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# Multiple regression model of the consumers' price sensitivity

**Abstract.** All marketing decisions have to take into account the customer's attitude to the price and consumers' price sensitivity. Consumers' price sensitivity depends on various factors: perceived quality and benefits, service quality, and of course, demographic characteristics.

The main aim of this paper is to explore the influence of socio-demographic characteristics on the customers' price sensitivity. Potential influencing factors and sample size were identified based on the literature search. The questionnaires were disseminated on-line in 2019.

The majority of respondents were at the age group 25-54 years old (63%) which corresponds to the composition of the Czech population. Most of the respondents live in the family with two children (29%) or only with a partner (28%), 61% of the respondents have a master or bachelor's degree.

The variable Age shows high significance, which means, no surprisingly, that older customers are more price-sensitive than the younger ones. Talking about gender, females are slightly more price-sensitive than males. Then, we can state that the more family members has got the household, the more price-sensitive the customer is. In comparison with other independent variables, Income and Education show a negative correlation with customer price sensitivity, which means that the higher level of Income or Education is, the lower is the customer's price sensitivity.

Based on the multiple regression analysis, the author's research proves that the most significant impact on the consumers' price sensitivity have two independent variables - age (positive correlation) and income (negative correlation).

**Keywords:** Consumers' Purchasing Behaviour; Customer; Price Sensitivity; Age; Income; Multiple Regression

**JEL Classification:** M30; M31; M39

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**Моделювання цінової чутливості споживачів на прикладі Чехії**
**Анотація.** Всі маркетингові рішення повинні приймати до уваги ставлення покупця до ціни та цінову чутливість споживачів. Чутливість споживачів до ціни залежить від різних чинників: сприйняття якості й переваг, якості послуг і, звичайно ж, демографічних характеристик.
Основна мета даної статті – вивчити вплив соціально-демографічних характеристик на чутливість споживачів до цін. Потенційні фактори впливу й розмір вибірки були визначені на основі вивчення попередніх дослідницьких робіт. Анкети були поширені в режимі онлайн у 2019 році.
Більшість респондентів були уналежали до вікової групи від 25 до 54 років (63%), що відповідає віковій структурі чеського населення. Вони живуть у родині з двома дітьми (29%) або тільки з партнером (28%), 61% респондентів мають ступінь магістра або бакалавра.
Дослідження автора на основі множинного регресійного аналізу доводить, що найбільш істотний вплив на цінову чутливість споживачів мають дві незалежні змінні – вік і дохід.
**Ключові слова:** купівельна поведінка споживачів; цінова чутливість; вік; дохід; множинна регресія.

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**Моделирование ценовой чувствительности потребителей на примере Чехии**

**Аннотация.** Все маркетинговые решения должны принимать во внимание отношение покупателя к цене и ценовую чувствительность потребителей. Чувствительность потребителей к цене зависит от различных факторов: воспринимаемого качества и преимуществ, качества услуг и, конечно же, демографических характеристик.

Основная цель данной статьи – изучить влияние социально-демографических характеристик на чувствительность потребителей к ценам. Потенциальные факторы влияния и размер выборки были определены на основе изучения предыдущих исследовательских работ. Анкеты были распространены в режиме онлайн в 2019 году.

Большинство респондентов были в возрастной группе от 25 до 54 лет (63%), что соответствует возрастной структуре чешского населения. Они живут в семье с двумя детьми (29%) или только с партнером (28%), 61% респондентов имеют степень магистра или бакалавра.

Исследование автора на основе множественного регрессионного анализа доказывает, что наиболее существенное влияние на ценовую чувствительность потребителей оказывают две независимые переменные – возраст и доход.

**Ключевые слова:** покупательское поведение потребителей; ценовая чувствительность; возраст; доход; множественная регрессия.

## 1. Introduction

Customers' price sensitivity represents one of the crucial factors of marketing decisions. Consumers' price sensitivity is affecting the pricing choices of companies and profitability as well. With the development of modern technology, consumers' are now very well informed about product alternatives, product features, product benefits and qualities, service alternatives through companies' promotion, advertising, opinion leaders, internet, newspapers, social media, etc. Therefore, customers can compare offers from different manufacturers and suppliers. Customers today are not willing to buy any product without searching for information and comparing it with other alternatives. Many factors influence customer decision-making. The customer compares the offer, product properties, accompanying services, delivery options, and the price at different offers (Mamun, Rahman, & Robel, 2014). Therefore, the price elasticity of demand is considered as the most fundamental concept of pricing. As stated by Kim, Srinivasan & Wilcox in 1999 and Mamun, Rahman and Robel (2014), several years ago, researches had minimal knowledge of price sensitivity, and the situation is not changing. Price sensitivity and preferences concerning price sensitivity are still a little bit unknown to firms as well as researches. There are many factors influencing price sensitivity, although, as stated by Kim, Srinivasan and Wilcox (1999), demographic data are one of the crucial factors of price sensitivity. Despite the fact, those sociodemographic characteristics are crucial for understanding costumers' price sensitivity; there are not many authors focusing on the demographic characteristics influencing customer price sensitivity, for example, Kim, Srinivasan and Wilcox (1999), Meyer et al. (2014), Etemadi (2019).

