in adulthood if he/she enjoys complete education and full health (HCI, 2020).

Hence, based on the information provided, we can express that there is a connection between human capital investment and employment. Our study explores the relationship between human capital investments and employment in Türkiye using Autoregressive Distributed Lag (ARDL) method employing the data for health expenditure, education expenditure, GDP growth, employment, and inflation from 2000 and 2021. The findings of this study have a significance importance to gain an insight into the causality between human capital investments and employment for health and education policy makers. More specifically, from a policy standpoint, this study is important in helping government and policymakers implementing of policies that promote the development of sustainable health and education systems while considering their impact on economy.

In this work, Section 1 surveys the current literature. Section 2 exhibits the data and methodology of the study, Section 3 evaluates the primary findings and section 4 concludes the work.

1. LITERATURE REVIEW

Education and health are distinguished among various activities by their inherent focus on future-oriented investment for societies as they have a crucial role in effecting the transmission of economic and social frameworks. Different studies are then carried out by different scholars to evaluate both theoretically and empirically the relation among human capital, economic development, unemployment and inflation among other variables. In this section, we provide a concise overview of the findings from the literature pertaining to this subject.

Amiri and Ventelou (2012) employ a modified version of the Granger causality test offered by Toda and Yamamoto to explore the causal relation among GDP and healthcare expenditure across 20 OECD economies from 1970 to 2009. Their outcomes demonstrate the prevalence of bidirectional Granger causality among GDP and healthcare expenditure. Moreover, by using Granger non-causality tests proposed by Hsiao, Amiri and Linden (2016) examine the relation between GDP and aggregate health expenditures for 34 OECD nations between 1970-2012. They explore a bidirectional Granger causality among GDP and healthcare expenditure in most nations. Also, they find that in growth series, the relation is from economic growth to healthcare expenditure. Angelopoulos et al. (2008) delve into the analysis of the growth and welfare implications of public education expenditure in the USA during the post-war period by calibrating a standard dynamic general equilibrium model, wherein human capital plays a crucial role in driving long term endogenous growth. Their findings suggest that augmenting the public spendings on education positively influences economic growth but it may not inherently results in enhanced welfare for society.

With the significance of human capital being emphasized for economic development, researchers ponder on what stimulates healthcare expenditures. Bedir (2016) addresses this problem statement by studying health care expenditure and output in Asian, African, European and Middle East countries from 1995 to 2013. Results indicate that GDP per capita plays a substantial role in accounting for the variation in healthcare expenditure among countries. Rodríguez and Valdés (2019) explore the presence of a long-term causal relations among GDP and healthcare expenditure in a selection of Latin American and Caribbean nations, as well as in OECD countries, during the period from 1995 to 2014. Their empirical analysis reveals that GDP does not exhibit a significant long-term response to variations in the level of health expenditure. Ye and Zhang (2018) investigate the complex causal relation among health expenditure and economic growth among 14 OECD and five developing nations by employing both the linear and nonlinear Granger causality test. Their outcomes show that there is no evidence of linear and nonlinear Granger causality between health expenditure and economic growth for Australia, Austria and UK but there is a unidirectional causal relations between these indicators for Ireland, Korea and India. Furthermore, they explore that in the case of Canada, Finland, Iceland, New Zealand, Spain, Brazil and South Africa, there exists a bidirectional linear causality between these variables. Yang (2020) represents the pioneering application of the panel threshold model to investigate the link among health expenditure and economic growth for 21 developing nations from 2000 to 2016. Their results reveal the presence of important interval impacts among health expenditure and economic growth due to the differing levels of human capital.

