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The Relationship between Health Expenditures and Foreign Direct Investment: Analysis of the ARDL Cointegration Approach and Toda-Yamamoto Causality

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Abstract The health sector comprises lots of themes which are health expenditures, health investments, the pharmaceutical and medical equipment industries, and health tourism. Health investments are often closely related to foreign direct investments. The priority motivation of foreign direct investments in field of health is humanistic development in other words, promoting human health. Investing in the health sector is difficult and carries inherent risks, despite the various contributions of FDI to a country's economy. The conneciton between health expenditures in GDP, FDI in GDP, service trade volume in GDP and the number of doctors has been examined for Turkey with ARDL analysis between 1975 and 2019. Obtaining results show a long-term correlation among the variables for analysis period.

Keywords Health expenditure · Foreign Direct Investments · Cointegration and Causality Approach

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The Relationship between Health Expenditures and Foreign Direct Investment: Analysis of the ARDL Cointegration Approach and Toda-Yamamoto Causality

The World Health Organisation (WHO) defines health as: "health is not only the absence of disease and infirmity but a state of complete physical, mental and social well-being" (WHO, 2020). The elements that reflect economic aspect of health are health expenditures, health service financing, budget provision for health, regulation of health services, resource allocation, function of the public in health, supervision of all these and health-related situations (Dilek & Konak, 2023, p.19-21). The health services sector can be stated as a service market, where consumers and producers interact as a part of of goods and services, and where the continuous control of these interactions is ensured (Kocasoy, 2014, p. 5- 11). In the health service market, demand is generally uncertain and supply exceeds demand (Boutsioli, 2010). On the other hand, life expectancy of human is a main determinant of their health expenditures. Health expenditure is a the health indicators and it reveals the quality of health services in countries. All of these are features that attract the attention of countries and lead them to revise their policies accordingly (Abdullah Siddiqua & Huque, 2017, p. 5-7). In essence, health expenditures refers to “the expenses incurred during the provision of health services." (there are three main types of health services: preventive, curative and rehabilitative. Preventive healthcare (health services) is health services for the individual and the environment. Curative health care consists of outpatient treatment, inpatient treatment, which is an advanced stage, and advanced technology supported treatments. Rehabilitative health services are medical and social rehabilitation). In more detail, health expenditures can be defined as follows: "Expenditures on buildings and infrastructure of health institutions, expenditures on health labor force and equipment, investment expenditures to improve physical and mental health conditions of citizens, investment expenditures on environmental health, investment expenditures on the production of drugs-medical equipment and diagnostic-imaging devices, investment expenditures on health education, investment expenditures on monitoring and research for optimum stock of health goods, personnel and organisation planning, investment expenditures on disease-drug side effects-distribution, etc.". R&D (research and development) expenditures, standardisation-quality-device calibration-monitoring expenditures." (Zorkun & Bülbül, 2022, p. 253-254). Among these, pharmaceutical expenditure represents a significant proportion of health expenditure (Eren, 2015, p. 149-150). In summary, health expenditure refers to all expenditure on health services provided in line with the needs of society and all expenditure made to restore health when it has been lost (Karababa, 2017, p. 60).

In the last period, particularly in developed countries, the aging of the population by an average of 5% has stimulated to significant inrease in health expenditures for therapeutic purposes (Karababa, 2017, p. 60). It has been observed that health expenditures increase day by day in OECD countries. In this direction, patients also look for alternative ways to receive more cost-effective health services. Especially the healthcare of developing countries attracts the attention of developed countries in this regard. Therefore, health services are becoming increasingly internationalised (Timmermans, 2004, p. 454).

In developed countries, the rise in the senescent population and the consequent rise in health expenditures, high-cost treatments, long waiting times, the development of communication technologies, the relative cheapening of international flights, the relative favourability of exchange rates, the strain on social security institutions as a result of the increase in cost burdens in social security and the strain on the state

in financing health services have opened the door to new searches for international patients and investors (Binler, 2015, p. 6).

In recent years, the international healthcare sector has experienced a period of accelerated growth, driven by increasing trade, developing media and a globalised world. The World Trade Organisation (WTO), in its "The General Agreement on Trade in Services (GATS)" signed in 1995, included many service sectors, especially health services, in international trade regulations (Mortensen, 2008, p. 5). Thus, international healthcare has become open to development as a new commercial field. The sector enables patients to undergo health-care services from outside, to put it another way from abroad or branches in other countries (Jackson & Barber, 2015, p. 20-21). However, for a country to realize international trade in health service, its health infrastructure must be good. The number of medical doctors or specialist (including the number of all health-care providers), the good condition of health expenditures, the number of hospital beds and hospitals will provide an advantage to countries for the provision of health services internationally (Sakala, Kolster & Fundani, 2013, p. 8).

International healthcare can generally be implemented in the ways specified by GATS (Smith, Chanda & Tangcharoensathien, 2009, p.594). These forms of implementation are as follows (UN et al., 2012, p.112-113; Chanda and Richard, 2006, p. 247):

- Cross-border supply: here, no one travels across the border, so It is exactly like trading goods. Telemedicine services and diagnosing patients via internet are related to this service.
- Consumption abroad: It is where a patient in a country travels to other countries to get medical support and services.
- Commercial presence: It implies when a service provider in a country provides the service in the territory of another country. In this context, commercial assets are held to establish close contact between the consumer and the producer. It refers to foreign direct investments in service areas such as health, education, finance, insurance, etc. The service provided by a hospital with foreign capital can be given as an example.
- Presence of natural persons: The application is in the form of a non-permanent presence of real people; the temporary presence of a person in a country other than his/her own country to provide a commercial service is within the scope of this type of service.

Health is a crucial component of human capital. The development of the health system is an essential factor in the decision-making process for foreign direct investment and investors. In this context, it is important to investigate how the developments and advancements on health in Turkey affect the foreign direct investments flow to the country. This study makes a difference in the literature with its analysis period and analysis method. Also, in this study, number of doctors and trade openness rate data are used different from others.

Until this point, health expenditures have been mentioned and it has been emphasized that the WTO states that international health service provision can be made. In the subsequent sections of the work, firstly, the connection between international health services, foreign direct investment and health expenditures has explained theoretically and the characteristics of FDI in health have mentioned. After that, there are some examples from around the world to illustrate this topic. Finally, the relationship between health expenditures and FDI has been analysed empirically.

International Health Services and Foreign Direct Investment

In last decades, healthcare has become one of the favorite sectors that can be actively offered in the international market, like manufacturing and many other service sectors. The globalisation of the sector is reinforced by increasing in trade and foreign direct investment (FDI) (Shenkar Liang & Shenkar, 2021, p.1). The most important determinants of FDI are; openness to foreign trade (foreign trade volume/gross national product), infrastructure systems, market size, labor costs and labor productivity, geographical proximity, trade deficit, technological competitiveness, quality of life, political risk, incentives and operating conditions (Kurtaran, 2007, p. 374-376). These determinants are also valid for health services. On the other hand, there are reasons to allow FDI in healthcare. These are the reduction of costs, the reduction of health pressure on the public, the possibility of access to better quality services and the potential for increasing health tourism (Zimny, 2011, p. 3-4). FDI can help state intervention in the health sector in terms of compulsory production, export bans and facilitating imports. In addition, implementing and potentially strengthening FDI in pandemic-related industries may be beneficial for national security and public health. However, contracts are signed to support public health policies and minimize investor and host country disputes (UNCTAD, 2020, p. 89).

