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THE RELATIONSHIP OF INFLATION, UNEMPLOYMENT, FINANCIAL DEVELOPMENT AND INCOME INEQUALITY IN TÜRKİYE

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Abstract

This study aims to explore the impact of inflation and unemployment on income distribution in the Turkish context. Additionally, the study seeks to assess the applicability of the financial Kuznets curve in the context of financial development. To achieve these objectives, the research utilizes annual data spanning the years 1990 to 2021. The investigation employs standard and Fourier Augmented Dickey-Fuller (ADF) tests to ascertain the stationarity of variables, Fourier Engle-Granger (and Standard Engle-Granger) test to determine cointegration relationships, and FMOLS, DOLS, and CCR estimators for long-short-term coefficient estimation. The empirical results indicate that elevated levels of unemployment and inflation during the examined period are correlated with heightened income inequality in Türkiye. In contrast, the validity of the financial Kuznets curve is not supported by the data in the relevant timeframe. It's noteworthy that the simultaneous consideration of financial development, unemployment, and inflation variables for Türkiye, as well as the utilization of Fourier methods for analysis, contribute novel dimensions to the financial Kuznets curve literature. Therefore, both the variables employed in the Turkish context and the methodological findings presented in this study offer innovative insights to the field.

Key Words: *Inflation, unemployment, Gini coefficient, financial development, Türkiye.*

TÜRKİYE'DE ENFLASYON, İŞSİZLİK, FİNANSAL GELİŞME VE GELİR EŞİTSİZLİĞİ İLİŞKİSİ

Özet

Bu çalışma, enflasyon ve işsizliğin gelir dağılımı üzerindeki etkisini Türkiye bağlamında incelemeyi amaçlamaktadır. Ek olarak, çalışma finansal Kuznets eğrisinin finansal gelişme bağlamında uygulanabilirliğini değerlendirmeyi amaçlamaktadır. Araştırma, bu hedeflere ulaşmak için 1990 ile 2021 yıllarını kapsayan yıllık verileri kullanır. Araştırma, değişkenlerin durağanlığını belirlemek için standart ve Fourier Augmented Dickey-Fuller (ADF) testleri, eşbütünleşme ilişkileri için Fourier Engle-Granger (ve Standard Engle-Granger) ve uzun-kısa vadeli katsayı tahmini için FMOLS, DOLS ve CCR tahmin edicilerini kullanır. Ampirik sonuçlar, incelenen dönemde artan işsizlik ve enflasyon düzeylerinin Türkiye'deki gelir eşitsizliği ile pozitif ilişkili olduğunu göstermektedir. Buna karşılık, finansal Kuznets eğrisinin geçerliliği, ilgili zaman dilimindeki veriler tarafından desteklenmemektedir. Türkiye için finansal gelişme, işsizlik ve enflasyon değişkenlerinin eş zamanlı olarak değerlendirilmesinin yanı sıra Fourier

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yöntemlerinin analiz için kullanılmasının finansal Kuznets eğrisi literatürüne yeni boyutlar kazandırması dikkat çekicidir. Bu nedenle, hem Türkiye bağlamında kullanılan değişkenler hem de bu çalışmada sunulan metodolojik bulgular alana yenilikçi bakış açıları sunmaktadır.
Anahtar Kelimeler: *Enflasyon, işsizlik, Gini katsayısı, finansal gelişme, Türkiye*.

1. Introduction

Achieving fair distribution of income, a fundamental goal within macroeconomics, holds significant importance from both social and economic standpoints. With a shift towards prioritizing a nation's economic growth, a multitude of inquiries have surfaced. Addressing this concern has involved redefining this objective as sustainable growth. In this framework, ensuring equity in income distribution and mitigating income disparity emerge as pivotal factors. Income inequality can stand as a substantial barrier to sustainable progress. Primarily, income inequality might lead to a decline in economic efficiency (Incekara and Mutlugun, 2016: 358), potentially resulting in a reduction or stagnation of national income growth. Conversely, a rise in income inequality can fuel social issues, potentially triggering social unrest and undermining overall well-being. When a subset of the population enjoys elevated income levels, along with better access to healthcare and education, while others struggle to meet basic needs, it can give rise to national or international problems, protests, and societal disruptions (Durgun and Durgun, 2023: 48).

Income justice and income inequality are interconnected yet distinct notions. This article aims to alleviate the common confusion surrounding these terms by offering an in-depth clarification. Given that income distribution and income inequality are fundamental concepts integral to economic literature, their profound impacts on economic and societal frameworks cannot be understated. These two subjects are intricate and multifaceted, influencing critical domains like economic growth, social well-being, and policymaking. In this section of the article, the theoretical foundations of income distribution and income inequality will be explored, with a specific emphasis on the clarification of the relationship between these two issues.

