Czech University of Life Sciences Prague

Faculty of Economics and Management

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Master's Thesis

Institutional and behavioural factors influencing consumers' decisions

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DIPLOMA THESIS ASSIGNMENT

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Institutional and behavioural factors influencing consumers' decisions

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Objectives of thesis

The main objective of the thesis is to provide a holistic view of how consumers behaviour was impacted during the pandemic, focusing also on particular phenomena such as panic buying, herd mentality and hoarding, since all of them influenced consumer decision making.
Another goal of this paper is trying to predict how consumers will react once we will be back to normality and if their habits will change.

Methodology

The first part of the thesis will present a literature review of different sources, in order to examine the theoretical background needed for understanding the phenomena object of analysis. Moreover, for a bet-ter interpretation of consumers behaviours, a market segmentation based on generational perspective is proposed.

In the second part are reported quantitative methods utilized in existing studies, such as surveys, multiple regression analysis and trend studies. Afterwards the results will be interpreted and discussed with the support of charts and tables.

The proposed extent of the thesis

60-80 pages

Keywords

Covid-19, Consumer behaviour, Consumer decision making, Lockdown, Scarcity, Habits, Panic buying, Generational perspective

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Recommended information sources

Eger L., Komarkova L., Egerova D., Micík M.: The effect of COVID-19 on consumer shopping behaviour: Generational cohort perspective. Journal of Retailing and Consumer Services, 2021, Vol. 61.

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Declaration

I declare that I have worked on my master's thesis titled "Institutional and behavioural factors influencing consumers' decisions" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on 31. 03. 2022 _____

LUIGI DANIELE RIZZO

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I would like to thank Professor Petr Wawrosz for his advice and supervision during the process of writing this paper. Moreover, I would like to dedicate this work to the people that walked me through this academic path.

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Institutional and behavioural factors influencing consumers' decisions

Abstract

Covid-19 pandemic is the most disruptive event of recent times, I think it is interesting to analyse how it affected consumption habits. In this paper I decided to study the case of the Food and Beverage sector in Czech Republic, specifically what are the factors that influenced the consumption in this sector before the pandemic and during its first phase.

Moreover, beyond Food and Beverage, also the Tobacco consumption is included in the research, a product that, together with Food and Alcohol, people consume also or exclusively for leisure, so there is a relevant psychological component related to the consumption of these products.

I will review some existing literature about consumer's behaviour, what affects it and the pandemic effect on consumers habits. Later I will describe research conducted by Eger L. Komarkova L, Egerova D. and Micik M. (2021), which provides a valid overview of Czech people's feelings and perceptions at the beginning of the second wave in September 2020, interestingly this is done from a generational point of view. After I will be analysing quantitative and qualitative data which I will utilize to conduct regression analysis for determining the factors and their influence. This practical part will be followed by the discussion of the results and conclusions.

Keywords: Covid-19, Consumer behaviour, Consumer decision making, Lockdown, Scarcity, Habits, Panic buying, Generational perspective, Food, Beverage, Tobacco, Pandemic.

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1 Introduction

The year 2020 will be remembered as one of the most significant years of the recent history, a year where we have seen our lives being severely upset by the Covid-19 global outbreak, which started in China already at the end of 2019 but it extended to Europe and the rest of the world at the beginning of the following year.

The population worldwide had to adapt to a completely new scenario never experienced before, our lifestyles and freedom have been massively compromised by the restrictions, necessary to preserve people's health. This is the key factor that brought (almost) everyone on the same page, leaving no room for any other kind of priority at any level. Given that, every context like work, school, shops, has been dealing with an adaptation process that involved also a high social responsibility.

This process stimulated new ideas of doing business, ideas that needed to be conform the anti-Covid 19 measures; obviously, in this situation where the human contact had to be minimized, the online world has been thriving sensationally in this period, even more before.

In this paper I decided to focus on the case of the Food and Beverage sector in Czech Republic, specifically what are the factors that influenced the consumption in this sector before the pandemic and during its first phase.

I chose this sector because its products are part of the habitual shopping patterns in everyone's life, something very recurrent and one of the basic human needs. Therefore, since the pandemic's impact on our behaviours was quite significant, I think it is interesting to analyse how it affected consumption habits so important like the ones related to Food and Beverage. Moreover, the Tobacco consumption is also included in the research, the reason is explained in the next paragraph, and together with Food and Alcohol are products which people consume also or exclusively for leisure, which played an important role in such a negative scenario like the start of the pandemic. What I mean by this is that a relevant psychological component is related to the consumption of these products.

