

THE LONG-RUN ANALYSIS OF THE TEXTILES AND CLOTHING INDUSTRY IMPACT ON ECONOMIC GROWTH IN TURKEY

ДОЛГОСРОЧНЫЙ АНАЛИЗ ВЛИЯНИЯ ТЕКСТИЛЬНОЙ И ШВЕЙНОЙ ПРОМЫШЛЕННОСТИ НА ЭКОНОМИЧЕСКИЙ РОСТ ТУРЦИИ

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This research explores the relationship between the textiles and clothing sector, represented as a percentage of value added in manufacturing, and GDP per capita growth (annual %) in Turkey over the period 1981–2023. As a pivotal component of Turkey's manufacturing industry, the textiles and clothing sector has significantly contributed to the country's economic development. The study employs the Autoregressive Distributed Lag (ARDL) model to examine both the short-run and long-run dynamics between these variables. The ARDL methodology was selected for its ability to accommodate variables with different levels of integration, ensuring robust and reliable findings. The econometric results demonstrate a strong long-term correlation between the value added by the textiles and clothing sector and GDP per capita growth, indicating that advancements in this sector are integral to Turkey's economic progress. Diagnostic tests confirmed the stability and reliability of the model, validating the robustness of the results. These findings underscore the necessity of strategic investments and policy measures to bolster the textiles and clothing industry, thereby sustaining economic growth. Prioritizing innovation, technological advancements, and integration into global value chains can further enhance the sector's impact on Turkey's long-term economic development.

В исследовании изучается вклад текстильной и швейной промышленности в добавленную стоимость в обрабатывающей промышленности и рост ВВП на душу населения (годовой %) в Турции за период 1981-2023 гг. Являясь ключевым компонентом обрабатывающей промышленности Турции, текстильная и швейная промышленность внесла значительный вклад в экономическое развитие страны. В исследовании используется модель авторегрессионного распределенного лага (ARDL) для изучения как краткосрочной, так и долгосрочной динамики исследуемых переменных. Методология ARDL выбрана за ее способность учитывать переменные с различными уровнями интеграции, обеспечивая надежные и достоверные результаты. Эконометрические результаты демонстрируют сильную долгосрочную корреляцию между добавленной стоимостью текстильной и швейной промышленности и ростом ВВП на душу населения, что подчеркивает необходимость стратегических инвестиций и мер поддержки текстильной и швейной промышленности для обеспечения экономического роста. Приоритет инноваций, технологических достижений и интеграции в глобальные цепочки создания

стоимости может еще больше усилить влияние сектора на долгосрочное экономическое развитие Турции.

Keywords: Textile industry, clothing industry, economic growth, value-added manufacturing, ARDL model, Long-run cointegration, Turkey.

Ключевые слова: текстильная промышленность, швейная промышленность, экономический рост, производство с добавленной стоимостью, модель ARDL, долгосрочная коинтеграция, Турция.

Introduction

Numerous studies have focused on the impact of various factors, including scientific and technological progress, on the development of the textile industry. While scholars agree on the importance of innovation, there remains a lack of consensus regarding the key priorities for enhancing economic security in business entities, particularly within the textile sector [1]. A growing body of literature highlights the transformative role of nanotechnology in improving traditional production technologies, suggesting that the adoption of advanced materials and processes is crucial for sustaining competitiveness in the global market [2,3]. However, limited research has addressed how Turkey can effectively leverage technological innovations to enhance the value-added capacity of its textile industry, a gap this study seeks to fill.