Health expenditures can be financed from domestic sources (tax, insurance, etc.) or foreign direct investment, portfolio flows or commercial loans. In other respects, the provision of medical and health-care services through FDI may sometimes be allowed to improve the health of poor people (Smith, 2004, p. 2314-2315). Additionaly, FDI in health services both offers opportunities and poses some risks to countries. Table 1 presents these risks and opportunities. Accordingly, international investment from outside in health services enables the development of services in areas such as infrastructure, technology and quality. In addition, FDI increases the exports of health services by decreasing the imports of health services, thus it helps the internationalisation of services. However, the risks of FDI in health services must be taken into consideration by all market actors. These risks are issues such as inequality among patients, increased burden in health services, imbalance in resource distribution and internal brain drain. In addition to this, the role of the government in healthcare is to provide a fair distribution of medical support and care. Therefore, the government establishes a balance between all citizens of the country and health tourists in international healthcare (Batbaylı, 2021b, p.125-126). Therefore, FDI inflow in health services should be carried out under the supervision of the government, taking into account the possible risks.

Table 1

Risks and Opportunities of FDI in Healthcare

	Threats	**Opportunities**
Capacity	Occurence or acceleration of internal brain drain by attracting more qualified medical doctors and workers.	Elimination of supply shortages Prevention or inversion of brain drain
	Insufficiency of medical rescurces in public institutions	To put into practice newly attainable services, equipments and treatments
Quality	Deterioration of the quality of public services because of the scarcity of high-quality resources.	Know-how and technology and knowledge boosts and transfers
	More than adequate investment in advanced private sector technology by government at the cost of other social and public health needs.	Competition between suppliers increases standards and quality and also decreases prices
	Aggravation of two-fer healthcare market	Minimization of financial respnsibility of government

	Threats	Opportunities
Equity	Crowding out of poorer patients Cream-skimming of weather patients	Re-distrubution of government expenses to the public health care

Source: Mantovani, 2020.

In a report published by the United Nations in 2021, basic (key) investment policies are given when investors invest in health. The purpose of this is to protect the sector. According to these policies in Tablo 2, investments can be made in the areas of administration, health infrastructure and health services. FDI inflows to these areas are accepted within certain limits and various incentives and facilities are provided for investments.

Table 2

Essential Investment Practices in the Health Sector

Industry	Entry and acceptance	Investment promotions and enabling	Investment incentives	International practices
Manufacturing	• FDI limits	• Investor targeting	• Specific to healthcare sector	• Preversation of IP rights
	• Provisory entry	• SEZs		• Investment preversation
	• FDI screening	• Health or Medical Sector Clusters • Further assistance	• As a part of general manufacturing systems	• Access to ISDS
Health Infrastructure	• FDI limits	• Investor targeting	• Specific to healthcare sector	• Investment preservation
	• Approval procedures			• Access to ISDS
	• Provisory entry		• As a part of general investment systems	
	• FDI screening			
Health Services	• FDI prohibition	• Further assistance	• Specific to healthcare sector	• Market access and national treatment
	• FDI limits	• Health and medical expositions		
	• Provisory entry	• SEZs	• As a part of general innovation support systems	• Investment preservation
	• FDI screening	• Health or Medical Sector Clusters		• Access to ISDS

Note: IIA = International investment agreement, IP = Intellectual property, ISDS = Investor-State dispute settlement, SEZ = Special economic zone, TRIPS = Agreement on Trade-Related Aspects of Intellectual Property Rights. a Applies primarily in developing countries, b Applies primarily in developed countries.
Source: UNCTAD 2021: 134.

Foreign patients (health tourists) who receive health services for consumption abroad can receive the service relatively easily as in their own countries. However, an investor who wants to hold commercial assets

in terms of healthcare faces many obstacles. More specifically, foreign firms that establish subsidiaries or branches that provide services in another country are often subject to economic restrictions. To decide whether a foreign firm's market entry is guaranteed on economic grounds, it is crucial to conduct a comprehensive review of the economic criteria and to be aware of the limitations on foreign capital participation (WTO, 2022).

Restrictions on foreign investment in healthcare have been introduced by "the Organisation for Economic Development and Cooperation (OECD)". Some of these are given below (Blouin, 2006, p. 172-173):

• All ownership, which is foreign, is not allowed, joint venture with local facility is obligatory.

• It is given to foreign ownership confirmation depending on policy directives and issues of general national interest.

• According to economic need or "net national benefit" condition, foreign investment is approved.

• Confirmation is given to foreign investment conditional on recognition of certain performance (for example, export achievements, contribution of local personnel, technology transfer, use of local goods and services).

• Acquisition of existing firms may be allowed with foreign capital limited to minority shares only.

• Some activities or sectors can only be reserved for investment by citizens.

• There are restrictions on land acquisition and "the composition of the board of management".

• Investors should focus on economically disadvantaged groups or regions.

Similarly, there may be restrictions on foreign investment in the healthcare sector:

• The right to limit the commercial establishment of foreign healthcare suppliers to natural (real) people,

• The right to demand that foreign-owned facilities ensure education to citizens,

• Limitations on foreign capital participation and types of legal entities allowed,

• There are restrictions on foreign investment in insurance services.

• Additionally, an economic need test can be applied for foreign investment in hospital services.

"Health" contributes to the development of countries and it is considered an indicator of the development of a country. For this reason, health expenditures have a significant share in the budget for both individual and public purposes. However, due to the unpredictable, non-substitutable and indispensable nature of health, sometimes there are sudden changes in private and public health expenditures. In addition, health care, which is the responsibility of the government, has a significant share in the gross domestic product (GDP) (Batbaylı, 2021a, p. 50; Batbaylı, 2021b). A higher share of the public than the private sector in total health expenditures and a good health infrastructure are desirable conditions for increased welfare. On the other side, health expenditures are beneficial to individuals and concern the whole society with their externality effect (Zorkun & Bülbül, 2022, p. 253). However, the expectation that the portion of health expenditures in GDP will increase, puts pressure on public and private health expenditures. Therefore, health expenditures made through foreign direct investment also confer a benefit the country where the investment is made. However, the potential for private health expenditures in the country can go to the health facility that comes with FDI. In this context, while foreign investors and the accompanying foreign human capital benefit, the health expenditure pressure on the public may not change. However, if local goods and services are used in the health facility in question, the public burden can be alleviated and it

can contribute to the country's economy. On the other side, since the risks and restrictions arising from the investment are determined to protect the country's health service, these must be taken into consideration. Thus, ensuring that the national health service is not damaged will be prioritized.

