# Determinants of economic performance in the clothing industry – an EU data panel analysis

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**ABSTRACT – REZUMAT**

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*In a global economy, textile and clothing companies operate in a highly competitive international market, where numerous firms compete for consumer demand, characterised by frequent changes, depending on fashion. Therefore, increasing economic performance is essential to survive in such an environment. This piece of research has the objective to analyse the factors that determine performance expressed in the form of companies' turnover, at sector level in the European Union region, trying to answer the question of which are the drivers influencing the turnover in the textile and clothing industry and how strong their influence is. In pursuing this, multiple linear regressions have been performed between turnover and its determinants. The findings show that turnover is strongly influenced by the number of employees, imports and exports and less influenced by consumers' expenditure. These results may serve to underpin the macro policy decisions regarding the textile, clothing and footwear industry.*

***Keywords:*** *textile and clothing industry, economic performance, productivity, competitiveness, turnover*

**Determinanți ai performanței economice a industriei textile și de îmbrăcăminte – analiză de tip panel a datelor din Uniunea Europeană**

*Într-o economie globală, companiile din industria textilă și de îmbrăcăminte operează pe o piață internațională extrem de competitivă, în care numeroase firme concurează pentru cererea consumatorilor, caracterizată prin schimbări frecvente, în funcție de modă. Prin urmare, creșterea performanței economice este esențială pentru a supraviețui într-un astfel de mediu. Această cercetare are ca obiectiv analiza factorilor care determină performanța exprimată sub forma cifrei de afaceri a companiilor, la nivel de sector în Uniunea Europeană, încercând să răspundă la întrebarea care sunt factorii care influențează cifra de afaceri în industria textilă și de îmbrăcăminte și cât de puternică este influența lor. În acest scop, au fost efectuate regresii liniare multiple între cifra de afaceri și factorii determinanți ai acesteia. Rezultatele arată că cifra de afaceri este puternic influențată de numărul de angajați, importuri și exporturi și mai puțin influențată de cheltuielile consumatorilor. Aceste rezultate pot servi la fundamentarea deciziilor macroeconomice din industria textilă, de îmbrăcăminte și de încălțăminte.*

***Cuvinte-cheie:*** *industrie textilă și de îmbrăcăminte, performanță economică, productivitate, competitivitate, cifră de afaceri*

## INTRODUCTION

Worldwide, population growth demands larger quantities of food, clothes and services. This is the reason why the textile industry has intensively developed, and, due to globalisation, operates on international competitive markets, where companies can survive only by increasing economic performance.

The textile and clothing industry in the European Union encompasses 197,000 companies, 1.3 million employees, and 170 billion euros turnover [1]. The average labour productivity in member states reached 40.2 thousand euros of value added per employee in 2023, while ten years ago it used to be 27 thousand euros. This increase in productivity is driven both by improved techniques and by reducing the number of workers and improving their skills. Women represent more than 70% of all workers in the industry. Consumption of clothing per person differs depending on the country. In Luxembourg, one person spent 1,500 euros to buy clothes, while in Hungary, one person spent 200 euros in 2022. On average, one person spent 630 euros on clothing [2]. Italy is the largest player in the textile and clothing industry in the European Union, accounting for 36% of turnover and 24% of employment [2]. Other important contributors are Germany, France, Spain, Portugal, Poland and Romania. By subsector, besides Italy, Germany plays a significant role in technical and industrial textile, interior textile and man-made fibres, yarns, fabrics; France in leather clothes and accessories; Spain, Portugal and Romania in footwear.

Given the complexity of the textile value chain, the European Union is proposing a complex strategy for the textile and clothing industry. The strategy focuses on strengthening industrial competitiveness and accelerating innovation in this branch. The aim is to

stimulate the EU market for sustainable and circular textiles, including textile reuse [3].

As seen, the textile industry is an important pillar of the European Union economy, being one of the fourteen industrial sectors that the Commission has identified as strategic in the recovery from the COVID-19 pandemic [4]. Given the importance of the textile industry, it becomes relevant to analyse the competitiveness and productivity of this branch and the drivers behind its performance.