The textile and clothing industry has long been a cornerstone of global economies, playing a pivotal role in both industrial development and economic growth. In Turkey, this sector has undergone significant transformation, evolving from small-scale workshops in the 1960s to a prominent player in the global market. The industry is comprised of over 65,000 companies, ranging from small family-owned businesses to large corporations, each contributing to the sector's adaptability and growth [4]. Despite its ongoing competitiveness, the Turkish textile and clothing industry has experienced a notable decline in the competitiveness of its clothing segment in recent years. This decline raises crucial questions regarding the sustainability of the sector's role in Turkey's economic development, especially in light of increasing global competition and rapid technological advancements [5]. Several scholarly works have examined the relation-

ship between the textile and clothing industry and economic development in Turkey. These studies explore the sector's role in driving economic growth, employment, and export performance, providing valuable insights into its impact on the overall economic trajectory of the country. Keane and Velde (2008) [6] examined the crucial role of the textile and clothing industries in fostering economic growth and development in developing countries, highlighting both their short-term and long-term contributions. While the sector offers immediate benefits such as income generation, employment opportunities, and foreign exchange earnings, its capacity for long-term growth depends largely on the quality and effectiveness of government policies and institutions that foster investment and enhance the sector's dynamic potential. Evgeniev and Gereffi (2008) [7] analyzed industrial and firm upgrading in the textile and apparel sectors of Turkey and Bulgaria between 1991 and 2005, employing interviews, quantitative export value-added analysis, firm surveys, and Global Value Chain (GVC) analysis. Their findings indicate that Turkish firms exhibit greater success in upgrading across product, process, functional, and organizational dimensions compared to their Bulgarian counterparts, while also emphasizing the higher dependency of Bulgarian firms on foreign buyers and intermediaries, suggesting that without strategic state and business cooperation, internationalization may result in a lock-in effect in low-value-added segments of the GVC.

Several studies have analyzed the development of the textile industry in the context of Russia [8] and Kazakhstan [9], providing various examples that highlight the sector's evolution and its impact on the economic growth of these countries. These examinations offer val-

uable insights into the challenges and opportunities faced by the textile industry in the region.

Although the textiles and clothing sector has been historically significant, the long-term relationship between this sector and economic growth, particularly in terms of the annual GDP growth rate, remains insufficiently examined. Most prior research has concentrated on short-term effects or specific aspects of the industry, leaving a gap in understanding the broader, long-term impact of this sector on Turkey's economic trajectory. This study aims to fill this gap by analyzing the long-run dynamics between the textiles and clothing sector and economic growth in Turkey from 1981 to 2023. The results are expected to contribute to the existing literature by offering a comprehensive examination of how advancements in the textiles and clothing industry affect overall economic growth. In doing so, this research will provide valuable insights for policymakers and industry stakeholders to enhance the sector's role in Turkey's sustainable economic development.

Data and Methodology

The data utilized in this study is obtained from the World Bank, a reliable and reputable source of global economic indicators. The dataset covers the period from 1981 to 2023, encompassing critical economic variables that facilitate an analysis of the relationship between Turkey's textile and clothing (T&C) sector and economic growth. The analysis uses the following key variables:

- GDP per Capita Growth (Annual %) – GDPPCG as the dependent variable.
- Textiles and Clothing (% of Value Added in Manufacturing) – TCVAM as the independent variable.

The TCVAM variable represents the proportion of value added by the textile and clothing sector within the broader manufacturing sector, serving as a key indicator of the sector's economic contribution to Turkey's industrial base. Data for TCVAM was sourced from the World Bank's [10] industrial sector statistics, which detail the textile and clothing sector's value added relative to total manufacturing output.

The graph in Figure 1 illustrates a decrease in the textile and clothing industry's share of manufacturing, alongside fluctuations in GDP per capita growth, which experienced both expansion and contraction during the observed period.

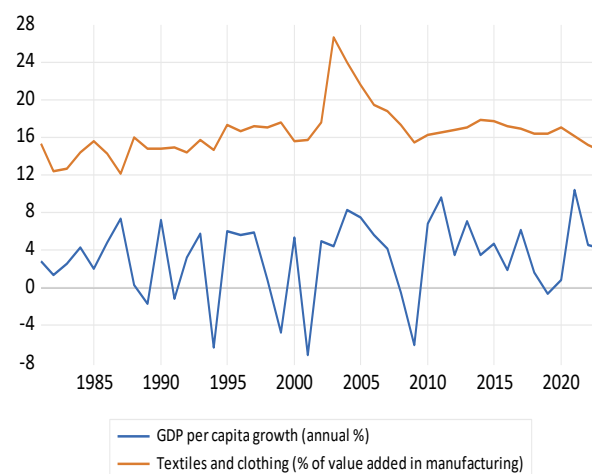


Fig. 1

The table 1 provides descriptive statistics for the variables GDPPCG and TCVAM, derived from a sample of 43 observations. The distribution of GDPPCG displays negative skewness, reflecting a longer tail on the left side, whereas TCVAM demonstrates positive skewness, indicative of a longer tail on the right side.

