IBDP Economics Extended Essay

Title: The Impact of the Change in Minimum Wage in Türkiye to its Car Market.

Research Question: "*How Did the Increase in Minimum Wage in 2023's Türkiye Effects the Consumer Demands on the Car Market?*"

Word Count: 3399

IB Candidate: mhm514

Table of Contents

Introduction:

In 2023's Türkiye; after the instabilities in the market, many markets of income-elastic products existing in the country started to lose money because of the decreasing living standards and increasing inflation. Because of the decrease in living standards, it was an urgency to increase the minimum wage since the population that earns minimum wage represents a significant share of the Turkish workforce. This change will potentially influence consumer spending in markets that are sensitive to income changes.

The research question "How Did the Increase in Minimum Wage in 2023's Türkiye's Effects the Consumer Demands on the Car Market?" In Türkiye's automobile market, every year buying a car gets harder because of the high rates of price raises. This market was chosen for this investigation because automobiles are widely consumed products in anywhere around the world, in addition they are durable products which means buying them will go years without needing to buy another product making automobiles a postponable purchase. This means that when buying a car, it will require extreme financial dedication causing a person to not buy it when they have low amounts of disposable income and uncertainty of income.

The aim of this investigation is to figure out to what extent the increase in minimum wage on the automobile market. This investigation will analyse the related concept to the government interventions in markets, market equilibriums such as demand and supply analysis and income elasticity of demand. After collecting real-world data, it will be processed to evaluate the effectiveness of minimum wage increase in stimulating a shift in the demand for automobile market.

Suggested by the previous research that household consumption can be increased after a raise in minimum wage levels since this increases the nominal incomes of the low-wage working class who tends to have lower levels of savings and relatively high marginal propensity to consume. For example, evidence from U.S. Household data says that after an increase of minimum wage, spending of a minimum wage-earning household drastically increase. The increase in spending was often seen to be higher than the increase in the minimum wage, which is supported by the increase of the finance through borrowing (Aaronson, Agarwal, & French, 2012). Macro-local evidence related to this topic also indicates that a modest increase in spending is affected by the increase in nominal income, alongside changes in household debt composition such as higher automobile-related borrowing and improved access to credit for constrained borrowers (Cooper, Luengo-Prado, & Parker, 2019).

Except the studies in U.S., studies about the minimum wage increase made in China determined strong relevance of changes in consumption with the changes in low-wage households. Determined that poorer households has high tendency to spend a large share of their additional income on consumption rather than saving (Dautović, Hau, & Huang, 2019). The findings of this study implies that policies in wage can influence demands of consumers, generally for households that has the most sensitive budgets to changes in income.

However, factors like inflation and credit conditions affects the demand on durable goods such as automobiles significantly. Since automobile purchases involves large and postponable spending, studies finds that demand on the automobile market often finds vehicle demand is income-elastic (McCarthy, 1996). When Türkiye is taken in consideration, this

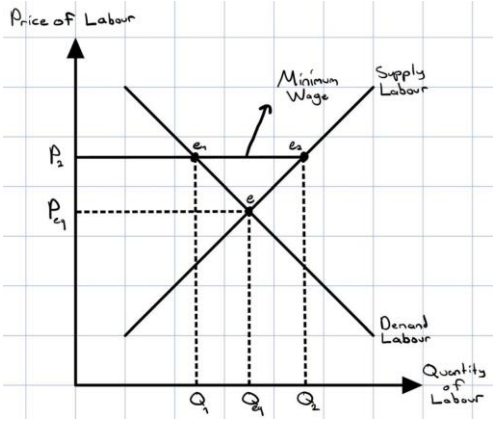
hypothesis of previous studies may be relatively weaker because generally income changes can not catch up to inflation rates and purchase power. Central Bank of the Republic of Türkiye reports 64.8% consumer inflation rate, which increases the significance of real income when interpreting with the changes in consumer choices (Central Bank of the Republic of Türkiye, 2024). In addition, researches that focus on Türkiye presents that broader macroeconomics dynamics and expectations of high-inflation periods influences durable-goods demand rather than the changes in wage alone (Gürbüz, 2025). Therefore, while non-Türkiye related studies shows that changes in minimum wage increases consumption, studies made in Türkiye suggests that this is not implyable for Türkiye because of other economic factors.

