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Repair Preference Rate: Analysis of Repair Service Demand in EU Countries

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ABSTRACT

This study aims to measure the rigidity of consumer preferences for repairing electronic products in 19 EU member states for 2013-2022 and examine the variables affecting demand. Quantitative studies examining repair demand mainly consist of questionnaires and cross-sectional data analysis. In this context, examining the subject using The System GMM Estimator Method developed by Arellano and Bover (1995) and Blundell and Bond (1998) is important. According to the analysis, the most effective variable on demand is the lagged values of the independent variable. For this reason, it has been observed that stereotyped consumers' perceptions about repair in the long term continue rigidly. In the short run, the small price elasticity and the negligible effect of taxes reduce the policy tools to be used. The results show that in the European Union countries, where the highest environmental standards are applied worldwide, consumers' preferences for repair cannot be changed enough, and the existing tools are insufficient to break the established perception.

Keywords: *Repair, Repair Preference Rate, Circular Economy, WEEE, Dynamic Panel*

Onarım Tercih Oranı: AB Ülkelerinde Onarım Hizmetleri Talebinin Analizi

ÖZET

Bu çalışma, 2013-2022 yılları arasında 19 AB üye ülkesinde elektronik ürünlerin tamirine yönelik tüketici tercihlerinin katılığını ölçmeyi ve talebi etkileyen değişkenleri incelemeyi amaçlamaktadır. Tamir talebini inceleyen nicel çalışmalar çoğunlukla anketlerden ve kesitsel veri analizlerinden oluşmaktadır. Bu bağlamda, Arellano ve Bover (1995) ve Blundell ve Bond (1998) tarafından geliştirilen Sistem GMM Dinamik Panel Yöntemi ile konunun incelenmesi önemlidir. Analize göre, talep üzerinde en etkili değişken bağımsız değişkenin gecikmeli değerleridir. Bu nedenle, tüketicilerin tamir hakkındaki kalıplaşmış algılarının uzun vadede katı bir şekilde devam ettiği görülmüştür. Kısa vadede, fiyat esnekliğinin küçük olması ve vergilerin ihmal edilebilir etkisi, kullanılacak politika araçlarını azaltmaktadır. Sonuçlar, dünya çapında en yüksek çevre standartlarının uygulandığı Avrupa Birliği ülkelerinde, tüketicilerin tamir tercihlerinin yeterince değiştirilemediğini ve mevcut araçların yerleşik algıyı kırmada yetersiz olduğunu göstermektedir.

Anahtar Kelimeler: *Onarım, Onarım Tercih Oranı, Döngüsel Ekonomi, WEEE, Dinamik Panel*

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1. INTRODUCTION

Sustainable production and consumption are among the United Nations' important development goals. To achieve this goal, the Circular Economy Model includes strategies such as Reuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Reuse, Recycle, and Recover. The European Union's official documents and promotional activities emphasize the strategies known as 3R (Repair, Reuse, Recycle).

Since it has measurable data, the literature on the Circular Economy Model has primarily focused on Recycle (Schöggl et al. 2020; Shobande et al. 2024). Recycling is the link point between the end of the life cycle of the good and the production of another good (Ragossnig and Schneider, 2019). This perspective is critical in providing sustainably needed raw materials and natural resources for value chains. However, closing the cycle more quickly and frequently can lead to a continuous income transfer from consumers to producers. Actions such as Reuse, Repair, Refurbish, Remanufacture, Repurpose, on the other hand, lead to a lengthening of the cycle and a decrease in the environmental load (Psarommatis et al, 2025; Russell & Nasr, 2023) and help protect consumer welfare.

Reuse is the use of products or parts by their new owners for the purpose they were produced by going through processes such as repair and maintenance (Delanoeije and Bachus, 2020). Studies in this area often refer to wastewater resources (Mannina et al., 2022; Ricart & Rico, 2019; Bellver-Domingo and Hernández-Sancho, 2022), steel and other building materials (Bertino et al., 2021; Schützenhofer et al, 2022, Anastasiades et al, 2021) and other issues related to Recycle (Repp et al, 2021; Ta et al, 2022; Bui et al, 2022). Additionally, the reuse of electronic waste is another area of interest (Brito et al., 2021, Shittu et al., 2021; Wang et al., 2024).