1.1.Income Distribution

Income distribution defines how incomes are distributed among individuals or households in a society or economy. This concept plays a significant role in terms of income fairness, equality of opportunities, and societal welfare. Income distribution is often measured using tools such as the Lorenz curve and the Gini coefficient (Lian et al., 2023; Raza et al., 2023).

Several factors influence income distribution, including education levels, labor market conditions, tax policies, and social assistance programs (Acevedo et al., 2023). It is essential to examine how these factors affect income distribution and shape it. Income

Distribution not only has social and economic consequences, but also has an impact on justice and social welfare (Peters and Jetten, 2023). In addition, the effects of income distribution on economic outcomes such as economic growth, poverty and social mobility are also discussed in the literature (Asongu and Eita, 2023; Hussain et al., 2023).

1.2. Income Inequality

Income inequality is a concept that measures how income is distributed unequally or equally among different groups in a society or economy (Kemeny and Storper, 2023). Income inequality arises as a result of income distribution and affects social and economic outcomes (Ruankham and Sethapramote, 2023).

Different methods and indicators used to measure income inequality, especially indicators like the Gini coefficient, Palma ratio, and 20/20 ratio, should be discussed (Cho et al., 2023). Causes of income inequality encompass elements that influence income disparity, such as labor market dynamics, technological advancements, globalization, and educational factors (Hassan and Olapeju, 2023; Rafique et al., 2023).

When assessing the societal and economic consequences of income inequality, it is essential to consider how income inequality affects social unity, the formulation of policies, economic expansion, and innovative processes (Bourdin et al., 2023).

By the conclusion of the industrialization journey, evident enhancements can be observed in both production techniques and overall supply volume. Subsequent eras witnessed the onset of societal and socio-economic shifts, paving the way for the process of globalization (Karasoy, 2021). Following the progression of trade liberalization, the momentum for financial liberalization gained traction. This initiated a swift metamorphosis on a global scale and within the Turkish economy. While the evolution that commenced in the 1980s within Türkiye faced setbacks due to crises in the 1990s, the advancements in information-communication technology played a role in propelling the process forward. The expansion of financial markets, facilitated by factors such as diversification of financial instruments and greater financial depth, often correlates with income inequality. Within the realm of economics literature, differing perspectives on the link between financial development and income inequality emerge. One stance posits a negative and linear correlation between financial development and income inequality. Another perspective suggests an inverted-U-shaped relationship between financial development and income inequality. The third and final standpoint asserts a direct and positive association between the interconnected variables (Destek et al., 2017). The inverted-U relationship, frequently subjected to empirical and theoretical scrutiny, garners substantial attention. As advocated by Greenwood and Jovanovic (1990), this viewpoint posits that during the

early stages of economic progress, the financial sector operates inefficiently, resulting in gradual economic growth.

Over time, there will be an escalation in financial development, leading to exclusive access to financial instruments by the high-income segments due to their elevated costs. Consequently, an upswing in financial development will correlate with an augmentation in income inequality. Subsequent phases will witness diminishing transportation costs associated with financial products, allowing access to these tools by lower-income segments. This progression results in a decline in income inequality, thereby establishing an inverted-U relationship between financial development and income inequality (Townsend and Ueda, 2006). Within the literature, the "Financial Kuznets Curve (FKC)" is employed to validate this relationship. In essence, its validation signifies the validity of the inverted-U relationship between the mentioned variables. An analysis of the 2022 Income Distribution Statistics from the Turkish Statistical Institute (TUIK) reveals that the share of the highest-equivalent household disposable income bracket, comprising 20% of the population, grew by 1.3 percentage points compared to the previous year, reaching 48.0%. Conversely, the share of the lowest 20% group contracted by 0.1 percentage point, accounting for 6.0%. The Gini coefficient stood at an estimated 0.415. The trajectory of the Gini coefficient over the years is presented in Table 1.

Table 1. Development of Gini Coefficient in Türkiye by Years (2013-2022)

Years	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Gini Coefficient	0,400	0,391	0,397	0,404	0,405	0,408	0,395	0,410	0,401	0,415

Source: TUIK (2023).

Upon reviewing Table 1, it becomes apparent that there has been a surge in income disparity, particularly during the pandemic era. On average, a Gini coefficient of approximately 0.40 is consistently observed across the years. It holds immense significance to diminish this coefficient to ensure a more equitable distribution of income.

