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Do Investments Have an Impact on Reducing Poverty? ARDL Approach

Yoksulluğu Azaltmada Yatırımların Etkisi Var mıdır? ARDL Yaklaşımı

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Abstract

Purpose: This study aims to examine the impact of foreign direct investment (FDI) and gross fixed capital formations (GFC) on poverty reduction in Türkiye.

Design/Methodology: In this study, which analyzes the impact of investments on poverty, two different models were established. The models constructed using 1982-2020 annual data were analyzed with the ARDL method.

Findings: The findings suggest that both FDI and gross fixed capital formations have positive (poverty-reducing) effects on poverty reduction in Türkiye. Gross fixed capital formations are more effective in reducing poverty than foreign direct investments.

Limitations: Given the limited quantity of data, it is not possible to increase the number of observations. Furthermore, the data on the number of poor individuals in Turkey is obtained in a discrete manner. This situation leads to a very restricted number of empirical studies on poverty in Türkiye using time series analysis. In this study, this constraint is overcome by using household final consumption expenditures per capita (HFC) as a proxy variable as in the literature.

Originality/Value: In this study, two separate models were established with foreign direct investments and gross fixed capital formations as independent variables. The comparison of the impact of these two types of investment variables on poverty in Türkiye reveals the originality of this study.

Keywords: Poverty, Foreign Direct Investment, Gross Fixed Capital Formation, ARDL, Bound Test

Öz

Amaç: Bu araştırma, Türkiye'de doğrudan yabancı yatırımların (DYY) ve brüt sabit sermaye yatırımlarının (BSSY) yoksulluğu azaltma üzerindeki etkisini incelemeyi amaçlamaktadır.

Tasarım/Yöntem: Yatırımların yoksulluk üzerindeki etkisinin incelendiği bu çalışmada iki farklı model kurulmuştur. 1982-2020 yıllık verileri kullanılarak oluşturulan modeller ARDL metoduyla analiz edilmiştir.

Bulgular: Analizler sonucunda; Türkiye'de yoksulluğun azaltılmasında hem doğrudan yabancı yatırımların hem de brüt sabit sermaye yatırımlarının pozitif yönde (yoksulluğu azaltıcı) etkilerine ulaşılmıştır. Brüt sabit sermaye yatırımların yoksulluğu azaltmada etkinliği doğrudan yabancı yatırımlara göre daha fazladır.

Sınırlılıklar: Veri kısıtı nedeniyle gözlem sayısı artıralamamaktadır. Ayrıca Türkiye'deki yoksullara ilişkin sayılara kesikli olarak ulaşılmaktadır. Bu durum Türkiye'de yoksulluğa ilişkin yapılan zaman serisi analizlerinin kullanıldığı ampirik çalışmaların oldukça sınırlı sayıda olmasına yol açmaktadır. Bu çalışmada bu kısıt, literatürde olduğu gibi kişi başına hanehalkı tüketim harcamalarının (HFC) vekil değişken olarak kullanılmasıyla aşılmıştır.

Özgünlük/Değer: Bu çalışmada bağımsız değişken olarak doğrudan yabancı yatırımlar ve brüt sabit sermaye yatırımları olmak üzere iki ayrı model kurulmuştur. Bu iki tür yatırım değişkeninin Türkiye'de yoksulluk üzerindeki etkisinin karşılaştırması bu çalışmanın özgün değerini ortaya koymaktadır.

Anahtar Kelimeler: Yoksulluk, Doğrudan Yabancı Yatırımlar, Brüt Sabit Sermaye Yatırımları, ARDL, Sınır Testi

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1. INTRODUCTION

Poverty is recognized as a substantial challenge not only for less developed or developing countries but also for developed nations. In this context, each country undertakes various initiatives and establishes projects aimed at preventing or reducing poverty. When creating projects, each country takes into account its own economic and social conditions. This situation indicates the development of national strategies alongside global strategies in combating poverty. However, it can be stated that the lack of a clear consensus in defining such an important issue leads to a decrease in effectiveness in the fight against poverty.

Indeed, the scientific definition of the phenomenon of poverty was first made by Seebohm Rowntree in his work "Poverty, A Study of Town Life," which was published in 1901 based on a survey conducted in 1889 (Freeman, 2011: 1177). In his work, Seebohm Rowntree defines poverty as "the insufficiency of economic resources necessary to sustain life biologically" (Es & Güloğlu, 2004: 82). The World Bank defines poverty as *the inability to reach the minimum standard of living* (Göze Kaya, 2020: 902). According to the United Nations, poverty is "the inability of individuals to meet their socially defined basic needs due to lack of sufficient income" (Townsend, 2006: 5).

As can be seen, the majority of poverty definitions are based on an approach based on the amount of income. Amartya Sen (2004), a development economist, opposes this approach and defines poverty in terms of "lack of capabilities". According to Sen, poverty is a phenomenon that depends on individuals' satisfaction with their education, capital, skills, and quality of life as well as their material and immaterial assets. Therefore, reducing poverty in a country is one of the first steps of economic development and progress.

The basis of reducing poverty is to increase the income levels of poor individuals (Rodríguez-Pose & Tselios, 2010: 138), and help them climb the steps on this difficult path. This is because the impoverished are unable to meet even their basic needs under current circumstances, lack sufficient income levels, and cannot benefit from employment opportunities. Therefore, they require assistance to overcome this initial step. Extremely impoverished individuals lack six fundamental types of capital. These are (Sachs, 2005: 244-245):

- Human capital: skills needed to be productive as well as health and nutrition
- Working capital: machinery, vehicles and facilities used in agriculture, industry and services
- Infrastructure: basic business inputs (roads, electricity, water and airports, ports and communication systems)
- Natural capital: fertile soils, arable land, biodiversity and well-functioning ecosystems
- Knowledge capital: Accumulation of knowledge that enhances efficiency and productivity in job outputs.