Repair, which is our research topic, depends significantly on the wishes and preferences of consumers (Terzioglu, 2021). Some studies show that only 10 percent of consumers use the repair option (Perez-Belis et al., 2017). These results suggest that the linear economic model of the traditional take-make-dispose format (Neves and Marques, 2022) continues. Many factors cause consumers to abandon the repair option. The price advantage of new products and the high or uncertain repair prices are the most important reasons (Van Der Velden, 2021; Brusselaers et al., 2020). Another problem is product designs that have difficulties installing and disassembling manufacturers, assuming their sales will decrease (Bracquene et al. 2019; Sabbaghi and Behdad, 2018). Behavioral factors (Jaeger-Erben et al., 2021) and established habits from the past also affect the preference for repair.

The repair issue has been less studied in the literature than other strategies and is mainly based on spatial (sectional) survey data without a time dimension (Rudolf et al., 2022; Neves and Marques, 2022). A few time series studies have been found (Jayasiri et al., 2024; Perez-Belis et al., 2017). This research examines consumer preferences for repairing electronic products, which we see as a deficiency in the literature, in the short and long term. The study investigates the situation of 19 countries in the European Union between 2013 and 2022 with Dynamic Panel data analysis. It is essential to determine which

variables affect these behaviors macroeconomically by considering the aggregated repair preferences of consumers, to examine the long-term rigidity of repair preferences, and to reveal the success of policies implemented on environmental issues such as the green deal and the fight against climate change.

Regulation 2024/1799 from the European Parliament and the Council addresses the incentives for the repair of goods (EU, 2024). Article 4 of text before the Regulation explains the reasons why consumers choose between repair and purchase of a new product. These reasons are analyzed with two econometric models we established in our research. Repair prices for the economic suitability variable, electricity consumption per capita for durability, and labor force working in the repair sector for the availability of repair services were used as proxy variables. In addition, the electronic waste rate and the tax rate variables of the repair sector, which we consider to be related to the dependent variable, were also included in the analysis.

Since it is thought that the increase or decrease in repair expenditure alone will not indicate consumer preference, these expenditures are proportional to the expenditures of electronic goods produced and imported into the market. We call this the "Repair Preference Rate". Thus, with a theoretical approach different from the literature, it is possible to determine to what extent the consumer prefers repair instead of buying a new product. Of course, we recognize that when consumers buy a new product, they do not only intend to replace the defective one. A similar theoretical approach has been applied to variables such as the ratio of employees to all employees in the repair sector and the ratio of electronic waste to the amount of goods placed on the market.

From this data set, which we obtained before conducting an empirical review, we see that the ratio of repair expenditures to electronic goods expenditures is constantly decreasing. So much so that it is easy to understand that while prices are increasing, the decrease in spending rates will be due to the decrease in the amount of repair choices made by consumers. Likewise, there is a continuous downward trend in the number of employees in the repair industry. The ratio of waste to goods placed on the market is increasing. Consumers are increasingly disposing of defective goods rather than having them repaired. The fact that the taxes levied on the repair industry are higher than on producing electronic goods can be seen as another concern. Thus, it is understood that the manufacture of goods is more encouraged than repair. Therefore, in terms of the circular economy approach, it becomes important to determine the impact of variables that may positively affect consumer preferences and create related policies. As such, our research questions are as follows:

RQ1. Are consumers' repairing behavior changing in the long term?

RQ2. What are the directions and effects of variables influencing consumer preferences for repairing electronic products in selected periods and countries?

2. LITERATURE REVIEW

Although repair services are essential for the circular economy model, studies on consumers' demand for repair are limited. Most studies discuss only survey data, while a small number include empirical models. In this context, the literature on the subject is listed below chronologically.

McCollough (2009) chose the number of employees in the repair industry as the proxy dependent variable to estimate the demand for repair services. The independent variables in the model were new product price, repair price, savings rate, product advertising expenditures, and GDP growth rate. He analyzed a time series of data from the United States between 1980 and 2000 using the least squares method and found that product price was the most important variable positively affecting demand. The cost of repair was not a statistically significant variable.