Apart from financial development, inflation stands out as another pivotal variable impacting income inequality. Elevated levels of inflation are a critical contributor to the erosion of macroeconomic equilibrium (Balcilar et al., 2018). Substantial inflation erodes the purchasing power of the majority, predominantly due to real wages generally lagging behind inflation rates (Jalil, 2012). This dynamic has the potential to exacerbate income inequality through the labor income channel, possibly leading to heightened welfare losses among low-income individuals and consequently, escalating

income disparity. Consequently, maintaining low inflation rates is identified as a primary objective by monetary authorities (Akyazi and Ekinci, 2009).

When faced with elevated unemployment rates or diminished employment opportunities, a decline in economic efficiency becomes evident. Essentially, this signifies that the actual GDP falls short of the potential GDP. This scenario can trigger not only economic outcomes but also give rise to societal predicaments. The immediate repercussions of unemployment frequently involve decreased income and an increased allocation of time toward non-labor market activities like leisure. Unemployment, stemming from income reduction, engenders adverse psychological effects including diminished self-esteem and identity, familial and social pressures, heightened stress, and amplified uncertainty about the future (Mete, 2022: 95). Unemployment rates, particularly with regard to income inequality, hold significant importance.

To address income inequality and ensure an equitable income distribution, it is crucial to unveil the factors underpinning this disparity and assess their impacts. The recent upsurge in volatility within certain macroeconomic indicators, particularly inflation, coupled with a rise in socio-economic challenges in Türkiye, constitutes the primary impetus for this study. This research delves into the determinants of income inequality under the purview of FKC. Notably, the study's distinctiveness stems from its focus on current-period datasets encompassing two key macroeconomic variables: inflation and unemployment, alongside its application of contemporary empirical methods. Thus, it is anticipated that this study will contribute substantively to the pertinent literature.

Subsequent sections of the study provide an overview of previous research on the subject. The third section introduces the dataset and model, subsequently presenting empirical findings. The final segment encompasses assessments, policy recommendations, and the study's conclusive remarks.

2. Literature Review

In the scholarly literature, numerous variables have been subjected to testing for their relationship with income inequality. Among these variables, inflation, unemployment, financial development, globalization, economic growth, foreign direct investment, defense expenditures, and corruption have been commonly employed (Hepsag, 2017; Destek et al., 2017; Cestepe & Tatar, 2018; Tunali & Cetinkaya, 2019; Emek & Yerdelen Tatoglu, 2020; Bilik and Aydin, 2023; Atilgan Yasa and Keyifli, 2023; Yilmaz Ozsoy, 2023; Akdag and Bozdaglioglu, 2023; Durgun and Durgun, 2023). Conversely, investigations into income inequality frequently center around the FKC (Financial Kuznets Curve) approach.

Ang (2010) examined the applicability of the Financial Kuznets Curve (FKC) in the Indian economy from 1951 to 2004. In this study, the Gini coefficient served as the indicator of income inequality, while explanatory variables encompassed financial development, economic growth, inflation, and financial liberalization. Utilizing the ARDL limit test as the empirical approach, the study concluded that the FKC did not hold validity. Shahbaz et al. (2014) explored the validity of the FKC within the Iranian economy. Their research spanned the period 1965 to 2011 and constructed an empirical model involving the Gini coefficient, GDP, the rate of domestic credit to the private sector, inflation rate, and the globalization index. Similar to Ang (2010), the study adopted the ARDL limit test while also conducting the VECM Granger causality test. The empirical findings indicated the validity of the FKC.

Ozdemir (2019) delved into the FKC's validity within a dataset comprising both developed and developing countries. Analyzing the years 1993 to 2013, the study incorporated variables such as Gini coefficient, financial development, economic growth, financial liberalization, globalization, unemployment rate, public expenditures, and real effective exchange rate. Employing the dynamic panel generalized method of moments (GMM) as the empirical technique, the results align with the valid direction of FKC.

In a different vein, Torusdag and Barut (2020) probed the applicability of the FKC in the Turkish economy across the 2002 to 2017 sampling period, using Bayer and Hanck (2012) cointegration tests. Their empirical model integrated the Gini coefficient, financial development, per capita income, and foreign direct investment variables. The findings of this study indicated that the FKC lacked validity.

Conversely, Yilmaz and Demirgil (2020) undertook an inquiry into the validity of the Financial Kuznets Curve (FKC) within Türkiye's context for the timeframe spanning 1980 to 2018. Employing the ARDL bounds test as their chosen empirical methodology, they incorporated variables such as the Gini coefficient, financial development, and economic growth. The empirical outcomes derived from this study affirm the validity of the FKC. In a similar vein, Sayar et al. (2020) assessed the validity of the FKC across 23 developing economies by utilizing panel data analysis.