Mekdad et al. (2014) explore the relation between education and economic growth, employing both theoretical and empirical approaches. From the theoretical part, they investigate multiple dimensions of information concerning education and economic growth. From the empirical part, they examine the influence of public education expenditure on economic growth in Algeria from 1974 to 2012, utilizing an endogenous growth model. Their model incorporates GDP in the Cobb-Douglas form including real GDP, capital, labor and education expenditures. Their empirical analysis relies on OLS, Johansen cointegration test and causality test. Their outcomes express that GDP, capital and labor have a positive influence on economic growth but their effects are relatively less pronounced compared to the impact of education in Algeria. In Nigeria, Eneji (2013) establish the relation among healthcare expenditure, health status of people and productivity. Focus is made on public healthcare expenditure from 1999 to 2012. This study takes into consideration other components that can increase productivity. Infant mortality is used as a representative measure of health status and various regression analyses are done in this work. The findings indicate that infant mortality has an adverse impact on productivity. Moreover, they find that health expenditure and health status explain approximately 53% and 46% variations in productivity, respectively. Also, they display that there is a strong causal correlation among poverty, unemployment, nutrition, health condition and productivity in Nigeria.

In addition, Boachie and Ramu (2016) study the impact of public health expenditure on the health condition in Ghana. They employ the data regarding to infant mortality, real GDP per capita, the literacy and female labor force participation rates from 1990 to 2012 applying the OLS and Newey-West regression methods. Their findings indicate that real GDP per capita, public health expenditure, education and the participation of females within the market are inversely associated with the infant mortality. Sharma and Sahni (2015) also carry out a similar study in India where they investigate the causality relation among the human capital investment in both the educational and health sector and the economic development in India from 1991 to 1992 and from 2012 and 2013. For this aim, they use the cointegration, Granger Causality analysis and VECM methods. The findings reveal a reciprocal link among investment on education and GDP, likewise among investment in

health and GDP. Improvements in human capital have also played a significant role in lowering employment volatility. Kenny and Nnamdi (2019) explore the influences of investing in human capital on the volatility of unemployment in Nigeria from 1981 to 2015. Variables used in the time series data are the government current expenditure on education, the government current expenditure on health, inflation and unemployment rate. Their results illustrate that there exist a long-term relation between human capital investment and unemployment volatility in Nigeria. Faridi et. al (2010) further unveil the influence of education and health on employment in a study conducted in Pakistan using data collected in the years 2008-2009. They employ logistic regression technique to estimate the coefficients of the variables. Their outcome shows that employment opportunities rise gradually with increasing level of education and also that the health condition of the workers has emerged as a highly influential factor to define the employment.

Saygılı et al. (2005) also carry out an analysis on human capital and the growth of productivity for 50 countries, with a detailed examination of the Turkish economy. The data used is from 1981-2002. In this study, proxy variables for human capital are utilized including the average duration of education among the labor force and the enrollment rates at various educational levels. Their observations reveal that there is a positive connection among human capital and productivity growth. However, this correlation does not hold for the Türkiye. Şenol and Onaran (2022) study the correlation among economic development, health expenditure, R&D expenditure, and unemployment in Türkiye for the period of 1990-2020. Results obtained from the Johansen co-integration analysis show that long-run relation exists among economic development and health expenditure, R&D expenditure and unemployment. They display that a 1% rise in health expenditure causes a 0.08% rise in GDP growth. Also, a 1% rise in R&D expenditure gives a 2.03% boost in economic development. Turgut et al. (2017) study the components of human capital in a slightly different approach. They analyze if there is an association among the growth rate of aggregate health expenditure and inflation and also investigate the effect of health expenditure on inflation in Türkiye by conducting Pearson Correlation Analysis. In their work, a positive association between the aggregate health expenditure growth rate and the inflation of 58.8% is existed and it is also concluded that the aggregate health expenditure growth rate has an important influence on the inflation.

The research conducted by Ak (2012), Üzümcü and Söğüt (2021) and Erçelik (2018) find that there exists a long-term relation among health expenditure and output in Türkiye. Furthermore, these studies suggest the existence of a mutual positive connection among output and health expenditure. Moreover, Üzümcü and Söğüt (2021) indicate that there exists a bidirectional causal link among health expenditure and output after employing the Toda-Yamamoto causality analysis on data for the period 1988-2019. They analyze the impacts of health expenditure and life expectancy at birth on economic development using the ARDL co-integration test. Their results on causality are different from Şenol and Onaran (2022) who conclude that there exists a one-way causality from health expenditure and output. Further research for the Turkish economy on the importance of human capital and economic development is taken by Kurt (2015). He conducts an analysis the Feder-Ram method to explore the direct and indirect influences of health expenditure on economy. The variables used in this study are aggregate and manufacturing industrial production from 2006:M01 to 2013:M10. The findings of the study indicate a reciprocal relation among the health of a population and economic growth. More specifically, government health expenditure affects output positively and contribute to a rise in overall demand and expenditures.