Although the issue of poverty, which is one of the global problems, remains important (Babajić et al., 2022: 1), it is possible to state that the number of people living in extreme poverty has decreased compared to previous periods. According to World Bank (2023) reports, while approximately 2 billion people around the world tried to live in extreme poverty (with an income of less than 2.15 dollars a day) in 1990, the number of people living in extreme poverty decreased by approximately 66% to 660 million between 1990 and 2019. In the same period, the world population increased by about 2.4 billion people and the number of people with incomes above the extreme poverty line rose from 3.3 billion to 7 billion. Accordingly, the share of the world's population in extreme poverty has fallen from about 38% to 8.5% (World Bank, 2023). In Türkiye, however, this rate decreased from 3% in 1994 to 0.4% in 2019 (World Bank Databank). Despite all these reductions, the fact that still over 600 million people globally and more than 300 thousand people in Türkiye are living below the extreme poverty line indicates that this problem persists at a significant level, necessitating all efforts to be made for its resolution.

Poverty can be classified fundamentally into two different categories: absolute and relative poverty. Absolute poverty is measured based on a certain unit of minimum income (generally 1 unit of

dollar) (Decerf, 2021: 325). If an individual earns less than this income level per day, they are considered poor (Banerjee & Duflo, 2007: 145). In relative poverty, on the other hand, a comparison is made among households or individuals within the same income group. A household or individual with income lower than the average income level within the same income group is considered poor. The degree of poverty of households or individuals is determined according to different average income levels (Todaro & Smith, 2012: 220; Yohanna, 2013: 58). As a first step towards the development and economic progress of societies, poverty reduction should be targeted. Accordingly, projects and policies should be implemented at both micro and macro levels tailored to the country profiles.

Economic growth and investments have an important place in reducing poverty within the scope of macroeconomics (Zhang, 2006: 82; Acharya & Nuriev, 2016: 322; Sasmal & Sasmal, 2016: 614). As a matter of fact, in order to reduce poverty in a country, first of all, the income levels of the poor must increase. For this to happen, the country must grow economically, and a more equitable income distribution must be achieved. Also, investments are one of the basic dynamics of a country's economic growth. In particular, fixed capital investments not only provide employment, but also contribute to income and consumption levels with their multiplier effect. These effects are seriously discussed in the economic literature.

In this context, studies that examine the relationship between growth and poverty are more frequently encountered in the literature within the scope of macroeconomics. Although growth alone may not be sufficient for rapid poverty reduction, high and sustained growth is at least necessary for poverty reduction (Osmani, 2008: 11). There are limited studies on investment, and they mainly use foreign direct investments (FDI), while total fixed capital investments are rarely encountered.

The purpose of this study is to demonstrate the impact of investments made in Türkiye on poverty reduction through time series analyses. In this context, two separate models were established with foreign direct investments (FDI) and gross fixed capital formations (GFC) as independent variables. The comparison of the impact of these two types of investment variables on poverty reveals the originality of this study. The number of poor people in Türkiye is accessed discretely. This situation has led to a limited number of empirical studies in the field of economics in Türkiye that use time series analyses related to poverty. This constraint has been overcome in the literature by using per capita household final consumption expenditures (HFC) as a proxy variable (Şahbaz et al., 2016; Usman, 2018; Algan et al., 2021; Sikandar et al., 2021; Sürücü et al., 2021; Ersoy & Karşıyakalı, 2022; Olaniyi & Odhiambo, 2024) for poverty. Therefore, in this study, per capita household final consumption expenditures were used for the poverty indicator, which is the dependent variable. Following the introduction, the study includes the theoretical background and literature of the relationship between investments and poverty. Then, the impact of investments on reducing poverty in Türkiye between 1982 and 2020 is tried to be determined through time series analysis.

2. THEORETICAL BACKGROUND AND LITERATURE ON THE RELATIONSHIP BETWEEN POVERTY AND INVESTMENT

In economic theory, investments are considered as having vital importance for economic growth (Bhattacharjee & Rajeev, 2013: 20). Investments are a type of expenditure that contributes to capital stock, increasing income and economic growth (Sabar, 2022: 89). Increasing investments stimulate economic growth by increasing demand. Both public and private investments made in education, R&D, and knowledge areas contribute to human capital in addition to physical capital (Nassar & Biltagy, 2017: 1). Nurkse's theory on the vicious cycle of poverty states that investments affect poverty. According to Nurkse, the fundamental reason for a country's poverty is low savings and investment rates (Rambe et al., 2023: 436). Therefore, poverty reduction requires rapid and sustainable economic growth, including investment, industrialization, and production growth (Bilal Khan et al., 2019: 3648). In order for economic growth to be more effective in reducing poverty, it must have the ability to create jobs (Nassar & Biltagy, 2017: 9). In this context, the attitudes of policymakers and macroeconomic policies are extremely important in contributing to the process. Indeed, the fact that policymakers are planning a rapid and sustainable growth program that puts poverty reduction at the center of its focus provides incentives for domestic and foreign investors. Investors' trust in such

policies and their positive response can increase investment volume, boost economic growth, and help reduce poverty (Izquierdo et al., 2001: 17).

The fact that investments made as a result of capital accumulation are effective on economic growth can be explained mainly by the following reasons (Teyyare, 2018: 119):

Investments realized as a result of capital accumulation;

- is the main factor of economies of scale and increasing returns, which is expressed as reducing the cost of production.

- is the main factor enabling the use of new technologies.

- provides the opportunity to gain experience and learn by practicing.

- is the basis for social capital and many other positive externalities.

- creates areas of activity with high efficiency and productivity.