Relevant Economic Theory:

The economic concept that is a subject of this research question is microeconomics. Specific economic policies are relevant to the research question as given below.

Minimum Wage:

Minimum wage is a government intervention used to set a lower price for labour in order to protect the labourers from getting underpaid by the employers. Minimum wage is a relevant topic to this research question because it effects the purchase power for a minimum wage-earning citizen. An increase in minimum wage results in an increase of the household income for a lower/middle-class Turkish citizen when the effects of their factor affecting their ability of buying automobiles.



Graph 1: Minimum wage playing a role of a price floor in a labour market. (adapted from Tragakes, 2020)

In figure 1 the “price floor” minimum wage is shown above the equilibrium. Setting this price floor causes the nominal income of a household to increase. However, when the minimum wage increases, there is a surplus of labour supplied because it has surpassed the quantity demanded.

Nominal Income, Real Income and Inflation:

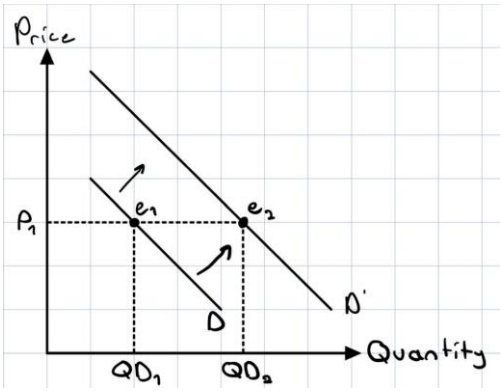
Nominal Income is measured from the current market prices. However, Real Income represents the real power of a consumer being able to buy a product because it is adjusted for inflation. These concepts are relevant because in a case of the inflation rising faster than the wages, real income decreases. This was experienced in 2023's Türkiye with a higher inflation rate than the increase in minimum wage which creates a decrease in Real Income of a household which could impact the automobile market.

Consumer Demand:

Consumer demand is basically the ability and willingness of a consumer to spend money on a product. This is affected by many factors such as income, prices of the goods and services in question and the expectations of the consumer from the product or service. During this investigation income is chosen the main determinant for this subject because the investigation demands to research the effect of change in minimum wage.

Income Elasticity of Demand:

Income elasticity of demand is relevant because it is basically the factor of what happens to the quantity of demand when a change in income happens. Since cars are a normal good, demand should increase into automobiles when income levels rise. Although, high prices and constraints may affect this change.



Graph 2: Effects of income increase into demand for automobiles. (adapted from Tragakes, 2020)

Figure 2 shows the effects of an increase in income on quantity demanded for a normal good. When an increase in income is implemented the demand curve shifts to the right from D to D'. With this change the equilibrium of price and quantity demanded is set to a higher quantity of demand then it was before the income raise e_1 to e_2, which means consumer demand is now shifted to a level where the consumer is willing more to buy a greater quantity of car.

Methodology:

Every other factor instead of income will be excluded during this investigation because it is not reliable to collect data about those variables, prices are data-collectable but are not used because we want to observe the effects of change in minimum wage to market.

Data:

In this investigation secondary data will be used to determine a conclusion for the research question, because we can reach into reliable secondary data from officials. TÜİK, CSBG and TCMB will be used as a base of data for this investigation since they are the official governmental Turkish Statistical Institute, Republic of Türkiye Ministry of Labour and Social Security and Central Bank of Republic of Türkiye data providers. This data will be taken from 2023's beginning to 2024's beginning and will be considered as a data taken from 2023's Türkiye.

The data will vary from, minimum wage levels, inflation rates and aggregate automobile sales which gives us quantity demanded. This is because we want to see how the quantity demanded changes over the change of minimum wage levels, which two of them are affected by inflation rates.