In contrast, Kuscuoglu and Cicek (2021) scrutinized the validity of the FKC within Türkiye, covering the period from 1987 to 2017, employing the Panel ARDL method. The empirical findings from their study indicated the lack of validity for the FKC. Similarly, Dumrul et al. (2021) focused on the validity of the FKC in the Turkish economy during the years 1980 to 2017, adopting structural break cointegration analysis. Their empirical results underscored the invalidity of the FKC.

Ozdemir (2021) tested the applicability of the FKC by examining Gini coefficient, economic globalization index, and financial development data from 27 OECD countries across the period from 1990 to 2017.

In the analysis, employing the panel fixed effects technique and the two-stage System GMM approach as the practical methodology, the findings indicate that the Financial Conditions Index (FKC) lacks validity. Efeoglu (2022) also explored the soundness of FKC in newly industrialized nations during the period of 1987-2019. The study utilized the panel data methodology and employed the estimations of Parks (1967), Kmenta (1986), and Beck and Katz (1995) to find that FKC remains valid. Another investigation by Khatatbeh and Moosa (2023) assessed the FKC's validity in the economies of 20 developed and developing countries spanning from 1980 to 2015. Using the fully modified ordinary least square (FMOLS) and the unobserved components model (UCM) approaches, the study concluded that FKC holds validity in some countries while being invalid in others. This disparity is primarily attributed to variations in economic development levels and financial structures.

In a study conducted by Yuldashev et al. (2023), the impact of foreign direct investments on income inequality in selected Asian countries was investigated. Using the ARIMA estimator for the period from 1990 to 2020, they found that foreign direct investments had a negative impact on inequality. Zandi et al. (2022) examined the dynamic role of corruption, inflation, and unemployment on income inequality in developing Asian countries. They used the GMM method to investigate 12 Asian countries for the period from 2006 to 2020. The results indicated a significant positive relationship between corruption, inflation, and unemployment with the GINI index, suggesting that these factors were key drivers of income inequality in developing Asian countries. Fauzan et al. (2023) employed panel regression to explore the relationship between income inequality, economic growth, inflation, and unemployment in the West Java Province. The findings revealed that income inequality, inflation, and unemployment were significant factors influencing economic growth and unemployment rates in the West Java Province.

Upon reviewing the literature, the significance of factors such as the time period, grouping of countries, empirical methodology, and model formulation becomes apparent in relation to the validity of FKC. This study aims to contribute to the existing literature by examining the validity of FKC through a distinct lens, utilizing contemporary period data and methodologies in the established model.

3. Methodology

This study investigates how inflation, unemployment, and financial development influence income inequality in Türkiye. Additionally, the research examines the

validity of the financial Kuznets curve, a theory proposing an inverse U-shaped connection between income inequality and financial development. The study employs annual data spanning from 1990 to 2021 and utilizes time series analysis techniques.

The research employs standard and Fourier Augmented Dickey-Fuller (Fourier ADF) tests to assess the presence of unit roots in the variables. The Fourier Engle-Granger (Fourier EG) cointegration test is conducted to evaluate the cointegration relationship. To analyze the long-term relationship, the study employs the Fully Modified Ordinary Least Squares (FMOLS), Dynamic Ordinary Least Squares (DOLS), and Canonical Cointegration Regression (CCR) tests.

3.1.Model and Data

Equation (1) examines the relationship between unemployment, inflation, financial development and income inequality in Türkiye

$$\mathrm{GINI_t} = \beta_1 + \beta_2 FDI_t + \beta_3 {FDI_t}^2 + \beta_4 \mathrm{INF_t} + \beta_5 \mathrm{UNMP_t} + \mathrm{u_t} \quad (1)$$

Equation (1) comprises several variables, namely the Gini coefficient (GINI), financial development index (FDI), the square of financial development index (FDI^2), inflation measured by consumer prices (annual %) (INF), and unemployment as a percentage of the total labor force (UNMP). The data utilized for this study were collected from various sources. The GINI variant was sourced from the Standardized World Income Inequality Database (SWIID) available at https://fsolt.org/swiid/. The FDI variant was obtained from the International Monetary Fund (IMF) data portal (https://data.imf.org/?sk=f8032e80-b36c-43b1-ac26-493c5b1cd33b&sid=1485894037365). Furthermore, the variables INF and UNMP were acquired from the World Bank's databank (https://databank.worldbank.org/reports.aspx?source=2&series=SP.URB.TOTL&country=#). To ensure consistency, the natural logarithms of all the variables were taken.