Perez-Belis et al. (2017) examined a sample of 400 consumers in Spain using the Logit model. In the modeling of the study, the repair option was defined as the dependent variable based on yes or no answers. Independent variables were socioeconomic factors such as age, gender, education level, household size, and income level. The data used in the study was processed using the R program. They calculated that women and elderly consumers had a higher rate of repair preferences than others. 78.88 per cent of users of small electrical appliances think that the repair cost can be equal to buying a new one.

Bovea et al. (2017) surveyed 68 people in Spain and found that 78.9 percent of consumers did not have their small electrical and electronic appliances repaired due to the low price of new products. Consumer perceptions regarding options such as repair location information, irreparability, low new product price, trust and difficulty are independent variables. The model was solved using the simple arithmetic average method.

Sabbaghi and Behdad (2018) used the Joint Probability Density Function (JDF) Method to investigate the mobile phone repair preferences of 208 students from the University at Buffola in the United States. In the research model, the consumer's relative willingness to pay for repair services (repair price/product price) was selected as the dependent variable, while product usage time (year) was selected as the explanatory variable. These results show that consumers' demand for repair services decreases by 6.7% every year. They also created a simple regression model for manufacturers with an R^2 of 85 per cent. The dependent variable, repair cost/price ratio, decreases by 3% depending on the time variable.

Brusselaers et al. (2020) examined consumers' preferences for repairing goods in terms of life cycle costs (LLC). The endogenous variables in the model are discount rates and energy use, exogenous variables are taxes and future prices, and behaviorally determined variables are the safe period and the allowable repair time. They adopted a Monte Carlo simulation method for their analysis. The study, which investigated the period between 2009 and 2015 for the Benelux region, concluded that approaching the maximum repair time of defective

devices reduced the preference for repair by 70 percent. Discounts for new goods reduced the preference for repair by 28.3 percent.

Rodrigues et al. (2020) showed that, according to survey data collected in Brazil, 65% of consumers avoided repairs due to high repair prices, 14.3% did not trust the repaired product, 10.9% could not find spare parts, 7% believed that new products were better, and 2.8% reported other reasons. In this study, survey data from 384 people was analyzed using the simple arithmetic mean method and SPSS 12 software.

Jaeger-Erben et al. (2021) interpreted the repair behaviors of 675 washing machines and 552 mobile phone users in Germany with the structural equation modelling method. Data collected via a survey was processed using the R Lavaan program. Repair preference was selected as the dependent variable, while longevity, novelty, behavioral cost, financial cost, competence, social support, and infrastructure were independent variables. The authors explain that financial costs, behavioral attitudes, and the desire for new products negatively impact repair preferences.

Laitala et al. (2021)'s study is based on a consumer survey conducted in Norway in 2019 with 1196 respondents. The study established a model focusing on the types of household items repaired, consumer motivations, and barriers. According to the results, consumers turn to repairing quality products when they fail. In addition, if the repair price is high, 49 percent of consumers replace the product with a new one. Analyses were conducted using simple arithmetic means by SPSS.

Rudolf et al. (2022) investigate a sample of 382 people in the Saxony, Germany region with a descriptive evaluation model. The survey model is based on economic barriers, needs and attitudes for consumers. Data was analyzed using qualitative content analysis using the MAXQDA program. Accordingly, repair costs, the lack of spare parts and new product prices significantly affect the repair preferences of consumers. Variables such as distance to the repaired place and repair time were found to be less effective.

Joergensen et al. (2023) determined that the most important reasons for a product's non-repairability were the difficulties caused by its price and design. They conducted a survey of 1005 people in Copenhagen in 2020. In addition to price and design features, the survey also analyzed the effects of variables such as product age and repair status.

Sandez et al. (2023) surveyed 156 water heater users in Spain and found that the two most important variables for repair behavior were the purchase price and the age of the product. In the model, participants were asked about their repair preferences based on purchase price and year of failure, and the significance of the variables was tested with a chi-square test for different periods and payment terms. Jamovi and R programs were used for statistical analyses.

Korsunova et al. (2023) emphasized that the most important variable for repair preference is previous experience. According to their study on 98 people in Finland, variables such as speed, convenience and price are of secondary importance. These variables are followed

by spare parts availability. Their model is structured in three stages: repair propensity and experience; warranty and insurance; self-repair and professional services. The variables quality, availability, price, speed, spare parts, and ease of opening are related to the third stage. This study used a quantitative assessment method.

