Research Article

The Middle-Income Trap: An Analysis on Türkiye

Erdal ALANCIOĞLU[1]

[1] Doç. Dr. Harran Üniversitesi, Bozova MYO, ealancioglu@harran.edu.tr , ORCID: 0000-0002-5008-4957

Abstract: Middle-income countries with low or moderate growth rates experience much more volatility in their growth rates than high-income countries. The achievement of high-income levels depends on relatively high rates of stable economic growth. The objective of this study is to estimate whether Türkiye, which is in the upper-middle income country group, is in the middle-income trap or not by utilizing annual data for the period spanning from 1960 to 2022. For this aim, Robertson and Ye (2013) approach was adopted for the empirical analysis. In the analysis, the stationarity test of the GDP series is implemented by RALS-LM and RALS-ADF and Fourier-based Fourier KPSS, Fourier ADF, and Fourier GLS unit root tests. The results of the unit root test indicate that Türkiye is not in a middle-income trap. For years, Türkiye has been considered an upper-middle-income country, though its economic evolution rates shift from year to year. Such fluctuations can destabilize the economy and hinder the pursuit of sustainable growth. To tackle these difficulties, Türkiye needs to address its economic vulnerabilities and strengthen its economic resilience. In this regard, prioritizing high value-added sectors and increasing investments in them can lead to more stable and sustainable economic evolution.

Keywords: Middle Income Trap, Türkiye Economy, Unit Root Test
Jel Codes: C22, E01, O11

Orta Gelir Tuzağı: Türkiye Üzerine Bir Analiz

Öz: Düşük ya da ılımlı büyüme oranına sahip orta gelirli ülkelerin büyüme oranlarında yüksek gelirli ülkelere göre çok daha fazla oynaklık yaşamaktadır. Yüksek gelir seviyelerine ulaşılabilmesi için, nispeten yüksek oranda istikrarlı iktisadi büyüme gerekmektedir. Bu çalışmanın amacı, üst-orta gelir grubunda yer alan Türkiye'nin 1960-2022 dönemi yıllık verileri kullanılarak orta gelir tuzağında olup olmadığını tespit etmektir. Bu amaçla ampirik analiz için Robertson ve Ye (2013) yaklaşımı izlenmiştir. Analizde GDP serisinin durağanlık sınaması RALS-LM ve RALS-ADF ve Fourier temelli Fourier KPSS, Fourier ADF ve Fourier GLS birim kök testleri ile gerçekleştirilmiştir. Birim kök testi bulgularına göre Türkiye'nin orta gelir tuzağında olmadığı tespit edilmiştir. Türkiye, uzun yıllardır üst-orta gelir grubunda yer almakta, ancak ekonomik büyüme oranları her yıl değişiklik göstermektedir. Bu dalgalanmalar, ekonomik istikrarı negatif yönde etkileyebilir ve sürdürülebilir büyümenin önünde engel oluşturabilir. Türkiye'nin bu sorunların üzerinden gelebilmek, ekonomik kırılganlıkları gidermesi ve ekonomiyi daha dayanıklı hale getirmesi gerekmektedir. Bu çerçevede, katma değeri yüksek sektörlere yönelmek ve bu alanlarda yapılan yatırımları artırılmak, ekonomik büyümeyi daha istikrarlı ve sürdürülebilir kılabilir.

Anahtar Kelimeler: Orta Gelir Tuzağı, Türkiye Ekonomisi, Birim Kök Testi
Jel Kodları: C22, E01, O11

Cite: Alancıoğlu E. (2025). The Middle-Income Trap: An Analysis on Türkiye, *Politik Ekonomik Kuram*, *9*(1), 43-54. https://doi.org/10.30586/pek.1519043

Submitted: 19.07.2024
Accepted: 27.12.2024

1. Introduction

The concept of a middle-income trap was first coined by Indermit Gill and Homi Kharas, comparing a general phenomenon observed in regions like Latin America and the Middle East to the possibility of slowdowns in East Asia's emerging economies (Gill and

Kharas 2007). This concept was later popularized by Kohli et al. (2009) in their studies on middle-income countries suffering from growth slowdown.

Commonly used metrics such as the World Bank's World Development Indicators indicate that economic growth in middle-income countries has not accelerated. Per capita income in these countries from the 1970s onward has not surpassed one-tenth of the levels experienced in the United States. In the coming years, the escalation of geopolitical, demographic, and environmental complications is expected to hinder economic evolution. Middle-income countries need to achieve remarkable miracles to transition into developed economies (WB, 2024).

Some middle-income countries are observed to be caught between low-income countries with low-wage advantages and high-income countries with rapid technological change (Alancıoğlu et al. 2019a). One possible reason maybe the economic struggles faced by those countries relating structural issues, such as the transformations of resources to the less productive sectors, the matter that adversely affect achieving sustained development (Moalla, 2023a). Analyzing countries' development processes, the concept of income trap, characterized by the long-term stagnation of some countries at their income levels compared to other countries, is particularly evident in periods of slowing economic growth (Göktaş, 2021: 210). Middle-income countries confront several barriers to the attainment of sustained growth. In this context, some factors affecting growth may be obstructed at the middle-income level, and if appropriate policies are not formulated and implemented, growth stagnation may manifest itself.

Developing economies undergo structural changes as they grow larger, indicating that fluctuations in growth rates arise from new factors. Economic expansion typically begins to slow down on average, often reaching a plateau in per capita income growth, by and large around 11% of U.S. per capita GDP; even though these dynamics might vary among nations. This figure would be approximately $8,000 presently, which is the level at which countries are generally considered upper-middle income. A systematic slowdown in growth takes place subsequently. Development strategies for these countries mainly founded on capital accumulation that served them well during their low-income times, even during low-middle income periods, with many falling between $1,136 and $4,465. However, the mentioned strategies start to yield diminishing returns. It is natural for the marginal productivity of capital to decrease, indicating that the outcomes of strategies relying solely on factor accumulation are likely to deteriorate (WB, 2024).