Examples of FDI in Health

Foreign direct investments, which are one of the ways to make health services international, manifest themselves as quality service and developed infrastructure in host countries. For this reason, countries such as Thailand, Nepal, India, Sri Lanka and Indonesia have become increasingly open to FDIs in health. For instance, it was planned to establish a big hospital in Delhi. Consequently, India has granted approval for a German company to participate in this scheme with 90% foreign capital. Several private corporate hospitals have been established between Canada, Australia and India. One of them is a heart center that is US$40 million (United States). Besides, It is clear that corporate medical centers like hospitals in developing countries establish a commercial presence overseas. For example, “Apollo Hospitals” in India has built a hospital in another country and it plans to invest around US$4 billion to establish 15 new hospitals in Malaysia, Sri Lanka, and Nepal.

Healthcare firms in some developing and industrialised countries are increasingly engaged in alliances and joint ventures, resulting in different regional healthcare chains and networks. For example, “Singapore-based Parkway Group” has acquired hospitals in Asia and the United Kingdom. Joint ventures have been established with partners in the United Kingdom, India, Sri Lanka, Malaysia and Indonesia to form Gleneagles International, an international hospital chain. In these particular, other examples are as follows: Raffles Medical Group in Singapore has established global strategic alliances with healthcare organisations from industrialised countries. These partnerships are being used to develop an integrated network of healthcare firms providing high-quality and cost-effective health services (Chanda, 2002, p. 159). "Cleveland Clinic" in the US manages a facility in Abu Dhabi. It has constructed a new hospital there. "Hospital Punta Pacifica" in Panama City is a subsidiary of US-based "Johns Hopkins International". Dallas-based "International Hospital Corporation" manages several hospitals in Mexico. It has established new hospitals according to American standards. The services in Mexico are advertised as "offering quality healthcare at relatively low Mexican prices" in the United States. "Wockhardt" in India, is affiliated with "Harvard Medical School" (Zimny, 2011, p. 11). Spain has changed its FDI screening procedure through several decrees to address concerns triggered by the COVID-19 pandemic. The new regime clearly states that acquisitions of more than 10% of capital exceeding €1 million in various sectors, including healthcare and biotechnology, must be reported. Besides, the new regime applies to European Union (EU) investors where at least 25% is owned by a third-country investor. Although the changes were initially temporary, they appear to have been made permanent (Burnside et al., 2020).

Literature

A review of the existing literature reveals a paucity of studies that have investigated the connection between foreign direct investments in health and health expenditures. For this reason, studies on national and international health services that are closest to the subject are included (Table 3).

Table 3

Literature Search

Author	Year	Subject	Method	Result
Barro	2003	The impact of social variables and economic variables on economic growth were examined.	Panel data analysis	The international trade openness rate affects economic growth positively, while health indicators negatively affect economic growth.
Alsan Bloom & Canning	2006	The impact of public health on FDI inflow has been investigated.	Panel data analysis	FDI in low, middle income countries is strongly influenced by public health.
Outreville	2007	The relation between health and FDI was examined.	Spearman rank correlation	FDI has been found to have a significant impact on primary healthcare infrastructure and many healthcare systems.
Erdoğan & Bozkurt	2008	The relationship between life expectancy and economic growth was examined.	ARDL analysis	A positive relationship has been seen between economic growth and life expectancy.
Korkmaz et al.	2014	The relationship between health tourism revenues, health expenditures and number of tourists was investigated.	Regression, Frequency analysis	The number of tourists affects health tourism revenues and health expenditures.
Unver & Erdoğan	2015	The impact of FDI on health expenditures, education expenditures and social security expenditures was examined .	Dynamic panel method	The impact of FDI inflows on health expenditure, educaiton expenditure is negative.
Göçer & Aydın	2016	The relationship between health expenditures, the number of doctors and tourism service revenues was examined.	Kapetanios unit root test, Maki cointegration and Toda-Yamamoto causality analysis	There is cointegration and causality relation between variables.
Magombeyi & Odhiambo	2017	The relationship between poverty decline and FDI has been examined.	ARDL analysis	Poverty reduction has a positive effect on FDI in the short term.
Burns et al.	2017	The health effect of foreign direct investments in low-middle-income countries has been examined.	Panel data analysis	FDI provides a general benefit to public health in low-middle-income countries.
Giammanco & Gitto	2019	The different national institutional factors in FDI has been investigated.	Panel Data Analysis	Public health are positively related to FDI.
Shahid Siddique & Liaqat	2019	It aims to examine the relationship between health, FDI and income.	Panel Data Analysis	Income, FDI and health are related each other strongly.
Esener & Karadağ	2020	The relationship between the life expectancy, one of the health indicators and economic growth was examined.	ARDL analysis	There is a positive relationship between the variables.
Tokmak & Sönmez	2021	The relation between GDP per capita, FDI, external openness rate, health expenditures,	Panel Data Analysis	As aresult; GDP, health, public, education expenditures, exports, FDI, life expectancy, inflation and trade openness are positive;

Author	Year	Subject	Method	Result
		education expenditures, public expenditures, birth rate, life expectancy and inflation rate was examined.		Fertility rate and imports have a negative impact.
Biri	2021	It aims to determine which factors are more effective in health tourism and investments for health tourism.	Engle-Granger Cointegration Analysis	Private health investments and exchange rates affect health tourism income in the short and long term.
Verma	2021	The impact of increasing FDI inflows on healthcare capacity has been examined.	Regression Analysis	FDI has been found to affect a country's health expenditure capacity in the short and long term.

The connection between health indicators and various economic indicators has been frequently examined in the literature. What makes this study different from others is to investigate the long-term relationship between foreign direct investments and health indicators that contribute to health expenditures in Turkey. The combination of health indicators and indicators that lead to international trade is important in terms of its contribution to the development of the sector and health tourism.

Data Set and Methodology

This work is aimed to analyze the connection between international trade and health services, taking into account health expenditures, foreign direct investment, the trade openness rate in the service sector and the number of doctors in Turkey. In this context, Autoregressive Distributed Lag (ARDL) analysis will be applied using 1975-2019 annual data. The variables and their sites are given in Table 4.

Table 4
Data Set

Health expenditure in GDP **(sh)**	OECD Health Data
Number of doctors (per 1000 people **(ds)**)	OECD Health Data
FDI in GDP **(dyy)**	Worldbank
Trade openness rate* **(da)**	Worldbank

Note: This formula expresses the foreign trade volume in GDP. Service trade is taken into account as foreign trade volume. It is calculated as follows: External openness ratio (index): (Export+Import/GDP)*100

It has been stated in the previous parts of the study that the selected variables are theoretically related to each other. “Sh” and “ds” variables are among the most used health indicators in the literature. FDI facilitates the internationalisation of the healthcare sector. The increase in the share of “Dyy in GDP” shows whether the country in question can easily accept foreign capital and paves the way for internationalisation. Furthermore, considering that health services operate in coordination with many other sectors, FDI in the context of both goods and services is linked to the expenditures made for optimal health, which is an essential component of human life. Because of healthcare is a service industry, while the "da" variable has been calculated, only international service trade is considered.

