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RELATIONSHIP BETWEEN INFLATION AND INCOME DISTRIBUTION: AN ANALYSIS FOR TURKEY USING ARDL APPROACH*

Öğr. Gör. Dr. Seyit Ali MİÇOĞULLARI**

ABSTRACT

Income inequality/inequity stands among the fundamental macroeconomic issues of economies. Inflation is one of the most significant macroeconomic factors affecting income distribution. The aim of this study is to analyze the impact of inflation on income distribution in the Turkish economy for the period 1987-2021, using annual data to examine both short-term and long-term relationships. The method employed is the ARDL (AutoRegressive Distributed Lag) bounds testing approach developed by Pesaran et al. (2001). According to the analysis findings, the effect of inflation on income distribution is identified as positive in both the short and long term.

Keywords: Inflation, Income distribution, Gini coefficient, Türkiye

JEL Codes: E31, I30

ENFLASYON VE GELİR DAĞILIMI ARASINDAKİ İLİŞKİ: ARDL YAKLAŞIMIYLA TÜRKİYE İÇİN BİR ANALİZ

ÖZ

Gelir dağılımındaki adaletsizlik/bozukluk ekonomilerin en temel makroekonomik problemleri arasında yer almaktadır. Enflasyon, gelir dağılımını etkileyen en önemli makroekonomik faktörlerdendir. Bu çalışmanın amacı, Türkiye ekonomisinin 1987-2021 dönemi için yıllık verilerle enflasyonun gelir dağılımı üzerindeki etkisini kısa ve uzun dönemli ilişkileri analiz etmektir. Yöntem olarak Peseran vd. (2001) geliştirmiş oldukları ARDL sınır testi kullanılmıştır. Analiz bulgularına göre, enflasyonun gelir dağılımı üzerindeki etkisi hem kısa hem de uzun dönemde pozitif olarak tespit edilmiştir.

Anahtar Kelimeler: Enflasyon, Gelir dağılımı, Gini katsayısı, Türkiye

JEL Kodları: M40, M49

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1. INTRODUCTION

The fundamental goal of the science and policies of economics is to enhance the living standards of different classes and individuals within society. To achieve this goal, economic growth and an increase in welfare are recognized as important objectives. Economic growth aims to elevate the per capita income level by boosting production. However, an increase in welfare is not solely dependent on the growth of production. Equitable distribution of income is also an indicator of societal well-being. In societies with income inequality, even if there is economic growth and high income levels, true welfare cannot be achieved unless the distribution is fair among all individuals and classes.

The issue of income distribution is approached from different perspectives in the economics literature. Heterodox economic approaches emphasize justice and social balance, whereas neoclassical approaches highlight economic growth. Throughout history and up to the present day, economists who have emphasized the importance of income distribution include names like David Ricardo and more recently, Thomas Piketty. Ricardo stated that the true purpose of economics is not only to examine the causes of national welfare increase but also to study how this welfare is shared among those involved in production (Ünsal, 2010). Piketty, on the other hand, asserted that the distribution of wealth is not only a concern for economists but also for social scientists, historians, and other thinkers (Piketty, 2014). Therefore, different analyses and theories continue to be developed to ensure a fair distribution of income.

Throughout history, both in Turkey and the global economy, income distribution has consistently been a subject of debate. This topic holds significant importance as it determines the level of prosperity of national economies and the happiness of societies. In simple terms, income distribution refers to how the income generated by a country during a specific period is shared among individuals and production factors. In this context, it is essential for income to be distributed fairly and equally. One of the important studies on income distribution is Kuznets' (1955) work. This study assumes that as countries develop, income inequality initially increases but later decreases. The traditional view suggests that the increase in income inequality stimulates capital accumulation and thus economic growth. However, this view has been challenged, and the weak link between income inequality and savings has been recognized through cross-country comparisons. Studies such as Furman and Stiglitz (1998), Aktan and Vural (2002), have also emphasized this weak connection.

Given the critical role of income distribution in economic welfare and societal balance today, research focusing on this topic is increasingly growing. In developing countries like Turkey, effective and equitable management of income distribution due to economic dynamics is a cornerstone of sustainable development. In this context, understanding the factors influencing income distribution, especially investigating the potential impacts of inflation on this balance, is of utmost importance. Inflation is a phenomenon that adds to the complexity of economic systems and has a wide range of effects. This study aims to shed light on the relationship between inflation and income distribution in the Turkish economy, with a particular focus on the impact of inflation on income distribution. The impact of inflation on income distribution raises questions about how different segments of the economy can be affected and how these effects can shape social inequality. As depicted in Figure-1, in recent years, the Gini Coefficient representing income inequality has followed a similar trend to inflation.