Reimann (2024) examined how incentives implemented in Austria affect prices, supply and demand. One of the important results of the research is that incentives positively affect prices. In addition, if incentives increase demand and public spending, this can be offset by a rise in VAT revenues. In the study, the price levels that maximize a monopolist repair company's profits were modelled by offering alternatives, such as whether to subsidize the consumer or pay the repair company. Mathematical analyses were performed using Wolfram Mathematica. The studies examined have revealed that the most important determinants of repair demand are the repair cost, the price of the product, and the duration of use.

3. DATA AND METHODOLOGY

In the study, Consumers' Repair Demands in 19 European Union countries will be explained with the help of a variable called "Repair Preference Rate" for the period 2013-2022. This variable is calculated as the sum of total repair expenditures/domestic and import expenditures on electronic goods. Repair expenditures are classified according to the NACE Rev.2 Classification system as "S95. Repair of computers and personal and household goods". Domestic expenditure on electronic goods is also referred to as "C26. Manufacture of computer, electronic and optical products". Import expenditures of electronic goods were collected with the help of conversion data from the BEC5 classification system to the HS2022 system (UNSTAT, 2025). In the study, 93 products were identified at the HS6 level, some of which were electrical appliances, etc.

For repair prices, the consumer price index for the repair of household appliances was used. In the studies in the literature, product price is also shown as an important variable. Although the ratio of the repair price index to the electronic goods price index was also investigated in the study, the results were not significant. We assume that as electricity consumption increases, the use of electronic products will increase and, accordingly, there will be an increase in the number of failures. Electricity consumption data per capita are compiled from the World Bank (2025); other data sets are compiled from Eurostat (2025a, 2025b, 2025c, 2025d, 2025e, 2025f, 2025g). Although Romania's waste data for 2022 were not reported, they were completed by considering the rate of decrease of the data for 2021 and 2022, as given on the ECOTECA (2023) website.

The countries examined are Bulgaria, Czechia, Denmark, Germany, Estonia, Greece, Spain, France, Croatia, Italy, Latvia, Lithuania, Hungary, Netherlands, Austria, Poland, Portugal, Romania, and Slovakia. Repair expenditure data for Ireland, Luxembourg, and Malta were not available, and data on repair prices are not available for Belgium, Finland, and Sweden. Repair tax data is also missing for S. Cyprus and Slovenia.

As such, data from 19 countries and a period of 10 years were converted to natural logarithms and pooled. MS Excel and Stata 15 were used for the analysis, and the models were created as follows.

(Model A)

$$LNRep\_Rate_{it} = \alpha_1 LNRep\_Rate(-1)_{it} + \beta_1 LNP_{it} + \beta_2 LNLbr\_Rate_{it} + \beta_3 LNRep\_Tax\_Rate_{it} + \beta_4 LNElec\_PerC_{it} + u_i + v_{it}$$

(Model B)

$$LNRep\_Rate_{it} = \alpha_1 LNRep\_Rate(-1)_{it} + \beta_1 LNP_{it} + \beta_2 LNLbr\_Rate_{it} + \beta_3 LNWaste\_Rate_{it} + u_i + v_{it}$$

The abbreviations of the variables in the models are as follows:

$LNRep\_Rate_{it}$: Repair preference rate

$LNRep\_Rate(-1)_{it}$: Previous period repair preference rate

LNP_{it} : Repair Price Index

$LNLbr\_Rate_{it}$: Ratio of employees in the repair industry to total employees

$LNRep\_Tax\_Rate_{it}$: The ratio of taxes in the repair sector to electronic goods.

$LNWaste\_Rate_{it}$: Ratio of electrical and electronic waste to goods placed on the market

$LNElec\_PerC_{it}$: Electricity consumption per capita

The first hypothesis was determined for the first long-term research question. The other five hypotheses relate to our second research question about the short term. H_1 hypotheses that show alternative expectations for the effects and signs of variables are listed below.

H_{1a} = The previous period repair preference rate variable has a positive and statistically significant effect on the current repair preference rate.

H_{1b} = The price variable has a negative and statistically significant impact on repair preferences.