Methodology

In this research, the connection between health expenditures and foreign direct investments will be tested with cointegration analysis. However, before the cointegration test, it is necessary to ensure that the

series are stationary or in what order they are stationary. In addition, the stationarity of the series prevents the emergence of spurious regression problems in the analysis we will apply (Kaya & Belke, 2017, p. 34). For this reason, primarily Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests, which are basic unit root detection model, will be used. In economies that are frequently affected by the economic conjuncture, the time series variables are likely to contain unit roots with structural breaks. Because of the length of the series and a dynamic economic environment, it is most likely that the economic time series data can show more than one break. For this reason, Lee and Strazicich (LS) unit root test can give more reliable and robust results (Yardımcı, 2024, p.30). And also, the Lee and Strazicich (LS) test, which consider stuctural breaks and change in regime, will be used in the work. The test results indicates that the time of the structural break should be included in the alternative and null hypothesis (Şen & Şit, 2015, p. 6756). In the LS test, if the alternative to the null hypothesis is "there is a structural break", the series contains a unit root with a structural break. This situation is explained by Lee and Strazicich (2003, 2004) as "non-stationary alternative hypothesis with structural breaks" (Yıldırım, 2009, p. 329).

Variables in time series are often not stationary. Therefore, stationary properties of the series are detected by applying various unit root tests. However, variables may not always be equally stationary. If this situation is valid, it is recommended to use the ARDL method. In addition, this feature of the ARDL approach, which provides safe results for small samples, makes it much more useful than other cointegration approaches (Chandio et al, 2020, p. 5). While we apply the cointegration test, we should detect and determine the cointegration order of each variable. Nevertheless, depending on the strength of the unit root models, various models give different results. In the light of this situation, Pesaran and Shin (1995) and Perasan, Shin and Smith (2001) offer a different model for cointegration. This procedure, known as the ARDL Model, is not to need the classification of variables as I(1) or I(0) and this situation is advantageous. Unlike standard cointegration tests, does not detect a unit root preliminary test (Sharifi-Renani, 2008, p. 4). Nevertheless, if the variables are integrated to the second or greater degree, the analysis in question cannot be applied. In the model, the difference of the explained variable is used. Independent variables can happen in two ways. The difference of the explained variable can start from the first order lag, other variables can start from the zeroth lag or the first order lag of all independent variables is included in the model. The ARDL analysis equation (1) and hypothesis are as follows (Esen, Yıldırım & Kostakoğlu, 2012, p. 257):

$\Delta sh_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta sh_{t-p} + \sum_{i=1}^{p} \beta_2 \Delta ds_{t-p} + \sum_{i=1}^{p} \beta_3 \Delta da_{t-p} + \sum_{i=1}^{p} \beta_4 \Delta dyy_{t-p} + \gamma_1 sh_{t-p} + \gamma_2 ds_{t-p} + \gamma_3 da_{t-p} + \gamma_4 dyy_{t-p} + ?t$ (1)

$H_0 : \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$ There is no cointegration (null hypothesis).

$H_1: \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq 0$ There is cointegration (alternative hypothesis).

t sybolizes time, β_0 is the constant term, β_x and γ_x is the regression coefficient and u is the error term of the model. Hypotheses are tested with the Wald test and F statistics. If the computed F statistic is above the upper level of the band, the null hypothesis is not accepted, and then we can say there is cointegration. If the computed F statistic is under the lower level of the band, it implies that there is no cointegration and the null hypothesis can be accepted. If the result is between the lower and upper bound, it is in the area of uncertainty (Sharifi-Renani, 2008, p. 4; Esen, Yıldırım & Kostakoğlu, 2012, p. 257).

In this study, after the ARDL analysis, the Toda and Yamamoto (1995) Causality test, which emerged with the development of the Granger Causality test will be applied. Granger causality test is found by adding the lagged value of a series to the equation for another series in the regression (Kutlar, 2017, p. 10). However, the

fact that the variables have different degrees of integration assumes that the results of the Granger (1969) test may be biased. The difference between the Toda and Yamamoto (TY) test and the Granger test is that loss of information is prevented by including the level values of non-stationary variables in the analysis. In order to apply the TY approach, first the unit root test is performed. Accordingly, the stationarity level of the highest degree stationary series is the maximum degree of integration ($d_{\max}$). Then, the appropriate lag length (p) determined by the unconstrained Vector Autoregression (VAR) model is used in the TY test ($d_{\max}$ + p). TY causality analysis is performed with the VAR model, which is re-estimated by taking into account the highest degree of integration and delays (Özaydın &Apaydın, 2019, p. 670). There is separate results emerge for both variables in the TY (Doğan, 2017, p. 24). The equation (2) is as follows (Meçik & Koyuncu, 2020, p. 2626):

$$Y_t = \alpha + \sum_{i=1}^{p+d_{\max}} \alpha_{1i} Y_{t-1} + \sum_{i=1}^{p+d_{\max}} \alpha_{2i} X_{t-1} + \mu_{1t} \quad (2)$$

$$X_t = \alpha + \sum_{i=1}^{p+d_{\max}} \beta_{1i} X_{t-1} + \sum_{i=1}^{p+d_{\max}} \beta_{2i} Y_{t-1} + \mu_{1t}$$

H_0 : There is no Granger causality relationship from Y to X. H_1, there is an alternative.

H_0 : There is no Granger causality relationship from X to Y. H_1, there is an alternative.

Results

In this part of the study, the results of the analysis applied according to econometric methodology are included. When Table 5 is examined, in line with both ADF and PP test results, except for the foreign direct investment variable, all others are stationary to the first degree. While the variables of health expenditures, number of doctors, and external openness rate are I(1), the foreign direct investment variable is I(0).

Table 5

Result of Basic Unit Roots Tests

Variable	ADF*				PP*			
	Level		1st		Level		1st	
	t-stat	prob	t-stat	prob	t-stat	Prob	t-stat	prob
da_t	-2.76	0.21	-4.85	0.001	-2.76	0.21	-4.51	0.004
ds_t	-1.18	0.9	-4.32	0.007	-0.29	0.98	-4.37	0.006
dyy_t	-4.72	0.002	-	-	-4.99	0.001	-	-
sh_t	-2.38	0.38	-7.18	0	-1.9	0.63	-7.08	0

For the ADF test, a model with constant and trend was selected with the SIC information criterion. Bartlett kernel and Newey-West Bandwidth criteria were chosen for the PP test.

Table 6 shows the result of the Lee and Strazicich unit root test with structural breaks, which allows two breaks. Obtaining test statistic values are interpreted by comparing them with the critical values of Lee and Strazicich (1999). Accordingly, da_t , ds_t, sh_t test statistics values are less than the critical values in model A. Results for Model C differ. The test statistic value of dyy_t is less than the critical values in both models. We interpret these resutls as follow; the basic hypothesis is accepted, the series contain unit roots with structural breaks and are not stationary.

Table 6

Result of Unit Roots Tests with Structural Breaks (L-S)

Variable	Model	Lag	Break Date	Test Stat.	Critical Values*		
					1%	5%	10%
da_t	A	0	1990, 2005	-2.42	-4.54	-3.84	-3.5
	C	1	1988, 2015	-8.91	-5.82	-5.28	-4.98
ds_t	A	1	1982, 1984	-2.05	-4.54	-3.84	-3.5
	C	3	1988, 2005	-5.6	-5.82	-5.28	-4.98
dyy_t	A	4	1982, 2005	-3.12	-4.54	-3.84	-3.5
	C	4	1986, 2000	-3.59	-5.82	-5.28	-4.98
sh_t	A	3	1990, 1995	-2.33	-4.54	-3.84	-3.5
	C	3	1983, 2001	-6.81	-5.82	-5.28	-4.98

Note: Critical values are taken from Lee and Strazicich (1999).