According to classical growth theorists, economic growth occurs through economic activities that produce a surplus. The success of the long-term economic growth process is achieved by the reinvestment of the surplus (Lanza, 2012: 50). Indeed, many economists such as Harrod, Domar, Lewis, and Lucas are of the opinion that rapid economic growth in the long term cannot occur without a positive development in capital accumulation (Çetin, 2012: 212). Ultimately, the leading conditions for reducing poverty can be considered as the increase in economic growth and investments (Ncube et al., 2014: 448).

It is evident in the economic literature that poverty reduction is predominantly associated with economic growth. However, the issue of investment is relatively limited. In the investment-poverty relationship, foreign direct investment (FDI) is often used as the independent variable, while gross fixed capital formations (GFC) are quite restricted. Within this context, Rambe et al. (2023) examined the role of investments, labor force, and industrialization in reducing poverty using data from Sumatra spanning from 2013 to 2018, where fixed capital formations were used as the independent variable. The findings of the study using the fixed effects model are that a 1% increase in the GFC reduced poverty by 0.136%. Another study, Ali et al. (2023), the Auto-Regressive-Distributed Lagged modeling (ARDL) method was used using data from 1987-2021. According to the study, a one-unit increase in the GFC in Pakistan increases gross domestic product (GDP) by 0.15 units (reduces poverty). Again, in the Pakistani sample, Shaheen et al. (2021) study, the relationship between various macroeconomic variables and poverty within the scope of sustainable growth was examined using data from 1990-2020. Several models were established in the study using the GMM. In one of these models, a one-unit increase in the GFC reduced poverty by 1.36 units, while in the other model, a one-unit increase in the GFC reduced poverty by 0.2 units. Alam et al. (2021) tried to identify the determinants of poverty with the ARDL method using annual data from 1974-2018 for India. According to the findings of the study, a one-unit increase in the GFC reduces poverty by approximately 1.8 units in the long run. In the short term, it is stated that it takes approximately 2.3 years to return to the balance path. In the study of Usman (2018), in which household consumption expenditures were used as dependent variables to represent poverty, FDI and GFC were used as independent variables. The findings of the study, in which the ARDL method was applied with annual data from 1981-2016 for the Nigerian economy, are that 1% increases in FDI and GFC increase HFC (reduce poverty) by 1.9% and 0.05%, respectively. In Ekobeng (2017) study, the relationship between poverty and GFC was examined in 41 Sub-Saharan African countries. The years 1981-2010 were chosen as the period of the study. In the study, Dynamic 2S-GMM and Pooled Least Squares (Pooled OLS) methods were used. According to both methods, increases in the GFC reduce poverty. Finally, Suryadarma and Suryahadi (2007) examined the impact of the growth of private sector investments on poverty reduction in Indonesia between 1984 and 2002. The GLS method was used in the study and a 1% increase in fixed capital investments reduced poverty by approximately 1.05%.

As observed in the literature, studies have determined that the GFC reduces poverty (no study in the opposite direction has been identified by me). The impact of FDI on poverty, however, is not conclusive. While the majority of findings in the literature suggest that FDI reduces poverty, there are

also studies indicating that FDI increases poverty or statistically significant relationships between these variables are absent.

Table 1: Literature Review Summary

Author(s)	Period and Country – Region	Methodology	Findings
Positive Relationship (Poverty Reduction)			
Jalilian & Weiss (2002)	1991–1997 / ASEAN Countries	Panel Regression	FDI reduces poverty (FDI increases GDP)
Calvo & Hernandez (2006)	1984–1998 / 20 Latin America Countries	Unbalanced Panel Data	FDI reduces poverty
Açıkgöz et al., (2008)	1997–2003 / 50 Developing and 14 Developed Countries	Panel FMOLS	FDI reduces poverty
MacDonald & Majeed (2010)	1970–2008 / 65 Developing Countries	2SLS, GMM, LIML	FDI reduces poverty high financial ıntermediation countries
Mahmood & Chaudhary (2012)	1973–2003 / Pakistan	ARDL	FDI reduces poverty
Gohou & Soumare (2012)	1990–2007 / 52 African Countries	Panel Data Analysis	FDI reduces poverty
Assadzadeh & Pourqoly (2013)	2000–2009 / MENA	Random Effects Model	FDI reduces poverty (FDI increases HDI)
Fowowe & Shuaibu (2014)	1981–2011 / 30 Selected African Economies	GMM	FDI reduces poverty
Uttama (2015)	1995–2011 / 6 ASEAN Countires	Fixed and Random Effects Model	FDI reduces poverty
Fauzel et al., (2016)	1980–2013 / Mauritius	Dynamic Vector Autoregressive Model	FDI reduces poverty (FDI increases HDI)
Şahbaz et al., (2016)	1980–2015 / Turkiye	Normalized Cointegration Equation	FDI reduces poverty (FDI increases HFC)
Hmani (2017)	1990–2014 / MENA Region	Simultaneous Equations Model	FDI reduces poverty
Trinh (2017)	2002–2012 / 63 Provinces of Vietnam	Fixed Effects Model	FDI reduces poverty
Usman (2018)	1981–2016 / Nigeria	ARDL	FDI reduces poverty (FDI increases HFC)
Ahmad et al., (2019)	1990–2014 / ASEAN – SAARC Countries	Panel Regression and Two Stages Least Squares	FDI reduces poverty (FDI increases GDP and HDI)
Ganić (2019)	2000–2015 / Western Balkan and CE Countries	Fixed Effects Model	FDI reduces poverty in Western Balkan Countries (FDI increases HDI)
Khan et al. (2019)	1985–2016 / Pakistan	ARDL	FDI reduces poverty (FDI increases calorie consumption)
Dhrifi et al., (2020)	1995–2017 / 98 Developing Countries	Simultaneous-Equations Models	FDI reduces poverty (FDI increases HFC)
Algan et al., (2021)	1996–2019 / Turkiye	Normalized Cointegration Equation	FDI reduces poverty (FDI increases HFC)
Dada & Akinlo (2021)	1986–2018 / 39 Sub-Saharan Africa Countries	Panel Threshold Regression	FDI reduces poverty (FDI increases HFC)
Do et al., (2021)	2010–2016 / 63 Cities of Vietnam	Fixed-Effects and Spatial Econometric Model	FDI reduces poverty
Hanim (2021)	2012 and 2016 /33 Provinces of Indonesia	Multiple Linear Regression Model	FDI reduces poverty (FDI increases GDP)
Saleem et al., (2021)	1987–2018 / Pakistan	ARDL	FDI reduces poverty
Sikandar et al., (2021)	1990–2018 / 14 Developing Economies	Pooled Mean Group Estimation (PMG)	FDI reduces poverty (FDI increases HFC)
Sürücü et al., (2021)	1980–2019 / Turkiye	Normalized Cointegration Equation	FDI reduces poverty (FDI increases HFC)
Ersoy & Karşıyakalı (2022)	1980–2018 / Turkiye	FMOLS and Error Correction Model	FDI reduces poverty (FDI increases HFC)