Usually, financial indicators are utilised to measure the economic performance [5]; as such, for this piece of research, turnover will be used as an expression of performance. Thus, the objectives of the paper are to explore the drivers of turnover of the textile and clothing industry and to rank them based on their influence. The research question is: Which are the determinants influencing the turnover in the textile and clothing industry, and how strong is their influence?

A possible answer to this question and, thus, the hypothesis tested in this piece of research, is that consumer demand, exports, and imports influence the turnover (sales revenue) of companies. The assumption is based on the basic economic theory of market equilibrium [6], when supply equals demand, and supply is made up of domestic production, plus imports, minus exports. As such, we expect a positive influence of imports and demand and a negative influence of exports on turnover.

In achieving the objectives of the research and answering the above question, multiple linear regressions have been performed between turnover and its influencing factors. The results of the study will facilitate the development of macroeconomic policy actions regarding the textiles and clothing industry.

The paper is structured as follows: after the introduction, the literature review explores the main results of research related to economic performance in the textile and clothing industry and the drivers behind it. Then, the methodology used in this study is presented, including the variables of the regression and tests made for their validation. The results are then discussed, the drivers influencing the performance are ranked, and the conclusions are drawn.

## LITERATURE REVIEW

The growing and intense competition in the textile and clothing market calls for exploring businesses' performance and their drivers. A large body of literature analysed the performance of this sector, and many researchers studied the factors influencing it.

Performance is defined as the relationship between output (turnover, production of goods) and input (consumed resources, such as labour, capital, money, energy, etc.) [7]. Some studies focused on productivity, as a form of performance, and analysed the textile and clothing industry productivity in individual countries, in different world regions. In Asia, the world leader of the clothing industry, some authors [8, 9] found that productivity increased in China and Taiwan, with growth driven mainly by technical improvements. Productivity growth rates have been found for Malaysia, 7% [10], and India, 3.5% [11].

In the United States of America, Datta and Christoffersen [12] found productivity growth of 2.1%, the main driver being technical change. In Europe, Milašius and Mikučionienė [13] argued that investments in the textile and clothing industry determine the long-term productivity growth, which indicates the concerns of producers to industrial development. One report of the European Commission on EU Textile Ecosystem and its Competitiveness [14] shows that this branch registered rapid productivity growth of 10%, since the value added was growing faster than employment. Moreover, the specialists argued that the value growth added may be explained by increasingly efficient production processes, which lowered production costs.

Overall, in those regarding productivity, both labour and technical, [15] argued that labour productivity, measured by value added per employee, is higher in developed countries compared to developing countries and higher in the textile industry compared to the clothing industry, in almost all regions and countries; and Kapelko and Oude Lansink [16] demonstrated a relatively small overall productivity increase for both textile and clothing firms due to positive technical change.

But performance can be expressed as competitiveness, as well, which can be assessed in different ways, including turnover, number of companies, number of employees, export and imports, as argued by Girneata and Dobrin [17]. The authors analysed the competitiveness of the European textile and clothing industry in the larger context of globalisation, using indicators such as household consumption, turnover, investment, employment, number of firms and EU balance trade for both textile and clothing. The results of the study showed that the competitiveness of the textile and clothing industry fell significantly in the period under analysis, 2007–2013, causing restructuring and downsizing.

Some authors [5] argued that performance can be measured exclusively based on financial information because performance management systems have been designed and operated predominantly by the accounting and financial functions within the company [18]. As such, turnover, as a financial result, has been studied for assessing the performance of the textile and clothing industry, but imports, exports, and consumption as drivers for turnover have been less explored. This is the reason why this piece of research fills in the gap and is original. The economic performance is assessed using turnover as the financial result of companies, and number of employees, expenditure of consumers for purchasing clothes and footwear, and exports and imports' values as its drivers, as explained in methodology.

## METHODOLOGY

The research aimed to analyse the main influences on the turnover in the clothing and footwear sector at

the macroeconomic level. For this, data were selected from the European statistical database Eurostat, regarding the net value of turnover, for the 27 Member States in the period 2019–2022, this period being established according to the availability of data.

The independent variables, for the 27 Member States and the same period, consumption, expressed as expenditure, the number of employees in this industry, the value of imports and the value of exports have been selected (table 1).