When the break dates are analysed, it is observed that after the 1980s, the externalisation policies of the Turkish economy have affected the trade openness index (ratio) and foreign direct investments. In particular, between 1980 and 2000, it had been adopted political and legal regulations concerning financial markets. Increasing foreign capital inflows in the 1990s had a significant impact on the national economy. The share of foreign direct investments in GDP showed a break in 1982, 1986, 2000 and 2005. On the other hand, the globalisation of the service sector all over the world since the 1970s has pushed countries to work in this field. In Turkey, the share of the service sector in GDP increased significantly in 1990. The volume of the service sector, which has an important economic-political value in the country's international trade, mainly includes tourism, health tourism, transport and communication sectors (TUIK, 2022). Similarly, after the 1980s, investments and expenditures in the field of health in Turkey had increased, with the health infrastructure had targeted for improvement and legal arrangements had made in this direction (T.C. Ministry of Health, 2012, p. 45-57).

It has been observed that the stationarity levels of time series reveal different results according to unit root tests with and without breaks. However, it was observed that the variables were not cointegrated into the I(2) order. Therefore, ARDL analysis can be applied. The structural break dates revealed in the LS test were taken into account in the cointegration analysis.

In the ARDL analysis, a constant model was selected and the appropriate lag length was determined as 4 according to Akaike Bilgi Kriteri (AIC), Schwart Bilgi Kriteri (SIC), Hannan Quin (HQ) values. It has been observed that there is no problem in the ARDL (4, 3, 4, 1) model created in this context and that it satisfies all assumptions (Table 5). When the bounds test results in Table 7 are examined, the F-statistic of 6.396 value is greater than the significance level of 10% and 5% critical upper limit value (3.983 and 4.733, respectively). Accordingly, the H_0 hypothesis cannot be rejected and there is a cointegration relationship between the variables at 10% and 5% significance levels.

Table 7

ARDL Model Boundary Test Results

k	F-stat**	Importance Level	Critical Values	
			Lower Limit	Upper Limit
3	6.396	10%	2.893	3.983
		5%	3.535	4.733
		1%	4.983	6.423
		Assumptions of the model		
		R-squared	0.98	
		Adjusted R-squared	0.96	
		F-statistic	62.01	
		Prob(F-statistic)	0.00	
		Durbin-Watson stat	1.82	

Notes: Breusch-Godfrey Serial Correlation LM Test; F-statistic (Prob): 0.8068, ObsR-squared (Prob): 0.6469. Heteroskedasticity Test: Breusch-Pagan-Godfrey; F-statistic (Prob): 0.1607, ObsR-squared (Prob): 0.1917, Scaled explained (Prob): 0.9947. Normality Test; Jarque-Bera: 0.0184 (Prob: 0.9908). According to the results here, there is no autocorrelation and heteroscedasticity problem in the model. In addition, the model is normally distributed. ** is significant at 5% and 10% level.

Table 8 presents the long-run variable coefficients according to the ARDL model. Probability values of the variables are not significant. Accordingly, the change in the share of foreign direct investments in GDP positively affects health expenditures in GDP. However, an increase in the number of doctors per 1000 people decreases the share of health expenditures in GDP by affecting it negatively. Turkey's openness to foreign trade in the service sector has a positive effect on the share of health expenditures in GDP.

Table 8

ARDL Long Term Period Results

Variable	Coefficient	t-Statistic	Prob
dyy_t	0.072	0.509	0.615
ds_t	−0.010	−0.017	0.986
da_t	0.125	1.475	0.154

Table 9 presents the findings of the short-run error correction model calculated over the ARDL model. The error correction term (ecm) is less than 1 and the probability value is significant. Moreover, since the coefficient of ECM has a negative sign as expected, it can be said that the model works. Accordingly, the deviation between the variables in the long run converges by 27% in the next period and the equilibrium is restored. In the short term period, a change in foreign direct investments in GDP positively affects the health expenditures in GDP. A change in the number of doctors affects health expenditures negatively. 1% change in the number of doctors reduces the health expenditures in GDP by −1.41% in the short run. However, the increase in Turkey's openness to foreign trade in the service sector has a negative effect on health expenditures in the short term period.

Table 9

ARDL Short Term Period Results

Variable	Coefficient	t-Statistic	Prob.
d(sh(-1))	0.275	2.041	0.0534***
d(sh(-2))	0.515	3.786	0.001*
d(sh(-3))	0.549	4.263	0.0003*
d(dyy)	0.038	1.61	0.1216
d(dyy(-1))	0.0058	0.236	0.8153
d(dyy(-2))	0.05	2.285	0.0323**
d(ds)	−1.414	−1.78	0.0887***
d(ds(-1))	−2.621	−3.151	0.0046*
d(ds(-2))	−0.105	−0.145	0.8856
d(ds(-3))	−1.757	−2.781	0.0109**
d(da)	−0.002	−0.323	0.7496
c	0.843	5.85	0*
Ecm(-1)*	−0.273	−5.392	0*

Note: It is significant at *1%, ** 5%, ***10% levels.

Figure 1 and Figure 2 presents The CUSUM test (Cumulative Sum of Recursive Residuals) and the CUSUM-squared test (Cumulative Sum of Squares of Recursive Residuals) are depend on the cumulative sum of recursive residuals depended on the first set of n observations. It is upgraded recursively and is plotted against the break points (Baharumshah Mohd & Mansur Masih, 2009, p. 239). If the plot of the test statistics are within the 5% significance level, namely, if the test statistic lies within the boundary lines, then the model has not stability problem.