Approaching the Variables:

Inflation is included in this investigation because it will affect a significant part of the investigation which affects the consumer demand which is Real Income. Automobile market is chosen because it is a normal good, so it will be an accurate variable to work with to determine how the quantity demanded by the consumer will change.

Assumptions and Limitations:

During the investigation, there should not be other variables that affects the consumer demand rather than minimum wage and inflation. So, we will be assuming that consumer preferences and population will be constant in both timelines where the rise in the inflation and minimum wage is not observed and the one that is observed. A potential limitation for our methodology is that the economic uncertainties and the interest rate changes. This is a limitation because it will affect how our quantity demanded will change so we can not purely know how the change in minimum wage affects the quantity demanded for automobiles.

Analysis:

Overall Data:

In this part of the investigation, data of minimum wage, inflation rates and the quantity of automobile sales made will be examined.

Official News Publishment Date	Effectiveness Dates of the Change in Minimum Wage	Daily Wage in ₺	Monthly Wage in ₺	Increase Rate in Percentage Change

29.12.2022	01.01.2023-30.06.2023	336,60	10.008,00	54,7
24.06.2023	01.07.2023-31.12.2023	447,15	13.313,50	34,0

Table 1: Illustrates the change in minimum wage in 2023's Türkiye According to TCSGB. (Republic of Türkiye Ministry of Labour and Social Security, 2022-2023.)

In this table there has been a change in minimum wage for 2 times in 2023. One before the beginning of the first half of 2023 and one after the beginning of the second half of 2023.

Date of Calculations Made	Value of a Basket of Goods in ₺	Total Change in Percentage
01.01.2023	100	-
01.01.2024	164,86	64,68

Table 2: Illustrates the change in inflation in 2023's Türkiye according to TCMB. (Central Bank of Republic of Türkiye, 2023-2024.)

In this table the change in inflation for the consumer was shown by calculating how much a basket of goods that was 100₺ by the beginning of 2023 is 164,68₺ by the beginning of 2024 giving us a %64,68 rate of change in inflation for year 2023.

Date of the Data Collected	Numbers of Registered Automobiles by Unit	Change in Unit During the Year in Question	Change in Percentage of the Number of Automobiles Registered
01.12.2021	13.706.065	-	-
01.12.2022	14.269.352	563.287	%4,11≈
01.12.2023	15.221.134	951.782	%6,25≈

Table 3: Illustrates the data of registered automobiles in 2021-2023's Türkiye according to TÜİK. (Turkish Statistical Institute, 2021-2023.)

As it can be seen in the Table 3, during 2023, from almost beginning to the ending, there were 951.782 units of automobiles registered into the governments system.

Analysing the Effects of Minimum Wage on Real Income:

An increase in minimum wage is followed by an increase in nominal income, but it does not necessarily mean that real income also rose, because of the high values of increase in inflation may increase price levels at the same time. Therefore, to evaluate whether the purchasing power increased or decreased, it is significant to adjust the nominal minimum wage change for inflation. A Real Income Index will be used to calculate the real income for this case, which is calculated by dividing the Minimum Wage Index by a Price Index and multiplying the results with 100. The Minimum Wage Index is equals to $100 + \%\Delta W$, where $\%\Delta W$ represents the total percentage change in minimum wage over the period.

Consequently, the price index will be calculated as $100 + \%\Delta P$, where $\%\Delta P$ represents the annual inflation rate for the same period.

In 2023's Türkiye, the monthly minimum wage was increased for two different times of the year. For the first half of 2023 the wage was 10,008 TRY and for the second half of of the year the wage was 13,313.50 TRY. 10,008TRY indicates a 54.7% increase from the previous wage level, this paves the way for the calculation of the wage level that existed before the wages increased to 10,008TRY, which is necessary to calculate in order to calculate $\%\Delta W$. This can be done by reverse calculating the percentage change,