As depicted in the literature, the relation between health and education expenditures and economic growth has been an area of considerable interest and scrutiny in scholarly research. Despite significant differences among these studies concerning the inclusion of countries, time periods, the factors under control, data definitions and employed models, many scholars recognize these expenditures as a substantial component in pursuit of an economic goal. Our study contributes to the broader literature on the subject by focusing on the specific context of Türkiye. The primary contribution of our study lies in its unique focus on employment as the central indicator of our investigation, distinct from the conventional emphasis on economic growth observed in existing literature. Also, our study stands out from the prevailing trend in the literature, where research primarily focuses on either health or education expenditures. In contrast, our research simultaneously unveils how both health and education expenditures influence employment outcomes in Türkiye.

2. DATA AND METHODOLOGY

2.1. Data

In this work, we use annual data from 2000 to 2021. The data for inflation rate, employment to population ratio and GDP growth is obtained from IMF, ILO and World Bank, respectively. The data for government expenditure on education (% of GDP) is received from UNESCO Institute for Statistics (UIS). The data for government health expenditure (% of GDP) is gathered from World Health Organization Global Health Expenditure Database. Employing this data, we show how human capital investments affect the employment rate. Note that we have been used the data from 2021 and earlier in this study due to the lack of data beyond 2021 for government health and education expenditures.

The reason why we choose these variables in the model is that they affect the employment rate directly or indirectly such as a rise in health expenditure improves a nation's health system. Also, a rise in education expenditure promotes a nation's literacy level. Therefore, individuals who live in these nations will be healthier and more educated so more individuals will be able to work in the market (Şenol and Onaran, 2022). As it declines the unemployment rate, it will raise the employment. Additionally, there exists a positive association among GDP growth and employment. If the economy grows, it creates more job opportunities, causes to a rise in the employment (Kapsos, 2005). For the relation between employment and inflation, we can express that the findings might be mixed as it depends on the type of inflation (Jain et al. 2022). Suppose that there is a demand-pull inflation, it influences the employment positively. Also, when demand is high, businesses may even struggle to meet the increased demand with current labor resources. However, if there is cost-push inflation, it influences the employment rate negatively as prices rise, and workers demand higher wages to keep their purchasing power.

Figure 1 displays the trend in Türkiye's general government expenditure on health and education (% of GDP) from 2000-2021. In this figure, we observe that general government health expenditure around 3% of GDP in 2000 but increased to 4.4 % in 2010. The reason behind this rise might be the implementing Health Transformation Program (HTP) in 2003 in Türkiye. This program is designed to improve the health system efficiency and accessibility (Yasar, 2011). By decreasing the restrictions and enhancing access to health facilities, the HTP has likely played a significant role in shaping the trajectory of health expenditure in Türkiye. Also, between 2010 and 2015, there was a significant decrease in health expenditure. Moreover, after 2018, we observe an increase in government health expenditure in Türkiye. Since then, Türkiye has been experiencing currency depreciation. Therefore, health expenditure might be rise as it causes an inflationary pressures and an

increase in import costs. For example, a weaker currency makes importing goods and services more expensive. This can lead to higher costs for medical equipment and pharmaceuticals for healthcare. When we examine the government expenditure on education in Türkiye, we observe that it was 2.5% of GDP in 2000 but it has raised significantly between 2000- 2010 and became nearly 4.4% between 2010 -2019. Despite the decrease in the population growth rate in Türkiye during this period, the overall population continues to grow due to the factors such as improved healthcare, reduced mortality rates, and increased life expectancy. This might increase the government investments to improve the quality of healthcare facilities and expand educational opportunities. Overall, we can emphasize that government health and education expenditures are influenced by a wide range of factors, which are interconnected but the government prioritize their health and education expenditures based on the changing needs and challenges face by their population.