Figure 1

Cumulative Sum of Recursive Residuals

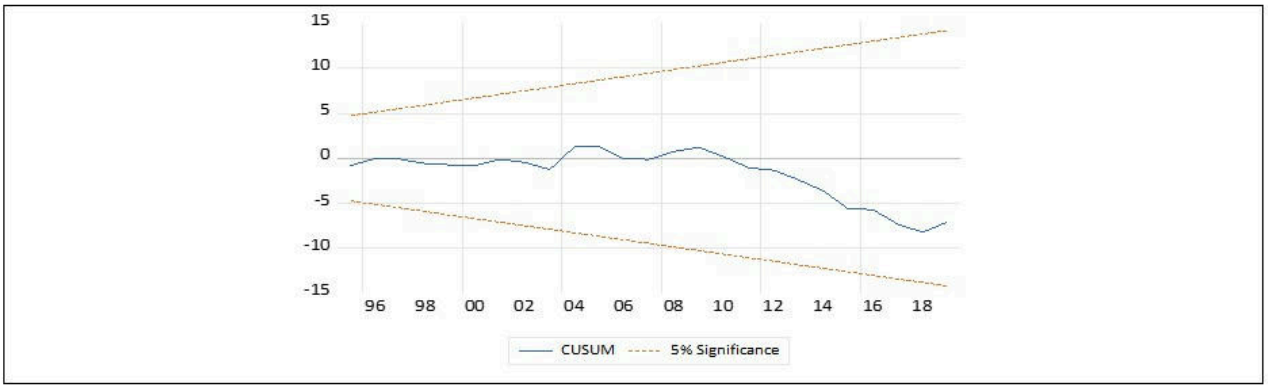
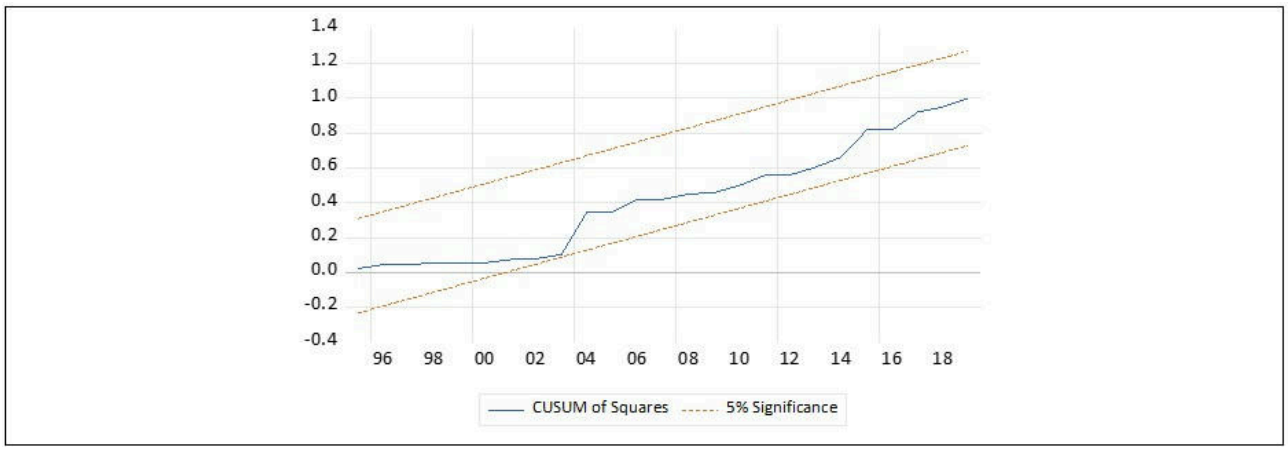


Figure 2

Cumulative Sum of Squares of Recursive Residuals



Causality test, which is developed as Toda-Yamamoto, are given in Table 10. With respect to the findings obtained, there is unidirectional causality from FDI in GDP to health expenditures in GDP. There is causality from health expenditures to the number of doctors and from the number of doctors to external openness. In the other causality test results indicated by X, it is concluded that it hasn't causality in the Granger sense.

Table 10

*Toda-Yamamoto Causality Test**

FDI in GDP **	→	Health expenditure in GDP
Health expenditure in GDP ***	→	Number of doctors
Trade openness rate	X	Health expenditure in GDP
Number of doctors	X	FDI in GDP
Trade openness rate	X	FDI in GDP
Trade openness rate ****	←	Number of doctors

Notes: *d_max +s = 1+1=2. →, ← indicates unidirectional causality. X indicates no causality. ** X^2 test stat: 5.5742, Prob: 0.0616. *** X^2 test stat: 10.535, Prob: 0.0052. **** X^2 test stat: 5.3699, Prob: 0.0682.

Conclusion

Foreign direct investment helps to obtain clear information about the current economic outlook of countries. It also indicates countries' economic openness. In addition; the infrastructure of the country, high quality of life, quality human capital, technological competitiveness, geographical location, political situation, incentives and investment capacity are important factors for inflows of FDI. The status and qualities of these factors affect FDI inflow. Therefore, it contributes to the health, education, social development and welfare of the investing country. Apart from this, foreign direct investments are closely related to human health and income.

If the foreign capital investments in the country are in a field related to health, it helps to spread health at the disadvantage group and areas. Therefore, the burden of health expenditures on the public sector will be reduced and public resources can be transferred to other areas. On the other side, the arrival of human capital with FDI may increase the quality of health services. The supply-demand imbalance at the core of health economics can be partially eliminated by FDI. An increase in the supply of health services, which is under the responsibility of the public sector, will ease the burden of the government. Consequently, the

development and improvement of health contribute to the development of the country both individually and socially. However, FDIs carry some risks but these can be eliminated by measures such as restrictions, regulations, incentives and policies in foreign capital inflows. Health care and expenditure are mostly the responsibility of the government. Because of that situation, countries allocate substantial amount of GDP to health expenditures. However, foreign direct investments in health care are important for reasons such as the number of doctors, hospital beds, hospitals, life expectancy at birth and increasing health expenditures in other countries, increasing in the elderly population. On the other hand, the motivation to reverse the international brain drain, the desire to reduce healthcare imports and increase exports, and the incentive to increase health tourism revenues encourage direct foreign investments.

In this work, the connection between health expenditures and foreign direct investments have been tested with ARDL cointegration and Toda- Yamamoto Causality analysis. Firstly, stationarity properties of the series have been investigated with unit root and obtaining findings indicate that series are not equally stationary. As a result of this, it has been used the ARDL method in line with the literature. In the long term period, there is a correlation between foreign direct investments and health indicators. It has found that there is a long term period connection between health expenditures in GDP, the volume of services trade in GDP, FDI in GDP and number of doctors variables in Turkey. In addition, while the increase in the share of health expenditures in GDP is positively affected by the increase in the portion of FDI in GDP and the increase in the rate of openness in the services sector, the increase in the number of doctors is negatively affected. Similar results is valid in the short run. However, openness to foreign trade in the service sector has negative effects on health expenditures in the short term period. Moreover, according to the Toda-Yamamoto test, foreign direct investments have found to be the cause of health expenditures. The results obtained at end of the study support Alsan Bloom and Canning (2006) and Verma (2021). In addition, while health expenditures are the cause of the number of doctors, the number of doctors is the cause of the country's openness to foreign trade in the service sector.

Ultimately, health expenditures are affected by FDI. Since the health sector is a stakeholder sector with transport, tourism, construction, insurance, communication services, pharmaceutical sector, medical devices and equipment production sector, FDI creates added value in this field and thus affects both health expenditures and national welfare. In this context, FDI inflows should be beneficial for the investor and the investee country. In particular, if FDI is to be made in the field of health, it should increase economic welfare in that country and protect the investor. It should provide net national benefits such as technology transfer, allowing the use of local goods and services. In addition, transferring the income obtained from the sector through foreign capital to health expenditures within the country will benefit human health and economic development.

We suggest that the distinction between the impact of FDI from europe and the impact of FDI from overseas countries on health expenditure should be investigated in further research.

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References

Abdullah S. M., Siddiqua, S. & Huque, R. (2017). Is Health Care a Necessary or Luxury Product for Asian Countries? An Answer Using Panel Approach. *Health Economics Review*, *7*(1), 1-12. https://doi: 10.1186/s13561-017-0144-8.

Alsan, M., Bloom, D. E. & Canning, D. (2006). The Effect of Population Health on Foreign Direct İnvestment İnflows to Low- and Middle-İncome Countries. *World Dev. Elsevier*, *34*(4), 613–630. https:// doi: 10.1016/j.worlddev.2005.09.006.