H_{1c} = The variable of the proportion of employees in the repair sector has a positive and statistically significant effect on repair preference.

H_{1d} = The variable of the ratio of the amount of waste to the amount of goods has a negative and statistically significant effect on the choice of repair.

H_{1e} = The tax rate variable in the repair sector has a negative and statistically significant effect on repair preference.

H_{1f} = The variable of electricity consumption per capita has a negative and statistically significant effect on repair preference.

The models will be analyzed using the Two-Stage System Generalized Moments Estimator method developed by Arellano and Bover (1995) and Blundell and Bond (1998). This method was chosen for two reasons. The first is the idea that consumers do not immediately give up their preferences and habits. The α_1 parameter in dynamic panel models illustrates this effect, which has been carried over from previous periods. The second reason is that the time dimension of the data is smaller, and the cross-sectional (country) dimension is larger. The System Generalized Moment Estimator Method is more accurate in this respect (Blundell and Bond, 1998; Guliyev et al., 2023; Emako et al., 2023).

4. EMPIRICAL FINDING

The results of the System Generalized Moments Estimator Method are shown in Table1. Accordingly, when the value of the repair preference rate variable in Model A increases by one percent in the previous year, its value this year is expected to increase by 0.9101566 percent. According to the 95th percent confidence interval, the lower value of this is 0.7561282 and the upper value is 1.064185. It was understood that the variable had a positive sign and was statistically significant.

A one-per cent increase in the repair prices variable leads to a decrease of 0.4676992 in the dependent variable, repair preference rate. Therefore, an inverse relationship was found between the two variables. At the 95 per cent confidence interval, this parameter is expected to take a value from -0.8699505 to -0.0654478.

A change of one percent in the variable we use as the ratio of employees to all employees in the repair sector creates a positive change of 0.3733041 in the repair preference rate. The variable coefficient was predicted to be 0.1117523 to 0.634856.

The coefficient of the variable of the ratio of taxes collected from the repair sector to taxes from the electronic product manufacturing sector was 0.0478025. It was calculated that the statistically significant parameter could be found between 0.0277234 and 0.0678817.

When electricity consumption per capita changes by one percent, the repair preference rate will change by about 0.2845104 percent. This coefficient was estimated to be between 0.0154393 and 0.5535815.

In this respect, all explanatory variables were found to be statistically significant. In Model A, all independent variables except price are positively correlated with the dependent variable. From the results of the Wald test, it is seen that Model A and B are significant as a whole. From the AR (2) results of the Arellano-Bond test, which investigates whether there is an autocorrelation, it was evaluated that the error terms were not in a sequential dependence. The Sargan Test concluded that the vehicle variants used in the two models were consistent.

The previous year's value parameter of the repair preference rate variable in Model B was determined as 0.9145816. Based on the 95 per cent confidence interval, this is expected to occur between 0.793338 and 1.035825.

Table 1. System-GMM Estimation Results

	Model A (N=190)			Model B (N=190)		
Variable/Test	**Coefficient**	**Q. Error**	**P Value**	**Coefficient**	**Q. Error**	**P Value**
LNRep_Rate $_{it}$(-1)	0.9101566	0.0785874	0.000	0.9145816	0.0618601	0.000
LNP$_{it}$	-0.4676992	0.205234	0.023	-0.512198	0.0882569	0.000
LNLbr_Rate$_{it}$	0.3733041	0.1334473	0.005	0.3432697	0.1179882	0.004
LNRep_Tax_Rate$_{it\ it}$	0.0478025	0.0102447	0.000	-	-	-
LNElec_PerC $_{it}$	0.2845104	0.1372837	0.038	-	-	-
LNWaste_Rate $_{it}$	-	-	-	-0.10037	0.03899	0.010
constant	1.66975	1.127348	0.139	4.03384	0.30719	0.000
Wald chi^2	2610.76	-	0.0000	1411.31	-	0.0000
AR (1)	-2.1319	-	0.0330	-2.2603	-	0.0238
AR (2)	0.45753	-	0.6473	0.51804	-	0.6044
Sargan (chi^2:43)	16.67418	-	0.9999	16.57741	-	0.9999

A negative relationship exists between the repair prices variable and the repair preference rate variable. The parameter of this variable was found to be -0.5121989 and can take values between -0.6851792 and -0.3392186.