3.2.Unit Root Test

For this research, both the conventional Augmented Dickey-Fuller (ADF) unit root test and the enhanced Fourier Augmented Dickey-Fuller (Fourier ADF) test are employed. The conventional ADF test does not consider structural breaks, unlike the Fourier ADF test which explicitly incorporates these breaks. This enhancement involves the inclusion of trigonometric functions into the standard ADF test. These supplementary functions are capable of accommodating the timing and quantity of structural changes present within the dataset. This aspect grants the Fourier ADF test a notable advantage over conventional methodologies. Enders and Lee (2012), the proponents of this approach in the literature, utilized the Fourier ADF test in the subsequent manner.

$$\Delta y_t = py_{t-1} + \beta_1 + \beta_2 trend + u_t \quad (2)$$

$$\Delta y_t = py_{t-1} + \beta_1 + \beta_2 trend + \beta_3 \sin\left(\frac{2\pi kt}{T}\right) + \beta_4 \cos\left(\frac{2\pi kt}{T}\right) + u_t \quad (3)$$

Within this specific framework, the variable 'k' corresponds to the frequency parameter, 't' symbolizes the trend, and 'T' signifies the time. The value 'k' is essential for the process of model selection. This is because the model with the minimum sum of squared residuals (MinSSR) corresponding to the suitable frequency value will be chosen based on the derived value. Consequently, this particular frequency value holds significant importance for the analysis at hand.

3.3. Cointegration Test

In this investigation, the Fourier Engle-Granger test, capable of accommodating structural changes, will be utilized to assess the cointegration relationship. In contrast, the conventional Engle-Granger (1987) method does not consider these structural alterations. Consequently, in scholarly discourse, cointegration tests that consider the impact of structural breaks have been introduced to tackle this concern. However, these tests incorporate these disruptions using dummy variables within the model. In contrast, the Fourier Engle-Granger test uniquely accommodates structural breaks by employing trigonometric functions, setting it apart from the conventional Engle-Granger methodology. This modification was introduced by Yilanci (2019), emulating the structure of the classic Engle-Granger (1987) cointegration test and subsequently becoming recognized within the academic literature.

$$y_{1t} = a_0 + \gamma_1 \sin\left(\frac{2\pi kt}{T}\right) + \gamma_2 \cos\left(\frac{2\pi kt}{T}\right) + \beta' y_{2t} + u_t \quad (4)$$

When employing the Fourier Engle-Granger test, a range of frequency values, including 1 through 5, is considered. Separate models are computed for each of these frequency values. Among these, the frequency value that yields the lowest sum of squared residuals (MinSSR) is identified, and interpretations are based on those specific values.

The procedure for conducting the Fourier Engle-Granger cointegration test bears resemblance to the traditional Engle-Granger cointegration test. In this context, models are executed, and the residuals are tested for stationarity using the suitable frequency value. This involves employing DF or ADF tests. Subsequently, the resulting statistical value is juxtaposed with the critical values determined in the study conducted by Yılancı (2019). If the statistical value surpasses these critical values, it indicates the presence of a cointegration relationship.

$$y_t = \beta x_t + e_t \quad (5)$$

In this context, the model is executed using EKK, leading to the acquisition of residuals. Subsequently, the residuals undergo DF and ADF stability tests. If these tests determine the series to be stationary, it indicates the presence of a cointegration relationship.

3.4. Long-Short Term Estimator

Ultimately, the estimation of long-term coefficients will be conducted. To address potential endogeneity issues, the Fully Modified Ordinary Least Squares (FMOLS) method, introduced by Phillips and Hansen (1990), will be employed. Additionally, the potential problems associated with interaction and autocorrelation between independent variables and residuals will be tackled using the Dynamic Ordinary Least Squares (DOLS) technique, devised by Stock and Watson (1993). Lastly, to address concerns regarding potential long-term correlations leading to endogeneity, the Canonical Cointegration Regression (CCR) method developed by Park (1992) will be utilized.

4. Empirical Results and Discussion

4.1. Unit Root Test Results

Before initiating the analysis, a evaluation of the stationarity of the variables will be executed. The stationarity of all variables was first appraised using the standart ADF and Fourier ADF tests, and the results are displayed in Table 2.