I will try to dig into this matter by reviewing some literature about consumer's behaviour, what affects it and the pandemic effect on consumers habits. Later I will describe research conducted by Eger L. Komarkova L, Egerova D. and Micik M. (2021), which provides a valid overview of Czech people's feelings and perceptions at the beginning of the second

wave in September 2020, interestingly this is done from a generational point of view. After I will be analysing quantitative and qualitative data which I will utilize to conduct regression analysis for determining the factors and their influence.
This practical part will be followed by the discussion of the results and conclusions.

2 Objectives and Methodology

2.1 Objectives and research questions

The Covid-19 pandemic has been, and still is, a very disruptive and upsetting event in our world. Therefore, it is important to study its effects and implications in order to have a better understanding of the impact and changes that caused in our lives.
The main goal of the thesis is to provide a study of how consumers' behaviour was impacted by the pandemic in Czech Republic during the first phase in 2020. Specifically, I chose to narrow down my research to the Food & Beverage sector, including also data about the tobacco consumption because in the COICOP classification it is grouped together with the data relative to alcohol expenditure, and it is interesting to study both goods because their consumption is mainly related to leisure needs.
Another objective of the paper is to describe how the Czech consumers' economic confidence was affected in the years 2020-2021 by the stringency of anti-Covid measures and by the pandemic trend.
In order to achieve these goals, I will try to answer the following research questions:

1. In Czech Republic during the years 2020 and 2021, how was consumers' economic confidence influenced by restrictions' stringency and the new Covid cases?
2. What happened to the Czech consumption trend of Food and non-alcoholic beverages in 2020?
3. What happened to the Czech consumption trend of Alcoholic beverages and tobacco in 2020?

2.2 Methodology

2.2.1 Main methods

In order to answer the research questions, I decided to build three linear regression models.

The first (Model 1) is relative to Czech consumers economic confidence and is based on monthly observations (20) during the period February 2020 – September 2021. It will explain how the Consumer economic confidence was influenced by the Covid restrictions stringency and by the pandemic trend; I decided to measure the latter with the Average new daily cases per month, because it was probably the number that influenced the most people's frame of mind. This will be a very simple model, just to give a general idea of how the restrictions affected consumers perception.

The next two models will be more complex, both based on annual observations and same set of variables, namely: Food & Non-Alcoholic Bev. expenditure, Alcoholic Bev. & Tobacco expenditure, Consumers' perception of price trends, Sales index in F&B services, Disposable income per capita, Intention to make major purchases.

The data set will be analysed thoroughly through correlation matrixes and distribution of relative changes, in order to provide an understanding of what happened concretely in numbers.

The model 2A will have as endogenous variable the Czech household expenditure on Food and non-alcoholic beverages and the others aforementioned will be the exogenous ones. Instead, the model 3A will have as dependent variable the Czech household expenditure on Alcoholic beverages and Tobacco, while the Food & Non-alcohol beverage expenditure will become independent like the rest of the variables. Both models are based on a 9 years' timeframe (2011-2019). I chose the time period 2011-2019 because it is long enough to obtain a reliable statistical result, but at the same time it is not too wide so that the information gets biased; what I mean is that the shopping habits change through the years, so for instance if I would have included in the observations data from the year 2000, then the results might have been significantly influenced by that despite it is not very relevant for the recent years.

In order to observe the pandemic impact in the year 2020, I will run two "dummy" models derived from the ones described above, identical structures but different observations number (10), relative to the time period 2011-2020. The idea is to

compare the initial two models with their derivative to see what changes when the observation for the year 2020 is included.

All the regressions and statistical analysis have been conducted through the software "Gretl" and "Excel".

2.2.2 Data collection

The data categories of Household money expenditure for "Food & Non-alcoholic beverages", and "Alcoholic beverages & tobacco", belong the COICOP classification (Classification Of Individual Consumption by Purpose); as reported by Eurostat, the COICOP is a classification developed by the United Nations Statistics Division to classify and analyse individual consumption expenditures incurred by households, non-profit institutions serving households and general government according to their purpose. I found the data for Czech Republic on the Czech Statistical Office (CZSO).

The data relative to Consumers' perception of price trends and to Consumer economic confidence were taken from Joint harmonized EU Programme of Business and Consumer surveys, which is described in the paragraph below.

2.2.3 Joint harmonized EU Programme of Business and Consumer surveys

As written in its user guide (European commission user guide, 2021) the Joint harmonized EU Programme of Business and Consumer surveys was launched by the European Commission in 1961 with the aim of providing essential information for economic surveillance, short-term forecasting and economic research. At the very beginning it was conducted only one business survey on the manufacturing industry, but later the sector coverage of the programme has widened considerably, covering also: construction sector, retail trade, services, consumers, financial services.