Türkiye's potential evolution could be increased by 28% with appropriate sectoral redistribution (Moalla (2022). It's crucial for policymakers to deliberate on strengthening economic stability by expanding the avenues of national income and focusing on achieving self-sufficiency in energy or a varied energy framework (Moalla, 2023b). This is significant in overcoming the MIT, which hinders the transition of middle-income countries to the high-income group and which is the outcome of the failures experienced in the process of sustainable economic growth, refers to the inability of a middle-income country to move to the high-income group after developing its growth strategy and moving to the middle-income group (Alancıoğlu et al. 2019b). Studies (Aiyar et al. 2018; Bulman et al., 2017; Eichengreen et al. 2012, 2013; Felipe et al. 2012) have tried to form the foundation of the middle-income trap concept. Although the middle-income trap is a new theme, it has been widely practiced in the context of economic growth and development. Generally, this concept is concretized by considering the economic structures of countries. Even though there is no consensus on the definition, the stagnation of economic growth at the middle-income level for a long time is considered a middle-income trap. Since 2005, as Türkiye attained the level of upper-middle-income countries, its economic growth has been sustained, however, the economy stagnated in the last period of 2008 due to the impact of the global crisis. To objectively interpret Türkiye's economic growth performance, it is necessary to consider the global GDP per capita performance. Graph 1 depicts the GDP per capita worldwide.

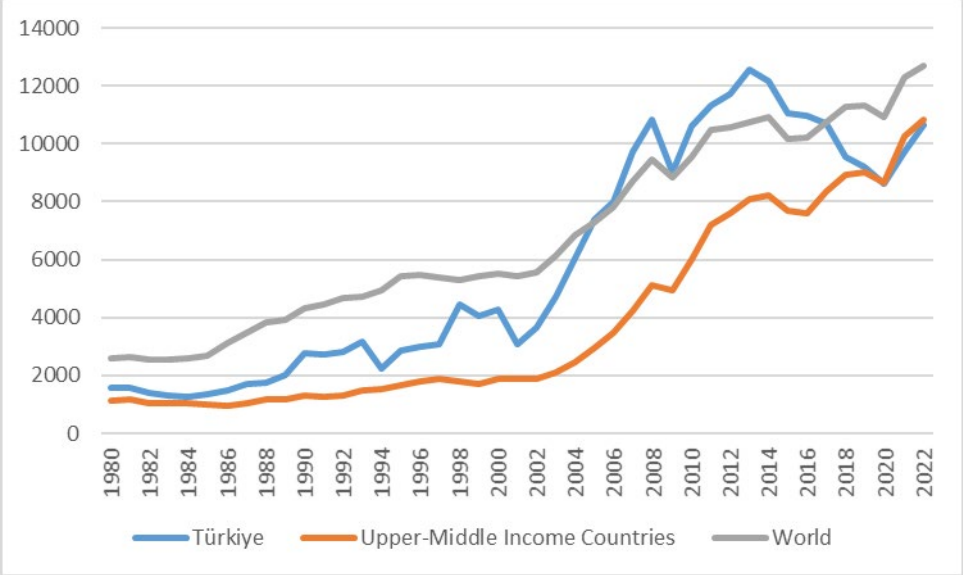

Figure 1. Global Per Capita GDP (Current $) Source: WDI, 2024

Figure 1 shows the historical evolution of Türkiye's GDP. It shows a long-term growth trend, with some fluctuations due to external factors. Figure 1 shows that Türkiye experienced a steady increase in GDP per capita from 1980 to the April 5, 1994 crisis. From 1994 up to the 2001 crisis, there was a fluctuating trend in GDP per capita. During the 2004-2008 period, GDP per capita increased steadily. However, after the 2008 crisis, GDP per capita decelerated and experienced a significant decline in 2009. This decline was not permanent and GDP per capita increased steadily from 2010 to 2015. The decline in 2015 has followed an upward trend starting from 2021. It is observed that the GDP per capita of upper-middle-income countries, the global average, and that of Türkiye follow the same trend. The average GDP per capita movements in Türkiye and the world peaked between 2005 and 2006. Since then, GDP per capita in Türkiye remained consistently above the world average. The widening GDP per capita gap between Türkiye and the world causes the middle-income trap to occur. In 2005, Türkiye became an upper middle-income country and its GDP per capita keeps exceeding the GDP per capita of upper middle-income countries. However, in 2017, while the GDP per capita in upper-middle-income and global average GDP per capita increased, Türkiye recorded a decline. Figure 2 depicts GDP growth rates as an annual percentage change.