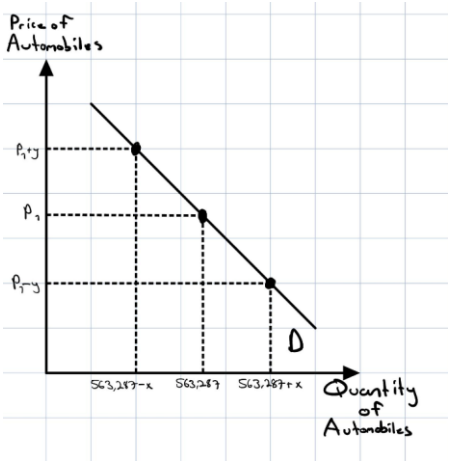
$$\frac{10{,}008}{1.547} \approx 6{,}469.30\ TRY$$

Since the late-2022 minimum wage level is determined, the total nominal increase from late 2022 to the late 2023 can be calculated as,

$$\left(\frac{13{,}313.50}{6{,}496.30} - 1\right) \times 100 \approx 105.80\%$$

Showing that across the period measured, minimum wage was increased by approximately 105.80% in terms of nominal wages.

Now the objective is to convert this into purchasing power by comparing the wage increase with the income increase. The change in a consumer basket worth 100 TRY at the start of 2023 was compared with the one at the start of 2024, which is 164.86 TRY, which corresponds to a 64.68% inflation rate. Therefore, the minimum wage index being $100 + 105.80 = 205.80$, and the Price Index being $100 + 64.68 = 164.68$, the Real Income Index was calculated as: $\left(\frac{205.80}{164.68}\right) x100 \approx 124.97$. This means that the real purchasing power after this period was increased by approximately 24.97% based on the wage and inflation data used in this investigation. This result has a significant role for this investigation since it will be used to compare the results of the data with what the theory predicts to happen.



Graph 3: Shows the relationship in between automobile price and demand.

The Real Income Index calculated in this investigation is approximately 124.97, which implies that the purchasing power of minimum wage earners increased by about 24.97% over the period measured. Automobiles are generally taken into account as normal goods and are income-elastic, so when an increase is observed in the real income this means that the

consumers' ability and willingness to purchase automobiles are increased. Therefore, demand for automobiles should increase from $563{,}287$ to $563{,}287 + x$ because the price is assumed to decrease because it has already been calculated that the purchase power for a minimum wage Turkish citizen increased by approximately 24.97% which means it is almost 25% easier to purchase an automobile because the financial burden was lowered almost 25% when other factors like credibility and interest rates are excluded. This theoretical prediction is consistent with an increase in automobile demand in 2023.

Conclusion and Evaluation:

The main objective of this investigation was to determine the effects of the change in minimum wage to the automobile market in 2023-2024's Türkiye. Utilizing the secondary data collected from official sources, first the scale of the minimum wage increase was calculated and then the result was interpreted to find its impact on the purchasing power for a minimum-wage earning individual. The minimum wage was observed to be raised from 6,496.30 to 13,313.50 TRY for the period of late-2022 and late 2023. This increase was calculated to be approximately 105.80% increase to the nominal income of a minimum wage earner individual.

Consequently, the inflation rate was determined by comparing a 100 TRY consumer basket at late-2022 to a late-2023 basket, which was 164.68, giving a value of 64.68% rate for inflation for the given period. Then the Minimum Wage Index was divided by Price Index and multiplied by 100 to calculate the Real Income Index. The Real Income Index was calculated as approximately 124.97, suggesting that the purchasing power of a minimum wage-earner was increased about 24.97% based on the given data by the officials.

The representative of demand was assumed to be the annual increase in registered automobiles which was observed to rise from 563,287 to 951,782 in the period. Later, this rise was observed to be consistent with the theoretical information found during the investigation. The prediction suggested that the increase in minimum wage dominated the increase in inflation rates, creating a higher boundary of purchasing power for an average minimum wage-earner. This prediction was supported within the limits of the data and method applied. The results came out to be aligning with the income-based demand theory.