When it comes to the geographical coverage, the programme covers all the 27 EU Members and the 5 EU candidate countries (i.e., Montenegro, North Macedonia, Albania, Serbia and Turkey). According to the user guide the harmonised surveys are carried out at national level by partner institutes such as ministries, statistical offices, central banks, research institutes, business associations or private companies. The surveys are conducted according to a common methodology, which consists essentially of harmonised questionnaires and a common timetable; the goal of the harmonisation is to provide a set of comparable data for

all countries, even though harmonisation does not mean uniformity, indeed national questionnaires may include additional questions beyond the harmonised ones.

Of course, this paper is focused on the Consumer surveys, whose purpose is first, to collect information on households' spending and savings intentions, and second, to assess their perception of the factors influencing these decisions. Therefore, the questions are organised around four topics: the households' financial situation, the general economic situation, savings and intentions with regard to major purchases. The consumer survey is mainly qualitative. Since 2003, two quantitative questions are asked concerning perceived and expected price changes.

The survey samples are derived from a frame, which is supposed to register all the units of the whole population under question. Taking into account the various changes that might occur in the population a regular update of the frame is necessary in order to keep a good representativeness and quality of the surveys.

The sample utilized for Consumer surveys is defined randomly with known probabilities of selection from the population; in order to secure its efficiency many institutes use some form of stratified random sampling that involves the separation of the population into non-overlapping sub-populations, called strata, which have similar variance with regard to the key variables covered in the survey. Stratification is applied according to different criteria, for consumer surveys, the sex, age, education, income and occupation of the person are commonly used for the selection of the respondents (European commission user guide, 2021).

Answers obtained from the surveys are aggregated in the form of "balances". Balances are constructed as the difference between the percentages of respondents giving positive and negative replies: starting from each stratum, the percentages of answers to each reply option are calculate. The outcome for each stratum h, for each variable X, for a given month t, is a column vector: $Xh = (Ph, Eh, Mh)$

Where Ph is the share reporting an increase, Eh is the share reporting no change, and Mh is the share reporting a decrease.

After obtaining the results for each stratum, the overall results are calculated as weighted averages of the results by strata. Weighting coefficients used at this stage reflect the relative significance of each stratum in the frame or population and are often derived from official statistics, such as the value added of a specific sector as a share of that of the total industry

in question. The weighting in this case is used to improve the quality of the sample, by correcting any possible discrepancies of representation.

So, the function of the column vector becomes: $Xh = (\Sigma Ph * wh, \Sigma Eh * wh, \Sigma Mh * wh)$

Where wh are the relative coefficients for each stratum and:

- $\Sigma wh = 1$
- $\Sigma Ph * wh + \Sigma Eh * wh + \Sigma Mh * wh = 100$

According to the user guide created by the European commission, the Consumer surveys are conducted monthly and quarterly, the questions contained differ depending on the time basis but both have the same way of answering that is a Likert scale with six options: very positive (PP), positive (P), neutral (E), negative (M), very negative (MM), don't know (N). The possible answers are adjusted for fitting better the question (e.g., "very positive" can be "very much higher"). The balances (B) are calculated on the basis of weighted averages, so:

- PP+P+E+M+MM+N=100
- $B = (PP + ½P) - (½M + MM)$

The answers of the respondents might be affected by seasonal or special events that occur throughout the year, such as Christmas, elections or natural disasters. Although it is specifically asked to the individuals not to consider these events when answering the questionnaire, in practice they do give biased answers visible in seasonal patterns. In order to eliminate this bias, once the balances are calculated after they are seasonally adjusted. The Commission is currently using Dainties as the seasonal-adjustment algorithm, originally developed by Eurostat.

The balance series are then used to build composite indicators, specifically for each of the five surveyed sectors, so-called confidence indicators are produced to reflect overall perceptions and expectations at the individual sector level in a one-dimensional index. Each confidence indicator is calculated as the simple arithmetic average of the (seasonally adjusted) balances of answers to specific questions chosen from the full set of questions in each individual survey. The Consumer Confidence Indicator includes the questions regarding:

- Household financial situation over the last 12 months.
- Expectation of the household financial situation over the next 12 months.
- Expectation of the general economic situation over the next 12 months.
- Major purchases expectation over the next 12 month.