Alp Coşkun, E. & Başkol, M. O. (2022). Türkiye Ekonomisinin İthalat Bağımlılığının İncelenmesi: Girdi-Çıktı Modeli (2002-2012). *Mehmet Akif Ersoy Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 9*(1), 294-318. https://doi.org/10.30798/makuiibf.862579.

Baharumshah, A. Z., Mohd, S. H. & Mansur Masih A. M. (2009). The stability of money demand in China: Evidence from the ARDL model. *Economic Systems, 33,* 231-244.

Batbaylı, Ş. (2021a). Sağlık Ekonomisi Perspektifinde Seçilmiş Ülkelerin Sağlık Göstergelerinin Değerlendirilmesi. *International Anatolia Academic Online Journal Social Sciences Journal*, *8*(1), 43-57.

Batbaylı, Ş. (2021b). *Sağlık Hizmeti İhracatı ve Türkiye Örneği*, (Unpublished doctoral dissertation). Bursa, Türkiye: Bursa Uludağ Üniversitesi.

Barro, R. J. (2003). Determinants of Economic Growth in a Panel of Countries. *Annals of Economics and Finance,* 4, 231-274.

Binler, A. (2015), *Türkiye'nin Medikal Turizm Açısından Değerlendirilmesi ve Politika Önerileri*, (Specialisation Thesis), Ankara: T. C. Kalkınma Bakanlığı, Sosyal Sektörler ve Koordinasyon Genel Müdürlüğü.

Biri, G. (2021). Türkiye'nin Sağlık Turizmi Gelirini Etkileyen Faktörlerin Eşbütünleşme Analizi. *Anadolu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, *22*(2), 39-58.

Blouin, C. (2006). Economic Dimensions and Impact Assessment of Gats to Promote and Protect Health. (Eds. C. Blouin, N. Drager and R. Smith), *International trade in health services and the gats current issues and debates*, Washington: D. C. The World Bank, 169-202.

Boutsioli, Z. (2010). Demand variability, demand uncertainty and hospital costs: a selective survey of the empirical literature. *Global Journal of Health Science*, *2*(1), 138.

Burns, D. K., Jones, A. P., Goryakin, Y. & Suhrcke, M. (2017). Is Foreign Direct Investment Good for Health in Low and Middle Income Countries? An Instrumental Variable Approach. *Social Science & Medicine*, 74-82.

Burnside, A., Darwin, R., Backer, M. D., Mitouard, S., Okkonen, M., Pelé, S., . . . Döhren, T. v. (2020). Increased Regulatory Scrutiny of Foreign Direct Investments in the Healthcare Sector. *JDSUPRA*, https://www.jdsupra.com/legalnews/increased-regulatory-scrutiny-of-42895/, 29.07.2020.

Chanda R. (2002). Trade in Health Services. *World Health Organization, Bulletin of the World Health Organization*, 158-163.

Chanda, R., & Richard, D. S. (2006). Trade in Health Services and GATS: A Framework for Policymakers. (Eds. C. Blouin, N. Drager and R. Smith), *International Trade in Health Services and the GATS: Current issues and debates*, Washington, 245-304.

Chandio, A. A., Jiang, Y., Rauf, A., Ahmad, F., Amin, W. & Shehzad, K. (2020). Assessment of Formal Credit and Climate Change Impact on Agricultural Production in Pakistan: A Time Series ARDL Modeling Approach. *Sustainability*, *12*(13), 1-19.

Dilek, S. & Konak, A. (2023). Sağlık ekonomisi. (Eds. N. Altuntepe), *Uygulamalı Sosyal Bilimlerin Disiplinlerarası Analizi*, Kastamonu/Türkiye: Gazi Yayınevi, 19- 50.

Doğan, B. (2017). Ekonomik Küreselleşme ve Büyüme İlişkisi: Türkiye Örneği Toda-Yamamoto Nedensellik Analizi. *Finans Politik & Ekonomik Yorumlar*, *54*(628), 19-27.

Erdoğan, S. & Bozkurt, H. (2008). Türkiye'de Yaşam Beklentisi- Ekonomik Büyüme İlişkisi: ARDL Modeli ile Bir Analiz. *The Journal of Knowledge Economy & Knowledge Management*, iii spring, 25-38.

Eren-Vural İpek, (2015). İlaç Sanayiinde "Fikri Mülkiyet Hakları Rejimi" ile İlgili Mücadeleler ve Devletin "Uluslararasılaşması". (Eds. G. Y. Yaşar, A. Göksel and Ö. Birler), *Türkiye'de Sağlık Siyaset Piyasa*, Ankara: NotaBene Yayınları, 125-172.

Esen, E., Yıldırım, S. & Kostakoğlu, S. F. (2012). Feldstein-Horioka Hipotezinin Türkiye Ekonomisi için Sınanması: ARDL Modeli Uygulaması. *Eskişehir Osmangazi Üniversitesi IIBF Dergisi*, *7*(1), 251-267.

Esener, S. Ç. & Karadağ, Y. (2020). *Kamu Maliyesi Gözünden Gelişmekte Olan Ülkelerde Kamu Sağlık Harcamalarının Belirleyicileri Üzerine Ampirik Bir Analiz*. Selçuk Zirvesi 2. Uluslararası Sosyal Bilimler Kongresi, Konya, 158-174.

Giammanco, M. D. & Gitto, L. (2019). Health Expenditure and FDI in Europe. *Economic Analysis and Policy, 62,* 255-267.

Göçer İ. & Aydın, N. (2016). Türkiye'de Sağlık Değişkenlerinin Turizm Gelirine Etkisi: Çoklu Yapısal Kırılmalı Bir Analiz. *Çankırı Karatekin Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 6*(1), 777-800.

Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. Econometrica: journal of the Econometric Society, 424-438.

Jackson L. A. & Barber, D. S. (2015). Ethical and Sustainable Healthcare Tourism Development: A Primer. *Tourism and Hospitality Research, 15*(1), 19-26.

Karababa, A. G. (2017). Türkiye'de Sağlık Turizminin Ekonomik Yönü. *Türk Sosyal Bilimler Araştırmaları Dergisi /Journal of Turkish Social Sciences Research*, *2*(1), Hasan Kalyoncu Üniversitesi, Gaziantep, 58-69.

Kaya, H., & Belke, M. (2017). Türkiye Ekonomisinde Döviz Kuru Kanalının Etkinliği: 2003-2016 Dönemi İçin VAR Analizi. *Mehmet Akif Ersoy Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi,* 4(2), 28-47.

Kocasoy A. (2014), *Türkiye'de Sağlık Hizmetlerine Yapılan Harcamalar ve Finansmanı*, (Unpublished master's thesis), Afyonkarahisar, Türkiye, Afyonkocatepe Üniversitesi.

Korkmaz M., Aytaç, A., Yücel, A. S., Kılıç, B., Toköz, F. & Gümüş, S. (2014). *Türkiye'de Sağlık Turizmi ve Ekonomik Boyutlarının Uygulamalı Örneği*. Sağlık ve Hastane İdaresi 8. Kongresi Bildiri Kitabı, KKTC: Lefke Avrupa Üniversitesi Sağlık Bilimleri Fakültesi, 1146-1159.