One point that proves the solidity of this investigation is that the secondary data such as wage, inflation, and automobile registration data were collected from official sources increasing the reliability and the transparency of the work. Another point was to use real income rather than nominal income, since it represents the purchasing power rather than the increase in the amount of money itself. Using the nominal income would create manipulation since it has almost nothing to do with how much value did the wage-earner obtain through the increase in minimum wage. This improves the theoretical validity of the analysis made.

However, there are still limitations existing in this investigation affecting the confidence of the reliability of directly approaching to the results as a follow-up of the increase in minimum wage. First, the way this investigation uses the annual change in registered automobiles as a representative of quantity demanded for automobile. It is possible that this does not directly measure the quantity demand because the outcomes of the annual automobiles registered might include many types of registration such as new or used vehicle registration, changes in import changes in fleet registrations, or administrative and recording

changes. Second, the analysis was made on the aggregate market data, which means that the recorder registrations are not made fully by the minimum wage-earning population. This weakens the confidence of the impacts of the change in minimum wage to the automobile demand across the minimum wage-earning population, since minimum wage-earners are not the only population to hold accountable of purchasing automobiles. Third, in this method it is assumed that the other factors that could affect the demand on automobiles are constant such as credits, interest rates and economic uncertainties. Excluding these significant determinants may affect the results of the observation.

To improve the investigation, the methodology of the analysis could be strengthened by using more-frequent data, where it shows monthly automobile registration numbers, so that the demand could be compared to both wage increases in 2023. Also, a more specific price measure such as vehicle price index could be used to calculate Price Index rather than using a normal consumer basket because consumer demand and choice vary for different types of goods. With that technique a real affordability factor could be found specifically measured for automobiles. Finally, the research question could be written in a narrower factor where the main objective is to find the effects of minimum wage to the used automobile demand rather than aiming for direct impacts for the automobile market.

Overall, considering the reliability and the validity of the scope of this investigation, the results provide theory-consistent evidence to a moderate extent that the minimum wage increase from 2022's end to 2024's beginning increased the automobile market activity. However, it must be considered that this result is not definitive proof for this relationship, since many other factors are excluded from the scope of this research.

References:

YILLAR İTIBARIYLA GÜNLÜK VE AYLIK ASGARİ ÜCRETLER. (n.d.). In ÇALIŞMA VE SOSYAL GÜVENLİK BAKANLIĞI & ÇALIŞMA GENEL MÜDÜRLÜĞÜ, *RESMİ GAZETE YAYIN*. https://www.csgb.gov.tr/Media/he5d3y21/asgari-%C3%BCcret-yillar.pdfam

Herkes için ekonomi. (n.d.). https://herkesicin.tcmb.gov.tr/wps/wcm/connect/ekonomi/hie/icerik/enflasyon+hesaplayici

TÜİK Kurumsal. (n.d.). https://data.tuik.gov.tr/Bulten/Index?p=Motorlu-Kara-Tasitlari-Temmuz-2025-54043

Tragakes, E. (2020). Economics for the IB Diploma Coursebook. (3rd ed.). Cambridge University Press.

Aaronson, D., Agarwal, S., & French, E. (2012). The spending and debt response to minimum wage hikes. American Economic Review, 102(7), 3111–3139. https://doi.org/10.1257/aer.102.7.3111

Central Bank of the Republic of Türkiye. (2024). Inflation Report 2024-I.

Cooper, D., Luengo-Prado, M. J., & Parker, J. A. (2019). The local aggregate effects of minimum wage increases (NBER Working Paper No. 25761). National Bureau of Economic Research.

Dautović, E., Hau, H., & Huang, Y. (2019). Consumption response to minimum wages: Evidence from Chinese households (ECB Working Paper No. 2333). European Central Bank.

Gürbüz, S. (2025). Investigation of the relationship between inflation, vehicle and housing sales in Türkiye. Trakya Üniversitesi Sosyal Bilimler Dergisi, 27(Special Issue), 107–122. https://doi.org/10.26468/trakyasobed.1516463

McCarthy, P. S. (1996). Market price and income elasticities of new vehicle demands. The Review of Economics and Statistics, 78(3), 543–547.