Shakil & Imran (2022)	1970–2019 / Pakistan	ARDL	FDI reduces poverty
Bashir (2023)	2006–2022 / 20 Developing Countries	ARDL	FDI reduces poverty
Haruna et al., (2023)	1980–2019 / Nigeria	ARDL and NARDL	FDI reduces poverty
Tsaurai (2023)	1989–2020 / BRICS	OLS, FMOLS, Fixed Effects Model	FDI reduces poverty
Zhang et al., (2023)	2000–2014 / Sub-Saharan Africa	Fixed Effects Model	FDI (Chinese infrastructure investment) reduces poverty
Negative Relationship (Increased Poverty)			
Ali et al., (2009)	1973–2008 / Pakistan	ARDL	FDI increases poverty (FDI increases infant mortality)
Huang et al., (2010)	1970–2005 / 12 Countries (Latin & East America)	Unbalanced Panel Data	FDI increases poverty
MacDonald & Majeed (2010)	1970–2008 / 65 Developing Countries	2SLS, GMM, LIML	FDI increases poverty (All Developing Countries and Low Financial Intermediation Countries)
Lazreg & Zouari (2018)	1985–2005 / 6 Countries in North Africa	Panel FMOLS	FDI increases poverty (FDI reduces GINI)
Anetor et al., (2020)	1990–2017 / 29 Countries in Sub-Saharan Africa	FGLS	FDI increases poverty (FDI reduces HDI)
Lee et al., (2021)	2012–2018 / 63 Provinces of Vietnam	GMM	FDI increases poverty (FDI increases income inequality)
Nkoro & Uko (2023)	1981–2019 / Nigeria	ARDL	FDI increases poverty
No Relationship			
Tsai & Huang (2007)	1964–2003 / Taiwan	Instrumental-Variable Estimates (Time Series)	Statistically insignificant relationship
Ali et al., (2009)	1973–2008 / Pakistan	ARDL	Statistically insignificant relationship
Chaudhry & Imran (2013)	1980–2010 / Pakistan	Ordinary Least Squares (OLS)	Statistically insignificant relationship
Ogunniyi & Igberi (2014)	1980–2012 / Nigeria	Ordinary Least Squares (OLS)	Statistically insignificant relationship
Arabyat (2017)	1980–2012 / 85 Developing Countries	Unbalanced Panel Data	Statistically insignificant relationship
Lazreg & Zouari (2018)	1985–2005 / 6 Countries of North Africa	Panel FMOLS	Statistically insignificant relationship
Quiñonez et al., (2018)	2000–2014 / 13 Latin American Countries	Fixed–Random Effects, FGLS and Prais-Winsten	Statistically insignificant relationship
Ganić (2019)	2000–2015 / Western Balkan and CE Countries	Fixed Effects Model	Statistically insignificant relationship in CE Countries (FDI increases HDI)
Nguea et al., (2020)	1984–2014 / Cameroon	ARDL	Statistically insignificant relationship
Aderemi et al., (2021)	1990–2018 / Nigeria	ARDL	Statistically insignificant relationship

When Table 1 is examined, it can be seen that there are findings that predominantly FDI reduces poverty. Again, it was determined that the studies in the literature were mainly analyzed with panel data methods, and also in studies where there was no significant relationship between variables, time series analyzes were the majority. Finally, it has been determined that many different proxy variables are used as poverty indicators.

2. DATA AND METHODOLOGY

2.1. Data

This study attempts to determine the impact of foreign direct investments and gross fixed capital formations on poverty in Türkiye through time series analysis. For this purpose, variables are constructed by considering annual data for the period 1982-2020 due to time constraints. All data constituting the series are obtained from the World Bank dataset and logarithms are taken.

In this study, where the impact of investments on poverty was examined, two different models were established. Model-I, in which foreign direct investments are included as the core independent variable, is based on Do et al. (2021):

$$LHFC_t = \beta_1 + \beta_2 LFDI_t + \beta_3 LGDP_t + \beta_4 LINT_t + \beta_5 LUNE_t + u_t$$

Here, *LHFC* denotes household final consumption expenditure per capita, *LGDP* denotes GDP per capita, *LINT* denotes deposit interest rate, *LUNE* denotes unemployment rate, and *u* denotes the error term. Model-II, in which gross fixed capital formations are included as the core independent variable, is $LHFC_t = \alpha_1 + \alpha_2 LGFC_t + \alpha_3 LINT_t + \alpha_4 LUNE_t + \alpha_5 LEXP_t + u_t$. In this model, export (*LEXP*) variable was used instead of *LGDP*, considering that gross fixed capital formations and gross domestic product variables may cause multicollinearity problems. Table 2 below contains information about all variables used in the models.