Therefore, the author focuses on the demographics characteristics influencing price sensitivity in her research. So we can state that the main aim of the author's research is to investigate the influence of sociodemographic characteristics (age, number of a family member, income, etc.) on the customer price sensitivity.

## 2. Brief Literature Review

Since consumers' price sensitivity is a fundamental factor influencing marketing strategies and pricing, there are many researches focusing on the consumers' price sensitivity (for example, Erdem, Keane, & Sun (2006), Wakefield & Inman (2003), Werner (2018), Widenhorn & Salhofer (2013) and many others). In the literature, we can find researches examining the relationship between advertising and customers' price sensitivity. For example, Kaul and Wittink (1995) reported 18 articles focusing on the relationship between advertising and customers' price sensitivity already in the nineties. Erdem, Keane and Sun (2006) have also addressed the issue of the relationship of advertising and price sensitivity of customers in their research and concluded that advertising affects, in particular, the customer's relationship with the brand. It affects the customers' demand for the brand in many different ways.

There are several researches on consumers' reactions to price, but surprisingly as stated Wakefield and Inman (2003), not many researches examining sociodemographic and social context on customers' price sensitivity. Several researchers (for example, Urbany, Dickson, & Kalapurakal (1996), Hoch et al. (1995)) examined the influence of demographics and psychographics on customers' price sensitivity. However, as already mentioned, too much research has not been done in this field. Therefore, the author's aim is to investigate the influence of sociodemographic characteristics on the customers' price sensitivity.

First of all, it is necessary to define price sensitivity. Al-Mamun, Rahman and Robel (2014) state that price sensitivity can be defined as the reaction of the customer to changes in the price level. This definition is a basic definition of price sensitivity. Bucklin, Grupta and Han (1995) approach customers' price sensitivity similarly and argue that customers' price sensitivity typically focuses on the routine decisions of customers in response to changes in price. Monroe (1973) claimed that customer's price sensitivity refers to the extent to which customers respond to and perceive changes in prices of products and services.

As stated above, the customer's price sensitivity depends on various factors. Nagle and Holden (1995) described the following ten factors influencing product/price sensitivity - unique value, perceived substitutes, the difficulty of comparison, switching costs, price-quality, end benefit, relative expenditure, perceived fairness, shared cost, and inventory effects. Danes & Lindsey-Mullikin 2012 research was based on the Nagle and Holden study, and they choose the following qualitative factors - perceived substitutes, quality fairness, unique value. Nagle continued in his research in 2016 (Nagle et al., 2016).

Masiero and Nicolau (2012) proposed following determinants of individual price sensitivity - motivations to go to a specific destination, prices, length of stay, activities at the destination and age. These authors concluded that age influences motivations as well as the price sensitivity of customers.

Yao, Leung and Lai (2008) analyzed the impact of price sensitivity factors on the returns policy in their paper. The results of Yao, Leung and Lai's study proved that when price sensitivity is high, the profit of the manufacturer decreases with an increase in demand variability.

One of the authors that focus on the sociodemographic characteristic in his research was Werner (2018). He studied the following factors in his research - religious values, Muslim faith, knowledge, Islamic finance, social influence, age, generation, income group, marital status, and degree of education. Demographic characteristics and their impact on price and purchase intention were analyzed among others, for example, by Dsouza, Taghian and Khosla (2007). They investigate the following demographic characteristics - age, education, gender, and homeownership.

## 3. Purpose

The sociodemographic characteristics are one of the crucial characteristics of influencing customers' price sensitivity. Therefore, the purpose of this paper is to explore the impact of socio-demographic characteristics on the customers' price sensitivity. Based on the literature search, the author has determined the following sociodemographic characteristics influencing customers' price sensitivity - age, gender, number of family members, education, and income.