When the ratio of employees in the repair sector to those in other sectors changes by one percent, the repair preference rate variable will change by 0.3432697 percent in the same direction. The variable is expected to be between 0.112017 and 0.5745224 with 95 percent confidence.

A one-per cent change in the variable of the ratio of the amount of electrical and electronic waste collected to the amount of goods placed on the market will create a change at the level of -0.1003744 in the opposite direction of the repair preference rate variable. At the 95 per cent confidence level, this value will occur around the low of -0.1767973 and the high of -0.0239514.

5. DISCUSSION

In the experimental review, the direction and effects of variables affecting consumer preferences for the repair of electronic products for 19 member countries of the European Union between 2013 and 2022 were investigated. The results of the two dynamic panels examined by the System Generalized Moments Estimator Method show that the models are significant as a whole. The findings obtained indicate that the Repair Preference Rate suggested in this study is an important variable.

Our alternative H_{1a} hypothesis regarding the previous year value variable of the repair preference rate was accepted because it was in line with the expectation in terms of sign and was statistically significant. The variable coefficient is high and significantly impacts the demand for repairs. This is an important proof that consumers in the countries examined adhere to their consumption habits in the long term. One of the most important features of dynamic panel models is that they can measure past effects by using the dependent variable's lagged values. From this point of view, the Union's highly developed and comprehensive environmental policies have not yet achieved sufficient impact. More comprehensive consumer training, practical awareness activities, encouraging voluntary efforts such as repair cafes, and disseminating practices such as repair labels can have significant impacts.

The relationship between repair prices and preferences aligns with the alternative H_{1b} hypothesis. The price effect supports the work of Jaeger-Erben et al. (2021) and Rudolf et al. (2022). In Model A, it can be explained that the value of the coefficient will occur in a wide range due to the high standard error. The coefficient of variables in Model B is more balanced in this respect. Therefore, it is understood that the price elasticity of both models is lower than 1 in the short term. In other words, short-term price-oriented policies may not adequately meet the expected results. As the paragraph above explains, consumers' perceptions of repair services have not yet reached the desired level. However, switching to a different behavior pattern can positively change flexibility in the long term.

One of the common variables in the two models is the ratio of employees in the repair industry to those working in other sectors. The variable coefficients in the two models were suitable for the H_{1c} hypothesis. These results are similar to McCollough's (2009) model. Although the need for personnel with the necessary knowledge and experience in the repair services sector is increasing, there is a decrease in basic and proportional converted data. Accordingly, the model results indicate that the demand for repair services will decrease as the qualified labor decreases. The effect of the variable remains relatively limited, as the demand for repair services decreases due to other reasons. The development of employment policies and vocational training programs for the sector can create positive results in the long term.

The H_{1d} hypothesis of the variable of the ratio of the amount of waste to the amount of goods placed on the market is also statistically significant. According to these results, approximately 10 percent of the total waste is directed to landfills when it is to be repaired. A decrease in this rate will increase the number of electronic product repairs.

The H_{1e} hypothesis of the variable of the ratio of taxes from the repair sector to taxes from the electronic product manufacturing sector in Model A was rejected because the coefficient sign was positive. Since the value of the variable parameter can take a value of 0.0277234 to 0.0678817 at the 95 percent confidence interval, it can be explained that the elasticity value is relatively small. The fact that the taxes collected from the repair sector are higher than the product expenditure has broken the connection between the two

countries. This limits the impact of taxes as a policy tool on the choice of repair. Taxes are an important incentive tool.

The H_{1f} hypothesis, which was established for electricity consumption per capita, resulted as expected. It is assumed that electronic products will be used more with the increase in electricity consumption. Thus, wear and tear of electronic devices can cause malfunctions that require repair. According to the results, political approaches to reducing electricity consumption can reduce the demand for repairs and the amount of electronic waste.

In the literature section, it was explained that in addition to the variables evaluated in the hypotheses, the prices of new electronic products also significantly impacted the demand for repairs. From the data used in the study, it was observed that the change in product prices was below the change in repair prices. Similar to the model of Sabbaghi and Behdad (2018), the two price indices were proportioned, but statistically significant results were not obtained. Conducting a review without converting product prices will not be useful because policies aimed at increasing product prices can have many negative consequences, such as inflation, loss of competitiveness and productivity. For these reasons, product price variables are not included in the models.