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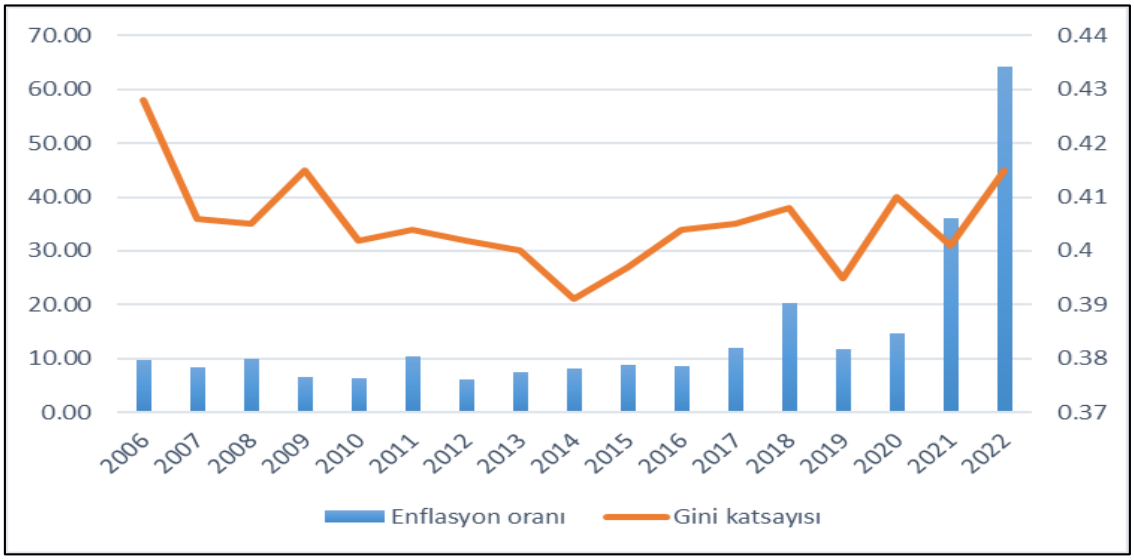

Figure 1: Gini Coefficient and Inflation - Turkiye (2006-2022)

Note: The left axis represents the annual inflation rate, while the right axis represents the Gini Coefficient. The Gini Coefficient is a measure that ranges from 0 to 1: the closer it is to zero, the more even (equitable) the income distribution; the closer it is to one, the more skewed (unequitable) the income distribution.

This article will address the impact of inflation on income distribution, considering both the theoretical framework and Turkey's income distribution and inflation situation. This analysis aims to contribute to making more effective decisions in the design and implementation of economic policies. Furthermore, the results of the study will help us understand the potential effects of policy initiatives aimed at rectifying income distribution on inflation. For this purpose, this study, which aims to determine the impact of inflation, a sig nificant macroeconomic factor on income distribution in Turkey for the period 1987-2021, is divided into four sections. The relevant literature is summarized, the model and variables are introduced; after explaining the econometric method, the analysis and findings are shared and interpreted.

2. LITERATURE REVIEW

Numerous theoretical and empirical studies have been conducted in economic theory to examine the effects of inflation on income distribution. Initially, a generally positive relationship between inflation and income distribution has been supported in empirical studies. For instance, Dolmas et al. (2000), analyzing data from 44 countries spanning from 1960, 1970, and 1980 to 2000, identified that economies with higher income inequality also experienced higher average inflation rates. According to their findings, a positive correlation between income distribution and inflation was established. In another study, Thalassinos et al. (2012) utilized a panel data model to analyze the relationship between inflation and income distribution in 13 European countries for the period 2000-2009. The results of the analysis indicated that inflation deteriorates income distribution. Nantob (2015) supported the hypothesis of a nonlinear relationship between inflation and income distribution using the GMM method in a study covering 46 countries. The findings of the study indicated a positive and significant effect of inflation on income inequality. Muhibbullah and Das (2019) analyzed the impact of inflation on income inequality in Bangladesh for the period 1990-2015. The results provided evidence that a 1% increase in inflation leads to a 4.99% increase in income inequality, as demonstrated by the VECM model. Law and Soon (2020) examined the relationship between inflation and income inequality in 65 developed and developing countries using data from 1987 to 2014. According to their analysis, an increase in the inflation rate exacerbates income inequality. One of the sectors that harbors income inequality is the

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manufacturing industry. Analyzing the manufacturing industry holds significance in terms of the Turkish economy (Moalla, 2020). In some studies conducted for the Turkish economy, the analysis of the manufacturing industry is important in this regard (Moalla, 2022).