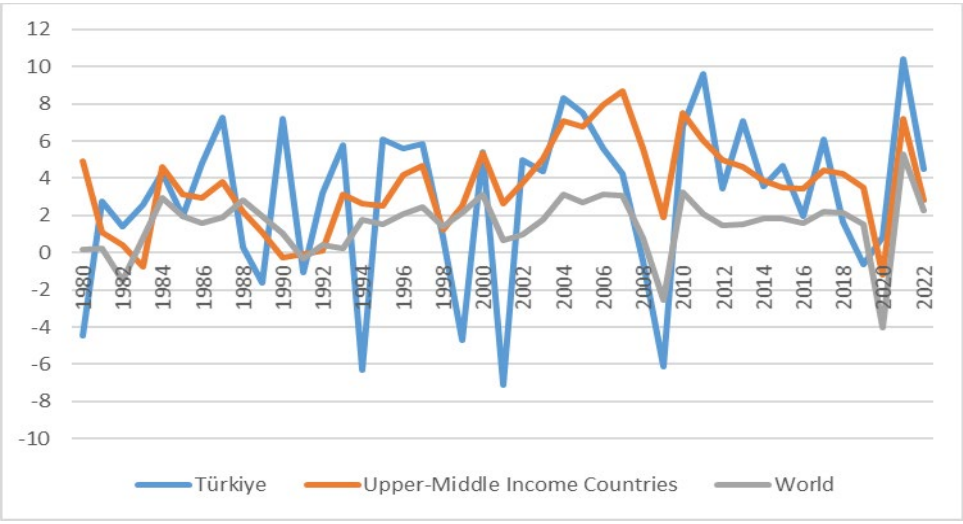

Figure 2. GDP Growth Rates (Annual %) Source: WDI, 2024

The annual GDP growth rate indicates that Türkiye grew faster than its income group in 2017, moving towards the upper-middle income group. However, in 2018, Türkiye's growth rate remained below the upper-middle income group and the world average. The main objective of this study is to scrutinize and investigate the theoretical background of the middle-income trap concept, identify the middle-income trap risk for Türkiye over the period 1960-2022, and provide some policy recommendations aimed at faster growth of the Türkiye economy.

Various approaches were employed in the literature to identify whether Türkiye is caught in the middle-income trap, indicating that there is no consensus among evaluations. For the aim of consistency and utilizing contemporary econometric tests, the hypothesis proposed by Robertson and Ye (2013) was adopted in this study.

The literature on this issue reveals that RALS-LM and RALS-ADF and Fourier-based Fourier KPSS, Fourier ADF, and Fourier GLS unit root tests are rarely used together, unlike traditional unit root tests. Accordingly, this study is anticipated to contribute to the literature. This study is organized as follows. The first section introduces the literature review. The econometric method and data set of the study are presented in the second section. The empirical findings are reported in the third section. The concluding section presents the evaluation of the results obtained from the empirical analysis.

2. Literature Review

Considering the current empirical literature analyzing whether Türkiye, an upper-middle-income country, is in a middle-income trap or not, the literature can be classified as being in a middle-income trap, not in a middle-income trap but carrying risks and not in a middle-income trap. i) Based on econometric and descriptive-country comparative analysis, Yılmaz (2014), Ener and Karanfil (2015), Uyanık (2015), Nişancı et al. (2015), Şahin et al. (2015), Ada and Acaroğlu (2016), Alkan and Ümit (2018), Furuoka et al. (2020) concluded that Türkiye is in the middle-income trap. Considering the studies suggesting that Türkiye is in the middle-income trap, Karhan (2019) tested whether 5 countries with high vulnerability (Brazil, Indonesia, India, Türkiye) are in the middle-income trap utilizing unit root tests for the 1968-2017 period. The findings indicate that the country group is in the middle-income trap.

ii) Studies by Yeldan (2012) and Kaya et al. (2015) indicate that Türkiye may not be in a middle-income trap, but it is at risk of a middle-income trap. For example, Ay et al. (2016) investigated the concept of the middle-income trap and made a comparison between BRICS countries and Türkiye. Variables such as human capital, education, and innovation were employed in the study. Although Türkiye has recently recorded steady growth, it faces difficulties in achieving a high-income level due to insufficient levels of human capital and innovation. Based on the comparison results with BRICS countries, it is concluded that Türkiye is exposed to the risk of the middle-income trap and to overcome the risk of the middle-income trap, some necessary recommendations for Türkiye's policies are presented. A similar study by Konya et al. (2017) analyzed Türkiye's middle-income trap situation with annual data covering the period of 1971-2015. Cointegration and causality tests were utilized in the analysis. The empirical findings revealed that Türkiye has not fallen into the middle-income trap, but is at risk of it. Sarıgül et al. (2022) investigated whether Türkiye is in a middle-income trap or not taking the US as a reference country for the period of 1960-2021. Conventional and structural break unit root tests were used in the analysis. The findings of all unit root tests except the test with one structural break indicate that the series contains a unit root. Moreover, the ratio of Türkiye's GDP per capita to that of the reference country, the GDP of the US, is within the range of 0.08 - 0.36, which is determined as the relative threshold for the relevant period. Though these findings do not provide conclusive evidence indicating that Türkiye suffers from a middle-income trap, this risk does exist.

iii) Keskingöz and Dilek (2016), Tıraşoğlu and Karasaç (2018) and Göktaş (2021) found that Türkiye was not in a middle-income trap. Considering the studies that