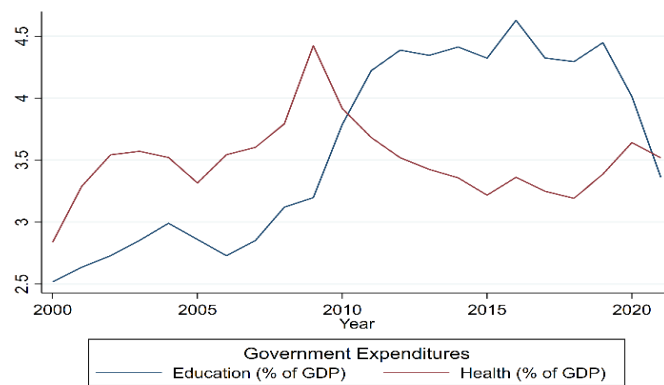


Figure 1: Health and Education Expenditure in Türkiye (2000-2021)

Figure 2 displays employment rate, GDP growth and inflation rates from 2000 to 2021. It shows that the employment rate was approximately 47% in 2000 but significantly declined and became almost 41% by 2004. In addition, from 2010 to 2018, it increased and reached to 47%. Also, GDP growth rates in Türkiye from 2000 to 2021 had ups and downs. We see that there was a negative growth rate in 2002 and 2009. It was affected by Türkiye's 2000-2001 financial crises and 2008-2009 global financial crises, respectively. Lastly, in 2000, the inflation rate was approximately 55% but it was around 8% between 2004 and 2016 in Türkiye. However, after 2019, it has an upward trend.

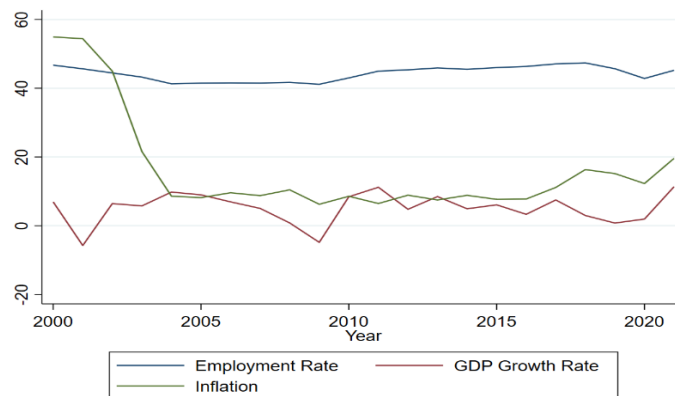


Figure 2: The Facts on Employment Rate, Inflation and GDP Growth Rate in Türkiye (2000-2021)

2.2. Methodology

This work uses an autoregressive distributed lag (ARDL) method to estimate the short run dynamics and the long run relations among the variables. The ARDL framework can be written as follows:

$$\begin{aligned} \Delta ER_t = & \alpha_0 + \sum_{i=1}^m \alpha_{1i} \Delta ER_{t-i} + \sum_{i=1}^{k1} \alpha_{2i} \Delta GHE_{t-i} + \sum_{i=1}^{k2} \alpha_{3i} \Delta GEE_{t-i} \\ & + \sum_{i=1}^{k3} \alpha_{4i} \Delta GDP_{t-i} + \sum_{i=1}^{k4} \alpha_{5i} \Delta INF_{t-i} + \phi_1 ER_{t-1} + \phi_2 GHE_{t-1} \\ & + \phi_3 GEE_{t-1} + \phi_4 GDP_{t-1} + \phi_5 INF_{t-1} + \mu_t \end{aligned} \quad (1)$$