Conversely, there are empirical studies that identify a negative relationship between inflation and income distribution. Franco and Gerussi (2013), employing panel data sets, concluded in their research covering 17 countries for the period 1990-2006 that inflation reduces income inequality. Similarly, in a study of 37 developing Asian countries for the years 2004-2012, Park and Mercado (2015) observed a negative relationship between inflation and income distribution. Emek (2019) demonstrated the negative direction of the relationship between income inequality, inflation rate, and public expenditures in a study focusing on 17 developing countries for the period 1991-2015. Emek and Tatoğlu (2020) asserted that inflation has a negative and significant impact on income distribution in developing countries based on a heterogeneous panel data analysis of 58 countries for the years 1991-2018.

Furthermore, there exist studies in the literature that advocate for the absence of a relationship between income distribution and inflation. Jäntti and Jenkins (2001) utilized Seemingly Unrelated Regressions (SUR) models and Ordinary Least Squares (OLS) estimates to examine the impact of inflation increases on income inequality in the UK from 1961 to 1991. Their results indicated that inflation has no effect on income inequality. Yue (2011) conducted a study for South Korea covering the years 1980-2002 and found that inflation does not affect income inequality, according to the results of the Engle-Granger Error Correction Model (ECM). Similarly, Dilber and Hatipoğlu (2022) investigated the causality relationship between inflation and income distribution using Dumitrescu-Hurlin panel causality tests for 8 developing OECD countries spanning from 2007 to 2019. The results revealed the absence of any causal relationship in either direction between inflation and income distribution within the considered group of countries.

Lastly, Aktaş and Dokuzoğlu (2022) employed a panel threshold value model for 40 developed and developing countries for the years 1993-2019, highlighting that the effect of inflation on income distribution changes based on threshold values. The authors emphasized that inflation has a negative effect when below the threshold inflation level and a positive effect when above it.

Through the review of the literature, it is evident that various findings have been obtained regarding the relationships between the variables.

3. METHODOLOGY

In this study, the Auto Regressive Distributed Lag (ARDL) bounds testing approach is employed to determine the impact of inflation, a significant macroeconomic factor on income distribution, for the period 1987-2021 in Turkey. The ARDL method was developed by Pesaran et al. (2001). Engle-Granger and Johansen cointegration tests are commonly used to examine long-term relationships between variables. These cointegration tests require variables to be at the same order of integration. According to Pesaran et al. (2001), variables being at different levels of integration does not hinder the application of the ARDL method. Even if the variables are stationary at I(0) or I(1) levels, the ARDL method can be tested. However, according to Pesaran, if variables are second-differenced stationary (I(2)), the ARDL method cannot be applied. The ARDL method offers advantages in terms of applicability to small samples and more reliable statistical results compared to other testing methods (Akel & Gazel, 2014).

4. DATA SET AND MODEL

For the Turkish economy, annual data between 1987 and 2021 are utilized, with the Gini coefficient serving as an indicator of income distribution, and the Consumer Price Index (CPI)

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representing inflation. This study is conducted to analyze both the long- and short-term relationships between variables. For this purpose, the distributed lag auto-regression (ARDL) bounds testing approach is chosen. The inflation data used in the analysis is obtained from the CBRT EVDS database, while the income distribution indicator is derived from the SWIID-Frederick Solt database. The variables used in the study are designated as ENF for inflation and GINI for income distribution for simplicity. The linear regression model composed of the variables used in the study is as follows:

$$ln\text{ENF} = \beta_0 + \beta_1 \text{GINI} \quad (1)$$

The tables below present the stability test and ARDL bounds test results for the variables used in the analysis.

5. ANALYSIS AND EMPIRICAL FINDINGS

5.1. Unit Root Tests

The ARDL test allows for different levels of I(0) and I(1) stationarity for the series (Pesaran et al., 2001). Before detecting the cointegration relationship, it is essential to determine the stationarity levels of the variables. In this study, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests are employed to ascertain the stationarity levels of the variables. The unit root test results are presented in Table 1.