demonstrate the absence of a middle-income trap in Türkiye, Bozkurt et al. (2014) analyzed Türkiye's annual data covering the period of 1971-2012 using convergence and ARDL methods. The findings indicate that Türkiye is not in the middle-income trap, converging to high-income countries. Similarly, Tasar et al. (2016) tested whether Türkiye and the US are in the middle-income trap using unit root tests with and without structural breaks considering the GDP per capita of Türkiye and the US for the period 1960-2014. Empirical findings reveal that Türkiye has no risk of a middle-income trap. Similar studies by Koçak and Bulut (2014) and Ballı et al. (2019) tested whether Türkiye is in the middle-income trap based on Robertson and Ye's (2013) middle-income trap approach. The analysis utilizes unit root tests that consider structural breaks developed by Lee and Strazicich (2003) and Carrion-i-Silvestre et al. (2009). The findings indicate that Türkiye is not in a middle-income trap. Ünlü and Yıldız (2018) examined whether Türkiye is in the middle-income trap using Robertson and Ye's 2013 approach. The ADF unit root test and the unit root test with two structural breaks developed by Narayan and Popp (2010) were utilized in the analysis. The results suggest that Türkiye is not in a middle-income trap. In a similar study, Öztürk and Tiftikçigil (2020) combined the most recent theoretical studies from different perspectives on the existence of the middle-income trap in Türkiye along with the Robertson and Ye approach at the empirical stage. Within the scope of this study, Türkiye's middle-income trap status is assessed by applying the structural break unit root test using recent data obtained through the Atlas method. World Bank's GNP per capita Atlas Method (current USD) data for the period of 1967-2016 are used in the analysis. The results indicate that Türkiye is not in the middle-income trap. The literature also presents studies that examine whether Türkiye is in a middle-income trap or not using different approaches. For example, Sarıbaş and Ursavaş (2017), following the approaches of Eichengreen et al. (2012), investigated at which income level the middle-income trap arises and whether Türkiye is in a middle-income trap or not by using GDP per capita data for the period 1957-2007. The findings indicate that the middle-income trap arises at 7,200 dollars. Türkiye is not in amiddle-income trap as per the study's findings. In another similar study, Kızılkaya (2022) analyzed Türkiye's middle-income trap status with annual data covering 1960-2020. Different unit root tests (Zivot-Andrews (1993), Lee-Strazicich (2003, 2004), Fourier KPSS, Fourier ADF, and Fourier KSS) were used in the study. The study's findings indicate that Türkiye is not in a middle-income trap. Türkiye tends to close the income gap with the US, representing the high-income group. Since different approaches are used in determining the middle-income trap, it is clear that there is no consensus in the literature on whether Türkiye is in a middle-income trap or not.

In the context of Türkiye, there are global studies as well as selected applications in the existing literature. Utilizing annual data from 1976 to 2015 and employing the Error Correction Model (ECM) method, Lumbangaol and Pasaribu (2019) investigated whether Indonesia was trapped in MIT, revealing that Indonesia is indeed in the MIT. Moreover, using annual data from 2000 to 2016 and employing the PANKPSS unit root test, Konat (2021) analyzed whether Balkan countries were trapped in the MIT, revealing that Balkan countries are also in MIT, indicating a stagnation or decline in their competitiveness and per capita income balancing. Furthermore, using the Lee and Strazicich and Fourier KPSS unit root tests, Şak (2021) examined whether the N11 countries were in the MIT utilizing data from 1984 to 2019 for Bangladesh, Indonesia, the Philippines, Iran, Mexico, Egypt, Nigeria, Pakistan, Turkey, Vietnam, and the United States, revealing that the Fourier KPSS test could not determine the series to be stationary. The two-break test suggested that Egypt was stationary, while the single-break test from the Lee and Strazicich test indicated that Mexico was stationary. Considering the consequences of both tests together, a definitive conclusion could not be reached; however, the findings for Egypt and Mexico indicated that these countries might be in the MIT.

3. Various Approaches to Classifying Income Groups

It is of weighty importance, principally in descriptive analyses, to classify countries into income groups to conclude whether they are caught in MIT. On the whole, it can be seen that either absolute thresholds or relative thresholds based on changes in the absolute threshold over time are used when scrutinizing methodologies to define middle-income levels. Middle income's absolute definitions are constructed on two different calculations of countries' per capita GDP. Table 1 depicts countries' middle-income levels based on various methods.

Table 1. Income Group Classification Based on Different Methods

Method	Middle-Income Economies (Per Capita GDP)	Notes
Felipe vd. (2012)	2.000$- 11.750$	PPP (1990)
Eichengreen vd. (2012)	< 17.000$	PPP (2005)
Woo (2012)	ABD'nin %20-%55	PPP (1990)
Han and Wei (2015)	ABD'nin % 16-%75	PPP (1990)
Bulman vd. (2014)	ABD'nin %10-%50	PPP (2005)
Wang and Lan (2017)	ABD'nin %5- % 45	Constant Prices (2010 US Dollars)

Note: PPP: Purchasing Power Parity

4. Data Set and Econometric Method

Various approaches were employed in the literature to identify whether Türkiye is caught in the MIT, implying that there is no consent among evaluations. For the aim of consistency and utilizing contemporary econometric tests, the hypothesis proposed by Robertson and Ye (2013) was adopted in this study.

This study seeks to examine whether Türkiye is in a middle-income trap or not by using annual data covering the period 1960-2022. The study follows the Robertson and Ye (2013) approach that utilizes unit root tests to determine whether countries are stuck in the middle-income trap. According to this approach;

$$X_{i,t} = \ln\left(\frac{GDP_{TR,t}}{GDP_{US,t}}\right) \quad (1)$$

$GDP_{TR,t}$ represents Türkiye's per capita GDP in year t, and, $\frac{GDP_{TR,t}}{GDP_{US,t}}$ represents the ratio of Türkiye's per capita GDP to the United States' per capita GDP in year t (measured in 2015 constant prices, USD), ln denotes the natural logarithm. Data on GDP used in the study were obtained from the World Bank development indicators database. In this study, unit root tests, which are not widely used in the literature, were preferred to test the stationarity of the GDP series. First, the stationarity of the series is investigated utilizing the one-break RALS-LM and RALS-ADF unit root tests. Subsequently, Fourier KPSS,

Fourier ADF, and Fourier GLS unit root tests were used to examine the stationarity of the series.