Δ demonstrates the first difference. μ_t is the white noise error term. α_0 is a constant term. In this model, $m, k1, k2, k3, k4$ display the optimum lag lengths. The coefficients measuring short-run relationships are $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$. The coefficients measuring long-run relationships are $\phi_1, \phi_2, \phi_3, \phi_4, \phi_5$. ER is the employment rate, GHE is the government health expenditure, GEE is the government education expenditure, GDP is GDP growth rate and INF is the inflation rate. Moreover, we use ARDL bounds test for cointegration to check the presence of the long run relationship among the variables. If cointegration exists there, both the short and long run dynamic relationships can be estimated. So the error correction model (ECM) representation can be specified as follows:

$$\Delta ER_t = \alpha_0 + \sum_{i=1}^m \alpha_{1i} \Delta ER_{t-i} + \sum_{i=1}^{k1} \alpha_{2i} \Delta GHE_{t-i} + \sum_{i=1}^{k2} \alpha_{3i} \Delta GEE_{t-i} + \sum_{i=1}^{k3} \alpha_{4i} \Delta GDP_{t-i} + \sum_{i=1}^{k4} \alpha_{5i} \Delta INF_{t-i} + \phi_1 ER_{t-1} + \phi ECT_{t-1} + \vartheta \quad (2)$$

Where ϕ shows the speed of adjustment parameter and ECT is error correction term. Lastly, in this work we employ the Pairwise Granger causality test to explore the causal relation among the indicators.

3. RESULTS

In this paper, we utilize the ADF unit root test to find the stationarity of the indicators. If the t-stat is below the critical value, the data is considered non-stationary. The findings reveal that the variables are non-stationary at their original form except GDP growth but become stationary at the first difference.

Table 1: The Unit Root Test

Variables	Level Form			First Difference		
	t-stat	Critical Value (5%)	Stationary	t-stat	Critical Value (5%)	Stationary
ER	-2.78	-3.65	No	-3.67	-3.65	Yes
HEXP	-2.86	-3.64	No	-4.19	-3.65	Yes
GEE	-0.64	-3.64	No	-4.28	-3.65	Yes
GDP	-3.72	-3.64	Yes	-6.42	-3.65	Yes
INF	-1.88	-3.64	No	-3.82	-3.67	Yes

Table 2 displays the findings of the ARDL bound test conducted to evaluate cointegration. That is, it is employed to evaluate the null hypothesis of no levels relation in the data. Also, we present the results for larger and smaller sample sizes. The estimated F statistic of 7.26 exceeds the critical value of the upper bound at all the significant levels,

resulting in the rejection of null hypothesis. Hence, the relation is long run among the variables. Note that if the F stat. falls below the lower bounds, I (0), the relation is short run. Moreover, the results on the adjusted R squared have been shown to represent 76% of the behavior of the employment described by the set of independent indicators in this study. Furthermore, the results show that Durbin Watson (2.20) is greater than that of the R squared (0.76). All these results confirm that our model is a long run model.

Table 2: Bound Test (For Cointegration)

F-Bounds Test		Null Hypothesis: No levels relation		
Test Statistics	Value	Significance	I(0)	I(1)
			Asymptotic: n=1000	
F-stat.	7.263622	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
Actual Sample Size	21		Finite Sample: n=35	
		10%	2.46	3.46
		5%	2.947	4.088
		1%	4.093	5.532
			Finite Sample: n=30	
		10%	2.525	3.56
		5%	3.058	4.223
		1%	4.28	5.84

Table 3 indicates the outcomes of the estimated coefficients in the long run. When we look at the long run coefficients for employment, a 1% rise in government education expenditure causes a 1.27% rise in employment in Türkiye, which is statistically significant. Table 4 presents the findings of the estimated short run coefficient in the model. When we look at the short run coefficients, we see that there are no relationships between the employment rate and other variables determined. Additionally, Table 4 displays the ECM coefficient, which quantifies the extent to which short-term imbalances resulting from shocks will ultimately be corrected in the long term. The fact that the adjustment coefficient is both negative (-0.899617) and statistically significant further strengthens the credibility of the long-term relationship.