## 4. Material and Methods

The author carried out a structured questionnaire for use in the author's survey to gather primary data for the author's research concerning customers' price sensitivity. The questionnaire was prepared based on the literature review mentioned in the text above and the objectives of the author's research.

As the main aim of this paper is to investigate sociodemographic characteristics influencing price sensitivity, the target population of the author's research comprised all categories of customers without referring to any specific customer group. The following figure 1 shows the conceptual framework of the author's research.

Since Roscoe (1975) claimed that the appropriate size of the research sample should be between 30 and 500 for most studies, a total of 400 questionnaires were distributed. Of the 400 questionnaires distributed, a total of 325 questionnaires were returned. The author distributed questionnaires online. Fifteen of the completed questionnaires were excluded, leaving a total
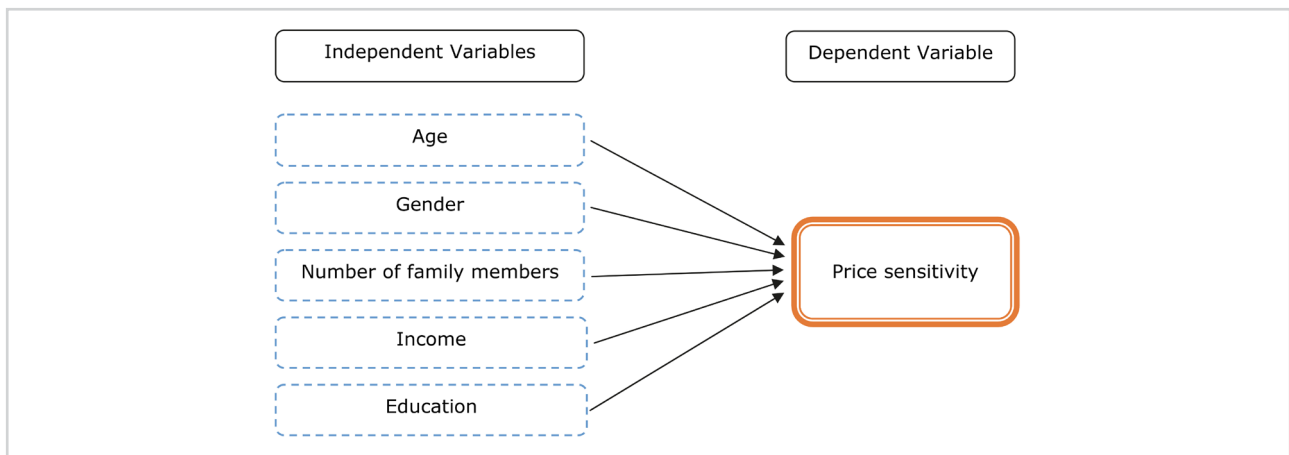
Figure 1:
**Conceptual framework**
Source: Own processing

of 310 usable replies. The questionnaire was based on the literature search described in the text above. The author's questionnaire was divided into two main sections. The first section gathered information about customers' price sensitivity. Based on the literature search author prepared a set of statements. This section was designed using a five-point Likert scale that was used for the evaluation of customers' responses. Used five-point Likert scale was ranging from strongly disagree (1) to strongly agree (5). The second part of the questionnaire gathers socio-demographics information about the respondents. The author used several statistical and mathematical methods: absolute and relative frequencies, basic descriptive statistics, multiple regression analysis, and $t$-test.

The multiple linear regression model was selected by the author as the means to assess factors influencing customers' price sensitivity. The Multiple linear regression model or analysis is a specific method that is used to draw a linear relationship between several independent and dependent variables. Therefore, the author's research is utilizing experimental research to collect primary data for regression analysis that allows obtaining a more realistic picture of customers' price sensitivity and influence of sociodemographic characteristics on customers' price sensitivity. The author suggests the following multiple regression model explain customers' price sensitivity based on sociodemographic characteristics:

$$CPS = a + b_1 A + b_2 G + b_3 NFM + b_4 I + b_5 E,$$ (1)

where:
$CPS$ - customers' price sensitivity;
$A$ - Age;
$G$ - Gender;
$NFM$ - Number of family members;
$I$ - Income;
$E$ - Education.

## 5. Results and Discussion
First of all, the author will present the background of the author's research respondents.

As we can see from Table 1, the author's research studied five sociodemographic-factors influencing customers' price sensitivity. In general, the author identified the following factors: age, gender, number of family members, income, education. The majority of respondents were at the age group 25-54 years old (63%), which is in line with the composition of the Czech population. Most of the respondents live in the family with two children (29%) or only with a partner (28%). 61% of respondents have a high school diploma or bachelor's degree. The author's research revealed several differences between the selected factors. The author conducted an independent $t$-test to compare the differences in attitudes of males and females towards prices. This $t$-test revealed that females are slightly more price-sensitive than males at the 95% confidence level.