Considering the 27 Member States and the 4 years taken into analysis, a panel model with a number of 108 observations results, however, for Estonia in 2019 and 2020, no data have been identified regarding Turnover and Number of Employees, thus these 2 records were removed so as not to affect the model, therefore a final model with a number of 106 observations has resulted.

The analysis of descriptive statistics for the variables used in the econometric model (table 2) highlights significant differences in terms of centrality and variability of the data. The turnover variable (T-over) has a mean of approximately 5,295 million euros, but the median is considerably lower, standing at 1,191 million euros. This difference highlights the presence of very large values (outliers) that raise the mean. A similar situation is observed in the case of the export value and import value variables, where the mean is higher than the median, indicating a positively skewed distribution. In the case of the number of employees, the mean is 12,537, but the median is much lower, at 6,034, reflecting a significant variation in the number of employees between the different countries. In contrast, the expenditure (PPS) variable has a mean of 731.5 euros/inhabitant and a median of 696.5 euros/inhabitant, suggesting a relatively symmetrical distribution.

Another important aspect is the analysis of skewness and kurtosis, which allows the evaluation of the shape of the data distribution. All variables present positive skewness coefficients, which indicates a tendency of skewness to the right, characterised by the presence of very high values. The most pronounced asymmetry is observed in the case of the import variable, with a coefficient of 2.245, suggesting the presence of extreme values that deviate significantly from the normal distribution. Also, the turnover variable

Table 1

NAMING AND CODING OF VARIABLES

| Variable | Codification | Unit of measurement | Explanation |
|---|---|---|---|
| Net turnover | T-over | Millions of euros | It measures the value of turnover for enterprises whose objective is the wholesale of clothing and footwear. |
| Expenditure | PPS | Nominal expenditure per inhabitant (in euros) | It measures the value of expenditure per inhabitant, in euros, for the purchase of clothing and footwear. |
| Import Value | Imp_Val | Millions of euros | It measures the value of imports for each Member State *i* in year *t*, at the global level as a partner. |
| Export Value | Exp_Val | Millions of euros | It measures the value of exports for each Member State *i* in year *t*, at the global level as a partner. |
| Number of employees | Employee | Persons | It measures the number of people working in enterprises whose objective is the wholesale of clothing and footwear. |

*Note:* Logarithm (Ln_Variable) for each variable that registered a distribution different from the normal one. The logarithm of the data set has been applied, using the natural logarithm.

Table 2

DESCRIPTIVE STATISTICS FOR THE ANALYZED VARIABLES

| | T-over | EXP_val | IMP_val | Emplyee | PPS |
|---|---|---|---|---|---|
| Mean | 5295.228 | 5079.623 | 7037.473 | 12537.68 | 731.5094 |
| Standard Error | 767.7818 | 677.7892 | 976.5481 | 1571.174 | 31.68366 |
| Median | 1190.72 | 1567.839 | 2344.013 | 6034.5 | 696.5 |
| Standard Deviation | 7904.797 | 6978.267 | 10054.18 | 16176.23 | 326.2032 |
| Sample Variance | 62485819 | 48696215 | 1.01E+08 | 2.62E+08 | 106408.5 |
| Kurtosis | 0.685525 | 2.116689 | 5.233824 | 1.17515 | 0.723824 |
| Skewness | 1.464382 | 1.714796 | 2.244813 | 1.523086 | 0.744562 |
| Range | 26159.8 | 28410.9 | 50256.47 | 62782 | 1598 |
| Minimum | 39.8 | 12.15908 | 127.7565 | 107 | 178 |
| Maximum | 26199.6 | 28423.06 | 50384.22 | 62889 | 1776 |
| Sum | 561294.2 | 538440 | 745972.2 | 1328994 | 77540 |
| Count | 106 | 106 | 106 | 106 | 106 |

has an asymmetry coefficient of 1.464, which indicates that there is a concentration of small values in contrast to a few very high values. Regarding flattening, the import variable records a kurtosis coefficient of 5.234, typical of a leptokurtic distribution, with a sharp peak and thick tails. The rest of the variables have kurtosis values less than 3, characteristic of platokurtic distributions, which suggests a lower concentration of values around the mean.