These results exhibit the importance of continuous investment in education to increase employment opportunities in Türkiye. Also, when we interpret the short and long run findings, in the short run, the effects of variations in government education expenditure on employment may not be immediately observed so it takes time for policies and investments in education to exert a noticeable impact on employment. Moreover, in the short run, the economy may be experiencing fluctuations or cyclical downturns, which can dampen the impact of education investments on employment. However, in long run, as the economy stabilizes, the relationship may become statistically significant.

In addition, the long run coefficient of government health expenditure is estimated to be 1.17% and is statistically significant at a significance level of 5%. This outcome expresses

that a 1% rise in government health expenditure causes a 1.17% rise in employment in Türkiye. We can interpret this finding is that the government can raise the well-being and productivity of the people by allocating resources to boost the healthcare infrastructure and healthcare services. This results in an increase in the employment rate. The long term coefficient of the GDP growth rate is estimated to be 0.76%, which is statistically significant at a significance level of 1%. It shows that if GDP growth rate raises by 1%, the employment will increase by 0.76%. That is, as GDP grows, investment increases and consumer expenditure rises which leads to more job opportunities and contributes to a decline in the unemployment in Türkiye. Also, we observe that the long run coefficient pertaining to the inflation rate is estimated to be 0.02%. However, it is important to note that it is not statistically significant. It means that the influence of inflation on employment is not deemed significant in the analyzed context for Türkiye.

Table 3: The Estimated Coefficients in the Long Run

Variable	Coefficient	Std. Error	t-Stat.	Prob.
C	8.778425	17.79943	0.493186	0.6290
ER(-1)	0.588328	0.422457	1.392631	0.1840
GEE(-1)	1.273885**	1.177227	1.082106	0.0271
HEXP(-1)	1.175851**	1.418257	0.829082	0.0476
GDP(-1)	0.760572***	0.072884	0.693863	0.009
INF(-1)	0.025844	0.049978	0.517109	0.6126

Note: ** and *** show the statistical significance levels of the estimated coefficients at the 5% and 1% levels, respectively.

Table 4: The Estimated Coefficients in the Short Run

Variable	Coefficient	Std. Error	t-Stat.	Prob.
C	0.135850	0.232991	0.583071	0.5691
D(ER(-1))	0.138847	0.296474	0.468327	0.6468
D(GEE)	0.391641	1.109209	0.353081	0.7293
D(HEXP)	-1.973936	1.112726	-1.773963	0.0978
D(GDP)	0.048247	0.053546	0.901035	0.3828
D(INF)	0.094016	0.039876	2.357707	0.0335
CointEq (-1)	-0.899617	0.395171	-3.643020	0.0030

Note: ** and *** show the statistical significance levels of the estimated coefficients at the 5% and 1% levels, respectively.

To the statistically robustness and model fit, we evaluate the presence of heteroskedasticity and serial correlation conducted on an ARDL model. The findings are shown in Table 5. According to the results, there is no strong evidence of heteroskedasticity or serial correlation in the ARDL model. The results of these tests affirm the statistical robustness and good fit of the estimated model.

Table 5: Post Estimation Tests

Breusch-Pagan-Godfrey Test for Heteroskedasticity			
F-stat.	0.780796	Prob. F(5,15)	0.5789
Obs*R-sq.	4.336844	Prob. Chi-Sq.(5)	0.5020
Scaled explained SS	2.401531	Prob. Chi-Sq.(5)	0.7912
Breusch-Godfrey Test for Serial Correlation			
F-stat.	1.560865	Prob. F(2,13)	0.2469
Obs*R-sq.	4.066333	Prob. Chi-Sqr.(2)	0.1309
White Test for Heteroskedasticity			
F-stat.	1.204279	Prob. F(5,15)	0.3540
Obs*R-sq.	6.015265	Prob. Chi-Sq.(5)	0.3047
Scaled explained SS	3.330958	Prob. Chi-Sq.(5)	0.6491

Table 6 shows the outcomes of the Pairwise Granger Causality Tests. The findings indicate that the F-stat. is 3.89 and the p-value is 0.0434. This suggests that there exists a bidirectional causality among government education expenditure and employment rate at a significance level of 5%. These results imply that previous levels of government education expenditure and employment rate can be used to estimate future level of the employment and government education expenditure. Moreover, at a significance level of 5%, this table displays that there is a causality from inflation to employment rate. Hence, we can conclude that the current inflation rate can be used to predict the future employment rate.