Table 1

Statistic	GDPPCG	TCVAM
Mean	3.184613	16.54573
Median	4.209876	16.31664
Maximum	10.4294	26.57687
Minimum	-7.138251	12.1799
Std. Dev.	4.098452	2.643717
Skewness	-0.829754	1.697966
Kurtosis	3.381476	7.460038
Jarque-Bera	5.194919	56.30186
Probability	0.074463	0
Observations	43	43

Data: World Bank

Results

Table 2 presents the covariance and correlation values between the variables, highlighting the relationships and variability between the variables. The Covariance Matrix shows that GDPPCG has a covariance of 16.40667 with itself, as expected, since a variable is always perfectly related to itself. The covariance

between GDPPCG and TCVAM is 2.334801, indicating a positive relationship where increases in one variable are associated with increases in the other, though the magnitude is relatively small compared to their variances. The Correlation Matrix reveals a perfect positive correlation of 1.000000 between GDPPCG and itself and a weak positive correlation of 0.220615 between GDPPCG and TCVAM, signifying a slight positive relationship but with limited strength.

Table 2

Statistic	GDPPCG	TCVAM
Covariance	16.40667	6.8267
Correlation	1	0.220615

The Augmented Dickey-Fuller (ADF) [11] and Phillips-Perron (PP) [12] tests check if a time series is stationary. Both tests indicate that GDPPCG is stationary, meaning its statistical properties are constant over time. Table 3 shows that TCVAM, however, is non-stationary at the level but becomes stationary after taking the first difference, suggesting a time-dependent trend.

Fig. 2 presents the Akaike Information Criterion (AIC) values for various ARDL (Autoregressive Distributed Lag) [13] models. The AIC, a statistical metric for model selection, identifies the best-fitting model among the candidates. Lower AIC values signify a better fit to the data.

Table 3

The Augmented Dickey-Fuller (ADF)			
Variable	Level	1 st Difference	Trend and Intercept
GDPPCG	-6.834 (0.000*)	-	
TCVAM	-2.482 (0.334)	-6.712 (0.000*)	
Phillips-Perron (PP)			
Variable	Level	1 st Difference	Trend and Intercept
GDPPCG	-7.956 (0.000*)	-	
TCVAM	-2.472 (0.339)	-12.187 (0.000*)	

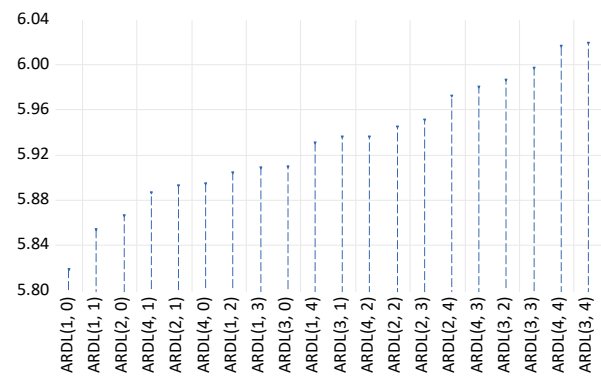


Fig. 2

Table 4 examines the results of the cointegration analysis, indicating an F-statistic value of 16.55. This finding confirms the existence of a long-run cointegrating relationship between GDPPCG and TCVAM. Specifically, a 1% increase in TCVAM is associated with a 0.333% rise in GDP per capita growth.

Table 4

Test Statistic	Value	Significance	I(0)	I(1)	Variable	Coefficient	Std. Error
F-statistic	16.5	10%	3.02	3.51	TCVAM	0.333	2.218
k	1	5%	3.62	4.16	C	-2.336	3.661

The diagnostic tests for serial correlation and heteroskedasticity, as reported in Table 5, demonstrate that the model is correctly specified. The lack of these problems ensures that the estimated coefficients are dependable and can be effectively utilized for inference and forecasting.