Table 1: Unit Root Test Results

		ADF	PP
	Variables	**Constant**	**Constant**
Level	GINI	-1.1988 (0.6631)	-0.5232 (0.8744)
	ENF	-1.2305 (0.1961)	-1.0285 (0.2673)
First Difference	GINI	-1.9547 (0.0496)**	-2.0099 (0.044)**
	ENF	-8.9778 (0.0000)*	-9.1039 (0.000)*

When evaluating Table 1, it can be observed that the GINI and ENF series are non-stationary at the level according to both the ADF and PP tests. However, it has been determined that the first differences of the GINI and ENF series are stationary based on the ADF and PP tests.

5.2. ARDL Bounds Test Results

The calculated F-statistic value of the series, if greater than the lower I(0) and upper I(1) bounds, allows us to detect a cointegration relationship. The ARDL bounds test findings are presented in Table 2.

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Table 2: F-Statistic and Critical Values

Model	K	M	F-Statistic	Significance Level	Bound I(0)	Bound I(1)
ARDL (2,4)	2	8	4.059***	%1 %5 %10	3.223 3.957 5.763	3.757 4.53 6.48

Note: K represents the number of explanatory variables, M denotes the maximum lag length, and *** indicates the 10% significance level.

The calculated F-statistic is greater than the critical values at a 10% significance level, indicating that the income distribution and inflation variables are cointegrated in the short term. Once the long-term cointegration relationship is established, the long and short-term coefficients for the variables can be computed. Table 3 presents the estimated long and short-term coefficient predictions for the ARDL (2, 4) model.

Table 3: Long and Short-Term Coefficients for ARDL (2, 4)

Long -term Coefficients				
Variables	Coefficient	Standard Deviation	t-stat.	Prop.
ENF	0.000330*	4.06E-05	8.11919	0.0000
C	0.396035	0.002093	189.252	0.0000
Short-Term Coefficients				
D(GINI(-1))	0.723289	0.102341	7.06744	0.0000
D(ENF)	2.01E-05	1.07E-05	1.88276	0.0724
D(ENF(-1))	-5.03E-05	1.72E-05	-2.920066	0.0077
D(ENF(-2))	-3.09E-05	1.57E-05	-1.973591	0.0606
D(ENF(-3))	-2.54E-05	1.22E-05	-2.085808	0.0483
CointEq(-1)*	-0.147854	0.040636	-3.638541	0.0014
Descriptive Tests				
R^2	0.770354		**X^2_{BG}**	0.422255 (0.8097)
Adjusted R^2	0.724425		**X^2_{BPG}**	2.578422 (0.9211)
F-Statistic (Probability)	604.3508 (0.0000)		**X^2_{JB}**	1.030764 (0,597272)
DW	1.9701		**X^2_{Ramsey}**	0.2622045 (0.6138)

Note: CointEq(-1) represents the error correction term, and *, ** denote the 1% significance level. X^2_{BG} is used for autocorrelation test, X^2_{BPG} is used for heteroscedasticity test, X^2_{JB} is used for normality test and X^2_{Ramsey} is used to test for errors in model specification in the regression.

According to Table-3, the long-term prediction coefficient for the ENF series is 0.000330, which is statistically significant at the 1% level. A positive relationship between the ENF series and the GINI series is observed. A 1% increase in the ENF series leads to an approximately 0.000330% increase in the GINI series.

The error correction coefficient represents a lagged value of the residuals of the model derived from the long-term relationship. The coefficient of CointEq(-1) indicates how much of a shock occurring in the short term will be corrected in the long term.

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Based on the error correction model results, a significant and positive relationship has been obtained for the ENF variable. According to Table-3, the coefficient of the ENF variable is estimated to be 2.01. The value of 2.01 for the error correction term indicates that a large portion of the deviations approaches equilibrium in the subsequent periods.

Finally, to determine if there is a structural break in the estimated model, CUSUM and CUSUMQ graphs developed by Brown et al. (1975) were employed. These graphs investigate whether there is a structural break in variables using the squares of the reverse residuals (Akel and Gazel, 2014: 36). Figure-2 displays the CUSUM and CUSUMQ graphs.