4.1. **RALS-LM and RALS-ADF Unit Root Test**

The RALS-ADF unit root test extends the ADF (Augmented Dickey-Fuller) unit root test. The regression model used to examine the stationarity of variables in the ADF test is given in equation (2).

$$ADF: \Delta Y_t = a + \gamma Y_{t-1} + \sum_{i=1}^{p} \delta_i \Delta Y_{t-1} + u_t \quad (2)$$

$$RALS - ADF: \Delta Y_t = a + yY_{t-1} + \sum_{i=1}^{p} \delta \Delta Y_{t-1} + \widehat{w}_t \varphi + v_t \quad (3)$$

Where $\widehat{w}_t$ denotes the RALS term that reflects the information that may arise in case the errors are not normally distributed in the unit root model. The existence of stationarity in the RALS-ADF unit root analysis is examined through its parameter. The test statistic for this parameter is defined as t_{RADF} for RALS-ADF

Hypotheses for the RALS-ADF unit root test;

H0: y=0 (Under the assumption that errors are not normally distributed, the series are unit-rooted).

HA: y<0 (Under the assumption that errors are not normally distributed, the series are stationary).

Table 2 presents the results of the RALS-ADF unit root test

Table 2. RALS-ADF Unit Root Test Results

Variables	With constant	ρ^2	Constant and Trend	ρ^2
GDP	-1.903	0.904	-2.258	0.892

Note: For the model with a constant, the critical values for 1%, 5%, and 10% significance levels are -3.91, -2.810, and -2.506, respectively. For the model with a constant and trend, the critical values for 1%, 5%, and 10% significance levels are -3.877, -3.327, and -3.032, respectively. The critical values are taken from Hansen (1995).

The results in Table 2 show that the series exhibits a unit root in both the constant model and the model with constant and trend. Meng et al. (2014) developed the RALS-LM unit root test using the RALS procedure. While this unit root test specifies the case where no structural break is considered and the case where 1 and 2 structural breaks in the constant term are considered, the test developed by Meng et al. (2017) takes into account 1 and 2 breaks both in the constant term and the trend. The (Meng et al. 2014) test, which does not consider structural breaks, is the RALS version of the LM test developed by Schmidt and Phillips (1992), while the Meng et al. (2014) test, which considers 1 and 2 structural breaks in the constant term, and the Meng et al. (2017) test, which considers 1 and 2 structural breaks in both the constant term and the trend, are the RALS version of the LS (2003, 2004) test. When the residuals are not normally distributed in the RALS-LM test, the second and third moments of the residuals are calculated to obtain the residual-expanded variables shown in Equation 3, labeled $\hat{wt}$.

$$\Delta y_t = \acute{\delta} \Delta Z_t + \emptyset S_{t-1} + \mu_t \quad (4)$$

$$\widehat{w}_t = [\hat{e}_t^2 - m_2, \hat{e}_t^3 - m_3 - 3m_{2t}\hat{e}_t] \quad (5)$$

$$\Delta y_t = \acute{\delta} \Delta Z_t + \emptyset S_{t-1} + \widehat{w}_t' y + \mu_t \quad (6)$$

The null hypothesis in the RALS-LM unit root test ($H0$: θ=0) states that the series is non-stationary, while the alternative hypothesis ($H1$: θ<0) states that the series is stationary. If the obtained test statistic is less than the critical value in absolute value, the

null hypothesis expressing the existence of a unit root cannot be rejected. Considering the power and size properties, RALS-LM unit root tests are known to provide stronger results than conventional unit root tests in cases where errors are not normally distributed (Meng et al., 2017: 35-36). Table 4 displays the results of the RALS-LM unit root test.

Table 3. RALS-LM Unit Root Test Results

	Variables	τ_{RALSLM}	ρ^2	RALS-LM Critical Values		
				%1	%5	%10
With constant	GDP	-2.263	0.892	-3.536	-2.987	-2.711
Constant and Trend	GDP	-2.263	0.892	-3.536	-2.987	-2.711

The results obtained from Table 3 reveal that the GDP series does not follow a stationary structure according to the RALS-based results obtained from the SP test performed without considering the breaks.

4.2. Fourier KPSS, Fourier ADF, and Fourier GLS Unit Root Test

In 2006, Becker et al (2006). developed a new unit root test using Fourier functions. Stationarity testing using Fourier functions has made it possible to recognize sudden and slow structural breaks. Moreover, the location, number, and form of structural breaks identified by Fourier functions do not negatively affect the reliability of the unit root test (Yılancı, 2017:55). The unit root test Fourier KPPS proposed by Becker et al. (2006) is based on the following equation;

$$Y_t = X_t^i\beta + Z_t^i y + r_t + e_t \tag{7}$$

In this equation e_t denotes errors. The variance of errors is independent and identically distributed. In equation 7 above, the terms (= [1]) and (= [1,t]) are added to identify the level and trend stationarity processes of the term. k denotes the squares of the error terms with (T) denoting the sample size

$$Y_t = \left[\frac{\sin(2\pi kt))}{T}, \frac{\cos(2\pi kt)}{T}\right] \tag{8}$$

Based on equation (8); equation (9) could be obtained

$$y_t = a + \beta_t + y_1 \sin\sin\left(\frac{2\pi kt}{T}\right) + y_1\cos\left(\frac{2\pi kt}{T}\right)e_t \tag{9}$$

In the above equation, if the model includes a trend, then the term will be included in the equation and the stationarity of the time series will depend only on the number of frequencies (k) and the number of observations (T). In this case, the unit root test statistic values both with constant and with constant + trend will be obtained by the following equation, which shows the residuals calculated by the least squares method;

$$T_\mu = \frac{1}{T^2}\frac{\sum_{t=1}^{T}\bar{st}(k)^2}{\bar{\delta}^2} \tag{10}$$

Unlike other unit root tests, the Fourier KPSS unit root test is tested with the null hypothesis stating the absence of a unit root in the series. The alternative hypothesis states the presence of a unit root in the series. If the calculated test statistic values are smaller than the critical table values, the null hypothesis cannot be rejected, meaning that there is no unit root in the series. As in the Fourier KPSS unit root test, another test that tests for stationarity using Fourier-type functions is the Fourier GLS Test. The test statistics of the Fourier GLS Unit root test developed by Rodrigues and Taylor (2012) are as follows;

$$\Delta y_t^{\bar{c}\,k,\sim} = \theta y_{t-1}^{\bar{c}\,k,\sim} + e_t \quad (11)$$

In Equation 10 above, with data (t = 2...T), $\bar{c}\,k,\sim$ represents the form of the deterministic component, μ represents the constant term, and the trend is represented by t. In the Fourier GLS Unit root test, the null hypothesis states the existence of a unit root in the series and if the FGLS t-statistic values are smaller in absolute value than the critical values in the table, the null hypothesis cannot be rejected (Rodrigues and Taylor, 2012: 736-750).