Table 6: Pairwise Granger Causality Test Results

Null Hypothesis	F-Statistics	Prob.
GEE ↔ ER	3.89640	0.0434*
ER ↔ GEE	5.03807	0.0212*
HEXP ↔ ER	1.48683	0.2576
ER ↔ HEXP	2.14791	0.1513
GDP ↔ ER	0.39709	0.6791
ER ↔ GDP	0.70818	0.5083
INF ↔ ER	1.76138	0.0256*
ER ↔ INF	1.50156	0.2055
HEXP ↔ GEE	1.15219	0.3424
GEE ↔ HEXP	1.47827	0.2594
GDP ↔ GEE	0.06756	0.9350
GEE ↔ GDP	0.01922	0.9810
INF ↔ GEE	0.46679	0.6358
GEE ↔ INF	1.86253	0.1895
GDP ↔ HEXP	0.41802	0.6658
HEXP ↔ GDP	0.34452	0.7140
INF ↔ HEXP	0.57745	0.5733
HEXP ↔ INF	1.25313	0.3139

INF ↔ GDP	1.19903	0.3288
GDP ↔ INF	1.01323	0.3866

Note: “↔” means “does not Granger Cause”.

CONCLUSION

The aim of this study is to delve into how Türkiye’s human capital investments influence employment from 2000 to 2021. To identify the presence of unit root in the study, we employ the ADF test. According to the results, our variables are non-stationary at their original form except GDP growth but become stationary at the first difference. Then to search the short and long term influence of human capital investment on employment, we use the ARDL model. Also, the ARDL bound cointegration test is used to explore whether cointegration exists or not. Lastly, to examine the causal relationships among indicators, the Pairwise Granger Causality test is employed.

The findings demonstrate that based on the long run coefficient, a 1% rise in education and health expenditure and GDP growth rate lead to a 1.27%, 1.17% and 0.76% increase in employment in Türkiye, respectively. These results imply that an increase in health expenditure will improve overall health outcomes and similarly, a rise in education expenditures is expected to foster higher literacy levels in the population which lead to increased human capital formation and consequently contribute to employment in Türkiye. Also, we explore that the results are not significant to interpret the impact of inflation on employment.

Moreover, our findings point out the fact that in the short run, the variations in government education and health expenditures may not have an immediate impact on employment. Hereby, ongoing investments in education and health are essential to boost the employment opportunities in Türkiye in the long term. Also, to raise the productivity of the workforce, the government should improve the healthcare services and infrastructure and increase its expenditure on health and education as these investments serve as a crucial determinant that enhancing the level of human capital and population’s welfare, resulting in higher employment.

Furthermore, the Pairwise Granger Causality test findings reveal that government education expenditure on human capital influences employment in Türkiye and vice versa. More specifically, the identification of bidirectional causality between government education expenditure and employment rate highlights the potential for a virtuous cycle, where investment in education can lead to higher employment and in turn, a more educated and skilled workforce can contribute to further economic growth. Also, we find that there is a causality between the employment and the inflation.

In the context of future research, there are several independent variables that could be considered to further explore the subject matter. Among these variables, population growth stands as a significant factor deserving attention. A growing population has the capacity to generate higher demand for goods and services, compelling businesses to increase production and employ more workers to meet the increasing demand. Moreover, instead of solely focusing on government health and education expenditures, private health and education expenditures can be included into the model as their inclusion can offer valuable insights into the overall human capital investment view. Lastly, labor demand might be different across industries and sectors, hereby, the industry and sector specific factors can be included into the model.

Statement of Research and Publication Ethics

This study has been prepared in accordance with the rules of scientific research and publication ethics.

Authors' Contribution Rates

The author's contribution to the article is 100%.

Declaration of Interest

There is no conflict of interest arising from the study from the point of view of the author or from the point of view of third parties.

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