Table 2: Unit root test results

Level	**Frequency**	**MinSSR**	**F-Test**	**Lag**	**Fourier ADF**	**Standart ADF**
GINI	3	0.0006	0.771	7	-0.802	0.264
FDI	5	0.028	2.255	1	-3.250	-1.829
FDI2	5	0.028	0.281	6	-2.132	-2.478
INF	1	0.355	6.459*	1	-2.408	-2.093
UNMP	2	0.068	2.428	1	-2.208	-1.447
Level	**Frequency**	**MinSSR**	**F-Test**	**Lag**	**Fourier ADF**	**Standart ADF**
GINI	3	0.0005	0.775	4	-1.729	-3.728***
FDI	5	0.032	0.479	8	-0.203	-5.709***
FDI2	3	0.035	1.520	8	-0.079	-5.119***
INF	1	0.428	6.311*	2	-4.734***	-4.693***
UNMP	2	0.079	3.878	2	-5.014	-4.803***

Note: The symbol Δ denotes the computation of initial differences. The critical thresholds for the Fourier F test are as follows: 10.35 for the 1% significance level,

7.58 for the 5% significance level, and 6.35 for the 10% significance level. For the frequency value of 1, the corresponding critical values are: -4.42% for the 1% level, -3.81% for the 5% level, and -3.49% for the 10% level.

F test results are given in the Table above. If this test result is statistically significant, the Fourier ADF results will be interpreted. If not significant, normal ADF results will be interpreted.

Conversely, for variables that do not exhibit statistical significance in the F test, their interpretation will rely on the traditional ADF test. As indicated in the table, all variables, except for the INF variable, demonstrate unit root presence in the smoothed values.

In contrast, first-order differences were applied to all variables. Likewise, the INF variable exhibited statistical significance in the F test. Consequently, upon analyzing the Table, the integration level for the INF variable was determined to be I(1). Similarly, based on the standard ADF test, the remaining variables were also identified as I(1).

4.2. Cointegration Test Results

After meticulously examining the stationarity characteristics of each variable, the subsequent phase involves investigating the possible presence of a persistent relationship among these variables. In order to thoroughly assess this aspect, a cointegration analysis will be carried out. Building upon the insights obtained from both the Fourier ADF and the standard ADF stationarity tests, the investigation will proceed to explore the cointegration linkage between the variables by employing the Fourier Engle-Granger (FEG) cointegration test. Thus, the study meticulously examines the cointegration connection among the variables using the FEG test, and the resulting findings of this analysis are meticulously presented in Table 3.

Table 3: Cointegration Test Results

Dep. Var.	Indep. Var.	k	MinSSR	Fourier Test Statistic
GINI	FDI, FDI^2, INF, UNMP	3	0.0009	-4.480**

Note: The critical values are 1%=-5.393, 5%=-4.733 and 10%=-4.394.

When the table is examined, the appropriate frequency value 3 was obtained. MinSSR is 0.0009. If the statistical value corresponding to these values is -4.480, it is greater than the critical value at the 5% significance level. Therefore, there is a cointegration relationship.

4.3. Long-Short Term Estimator Results

Next, we will proceed with estimating the long-term coefficients. To achieve this goal, the FOMLS, DOLS, and CCR tests were executed, and the outcomes are presented in Table 4.

Table 4: Long-short term results

GINI		**FDI**	**FDI2**	**INF**	**UNMP**	**SIN**	**COS**	**C**
FMOLS		-0.715***	-0.594***	0.006***	0.007***	0.008***	0.0008***	3.515***
		(0.003)	(0.003)	(0.0002)	(0.0003)	(0.0001)	(0.0001)	(0.0008)
CCR		-0.694***	-0.576***	0.009***	0.008***	0.007***	0.0001	3.516***
		(0.004)	(0.004)	(0.0002)	(0.0004)	(0.0001)	(0.0001)	(0.001)
DOLS		-0.741**	-0.619**	0.003	0.005	0.009	0.002	3.515***
		(0.274)	(0.261)	(0.015)	(0.027)	(0.008)	(0.005)	(0.077)
∆GINI	**ECT**	**∆FDI**	**∆FDI²**	**∆INF**	**∆UNMP**	**SIN**	**COS**	**C**
FMOLS	-0.227***	-0.179***	-0.181***	0.008***	0.018***	-0.001***	0.002***	-0.002***
	(0.006)	(0.006)	(0.006)	(0.0003)	(0.0007)	(0.0001)	(0.0001)	(0.0001)
CCR	-0.238***	-0.167***	-0.170***	0.010***	0.014***	-0.0001**	0.002***	-0.002***
	(0.009)	(0.013)	(0.011)	(0.0005)	(0.001)	(0.0001)	(0.0001)	(0.0001)
DOLS	-0.227	-0.186	-0.188	0.006	0.021	-0.0002	0.002	-0.002*
	(0.189)	(0.173)	(0.166)	(0.009)	(0.020)	(0.002)	(0.002)	(0.001)

Note: ***, ** and * are 1%, 5% and 10% significance levels, respectively.