The observation of the extreme values and the range indicates notable differences between the minimum and maximum values for each variable. For example, for the turnover variable, the minimum value is 39.8 million euros, and the maximum value reaches 26,199.6 million euros, resulting in a range of 26,159.8 million euros. Similarly, the value of exports varies between 12.16 million euros and 28,423.06 million euros, and the value of imports between 127.76 million euros and 50,384.22 million euros. In the case of the number of employees, the range of variation is extremely large, 62,782 people, from a minimum of 107 to a maximum of 62,889. For the expenditure variable, the difference between the minimum and maximum is 1,598 euros/inhabitant, suggesting significant variations in expenditure between the countries analysed.

Descriptive analysis of the variables in the model indicates high variability and the presence of outliers that significantly influence the mean. The positive skewness of the distributions suggests that large values are predominant, and the kurtosis coefficients indicate, in some cases, sharp peaks and thick tails of the distributions.

To obtain more robust results and to reduce the influence of extreme values, it is recommended to apply a logarithm to variables that present asymmetric distributions. This approach will contribute to normalising the distributions and improving the accuracy of the econometric model.

The equation of the multiple linear regression model was set to be in the following form, in which the variable is measured by country *i* and year *t*:

$$LnTover_{it} = LnPPS_{it} + LnIMP\_Val_{it} + \\ + LnEXP\_Val_{it} + LnEmplyee_{it} + \varepsilon \quad (1)$$

## RESULTS AND DISCUSSIONS

Following the process of applying the logarithm to the variables, the first step was to determine possible correlations between the variables, especially those related to turnover and its determinants.

The correlation coefficients between the logarithmic variables and turnover (table 3) highlight the existence of significant and strong relationships between turnover and the variables number of employees, export value and import value. The relationship between the logarithmic number of employees and logarithmic turnover is extremely strong and positive, with a correlation coefficient of 0.9338. This result suggests that as the number of employees increases, turnover shows a significant upward trend. The p-value is 0.0000, indicating that this relationship is statistically significant at any conventional level (1%, 5%, 10%).

Another significant relationship is between the logarithmic value of exports and the logarithmic turnover, with a correlation coefficient of 0.8537. This indicates a positive and strong correlation, suggesting that exports contribute significantly to the increase in turnover. The high level of correlation confirms that export activity is an essential pillar of financial success in the wholesale clothing and footwear sector. The p-value of 0.0000 attests to the robustness of this relationship, indicating that there is an extremely

Table 3

CORRELATIONS BETWEEN VARIABLES

Covariance Analysis: Ordinary
Date: 03/23/25 Time: 13:05
Sample: 1 106
Included observations: 106

| Correlation<br>Probability | LN_EMPLY... | LN_EXP_VAL | LN_IMP_VAL | LN_PPS_N | LN_T_OVER |
|---|---|---|---|---|---|
| LN_EMPLYEE | 1.000000<br>----- | | | | |
| LN_EXP_VAL | 0.900849<br>0.0000 | 1.000000<br>----- | | | |
| LN_IMP_VAL | 0.893070<br>0.0000 | 0.923003<br>0.0000 | 1.000000<br>----- | | |
| LN_PPS_N | -0.110039<br>0.2615 | -0.043736<br>0.6562 | 0.144734<br>0.1388 | 1.000000<br>----- | |
| LN_T_OVER | 0.933847<br>0.0000 | 0.853735<br>0.0000 | 0.921138<br>0.0000 | 0.143153<br>0.1432 | 1.000000<br>----- |

low probability that this correlation would occur by chance.

Also, the logarithmic value of imports is positively and strongly correlated with turnover, the correlation coefficient being 0.9211. This suggests that an increase in imports has a positive impact on turnover, which may reflect an intense supply activity with products intended for marketing. The fact that the p-value is also 0.0000 confirms the statistical significance of the relationship, indicating that imports are a significant factor in increasing the income of enterprises in the analysed sector.

The stationarity test indicates that the logarithmic series is stationary at the individual level, according to the Im, Pesaran and Shin W-stat, ADF – Fisher Chi-square and PP – Fisher Chi-square tests, all having a p-value of 0.0000, which allows the rejection of the unit root hypothesis. Although the Levin, Lin & Chu t-test suggests the presence of a unit root (p-value 0.9854), the overall results validate the stationarity of the series. Therefore, the model is valid, and we can continue with the regression analysis.