Table 2. Variables and Sources

Variable	Defination	Source
LHFC	Household final consumption expenditure per capita (current US$) (adjusted for inflation and divided population)	World Bank Database
LFDI	Foreign direct investment, net inflows (current US$) (adjusted for inflation)	World Bank Database
LGFC	Gross fixed capital formation (of % GDP)	World Bank Database
LGDP	GDP per capita (current US$) (adjusted for inflation)	World Bank Database
LINT	Deposit interest rate (%)	World Bank Database
LUNE	Unemployment, total (% of total labor force) (national estimate)	World Bank Database
LEXP	Exports of goods and services (current US$) (adjusted for inflation)	World Bank Database

2.2 Methodology

In the analysis of empirical studies, stationarity tests are conducted first. In this study, Phillips and Peron (1988) PP test and Kwiatkowski et al. (1992) KPSS test are used to investigate stationarity. The PP unit root test is widely used because it corrects for autocorrelation and variance in the error term (u_t). The fixed and fixed-trend equations for the PP test are as follows:

$$\Delta Y_t = \beta + \delta y_{t-1} + u_t \quad (1)$$

$$\Delta Y_t = \beta + \delta y_{t-1} + \omega trend + u_t \quad (2)$$

If the PP test statistic is greater than the critical values, it means that the null hypothesis (H_0) is rejected.

When the PP test statistic is greater than the critical value, the null hypothesis (H0) is rejected. In the KPSS test, which is another linear unit root test, if the value calculated using the Lagrange Multiplier (LM) test is greater than the critical value, the H0 hypothesis is rejected. Conversely, the series is accepted to be stationary. The LM statistic is calculated as follows (Kwiatkowski et al., 1992: 162-163):

$$LM = \sum_{i=1}^{T} B_t^2 / \delta_\alpha^2 \quad (3)$$

The simple regression equation of the KPSS unit root test is shown below (Sevüktekin & Çınar, 2017: 376):

$$Y_t = \beta_t + w_t + £_t \quad (4)$$

$$w_t = w_{t-1} + u_t \quad (5)$$

In equations (4) and (5), w_t denotes random walk, $£_t$ stationary errors and t denotes deterministic trend.

The ARDL bounds test (Pesaran et al. 2001), which is used to test the long-run cointegration relationship, has several advantages. First, the ARDL method can be applied regardless of the stationarity level of the series (except I_2). In addition, a dynamic unrestricted error correction model (ECM) coefficient can be obtained in the ARDL method. The ECM coefficient can integrate short-run dynamics and long-run equations without any loss of long-run information (Shahbaz & Lean: 2012: 475).

The long-term ARDL model of the variables that have a cointegrated relationship between them is as follows (Çelikay, 2017: 178):

$$Y_t = \omega_0 + \sum_{i=1}^{p} \omega_{1i}\, Y_{t-i} + \sum_{i=0}^{q} \omega_{2i}\, X_{1t-i} + \cdots + \sum_{i=0}^{r} \omega_{mi}\, X_{mt-i} + \varepsilon_t \quad (6)$$

The error correction model, which reflects the short-run dynamic relationships between variables and the effects of the error correction term derived from the long-run ARDL model, is:

$$Y_t = \omega_0 + \sum_{i=1}^{p} \omega_{1i}\, \Delta Y_{t-i} + \sum_{i=0}^{q} \omega_{2i}\, \Delta X_{1t-i} + \cdots + \sum_{i=0}^{r} \omega_{mi}\, \Delta X_{mt-i} + \sigma ECM_{t-1} + \varepsilon_t \quad (7)$$

In equation 7, ω_{1i}, ω_{2i} and ω_{mi} are the short-run coefficients of the variables in the model, ε is the error term, and σ is the coefficient of the error correction term that shows how much the deviation from equilibrium in the short run can be corrected in the long run. The Δ sign indicates that the variables are differenced.

3. FINDINGS

PP and KPSS unit root tests are frequently preferred tests to determine the stationarity of series in econometric analyses. Therefore, the mentioned tests were preferred in this study.