As per the findings outlined in Table 4, the variables displayed consistent trends across the estimators, albeit with differing degrees of strength. The variables INF and UNMP exhibited a positive influence on GINI over the extended period. Conversely, rises in FDI led to a decrease in income inequality. However, despite the negative nature of the FDI2 variable, it's apparent that the Financial Kuznets curve doesn't hold true for Türkiye, as the FDI variable also displays a negative relationship.

However, upon analyzing the Table, it is evident that the ECT coefficient, which validates the presence of a cointegration connection in the short-term outcomes, displays a negative value within the range of -1 to 0, and this value holds statistical significance (as observed in FMOLS and CCR). The findings from the short-term analysis mirror those of the long-term analysis.

When examined in long-terms of coefficients, a rise of ‰10 in the variables INF and UNMP, as indicated by FMOLS (CCR/ DOLS), corresponds to an approximate increase in income inequality by ‰0.006 and ‰0.007 (‰0.009 and ‰0.008/ ‰0.003 and ‰0.005), respectively. Notably, both INF and UNMP variables demonstrated statistical significance in the FMOLS and CCR estimations, whereas they yielded insignificant outcomes according to the DOLS analysis. Conversely, a 1% elevation in FDI was found to result in an approximate reduction of 0.72% (0.69%/ 0.74%) in income inequality. Noteworthy is the statistical significance of the FDI results across all estimation methods.

impact. A rise in inflation can have detrimental effects on the purchasing power of individuals. In the context of the Turkish economy, the largest portion of household incomes is allocated to fulfilling basic necessities. Escalating inflation can result in higher expenditures on these essentials, disproportionately affecting individuals with lower incomes. The inflation rates in Türkiye have been notably elevated in recent years, necessitating proactive measures to counteract heightened income inequality stemming from this inflationary pressure.

To mitigate the adverse effects of increasing inflation on income inequality in Türkiye, various strategies need to be implemented. Among these strategies, the utilization of tools such as monetary and fiscal policies holds paramount importance. Monetary policy aims to rein in inflation by raising interest rates, while fiscal policy strives to curb inflation through measures like increased taxation or reduced spending. Additionally, elevating minimum wages and implementing social assistance programs can mitigate the impact of inflation on low-income segments of society.

The equitable distribution of income in Türkiye is negatively impacted by elevated levels of unemployment. This stems from the fact that jobless individuals experience reduced or no earnings, consequently leading to heightened poverty rates. Moreover, an uptick in unemployment can hinder individuals' access to vital services like education and healthcare. Furthermore, it can engender feelings of exclusion and isolation among the unemployed population, potentially eroding social cohesion.

Conversely, bolstering financial development in Türkiye serves as a vital tool in curbing the expansion of income inequality. Enhancing financial development has the potential to decrease unemployment by encouraging increased investments from individuals and businesses alike. Moreover, improved financial development may create additional avenues for savings for both individuals and businesses.

5. Conclusions and Policy Implications

This research delved into the intricate connections between unemployment, inflation, financial development, and income inequality in the Turkish context. Additionally, the study ventured to assess the applicability of the financial Kuznets curve for Türkiye by incorporating the square of the financial development variable. Through the employment of Fourier Augmented Dickey-Fuller (ADF) and standard ADF tests for stationarity, Fourier Engle-Granger test for cointegration, and FMOLS, DOLS, and CCR methods for coefficient estimation, this investigation utilized annual data spanning the period from 1990 to 2021. The outcomes gleaned from this study unveil consistent patterns across diverse predictive techniques, thereby illuminating crucial insights warranting the attention of policymakers.

Initially, this study underscores that both inflation (INF) and unemployment (UNMP) exert an upward influence on income inequality (GINI), encompassing both immediate and protracted timeframes. This accentuates the significance of concerted endeavors to manage inflation and curtail unemployment, pivotal for attenuating the mounting income inequality in Türkiye. Given that ascending inflation disproportionately impacts individuals with limited financial means who allocate a substantial share of their earnings towards basic necessities, a multifaceted strategy becomes imperative. Policymakers should channel their efforts into targeted measures aimed at stabilizing inflation, encompassing the effective employment of monetary policies and vigilant monitoring of factors on the supply side contributing to inflationary pressures.