The linear regression model applied for the dependent variable – logarithm of turnover – highlights statistically significant results and a high degree of explanatory power. The coefficient of determination R2 is 0.9423, which indicates that approximately 94.23% of the variation in turnover (logarithm) is explained by the independent variables included in the model (number of employees, value of exports, value of imports and expenditure). The adjusted R2 coefficient, with a value of 0.9401, confirms the stability of the model even after adjusting for the number of variables.

The overall significance test of the model, reflected by the F-statistic value (412.36) and the associated probability (p-value 0.0000), shows that the model is significant overall, rejecting the null hypothesis that all coefficients are equal to zero. This indicates that at least one of the independent variables has a significant impact on turnover.

Analysing the regression coefficients, it can be noticed that the employee variable has a positive and statistically significant coefficient (0.9706), with a p-value of 0.0000. This result indicates a positive relationship between the number of employees and turnover, suggesting that a 1% increase in the number of employees would lead, on average, to an

Table 4

RESULTS OF THE REGRESSION MODEL BETWEEN TURNOVER AND ITS DRIVERS

Dependent Variable: LN_T_OVER
Method: Least Squares
Date: 03/23/25 Time: 13:08
Sample: 1 106
Included observations: 106

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LN_EMPLYEE | 0.970657 | 0.075886 | 12.79093 | 0.0000 |
| LN_EXP_VAL | -0.190743 | 0.071769 | -2.657722 | 0.0091 |
| LN_IMP_VAL | 0.434961 | 0.109542 | 3.970712 | 0.0001 |
| LN_PPS_N | 0.719106 | 0.120780 | 5.953851 | 0.0000 |
| C | -7.794858 | 0.763295 | -10.21212 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.942301 | Mean dependent var | 7.085617 |
| Adjusted R-squared | 0.940016 | S.D. dependent var | 1.924977 |
| S.E. of regression | 0.471458 | Akaike info criterion | 1.380050 |
| Sum squared resid | 22.44958 | Schwarz criterion | 1.505684 |
| Log likelihood | -68.14263 | Hannan-Quinn criter. | 1.430970 |
| F-statistic | 412.3664 | Durbin-Watson stat | 1.530990 |
| Prob(F-statistic) | 0.000000 | | |

Estimation Command:
==========
LS LN_T_OVER LN_EMPLYEE LN_EXP_VAL LN_IMP_VAL LN_PPS_N C

Estimation Equation:
==========
LN_T_OVER = C(1)*LN_EMPLYEE + C(2)*LN_EXP_VAL + C(3)*LN_IMP_VAL + C(4)*LN_PPS_N + C(5)

Substituted Coefficients:
==========
LN_T_OVER = 0.970657129219*LN_EMPLYEE - 0.1907427595*LN_EXP_VAL + 0.434961317854*LN_IMP_VAL + 0.719106196124*LN_PPS_N - 7.79485778377

increase of approximately 0.97% in turnover, all other variables remaining constant.

The analysis of the export variable reveals a negative coefficient of –0.1907, indicating that a 1% increase in exports leads to a 0.19% reduction in the sector's turnover. The associated p-value of 0.0091 confirms that this negative influence is statistically significant. This result may suggest that not all exports directly generate substantial revenues within the wholesale clothing and footwear sector. It is possible that some exported products yield lower profit margins or that export activities incur additional costs, which ultimately reduce profitability.

In contrast, the import variable demonstrates a positive coefficient of 0.4349, indicating that a 1% increase in imports results in a 0.43% increase in turnover. The statistical significance of this relationship, supported by a p-value of 0.0002, highlights the positive contribution of imports to turnover. This finding may imply that the supply of imported clothing and footwear is advantageous for the sector, reflecting a robust volume of trade in imported products and their positive impact on business revenue.

Furthermore, the expenditure variable also exhibits a positive coefficient of 0.7191, accompanied by an extremely low p-value of 0.0000, indicating a highly significant positive influence on turnover. This result suggests that in countries with higher nominal expenditure per inhabitant, the turnover of enterprises operating in the wholesale clothing and footwear sector is correspondingly higher. Consequently, increased consumer spending capacity directly contributes to stronger business performance within the sector.