The author used the multiple linear regression to measure the linear relationship between socio-demographic characteristics and consumer's price sensitivity. Additionally, this model will help to determine the percentage of variance in socio-demographic characteristics that can significantly explain consumer's price sensitivity. The value of the correlation coefficient lies only within the range from -1 to +1. Correlation -1 reflects negative association, and correlation +1 reflects positive association, the absence of association is reflected by the correlation 0. Table 2 summarises the results of the multiple regression model proposed by the author.

The variable Age shows high significance with $p$-value 0.005 and a beta coefficient of 2.036, meaning if an individual is of age, all else equal, customers' price sensitivity to a product will be significantly higher of 2 points. This finding is of no surprise, showing that older customers are more price-sensitive than younger customers. Then, gender shows a positive beta coefficient of 1.2591, significant with a $p$-value below 0.01. Furthermore, as stated above, females are slightly more price-sensitive than males. Variable Number of Family Members indicates several differences. We can state that the more family members is there in the household, the more sensitive the customer is. In comparison with other independent variables, Income and Education show a negative correlation with customer price sensitivity, which means that the higher level of Income or Education the customer has, the lower is the customer's price sensitivity. The beta coefficient is used for the values in the multiple regression linear model. Based on the theory, we can state that a higher beta value indicates a more significant impact of the independent variable on the dependent variable (customer's price sensitivity). The default equation is as follows:

$$CPS = a + b_1 A + b_2 G + b_3 NFM + b_4 I + b_5 E. \tag{2}$$

The $b$ in this equation represents the multiple regression coefficients (the amount that dependent variable $CPS$ (customers' price sensitivity) changes when the corresponding independent variable changes by 1 unit). The a is the constant, where the multiple regression lines intercept the axis Y. This number represents the amount of the dependent variable $CPS$ when all of the independent variables are 0. The multiple regression model of the author's research follows:

$$CPS = 1.4687 + 2.036A + 1.2591G + 0.596NFM - 2.365I - 1.236E. \tag{3}$$

Table 1:
**Summary of sample characteristics**

| Age | % | The average income per month | % |
|---|---|---|---|
| 16-24 | 16 | less than EUR 370 | 8 |
| 25-34 | 21 | EUR 370 - 730 | 27 |
| 35-44 | 23 | EUR 730 - 1100 | 35 |
| 45-54 | 19 | EUR 1100 - 1500 | 21 |
| 55-64 | 13 | EUR 1500 and more | 9 |
| 64+ | 8 | | |
| **Number of family members** | **%** | **Education level** | **%** |
| 1 | 20 | basic education | 9 |
| 2 | 28 | high school diploma | 31 |
| 3 | 15 | bachelor's degree | 30 |
| 4 | 29 | master's degree | 24 |
| 5 and more | 8 | doctoral degree | 6 |
| **Gender** | **%** | | |
| Male | 41.4 | | |
| Female | 58.6 | | |

Source: Compiled by the author

Table 2:
**Multiple regression analysis**

| Model | $t$ | $p$ | beta coefficient | Std. error |
|---|---|---|---|---|
| (constant) | 0.34 | 0.628 | 1.4687 | 1.0126 |
| Age | 3.526 | 0.005 | 2.036 | 0.658 |
| Gender | 1.816 | 0.089 | 1.2591 | 1.536 |
| Number of Family Members | 1.718 | 0.093 | 0.596 | 1.949 |
| Income | -0.756 | 0.063 | -2.365 | 1.0236 |
| Education | -0.856 | 0.078 | -1.236 | 2.001 |

Source: Compiled by the author

## 6. Conclusions

The main aim of this research was to contribute to the understanding of the impact of socio-demographic characteristics on the customer's price sensitivity. The results of the study indicate that three of the characteristics examined show a positive correlation with the customer's price sensitivity, and two of them show a negative correlation with the customer's price sensitivity. Based on the result obtained, the Age has the most positively significant impact on customer's price sensitivity.

On the other hand, Income has the most negatively significant impact on the customer's price sensitivity. The results of the author's research correspond with the other researches. Nevertheless, in practice, we will not find any such comprehensive research on multiple regression analysis, which would focus directly on the impact of socio-demographic characteristics on customer's price sensitivity.

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