Another Fourier type unit root test similar to Fourier KPSS and Fourier GLS is the Fourier ADF unit root test developed by Enders and Lee (2012), which is based on the ADF unit root test. The regression equation for this unit root test is as follows;

$$\Delta y_t = p y_{t-1} + c_{1+} c_2 t + c_3 \sin\left(\frac{2\mu k t}{T}\right) + c_4 \cos\left(\frac{2\mu k t}{T}\right) + e_t \quad (12)$$

In Equation 12, t is added to the equation if the series contains a trend. The stationarity test is also determined by the number of frequencies (k) and observations (T) of the series. The null hypothesis Ho cannot be rejected in the FADF unit root test if the calculated test statistics (in absolute terms) are smaller than the table critical values compared to the alternative hypothesis (Enders and Lee, 2012:196-199). Table 4 presents the results of Fourier KPSS, Fourier GLS, and Fourier ADF unit root tests.

Table 4. Results of Fourier KPSS, Fourier GLS, and Fourier ADF Unit Root Tests

With Constant Model							
					Critical Values		
	Variables		L	K	%1	%5	%10
FKPSS	GDP	0.595	0	1	0.270	0.172	0.132
FGLS		-1.450	0	1	-2.934	-2.256	-1.918
FADF		-1.885	0	1	-3.640	-2.970	-2.640
With constant and Trend Model							
FKPSS	GDP	0.552	2	1	0.202	0.132	0.103
FGLS		-2.273	0	1	-3.920	-3.232	-2.902
FADF		-2.146	0	1	-4.290	-3.650	-3.290

Note: The "*" sign of the test statistics calculated for the variables indicates that the variables are stationary at 1% significance level. Columns "L" and "K" in the table indicate the optimal lag lengths and frequencies of the Fourier KPSS, Fourier GLS, and Fourier ADF tests calculated for the data sets using the Schwarz Information Criterion (SIC), respectively. Critical table values for Fourier KPSS, Fourier GLS, and Fourier ADF tests are obtained from Becker, et al. (2006) Rodrigues and Taylor (2012) and Enders and Lee (2012), respectively.

Table 4 presents the test statistic calculated utilizing Fourier-type unit root tests for the GDP series and the critical values at 1%, 5%, and 10% significance levels. Table 3 shows that the test statistics obtained from the data set for both the model with constant and the model with constant and trend are not stationary when compared with the critical values at the significance level. The calculated test statistic values of Fourier KPSS, Fourier GLS, Fourier GLS, and Fourier ADF are larger and smaller in absolute terms than the critical values in the table, respectively, indicating that the GDP series in the Türkiye economy does not tend to revert to averages in the long run during the analysis period. In simpler terms, the middle-income trap approach is not valid in the Türkiye economy in the analysis period.

5. Conclusion

In this study, Türkiye's middle-income trap is analyzed using annual data covering the period 1960-2022. The approach of Robertson and Ye (2013), which seeks to determine the middle-income trap of countries through unit root tests, is applied. The stationarity of the series was analyzed by RALS-LM, RALS-ADF, Fourier KPSS, Fourier GLS and Fourier ADF unit root tests. The findings of the unit root tests revealed that the series is non-

stationary and contains unit roots, indicating no middle-income trap in Türkiye. Considering the existing literature, the findings of the analysis are in line with Keskingöz and Dilek (2016), Tıraşoğlu and Karasaç (2018), Göktaş (2021) Bozkurt et al. (2014), Tasar et al. (2016), Koçak and Bulut (2014), Ballı et al. (2019), Ünlü and Yıldız (2018), Öztürk and Tiftikçigil (2020), Sarıbaş and Ursavaş (2017), Kızılkaya (2022). Avoiding the middle-income trap and achieving the level of high-income countries is an important goal for many developing countries, but it is not always easy to realize. Türkiye, having been in the upper-middle income group for a long time, needs to increase its innovation capacity, accelerate the transformation and upgrade its manufacturing industry to move up to the high-income group. Even though Türkiye has a younger population, the development of its human capital is not at the required level, complicating the utilization of high levels of innovative technical capabilities. Türkiye's underinvestment in scientific research coupled with its difficulties in building its competitiveness has led to the slow development of its industry and subsequent long-term trade deficits in international trade. With a young and dynamic population, Türkiye should take advantage of this opportunity, effectively improve public education, accelerate the development of its human capital, increase investment in technological research and development, promote technological innovation, and build its core competitiveness.

Many countries have made historic strides in escaping low-income levels and eradicating extreme poverty since the 1990s, leading to a widespread belief that the past thirty years have been a great success for development. Countries grouped as MIT can draw valuable insights from the strategies of those that have achieved stable economic evolution and transitioned from middle to high-income levels. Accordingly, it is important to pay attention to successful examples such as workforce quality, domestic value development, research and development, and innovation, while customizing strategies to fit national economic environments.

Ultimately, it is decisive to stimulate macroeconomic dynamics that can create a driving force for economic growth and development in Turkiye and enhance the quality and productivity of human capital.