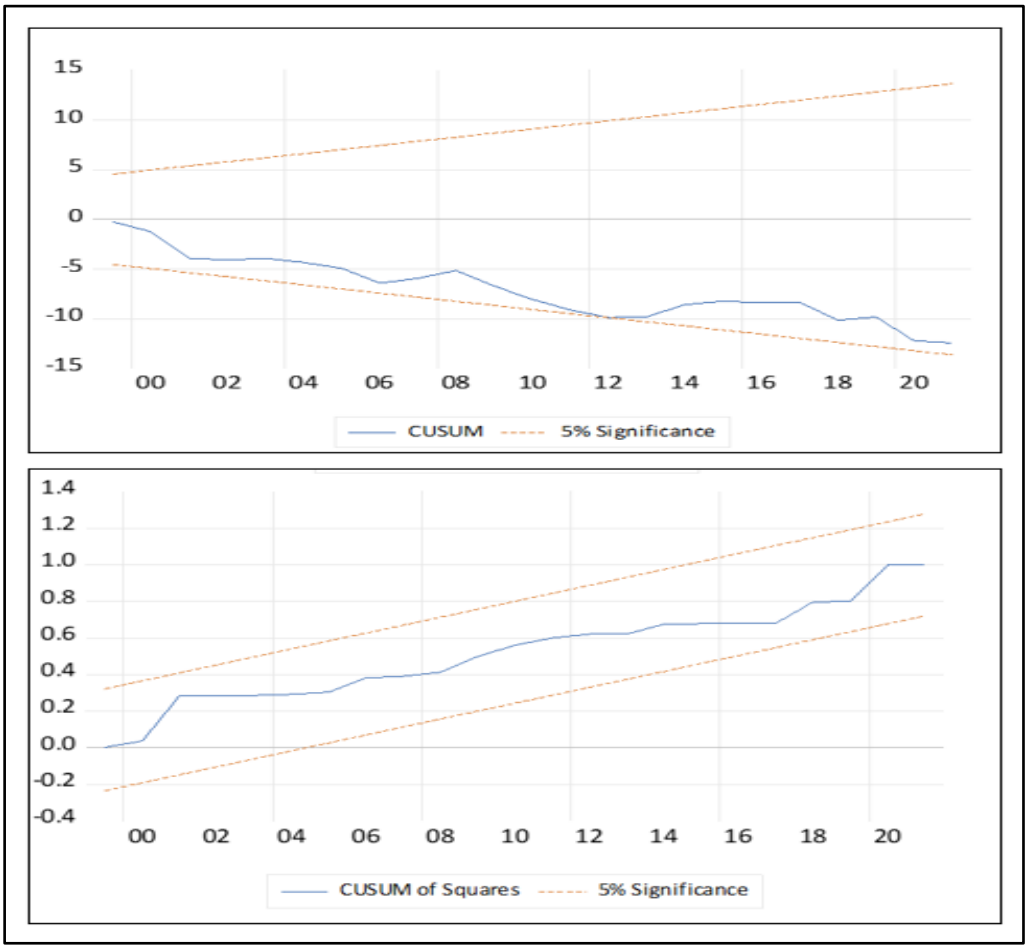

Figure 2: CUSUM and CUSUMQ Results

If the CUSUM and CUSUMQ graphs do not exceed the critical boundaries at the 5% significance level, it is concluded that the estimated long-term coefficients are consistent (Tatlı and Lebe, 2017: 18). Upon examining Figure-1, it can be observed that the CUSUM and CUSUMQ graphs are within the critical boundaries. Therefore, it is possible to assert that the long-term coefficients between the variables are consistent.

6. CONCLUSION AND POLICY RECOMMENDATIONS

This study aimed to determine the impact of inflation on income distribution in the Turkish economy using an ARDL (AutoRegressive Distributed Lag) bounds testing approach. The analysis, conducted using annual data from the period 1987-2021, aimed to examine the relationship between the income distribution indicator represented by the Gini coefficient and inflation represented by the Consumer Price Index (CPI).

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The findings demonstrate a long-term co-integrated relationship between income distribution and inflation. This relationship indicates that an increase in inflation has an exacerbating effect on income inequality. The obtained results provide valuable insights for a balanced economic growth and sustainable development goals.

The results from this analysis offer significant policy recommendations for policymakers and decision-makers in the economy: i. Inflation Control and Stabilization Policies: Effective inflation control and price stability policies should be adopted to mitigate the adverse effects of inflation on income distribution. Maintaining the independence of the Central Bank and implementing inflation targeting policies can serve as effective tools towards this aim. ii. Income Inequality-Reducing Policies: Policies to reduce income inequality should be implemented. Tax policies can be revised to ensure higher income groups are subject to greater taxation. Social assistance programs and public education provisions can contribute to establishing a fairer income distribution. iii. Education and Labor Market Regulations: Increasing access to education opportunities and ensuring a fair functioning of the labor market can help reduce income inequality. Occupational training and skill development programs can enhance economic opportunities for low-income groups. iv. Focus on Economic Growth and Employment: Policies prioritizing employment generation aligned with sustainable economic growth goals are crucial. An increase in employment can contribute to a more equitable income distribution. v. Policies Promoting Public Participation in the Economy: Policies encouraging broader public participation in the economy can assist in reducing income inequality. Measures such as supporting small businesses and promoting entrepreneurship activities can make income distribution more equitable.