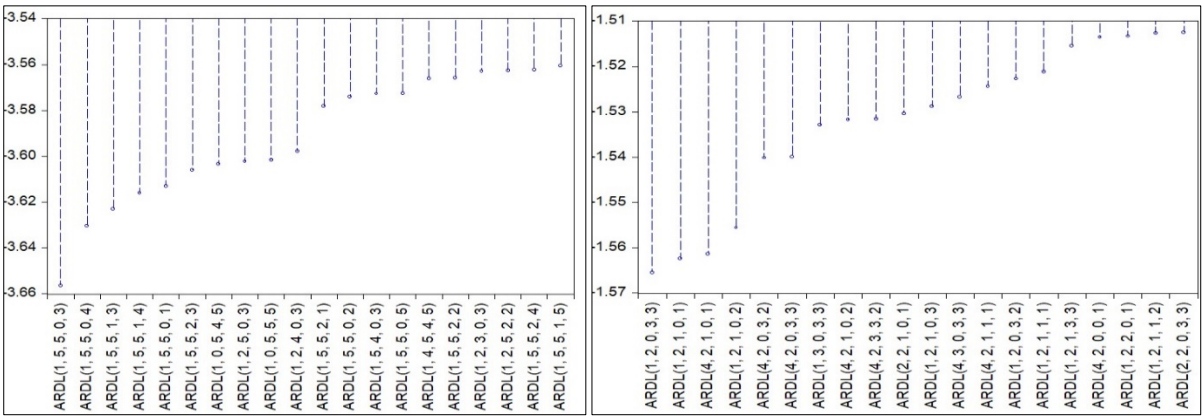
Table 3: Unit Root Tests Results

Variables		PP		KPSS	
		I(0)	I(1)	I(0)	I(1)
LHFC	c	-1.5319	-6.2934*	0.985845	**0.2146**
	c & t	-1.2421	-6.5631*	0.371536	**0.0787**
LFDI	c	-1.8908	-6.2076*	0.7034	**0.2366**
	c & t	-1.7722	-6.7382*	**0.1151**	**0.0998**
LGFC	c	-2.2853	-5.6346*	0.797668	**0.0982**
	c & t	-2.4976	-5.8228*	0.202493	**0.0489**
LGDP	c	-1.3452	-6.1926*	0.846705	**0.2172**
	c & t	-1.2269	-6.4182*	0.338628	**0.0916**
LINT	c	-0.5653	-6.0358*	0.5297	**0.1929**
	c & t	-1.9805	-6.0178*	0.1297	**0.0975**
LUNE	c	-1.6632	-5.2896*	**0.2460**	**0.2476**
	c & t	-1.5986	-6.9790*	0.1595	0.1473
LEXP	c	-1.9723	-5.2092*	1.054595	**0.4017**
	c & t	-0.1397	-5.8453*	0.238111	**0.1089**

Note: * and ** have defines the significance level of 1%, and 5% and respectively. In addition, *c* stands for constant, and *c&t* stands for constant and trend.

Table 3 shows that the dependent variable, *LHFC*, is stationary at the first difference according to both PP and KPSS tests. While all other variables are stationary at the 1st difference according to the PP test, some are stationary at their levels (*LFDI* and *LUNE*) and some are stationary at the 1st difference according to the KPSS test. Accordingly, a bounds test can be performed by applying the ARDL method. Once a long-term relationship is identified in the bounds test, long- and short-term coefficient estimates can be made possible. Therefore, Figure 1 below shows the top 20 best models based on the ARDL method.

Figure 1: Akaike Information Criteria - Top 20 Models (Model I and Model II)



According to Figure 1 above, the best model for Model I is (1,5,5,0,3) while the best model for Model II is (1,2,0,3,3). Table 4 below presents the findings of the ARDL bounds test and diagnostic test results applied in this study to determine the cointegration relationship.

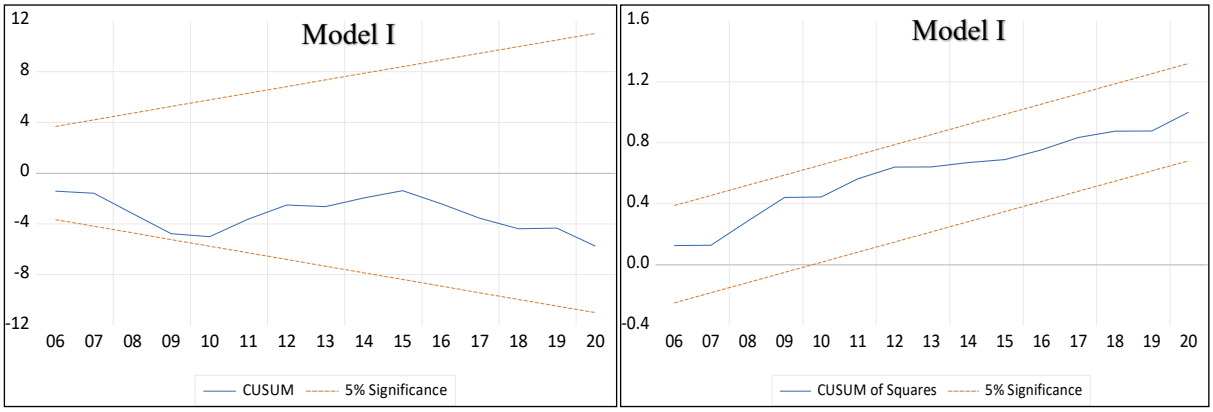
Table 4: ARDL F- Bounds Test Results

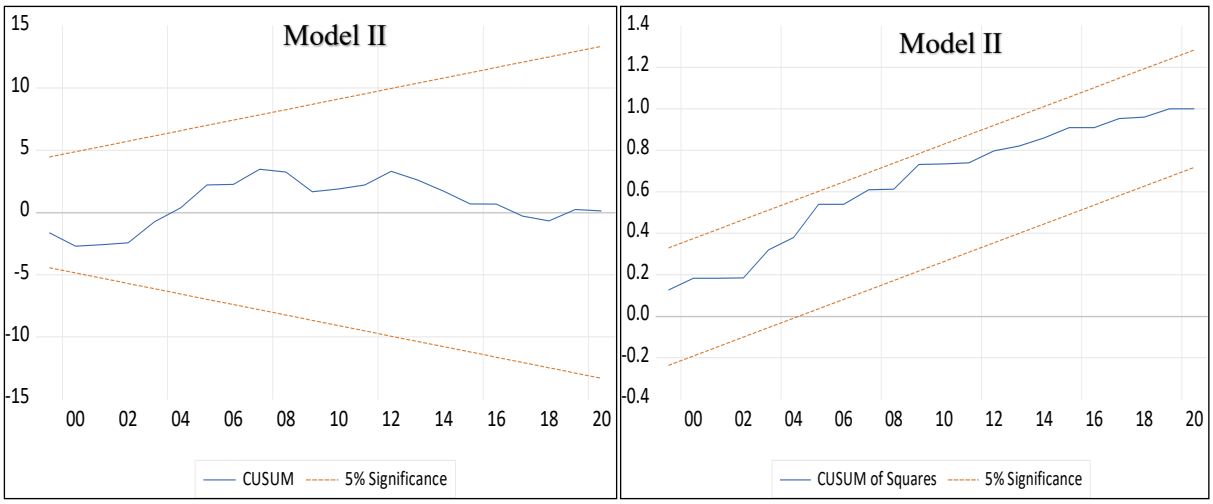
Functional Model I	**ARDL Model**		**k**	**F- Statistic**	**Diagnostic Tests**	**F-Stat.**	**Prob**
$LHFC_t = f(LFDI_t, LGDP_t, LINT_t, LUNE_t)$	(1,5,5,0,3)		4	**7.049797**	**Jarque-Bera**	0.915	0.955
	Critical Values				**Bre-God. LM**	0.855	0.448
	%1	**%2,5**	**%5**	**%10**	**Hete. ARCH**	0.806	0.456
I_0	3.29	2.88	2.56	2.2	**Ramsey Res.**	1.788	0.202
I_1	4.37	3.87	3.49	3.09	**CUSUM**	Stable	
					CUSUMQ	Stable	
Functional Model II	**ARDL Model**		**k**	**F- Statistic**	**Diagnostic Tests**	**F-Stat.**	**Prob**
$LHFC_t = f(LGFC_t, LINT_t, LUNE_t, LEXP_t)$	(1,2,0,3,3)		4	**4.716369**	**Jarque-Bera**	2.173	0.337
	Critical Values				**Bre-God. LM**	1.151	0.336
	%1	**%2,5**	**%5**	**%10**	**Hete. ARCH**	1.510	0.237
I_0	3.29	2.88	2.56	2.2	**Ramsey Res.**	1.286	0.267
I_1	4.37	3.87	3.49	3.09	**CUSUM**	Stable	
					CUSUMQ	Stable	