References

Ada, A.; Acaroğlu, H. (2016). An Empirical Remark About Middle Income Trap Problem for Turkey. *Research Journal of Politics, Economics and Management*. *4*(3), 81-95.

Alancıoğlu, E.; Arslan, İ.; Bayraktutan, Y. (2019a). Orta Gelir Tuzağı, Nedenleri ve Çıkış Politikaları. *Akademik Araştırmalar ve Çalışmalar Dergisi, 11*(21), 472-486.

Alancıoğlu, E.; Arslan, İ.; Bayraktutan, Y. (2019b). Orta Gelir Tuzağının Belirleyicileri: Yükselen Ekonomiler Üzerine Bir Analiz. *Gaziantep University Journal of Social Sciences*, *18*(4), 1489-1500.

Alkan, H.I.; Ümit, Ö. (2018). Orta Gelir Tuzağının Türkiye Açısından İncelenmesi Ve Tuzaktan Çıkış Stratejileri. *Manas Sosyal Araştırmalar Dergisi. 7*(4), 97-112.

Ay, A.; Akar, G.; Akar, T. (2016). Middle Income Trap: A Comparison Between BRICS Countries and Turkey. *Economic and Environmental Studies*. *16*(2), 279-301.

Ballı, E.; Manga, M.; Güreşçi, G. (2019). Orta Gelir Tuzağı: Türkiye Üzerine Ampirik Bir Analiz. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, (59), 48-60.

Becker, R.; Enders, W.; Lee, J. (2006). A Stationarity Test in the Presence of an Unknown Number of Smooth Breaks. *Journal of Time Series Analysis, 27*(3), 381-409.

Bozkurt, E.; Bedir, S.; Özdemir, D.; Çakmak, E. (2014). Orta Gelir Tuzağı Ve Türkiye Örneği. *Maliye Dergisi, 167*, 22-39.

Bulman, D; Eden, M; Nguyen, H. (2014). Transitioning from Low-Income Growth to High-Income Growth – Is There a Middle-Income Trap? Policy Research Working Paper No, 7104.World Bank. Washington.

Eichengreen, B; Park, D; Shin, K. (2012). When Fast-Growing Economies Slow Down: International Evidence and Implications for China, *Asian Economic Papers, 11*(1), *42-87.*

Enders, W.; Lee, J. (2012). The Flexible Fourier form and Dickey-Fuller Type Unit Root Tests. *Economics Letters*, *117*(1), 196-199.

Ener, M.; Karanfil, M. (2015). Türkiye Ekonomisinde Tasarruf Açığının Orta Gelir Tuzağı Üzerine Etkisi. *Eskişehir Osmangazi Üniversitesi İİBF Dergisi. 10*(2), 31-46.

Felipe, J; Abdon, A; Kumar, U. (2012). Tracking the Middle-income Trap: What Is It, Who Is in It, and Why? Levy Economics Institute of Bard College Working Paper, No: 715.

Furuoka, F.; Pui, K. L.; Ezeoke, C.; Jacob, R. I.; Yaya, O. S. (2020). Growth Slowdowns and Middle-İncome Trap: Evidence from New Unit Root Framework. MPRA Paper 98672, University Library of Munich, Germany.

Gill, I. and H. Kharas. (2007). An East Asian Renaissance: Ideas for Economic Growth. Washington, DC: The World Bank.

Göktaş, Ö. (2021). Üst orta-gelir düzeyinde olan ülkeler orta gelir tuzağındalar mı? Fourier birim kök testlerinden kanıtlar. Ekonometri de güncel yöntemler ve uygulamalar. Ed. Çil, N., 207-224. İstanbul University Press.

Han, X; Wei., S.-J. (2015). Re-Examining the Middle-Income Trap Hypothesis: What to Reject and What to Revive. CEPR Discussion Paper Series No. 10989. London: Centre for Economic Policy Research.

Karhan, G. (2019). Orta Gelir Tuzağı: Kırılgan Beşli Ekonomilerinden Kanıtlar. *İnsan ve Toplum Bilimleri Araştırmaları Dergisi*, *8*(1), 332–344.

Kaya, Z.; Tokucu, E.; Aykırı, M.; Durmuş, C. (2015). Türkiye Ekonomisinde Orta Gelir Tuzağı ve Ödemeler Bilançosu Kısıtı. International Conference on Eurasian Economies 2015. Ed. Sarı:, Gencer, A. H. ve Sözen, İ., 830-840.

Keskingöz, H.; Dilek, S. (2016). Middle Income Trap and Turkey. *The Empirical Economics Letters*. *15*(7), 657-666.

Kızılkaya, F. (2022). Orta Gelir Tuzağı Hipotezi ve Türkiye: Ekonometrik Bir Yaklaşım. *Akademik İzdüşüm Dergisi*, 7(1), 71-83.

Koçak, E.; Bulut, Ü. (2014). Orta Gelir Tuzağı: Teorik Çerçeve, Ampirik Yaklaşımlar ve Türkiye Üzerine Ekonometrik Bir Uygulama. *Maliye Dergisi*, *167*, 167-01.

Konat, G. (2021). Balkan ülkeleri için orta gelir tuzağı: Panel veri analizi. *Gaziantep University Journal of Social Sciences, 20*(2), 466-479.

Konya, S.; Karaçor, Z.; Yardimci, P. (2017). The Middle-Income Trap: An Assessment in Terms of Turkish Economy. *In DIEM: Dubrovnik International Economic Meeting*, *3*(1), 270-287.

Lumbangaol, H. E. ve Pasaribu, E. (2019). Eksistensi dan Determinan middle income trap di Indonesia, existence and determinants of middle-income trap in Indonesia. *Jurnal Ekonomi & Kebijakan Publik, 9*(2), 83-97.