These policy recommendations can aid Turkey in achieving a more just and sustainable economic growth by reducing income inequality. They can serve as a foundation for future studies and shaping economic policies.

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REFERENCES

Aktaş, E. E. &Dokuzoğlu, S. (2022). Enflasyon-gelir eşitsizliği ilişkisi: Gelişmiş ve gelişmekte olan ülkeler için panel eşik değer analizi. *Sosyoekonomi*, 30(51), 449-470.

Dilber, C., & Hatipoğlu, M. (2022). Enflasyon Ve Gelir Dağılımı Arasındaki Nedensellik İlişkisi: Gelişmekte Olan Oecd Ülkeleri Üzerine Bir Araştırma. *Finans Ekonomi ve Sosyal Araştırmalar Dergisi*, *7*(3), 342-347.

Dolmas, J., Huffman, G. W. &Wynne, M. A. (2000). Inequality, inflation, and central bank independence. *Canadian Journal of Economics/Revue canadienne d'économique*, 33(1), 271-287.

Emek, Ö. F. (2019) Gelişmekte olan ülkelerde makroekonomik faktörlerin gelir eşitsizliği üzerindeki etkisi: Panel veri analizi. *Artuklu Kaime Uluslararası İktisadi ve İdari Araştırmalar Dergisi,* 2(2), 132-142.

Emek, Ö,F. &Tatoğlu, F. Y. (2020). Gelir eşitsizliği ile enflasyon ilişkisinin gelişmişlik düzeyine göre heterojen panel veri modelleri ile analizi. *Sosyal Güvenlik Dergisi*, 10(2), 301-312.

Franco, Chiara &Elisa Gerussi (2013), "Trade, foreign direct investments (FDI) and income inequality: Empirical evidence from transition countries", The Journal of International Trade & Economic Development, 22(8): 1131-1160.

Jäntti, M. &Jenkins, S. P. (2001). Examining the Impact of Macro-Economic Conditions on Income Inequality. Bonn: Discussion Paper No. 364.

Law, C. H., &Soon, S. V. (2020). The impact of inflation on income inequality: the role of institutional quality. *Applied Economics Letters*, *1*(4), 1.

Muhibbullah, M. &Das, M. R. (2019). The impact of inflation on the income inequality of Bangladesh: A time series analysis. *International Journal of Business and Technopreneurship,* 9(2), 141-50.

Moalla, M. (2020). "Türkıye imalat sanayiinde schumpeter'in rekabet mekanizmaları.", *Mersin Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 4(1), 121-135.

Moalla, M. (2022), "Is there a Nexus between Micro and Macro Labor Productivity Evolutionin the Turkish Manufacturing Industries?", *Montenegrin Journal of Economics,* Vol. 18, No. 1, pp. 139-149.

Nantob, N. (2015). Income inequality and inflation in developing countries: An empirical investigation. *Economics Bulletin*, 35(4), 2888-2902.

Park, C.-Y. &Mercado, R. V. (2015). Financial Inclusion. Poverty, and Income Inequality in Developing Asia. Adb Economics Working Paper Series No. 426.

Piketty, T. (2014). *Yirminci Yüzyıda Kapital.* (H. Koçak, Çev.) İstanbul: Türkiye İş Bankası Kültür Yayınları.

Standardized World Income Inequality Database (SWIID) (2022) https://fsolt.org/swiid/

***Cilt/Volume**:4, **Sayı/Issue:**2, **Yıl/Year:**2023, **Sayfa/Page**:78-87 **ISSN:** 2717-7890*

Ünsal, E. M. (2010). *Mikro İktisat.* Anakara: İmaj Yayınevi.

Thalassınos, E., Uğurlu, E. &Muratoğlu, Y. (2012). Income Inequality and Inflation in the EU. *European Research Studies*, 15(1).

Yue, H.-Y. (2011). Income Inequality, Economic Growth and Inflation: A Study on Korea. *International Journal of Economics and Research*. 2(5).14-21.