Furthermore, our findings underscore that financial development index (FDI) plays a pivotal role in mitigating income inequality. The inverse relationship between FDI and GINI underscores the potency of financial development in generating employment opportunities and kindling economic growth, ultimately culminating in a more equitably distributed income landscape. Propelling an environment conducive to investments through policy initiatives and incentivizing mechanisms can thus facilitate the reduction of unemployment and income inequality.

The imperative of embracing a comprehensive approach to counteract the adverse effects of surging inflation on income inequality is self-evident. This encompassing strategy entails the orchestration of both monetary and fiscal policies to stabilize price levels and foster sustainable economic expansion. By adroitly combining interest rate adjustments and precision-targeted fiscal interventions, governmental bodies can expertly manage inflation while simultaneously shielding the purchasing power of marginalized segments of society. Additionally, elevating minimum wage standards and instituting robust social welfare programs stand poised to provide a safeguarding net for individuals with modest incomes, effectively cushioning them against the repercussions of escalating inflation.

The issue of unemployment, perpetuating a prominent role in income inequality dynamics, necessitates the implementation of policies to galvanize job creation and augment employment prospects. Measures supporting skill enhancement, fostering entrepreneurship, and capitalizing on sectors marked by high labor-intensity collectively bear the potential to alleviate unemployment rates, thus fostering a more equitably distributed income framework. Simultaneously, prioritizing accessible avenues to education and healthcare services for the unemployed holds the promise of uplifting their socio-economic outlooks while fostering societal cohesion.

Notably, the study emphasizes the indispensable role of financial development in ameliorating income inequality. Policymakers are enjoined to prioritize the creation of an environment conducive to financial growth by championing innovative financial

instruments, nurturing entrepreneurial spirit, and enhancing credit accessibility. An effectively robust financial sector emerges as a catalyst for investment promotion, spurring economic dynamism, and engendering avenues for both individuals and enterprises to accumulate capital, thereby contributing to a more just income distribution.

Our findings suggest that inflation and unemployment have a positive impact on income inequality in Türkiye, while FDI has a negative impact. These results are consistent with some of the existing studies on the topic, but also differ from others in some aspects.

One of the studies supporting our findings is Ucal et al. (2016) examined the relationship between financial development and income inequality in Türkiye using the ARDL approach. They found that foreign direct investment reduces income inequality in both the short and long term. Şenol and Orhan (2021), in their study investigating the factors affecting income inequality for Türkiye and OECD countries, found that unemployment increases income inequality. Similarly, Hayrullahoglu and Tuzun (2020) found that inflation and unemployment had a positive effect on the Gini coefficient in their study investigating the factors affecting income inequality for Türkiye and OECD countries. On the other hand, Koçak and Uzay (2019) analyzed the impact of financial development on income inequality in Türkiye using the FMOLS approach. They found that foreign direct investment reduces income inequality in both the short and long term, while inflation increases it in both periods.

Another study that corroborates our findings is by Destek et al. (2020), who investigated the different dimensions of financial development on income inequality in Türkiye using the nonlinear ARDL approach. They found that overall financial development and banking sector development have an inverted U-shaped relationship with income inequality, while stock market development has a monotonically decreasing relationship with income inequality. They also found that real income and government expenditures reduce income inequality, while population growth worsens it. They argued that financial development can reduce income inequality by enhancing economic growth, improving human capital, and facilitating social mobility.

However, some studies have challenged our findings and reported different or opposite results. For instance, Koçak and Uzay (2019) analyzed the effect of financial development on income inequality in Türkiye using the FMOLS approach. They found that FDI increases income inequality in both the short and long run, while inflation decreases it in both periods. They also found that GDP growth reduces income inequality in both periods, while domestic gross capital formation increases it. They explained the positive effect of FDI on income inequality by the presence of skill-biased technological change, rent-seeking behavior, and crowding-out effects. On the

other hand, Minh Huynh (2021) investigated the impact of Foreign Direct Investments on income inequality for 36 Asian countries. He finds that foreign direct investment both increases income inequality. They explained this situation by the fact that these countries face low institutional quality problems. Therefore, for these countries, government effectiveness has achieved mitigation of the impact of FDI on income inequality through domestic mechanisms such as control of corruption, political stability and absence of violence/terrorism, and the rule of law.

In conclusion, our findings contribute to the literature on the relationship between financial development and income inequality in Türkiye by providing new evidence from different estimation methods and variables. However, our findings also reveal some discrepancies and inconsistencies with previous studies, which may be due to different data sources, time periods, model specifications, or measurement errors. Therefore, further research is needed to reconcile these differences and to understand the underlying mechanisms and channels through which financial development affects income inequality in Türkiye.

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