Note: Since the data are used at annual frequency, the lag length is taken as two according to the Akaike information criterion. Here, we use the Jarque-Bera normality test, Bre-God. LM to test for autocorrelation, Breusch-Godfrey Serial LM test, Hete. ARCH test to test for variance, Ramsey Res. test for specification check, CUSUM and CUSUMQ denote the stability conditions of the parameter estimates of the series.

The bounds test result shown in Table 4 shows that the value of the F-statistic for Model I is (7.049797) and for Model II is (4.716369). Since these values are greater than the upper limits of the critical values at the 5% significance level, a long-run relationship is found. Moreover, according to the diagnostic test results, probability values greater than 0.10 indicate that the models are free from normality, autocorrelation, variance and specification error and the residuals are normally distributed.

Figure 2: CUSUM and CUSUMQ Test Results





According to Figure 2 above, since the CUSUM and CUSUMQ tests for both Model I and Model II are stable, the parameter estimation of the series satisfies the stability condition. Table 5 below presents the ARDL model estimation results for Model I and Model II.

Table 5: ARDL Model Estimation Results (Model I and Model II)

	Model I (1,5,5,0,3)					***Model II (1,2,0,3,3)***			
Variables	**Coefficient**	**St. Error**	**t-statistic**	**Probality**	**Variables**	**Coefficient**	**St. Error**	**t-statistic**	**Probality**
LHFC(-1)	0.387106	0.179842	2.152479	0.0480	LHFC(-1)	0.555042	0.027447	20.22247	0.0000
LFDI	-0.029560	0.017534	-1.685916	0.1125	LGFC	-0.005298	0.139210	-0.038057	0.9700
LFDI(-1)	0.000461	0.022153	0.020824	0.9837	LGFC(-1)	-0.316382	0.146582	-2.158388	0.0421
LFDI(-2)	0.046323	0.007674	6.036282	0.0000	LGFC(-2)	0.705070	0.083129	8.481684	0.0000
LFDI(-3)	0.007083	0.012440	0.569317	0.5776	LINT	-0.380431	0.023427	-16.23868	0.0000
LFDI(-4)	0.008111	0.012771	0.635127	0.5349	LUNE	-0.071132	0.070871	-1.003674	0.3264
LFDI(-5)	0.033115	0.011742	2.820319	0.0129	LUNE(-1)	-0.203747	0.077936	-2.614291	0.0158
LGDP	0.980514	0.048709	20.13016	0.0000	LUNE(-2)	0.092145	0.054983	1.675880	0.1079
LGDP(-1)	-0.485599	0.171665	-2.828763	0.0127	LUNE(-3)	-0.438493	0.028350	-15.46735	0.0000
LGDP(-2)	0.017689	0.031680	0.558349	0.5848	LEXP	0.991526	0.042436	23.36495	0.0000
LGDP(-3)	-0.093403	0.041166	-2.268945	0.0385	LEXP(-1)	-0.592259	0.070636	-8.384714	0.0000
LGDP(-4)	-0.037329	0.053749	-0.694501	0.4980	LEXP(-2)	0.033190	0.108208	0.306721	0.7619
LGDP(-5)	-0.100066	0.031132	-3.214273	0.0058	LEXP(-3)	-0.353528	0.048654	-7.266226	0.0000
LINT	-0.089894	0.024878	-3.613477	0.0026	C	3.004007	0.418404	7.179673	0.0000
LUNE	0.048801	0.033850	1.441706	0.1699					
LUNE(-1)	-0.245528	0.067741	-3.624524	0.0025					
LUNE(-2)	0.167660	0.077128	2.173772	0.0461					
LUNE(-3)	-0.117037	0.059667	-1.961488	0.0687					
C	-3.338890	1.219218	-2.738551	0.0152					
R^2	0.998				**R^2**	0.987			
ADJ- R^2	0.997				**ADJ- R^2**	0.980			

Note: Optimal lag lengths were determined by the Akaike Information Criterion (AIC).

When the results of Model I in Table 5 are analyzed, it is seen that the R^2 and Adjusted-R^2 (ADJ-R^2) coefficients expressing the explanatory power of the model are 0.998 and 0.997, respectively. This result indicates that the independent variables in Model I explain approximately 99% of the dependent variable. When the results of Model II are analyzed, R^2 and Adjusted-R^2 (ADJ-R^2) coefficients are 0.987 and 0.980, respectively. This result indicates that the independent variables in Model II explain approximately 98% of the dependent variable.