3 Literature Review

3.1 Factors influencing consumer behaviour

According to American Marketing Association (Bennett, 1995), consumer behaviour can be defined as "the dynamic interaction of affect and cognition, behaviour, and environmental events by which human beings conduct the exchange aspects of their lives". From this definition emerges that is a complex process composed by several facets, but it can be divided in two main parts: decision making process and final purchasing behaviour. The latter is what is visible from the outside, the concrete consequence of the internal process (i.e., decision-making) that goes on in consumers' mind when it comes to purchase a product; the inner nature of this process makes it difficult to study, however factors and patterns that help us to understand it can be identified.

Rangaiah (2021) in her article for Analytic Steps, describes five categories of factors that influence consumer decision-making process, listed in Figure 3.1, those are: psychological, personal, social, cultural, economic. The first two are internal to the individual, the second ones are external, meanwhile the economic influence is half way between internal and external since it depends on the person but also on the environment around.

Figure 3.1 Factors influencing consumer decision making process

Source: Rangaiah (2021)

3.1.1 Psychological factors

Rangaiah (2021) observes that the psychological sphere can be broken down through some sub-factors, such as:

• Motivation: the driver that induce the consumer to start the purchasing process, due to a need or want depending on the type of consumption. There are several theories about consumer's needs, some of the most popular are Maslow's hierarchy of needs and ERG theory.

• Perception: the image we have of a certain product, which is shaped by the information we gather about it through advertisements, reviews, feedbacks or promotions. Being in times where the information collection is constant, a good perception of the products became essential.

• Learning: when we purchase a product, we enrich our knowledge about it through the experience. This learning can either be cognitive or conditional. While in cognitive learning, we use our knowledge for finding satisfaction and fulfilling his needs with the item we purchase, conditional learning is where we get constantly exposed to a situation, enabling us to respond towards it.

• Attitudes and beliefs: We all have certain attitudes or beliefs that consciously or subconsciously prompt our purchasing decisions. Our attitude and what we believe influence our behaviour towards a product and also play a key role in shaping the product's brand image.

3.1.2 Social factors

Rangaiah (2021) states that the people in our social sphere also influence our consuming behaviour, the social interactions can change the idea about a certain product or brand (e.g., word of mouth regarding bad experiences with a purchase). There three main social factors:

- Family: Our families actually have a considerable role to play in impacting our purchasing behaviour. We form an inclination or aversion towards certain products from our childhood by observing our families use that product and persist in using those products as we grow up. For instance, if at home a family consumes Pepsi, in other contexts the members will be more likely to buy that rather than Coca Cola.
- Reference groups: groups of people with whom we associate ourselves. These include clubs, schools, professional or playgroups, churches, and even

acquaintances or a group of friends, etc. The people in the reference groups normally have a common pattern of purchasing and an opinion leader who influences them in terms of their buying behaviour.

- Roles and status: of course, we all are influenced by the role that we hold in society. The higher position we hold, the more our status affects what and how much we purchase. For instance, the CEO of a company and a normal employee would have a different buying pattern.

3.1.3 Cultural factors

Rangaiah (2021) sustains that we all have our values and ideologies that are shaped by the values and ideologies of the society we exist in and the community we belong to. Our behaviour is consciously or subconsciously driven by the culture followed by that particular community.

The case of McDonald's in India is a good example of culture affecting the consumption patterns, in fact there is a massive consumer base and McDonald's has adjusted its menu to match the tastes and preferences of the local community. Indeed, since cows are sacred and worshipped the company uses chicken instead of beef for their burgers.

So, among the cultural factors we can distinguish: culture, sub-culture and social class.

3.1.4 Personal factors

Beyond the psychological, social and cultural factors, Rangaiah (2021) identifies the personal ones, so the subjective intrinsic characteristics of each individual; of course, they vary from person to person. They are:

- Age: people belonging to a certain age range will tend to have similar needs, this matters when it comes to targeting. For instance, as Baby Boomers proceed for retirement, they are targeted by marketers with messages regarding prescription drugs as well as other health care items such as home, financial security, or insurance, all of which are relevant issues with regard to their age.
- Income: our income definitely impacts our purchasing behaviour. The higher our income, the more purchasing power we hold and vice versa. Higher disposable income compels us to spend more on luxurious items while a lower or mediocre income makes us spend more on our basic needs like education, groceries, and clothing.

- Occupation: our occupation largely steers our purchasing decision making. We all tend to purchase the items that are relevant or suitable for our profession. For instance, a businessman would have different clothes purchasing pattern in comparison to an artist.
- Lifestyle: our way of life is one of the most powerful influencers that controls our choices. It dominates our buying behaviour quite significantly. Suppose we are on a diet then the products we purchase will also complement our diet, from food, weighing scale to using protein.