The regression model is robust and well specified, highlighting that the number of employees, the value of imports and expenditure have a positive and significant impact on turnover, while the value of exports exerts a negative effect. The model provides a pertinent explanation of the economic relationships between the variables and can serve as a basis for formulating economic policies that support growth in the wholesale clothing and footwear sector.

The interpretation of the coefficients shows that the number of employees and the value of imports are the factors with the greatest positive impact on turnover, while the value of exports has a negative effect. Expenditure also contributes positively to income growth. One person spent on average, 731.50 euros to buy clothes and footwear, which is in line with statistics showing that the average expenditure for clothes is 630 euros [2].

These results suggest that development strategies should focus on expanding the labour force and efficiently sourcing through imports, while monitoring the negative impact of higher exports.

The finding that an increase in the number of employees leads to a significant increase in turnover is supported by the literature on human resource efficiency in the trade and textile sector. According to studies [19], human capital is a key factor in economic value creation, and increasing the workforce can increase production capacity and operational efficiency.

The negative impact of exports on turnover in the clothing and footwear sector, highlighted by the regression analysis, is explained by the way value is created in the global textile supply chain. Many EU countries with high export volumes-such as Romania, Bulgaria or Portugal-act as manufacturing hubs, under outsourcing models with low profit margins [20, 21]. Thus, although export volumes are high, turnover remains limited due to low value added per unit. In addition, exports are often realised at wholesale prices in a B2B context, as opposed to domestic sales that may occur at higher retail prices or through vertically integrated channels [22]. Additional costs of exporting-logistics, compliance, foreign market risks-can further reduce margins [23]. Therefore, reliance on exports without integration of higher value-added functions (branding, design, direct retailing) can lead to poor financial performance.

The positive effect of imports can be explained by the theory of comparative advantage, but also by modern observations on global trade and globalisation. Especially in clothing retailing, studies [24] show that firms that import products from low-cost markets can achieve higher margins and better competitiveness. This is a common reality in the EU, where many local brands import clothes from Asia or North Africa, maintaining low costs and diversity in their offer.

The positive association between household spending and turnover is well documented in the consumer literature. According to Engel's model and subsequent studies [25], as incomes rise, the share of spending on clothing remains relatively stable, but in absolute terms it increases. Also, in markets with higher purchasing power, such as the European Union, there is a more pronounced trend towards fashion consumption and clothing diversity.

## CONCLUSIONS

The paper explored the drivers of economic performance in the clothing and footwear industry, using regression models for analysing the relationships between turnover and its factors of influence: employees, purchases, exports and imports.

The results of the regression model highlight the importance of factors for increasing turnover in the clothing and footwear retail trade sector. On the one hand, the number of employees, imports and exports, in this particular order, prove to be essential variables, with a significant influence on turnover. The results show that 1% increase in the number of employees would lead, on average, to an increase of approximately 0.97% in turnover; a 1% increase in exports leads to a 0.19% reduction in the sector's turnover; a 1% increase in imports leads to a growth of turnover by 0.43%. On the other hand, consumption, expressed in terms of purchases, does not have the same relevance, which suggests that the dynamic of the domestic market does not influence the direct income of enterprises in this sector.

Moreover, part of the hypothesis established at the beginning of the research is validated, with turnover being positively influenced by imports and negatively by exports. Regarding demand, expressed as consumers' expenditure, it can be stated that it positively influences turnover, as assumed, but to a lesser extent.

Based on these findings, sectoral policymakers are recommended to support strategies that encourage the expansion of workforce capacity and facilitate efficient access to imported goods, both of which have a strong positive impact on turnover. At the same time, policies should aim to reduce the structural dependence on low-margin export models by stimulating value-added activities such as branding, design, or retail integration. These shifts could enhance the sector's profitability and long-term resilience within the EU.

The research has its limitations, consisting of the fact that the analysed period is short. This restriction may be overcome in the following years, by future research, as new statistical data appear. Moreover, the value of the Durbin-Watson statistic (1.3196) indicates a possible residual positive autocorrelation, but this aspect requires further checks to confirm whether there is a problem of autocorrelation of errors.

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