Table 6: ARDL (Long Run)

Model I			**Model II**		
Dependent Variable: *LHFC*			***Dependent Variable:*** *LHFC*		
Variables	**Coefficient**	**Probality**	**Variables**	**Coefficient**	**Probality**
LFDI	0.106924	0.0237**	*LGFC*	0.861633	0.0002*
LGDP	0.459796	0.0000*	*LINT*	-0.854983	0.0000*

LINT	-0.146672	0.0001*	*LUNE*	-1.396148	0.0000*
LUNE	-0.238384	0.0222**	*LEXP*	0.177385	0.0016*
C	-5.447743	0.0008*	*C*	6.751217	0.0000*

Note: * and ** have defines the significance level of 1%, and 5% and respectively.

According to Table 6 above, all variables are statistically significant. According to Model I, a 1% increase in *LFDI* increases *LHFC* by 0.10% (poverty reducing), while according to Model II, a 1% increase in *LGFC* increases *LHFC* by 0.86% (poverty reducing). Other variables also affect *LHFC* in the direction of expectations. These results are consistent with the results of many studies such as Shahbaz et al. (2016), Usman (2018), Dhrifi et al. (2020), Algan et al. (2021), Do et al. (2021), Sikandar et al. (2021), Sürücü et al. (2021), Alam et al. (2021), Shakil & Imran (2022) and Rambe et al. (2023).

Table 7: ARDL and Error Correction Model (Short Run)

Model I (1,5,5,0,3)					***Model II (1,2,0,3,3)***				
Variables	**Coefficient**	**St. Error**	**t-stat.**	**Prob.**	**Variables**	**Coefficient**	**St. Error**	**t-stat.**	**Prob.**
D(LFDI)	-0.02956	0.01585	-1.86446	0.0819	D(LGFC)	-0.00529	0.20175	-0.02625	0.9793
D(LFDI(-1))	-0.09463	0.01991	-4.75106	0.0003	D(LGFC(-1))	-0.70507	0.21513	-3.27727	0.0034
D(LFDI(-2))	-0.04830	0.01618	-2.98532	0.0092	D(LUNE)	-0.07113	0.15443	-0.46059	0.6496
D(LFDI(-3))	-0.04122	0.01516	-2.71891	0.0158	D(LUNE(-1))	0.34634	0.16938	2.04477	0.0530
D(LFDI(-4))	-0.03311	0.01289	-2.56879	0.0214	D(LUNE(-2))	0.43849	0.16909	2.59316	0.0166
D(LGDP)	0.98051	0.04018	24.4001	0.0000	D(LEXP)	0.99152	0.15953	6.21502	0.0000
D(LGDP(-1))	0.21310	0.04855	4.38877	0.0005	D(LEXP(-1))	0.32033	0.17800	1.79961	0.0857
D(LGDP(-2))	0.23079	0.05080	4.54293	0.0004	D(LEXP(-2))	0.35352	0.14351	2.46343	0.0221
D(LGDP(-3))	0.13739	0.04634	2.96460	0.0096	***ECT(-1)***	***-0.44495***	*0.07550*	*-5.89318*	***0.0000***
D(LGDP(-4))	0.10006	0.04709	2.12485	0.0506					
D(LUNE)	0.04880	0.05316	0.91799	0.3731					
D(LUNE(-1))	-0.05062	0.05240	-0.96595	0.3494					
D(LUNE(-2))	0.11703	0.06121	1.91183	0.0752					
ECT(-1)	***-0.61289***	*0.08161*	*-7.50988*	***0.0000***					

According to Table 7 above, the *ECT(-1)* terms representing the error correction coefficient in both models are negative and statistically significant. These results indicate that the error correction models work. In addition, in the short run, approximately 61% of the shocks caused by poverty, foreign direct investment, economic growth, and unemployment for Model I and 44% of the shocks caused by poverty, gross fixed capital formation, unemployment, and exports for Model II are compensated within one period and equilibrium will be reached again in the long run.

4. CONCLUSION

The globalization trend has led to an unprecedented intensification of political and cultural interactions as well as economic interactions between societies. Multinational corporations have a great influence on this intensification. As a matter of fact, the functioning of the global economy in the modern era is largely determined by multinational firms. Through these multinational firms, production and financial flows become more globalized, and new information and communication technologies accelerate foreign direct investments and portfolio investments. The contribution of such capital flows, especially to the economies of underdeveloped countries, is controversial. One of the most important of these discussions is the issue of poverty.

The number of extremely poor people is decreasing compared to previous years. However, despite the globalization process and technological innovations, the problem of poverty is still an important global problem that needs to be solved. Neoliberal economic policies, especially implemented since the 1980s, were expected to increase global trade and investments as well as contribute to poor countries. These expectations can be stated that they were partially met. The poverty problem is the issue with the least improvement among these expectations. Therefore, this study examines the impact of investments on poverty in Türkiye through empirical analysis. The findings suggest that both gross fixed capital formations and foreign direct investments reduce poverty. According to the results of the analysis, gross fixed capital formations are more effective than foreign direct investments in reducing poverty.

These results show that investments contribute to economic growth and development in Türkiye between 1982 and 2020, which is the period of the study. As a matter of fact, while foreign investments contribute to a country in terms of new job opportunities, technology transfer and production increase, gross fixed capital formations in a country helps economic growth and development more comprehensively by adding infrastructure and superstructure investments in addition to all these. In addition, gross fixed capital formations also support local enterprises and help to create a competitive business environment. However, the concentration of investments in certain regions may lead to a deterioration in income distribution and socioeconomic and social problems in the country. Therefore, attention should be paid to the distribution of investments within the country.

In conclusion, it appears that both national and international investments are effective in reducing poverty in in Türkiye. In this context, improvements are needed in terms of increasing the ease of doing business, improving the investment climate, compliance with international law, transparency, supporting local industries and strengthening social development policies.

Ethics Statement: *In this study, no method requiring the permission of the "Ethics Committee" was used.*

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