Meng, M.; Im, K. S.; Lee, J.; Tieslau, M. A. (2014). More Powerful LM Unit Root Tests with Non-Normal Errors. *Festschrift in Honor of Peter Schmidt: Econometric Methods and Applications*, 343-357.

Meng, M.; Lee, J.; Payne, J. E. (2017). RALS-LM Unit Root Test with Trend Breaks and Non-Normal Errors: Application to the Prebisch-Singer Hypothesis. *Studies in Nonlinear Dynamics & Econometrics*, *21*(1), 31-45.

Moalla, M. (2022), Is there a Nexus between Micro and Macro Labor Productivity Evolution in the Turkish Manufacturing Industries? *Montenegrin Journal of Economics*, *18*(1), 139-149.

Moalla, M. (2023a). Potential Gains from Reallocation in Turkey. *Social Sciences Research Journal*, *12*(8), 960-966.

Moalla, M. (2023b). Oil Prices and Inflation: Empirical Evidence from Turkey. *Premium E-Journal of Social Sciences, 7*(33), 970-976. DOI: 10.5281/zenodo.8309753

Nişancı, M.; Gerni, M.; Emsen. Ö. S.; Türkmen, A. (2015). Türkiye Ekonomisinin Orta Gelir Tuzağına Düşüp Düşmediğine Dair Tartışma: Kur Değerlenmesi Çerçevesinde Bir Bakış. International Conference on Eurasian Economies 2015 Kazan, Rusya.

Öztürk, A. C.; Yavuz Tiftikçigil, B. (2020). Assessment of the Possibility of a Middle–Income Trap in Turkey. *Journal of Life Economics, 7*(4), 331–348.

Robertson, P. E.; Ye, L. (2013). On the Existence of a Middle-Income Trap. *University of Western Australia Economics Discussion Paper, 3*(12), 2-7.

Rodrigues, P.M.; Taylor, R.A.M. (2012). The Flexible Fourier form and Local Generalised Least Squares De-Trended Unit Root Tests. *Oxford Bulletin of Economics and Statistics*, *74*(5), 736-759.

Sarıbaş, H.; Ursavaş, U. (2017). Orta Gelir Tuzağı: Ampirik Bir Çalışma. *Abant İzzet Baysal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi 17*(2), 37-51.

Sarıgül, H.; Apak, S.; Koyuncu, T. (2022). Orta Gelir Tuzağı, Ticari Açıklık ve Yakınsama İlişkisi: Türkiye Örneği. *İzmir İktisat Dergisi, 37*(4), 1071-1093.

Schmidt, P.; Phillips, P. C. (1992). LM Tests for a Unit Root in The Presence of Deterministic Trends. *Oxford Bulletin of Economics and Statistics*, *54*(3), 257-287.

Şahin, İ.; Başer, K.; Karanfil, M. (2015). Orta Gelir Tuzağı Üzerine Ampirik Bir Çalışma: Türkiye Örneği (1980-2013). *Uluslararası Alanya İşletme Fakültesi Dergisi. 7*(2), 225-235.

Şak, N. (2021). Orta Gelir Tuzağı: N11 Ülkeleri Üzerine Bir İnceleme. *İstatistik Araştırma Dergisi, 11*(1), 23-36.

Tasar, I., Gültekin, E.; Acci, Y. (2016). Is Turkey in a Middle Income Trap? *Journal of Applied Research in Finance and Economics*, *1*(1), 36-41.

Tıraşoğlu, M; Karasaç, F. (2018). Orta Gelir Tuzağı: Yapısal Kırılmalar Altında E7 Ülkeleri İçin Ampirik Bir İnceleme. *Akademik İncelemeler Dergisi. 13*(2), 337-361.

Uyanık, C. C. (2015). Orta Gelir Tuzağı ve Türkiye'nin Konumu Açısından Bir Değerlendirme. *Sosyoekonomi*. *23*(26), 175-186.

Ünlü, F.; ve Yıldız, R. (2018). Orta Gelir Tuzağının Belirlenmesi: Ekonometrik Analiz. *Uluslararası Yönetim İktisat ve İşletme Dergisi, 14* (1,2), 1–20.

Wang, C; Lan, J. (2017) Inequality, Aging, and the Middle-Income Trap, ADBI Working Paper Series No:785.

WB, (2024) https://www.worldbank.org/en/publication/wdr2024

WDI, (2024) https://databank.worldbank.org/

Woo, W. T. (2012). China Meets the Middle-Income Trap: The Large Potholes in the Road to Catching-Up, *Journal of Chinese Economic and Business Studies, 10*(4), *313-336.*

Yeldan, E. (2012). Türkiye Ekonomisi için Beşeri Sermaye ve Bilgi Sermayesi Birikimine Dayalı Bir İçsel Büyüme Modeli. *Ekonomi-TEK Dergisi. 1*(2), 21-60.

Yılancı, V, (2017). Petrol Fiyatları ile Ekonomik Büyüme Arasındaki İlişkinin İncelenmesi: Fourier Yaklaşımı, *İstanbul Üniversitesi Ekonometri ve İstatistik*, *27*, 51-67.

Yılmaz. G. (2014). Turkish Middle-Income Trap and Less Skilled Human Capital. Working Paper No: 14/30. Central bank of the republic of Turkey.

Conflict of Interest: None.
Funding: None.
Ethical Approval: None.
Author Contributions: Erdal ALANCIOĞLU (100%)

Çıkar Çatışması: Yoktur.
Finansal Destek: Yoktur.
Etik Onay: Yoktur.
Yazar Katkısı: Erdal ALANCIOĞLU (%100)