The graphs in Figure 3, depicting the CUSUM and CUSUM of Squares plots, are employed to evaluate the stability of the model. Both plots remain within the 5% significance bounds, signifying that the model is stable and reliable for forecasting purposes.

Table 5

Test	Statistic	p-value
Breusch-Godfrey Serial Correlation LM Test	F-statistic: 0.407	Prob. F(2,37): 0.668
	Obs*R-squared: 0.905	Prob. Chi-Square(2): 0.635
Heteroskedasticity Test: Breusch-Pagan-Godfrey	F-statistic: 0.380	Prob. F(2,39): 0.685
	Obs*R-squared: 0.804	Prob. Chi-Square(2): 0.668
	Scaled explained SS: 0.825	Prob. Chi-Square(2): 0.661

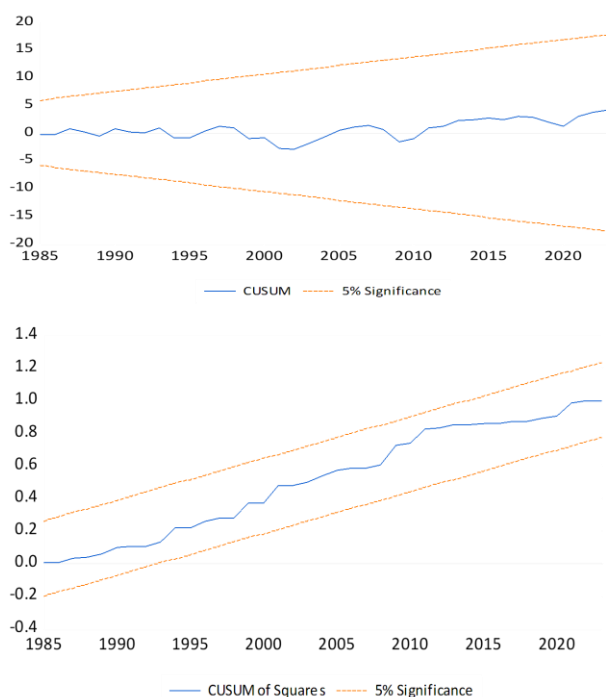


Fig. 3

To strengthen the textiles and clothing sector's contribution to economic growth, policymakers should focus on fostering innovation and the adoption of advanced technologies to boost productivity and operational efficiency. Enhancing the sector's integration into global value chains through trade liberalization and strategic collaborations can broaden market opportunities and enhance competitiveness. Investing in workforce training and skill development is crucial for adapting to modern manufacturing processes and responding to evolving market needs. Furthermore, encouraging sustainable practices and environmentally friendly production methods will not only align with global sustainability trends but also enhance the sector's long-term value creation potential.

Conclusion

The results of this study highlight the significant role of the textiles and clothing sector in Turkey's economic growth, particularly its effect on GDP per capita growth. The econometric analysis utilizing the ARDL model demonstrates a robust long-term cointegrating relationship between the textiles and clothing sector, represented by its value added in manufacturing (TCVAM), and GDP per capita

growth (GDPPCG). The cointegration analysis reveals compelling evidence, with an F-statistic value of 16.55, affirming the stability of this long-run relationship. Notably, the analysis shows that a 1% increase in TCVAM corresponds to a 0.333% increase in GDP per capita growth, underscoring the sector's pivotal influence on Turkey's economic development trajectory.

These outcomes underscore the necessity of implementing targeted policy interventions to strengthen the productivity and value-added potential of the textiles and clothing industry. Prioritizing investments in innovation, advanced technologies, and workforce development will be essential to maintaining and enhancing this sector's economic contributions. Furthermore, increasing integration into global value chains can improve the industry's competitiveness and expand its market reach. Policymakers and stakeholders should focus on fostering the growth of this sector as a strategic driver of sustainable economic development in Turkey, given its demonstrated capacity to support long-term macroeconomic growth.

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