6. CONCLUSION

The study examines the long-term rigidity of consumer repair preferences in the European Union and the short-term effects of variables such as price, labor, tax, waste amount, and electricity consumption. Two dynamic panel models created for this purpose cover 2013-2022. According to the analysis results with the help of the Two-Stage System Generalized Moments Estimator Method, the Consumer Preference Ratio indicator is mostly affected by its lagged values. Therefore, consumers maintain past behavior patterns towards repair in the long term.

It has been calculated that price elasticity is low in the short term. This means that changes in prices will change repair demand less. Furthermore, as expected, an inverse relationship was found between repair demand and price. Therefore, it can be said that demand will decrease as repair prices increase. From this perspective, the results are similar to studies such as Perez-Belis et al. (2017), Rodrigues et al. (2020), Jaeger-Erben et al. (2021), Laitala et al. (2021), and Rudolf et al. (2022), which explain that high repair prices negatively affect repair choice. Our research differs from McCollough's (2009) study, which found repair prices to be statistically insignificant. Decreases in new product prices may affect repair demand in the same direction, as noted by McCollough (2009), Bovea et al. (2017), Joergensen et al. (2023), Sandez et al. (2023), and Korsunova et al. (2023). However, similar to Sabbaghi and Behdad (2018), the variable we determined as the ratio of the repair price to the product price was not found to be statistically significant. Reimann's (2024) simulation result, which suggests that incentives will positively affect repair prices, can also be presented as a policy recommendation for the price variable.

Taxes on repair services are higher than taxes on electronic goods. The study concluded that taxes have an insignificant and anti-expectation effect on consumer preferences. Of course, if perceptions of repair services change in the long term, more positive effects can be expected from these variables. In their study, Brusselaers et al. (2020) found that VAT paid on new product purchases positively impacted vacuum cleaner repairs by 4 to 14 percent. However, it had no positive or negative impact on washing machine repair demand. Our findings are similar to the authors' findings regarding washing machines.

In addition, it is understood that as the ratio of electronic waste to electronic products increases (decreases), the demand for repair will decrease (increase). These results are in line with expectations. However, no similar variable has been investigated in the literature. As the qualified labor in the sector decreases, the demand for repairs also decreases. An examination of the employee count graphs reveals that the workforce in the repair sector has decreased compared to other sectors in all countries. Korsunova et al. (2023) also note that repair businesses across Europe have declined rapidly over the last 20-40 years. McCollough (2009) used the number of employees as a proxy for repair demand, selecting product price, repair price, savings rate, product advertising expenditures, and GDP growth rate as independent variables. In this respect, the fact that employees in the sector are a significant variable explaining repair demand in our model is similar to McCollough's results. According to the findings, as electricity consumption increases, the need for repairs will also increase. Brusselaers et al. (2020) considered energy consumption as a cost factor. No other study examining the relationship between repair and electricity consumption was found.

Improving consumers' propensity to repair is crucial for a circular economy. Developing policies related to this will reduce resource consumption. In new research, repair preference rates can be measured for different countries and time periods, correlated with other variables, and calculated for any breaks or differences over time.

Although each repaired product creates at least as much value as the purchase of a new product, it is not shown in the national income accounts. This study also recommends that the European Repair Data Form should be amended, and the average price of similar goods sold in the market should be included in the document. The resulting data set will be an important indicator showing the productivity increases arising from the consumer in the circular economy context.

It is understood that in European Union countries, where highly developed and comprehensive environmental policies are implemented, consumers' preferences for repair cannot be easily changed in the short term. More effectively planning and implementing employment policies for the sector, vocational training programs, training methods for consumers, awareness studies, and tools such as Repair Label and Repair cafes will be beneficial.

Statement of Research and Publication Ethics

In all processes of the article, the principles of research and publication ethics of the Manisa Celal Bayar University Journal of Social Sciences were followed.

Contribution Rate of Authors to the Article

The entire manuscript was written by the author.

Declaration of Interest

Author has no conflict of interest with any person or organization.

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