Kurtaran, A. (2007). Doğrudan Yabancı Yatırım Kararları ve Belirleyicileri. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *10*(2), 367-382.

Kutlar A. (2017), *EViews ile Uygulamalı Çok Denklemli Zamana Serileri*, 1. Basım, İstanbul, Umuttepe Yayınları.

Lee J. & Strazicich, M. (1999), *Minimum Lm Unit Root Test with Two Structural Breaks*, Department of Economics University of Central Florida.

Lee J. & Strazicich, M. (2003). Minimum Lm Unit Root Test with Two Structural Breaks. *Review of Economics And Statistics*, 1082-1089.

Lee J. & Strazicich, M. (2004). Minimum Lm Unit Root Test with One Structural Breaks. *Apalachian State University Working Papers, 04*(17), 1-15.

Magombeyi, M. T. & Odhiambo, N. M. (2017). Does Foreign Direct Investment Reduce Poverty? Empirical Evidence from Tanzania. *Spoudai Journal of Economics and Business*, *67*(2), 101-116.

Mantovani, I. (2020). Can Foreign Direct İnvestment Improve the Resilience of Health Systems?" OECD, https://oecdonthelevelcom.wordpress.com/2020/09/28/can-fdi-improve-the-resilience-of-health-systems/, 28.09.2020.

Meçik, O. & Koyuncu, T. (2020). Türkiye'de Göç ve Ekonomik Büyüme İlişkisi: Toda-Yamamoto Nedensellik Testi. *İnsan ve Toplum Bilimleri Araştırmaları Dergisi, 9*(3), 2618-2635.

Mortensen, J. (2008). International Trade in Health Services Assessing The Trade And The Trade-Offs. *Danish Institute for International Studies*, 1-37.

OECD. (2022), *Health Data*, https://data.oecd.org/health.htm, 10.11.2023.

Outreville, J. F. (2007). Foreign Direct Investment in the Health Care Sector and Most-Favoured Locations in Developing Countries. *Eur J Health Econ*, https://doi:10.1007/s10198-006-0010-9: 305–312.

Özaydın, Ö. & Apaydın, C. (2019). *Yapısal Kırılmalar Altında Çevresel Kuznets Eğrisi Hipotezinin Türkiye için Geçerliliği: ARDL Sınır Testi Yaklaşımı*. XI. IBANESS Congress Series, Tekirdag, Türkiye, 667-677.

Pesaran, M. H. & Shin, Y. (1995). An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis. http://www.econ.cam.ac.uk/faculty/pesaran/ardl.pdf, (Erişim: 29.03.2024).

Pesaran, M. H., Shin, Y. & Smith, R. (2001). Bounds Testing Approaches to The Analysis of Level Relationship. *Journal of Applied Econometrics, 16*(3), 289-326.

Sakala Z., Kolster, J. & Fundani, N. M. (2013). The Growth of International Trade in Health Services: Export Prospects in North Africa. *African Development Bank*, 1-27.

Shahid, A., Siddique, H. M. & Liaqat, R. (2019). Human Health and Foreign Direct Investment Nexus: Evidence from South ASIA. *Asian Development Policy Review*, *7*(3), 209-218. https://doi: 10.18488/journal.107.2019.73.209.218.

Sharifi-Renani, H. (2008). Demand for Money in Iran: An ARDL Approach. *MPRA, Paper*, 8224, 1-10.

Shenkar, O., Liang, G. & Shenkar, R. (2021). The Last Frontier of Globalization: Trade and Foreign Direct Investment in Healthcare. *Journal of International Business Studies*, 1-13.

Smith, R. D. (2004). Foreign Direct Investment and Trade in Health Services: A Review of the Literature. *Social Science & Medicine*, *59*, 2313–2323.

Smith R. D, Chanda, R. & Tangcharoensathien, V. (2009). Trade in Health Related Services. *Lancet, 373*(9663), 593-601.

Şen, A. & Şit, M. (2015). Reel Döviz Kurunun Türkiye'nin Turizm Gelirleri Üzerindeki Etkisinin Ampirik Analizi. *Journal of Yasar University*, *10*(40), 6752-6762.

T.C. Sağlık Bakanlığı, (2012), T*ürkiye Sağlıkta Dönüşüm Programı Değerlendirme Raporu (2003-2011)*, Ankara: T.C. Sağlık Bakanlığı.

Timmermans, K. (2004). Developing Countries and Trade in Health Services: Which way is Forward?. *International Journal of Health Services*, *34*(3), 453-466.

Tokmak, T. & Sönmez, A. (2021). Ekonomik Büyümenin Belirleyicileri: Farklı Gelir Grubu Ülkeleri için Karşılaştırmalı bir Analiz. *Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi (ASEAD),* 532-562.

TÜİK, (2022). İstatistiki göstergeler. https://www.tuik.gov.tr/, 10.11.2023.

UN, IMF, OECD, EUROSTAT, UNWTO & WTO (2012), *Manual on Statistics of International Trade in Services 2010 (MSITS 2010),* Geneva; Luxembourg; Madrid; New York; Paris and Washington D.C. United Nations, New York.

UNCTAD. (2020), *World Investment Report 2020*, Geneva: UNCTAD.

UNCTAD. (2021), *World Investment Report 2021*, Genava: UNCTAD.

Unver, M. & Erdoğan, M. (2015). Social Effects of Foreign Direct Investments: International Empirical Evidences for Education, Health and Social Security. *International Research Journal of Finance and Economics*, 7-19.

Verma, R. (2021). FDI and Health Expenditure Dynamics in ASEAN. *Medicine, Political Science*, https://doi:10.21203/RS.3.RS-640533/V1: 1-12.

WHO. (2020), *What is the WHO Definition of Health?*, World Health Organization, https://www.who.int/about/who-we-are/frequently-asked-questions, 10.10.2020.

Worldbank. (2022), *Databank*, https://databank.worldbank.org/source/world-development-indicators, 10.11.2023.

WTO. (2022). Health and Social Services. World Trade Organization: https://www.wto.org/english/tratop_e/serv_e/health_social_e/health_social_e.htm.

Yardımcı, M. C. (2024). Satın Alma Gücü Paritesi Hipotezinin Türkiye İçin Geçerliliğinin Araştırılması: Lineer Olmayan Birim Kök Testi. *Uluslararası Batı Karadeniz Sosyal ve Beşeri Bilimler Dergisi, 8*(1), 22-39.

Yılancı V. (2009). Yapısal Kırılmalar Altında Türkiye için İşsizlik Histerisinin Sınanması. *Doğuş Üniversitesi*, *10*(2), 324-335.

Zimny, Z. (2011). Foreign Direct Investment in Health Services. *Background Paper Prepared for UNCTAD,* Warsaw, 18 December 2011, SSRN 2433906, 1-39.

Zorkun, M. & Bülbül, D. (2022). 2000-2021 Dönemi Türkiye'de Sağlık Harcamalarının İncelenmesi ve Değerlendirilmesi. *BŞEÜ Sosyal Bilimler Dergisi*, 7(2), 252-267.