3.1.5 Economic factors

The last factors category that Rangaiah (2021) describes is the economic one.
The purchasing quirks and decisions of the consumer largely rely upon the market or nation's economic circumstances. The more that a nation is prosperous and its economy stable, the larger will be the money supply of the market and the consumer's purchasing power.
A strong, healthy economy brings purchasing confidence while a weak economy reveals a strained market, marked by a weakened purchasing power and unemployment.
Some significant economic factors include:

- Personal income: our personal income is the criteria that dictate the level of money we will spend on buying goods or services. There are primarily two kinds of personal incomes that a consumer has: namely disposable income and discretionary income. Our disposable income is mainly the income that remains in hand after paying the taxes. The greater the disposable personal income the greater would be the expenditure on several products, and the same would be the case when it is the other way round. Instead, the discretionary income is related to the money left after paying other necessary expenses such as rent and food, so we decide how to spend it in a discretional way.
- Family income: our family income is actually an aggregate of the sum total of the income of all our family members. This income also plays a considerable role in driving consumer behaviour. The income that remains after meeting all the basic life necessities is what is then used for buying various goods, branded items, luxuries, durables, etc.

- Future income expectation: the prevision of our future income also has a role to play. For instance, if we expect our income to rise in the future, we would naturally spend a greater amount of money in purchasing items. And of course, in case we expect our income to take a plunge in the near future, it would have a negative influence on our expenditure.
- Consumer credit: the credit facilities at our behest also impact our purchasing behaviour. This credit is normally provided by sellers, either directly or indirectly via banks or financial institutions. If we have flexible credit terms as well as accessible EMI schemes, our expenditure on items is likely to increase and in less flexible credit terms would result in the opposite.
- Liquid assets: even the liquid assets we've maintained influence our purchasing behaviour. These are the assets that get promptly converted into cash such as stocks, mutual funds, our savings or current accounts. If we have more liquid assets, there is a greater likelihood of us spending more on luxuries and shopping items. Lesser liquid assets meanwhile result in lesser expenditure on these items.
- Savings: the savings generated from our personal income are also regulating our buying behaviour. For example, if we take the decision of saving more from our income for a certain period of time, our expenditure on goods and services would be lesser and for that period and if we wish to save less, our expenditure on such items would increase.

We undertake purchase decisions nearly every day, either big or small. For every buying decision made, we think of fulfilling a need. This need can be steered by a range of factors, which have been elaborately highlighted here. Every one of these factors can be leveraged as a weapon by businesses for enhancing their sale prospects.

3.2 Consumer's behaviours and patterns

3.2.1 Types of consumer behaviours

Clootrack (2021) is a platform dedicated to customer experience analytics, one of their articles explains very well what are the main types of consumer behaviours.
First of all, it is important to point out that consumer's buying decision depends on the type of products that they need to buy. The behaviour of a consumer while buying a coffee is a

lot different while buying a car. Based on observations, it is clear that purchases that are more complex and expensive involve higher deliberation and many more participants. Consumer buying behaviour is determined by the level of involvement that a consumer shows towards a purchase decision. The amount of risk involved in a purchase also determines the buying behaviour, higher priced goods tend to increase the risk, thereby seeking higher involvement in buying decisions.

There are four main types of consumer behaviour (Clootrack, 2021): Complex buying behaviour, Dissonance-reducing buying behaviour, Habitual buying behaviour, Variety seeking behaviour.

At the end of the chapter there is a graph on which the behaviours are allocated according to the level of involvement in the purchase and differences among the brands.

3.2.1.1 Complex buying behaviour

As stated by Clootrack (2021), complex buying behaviour is encountered particularly when consumers are buying an expensive product, in this infrequent transaction, consumers are highly involved in the purchase decision. Consumers will research thoroughly before committing to invest.

Consumer behaves very differently when buying an expensive product or a product that is unfamiliar to him. When the risk of buying a product is very high, a consumer consults friends, family and experts before making the decision.

For example, when a consumer is buying a car for the first time, it's a big decision as it involves high economic risk. There is a lot of thought on how it looks, how his friends and family will react, how will his social status change after buying the car, and so on.

In complex buying behaviour, the buyer will pass through a learning process. He will first develop beliefs about the product, then attitudes, and then making a thoughtful purchase choice.

For complex buying behaviour customers, marketers should have a deep understanding of the products. It is expected that they help the consumer to understand about their product. It is important to create advertising message in a way that influences the buyer's beliefs and attitudes.

3.2.1.2 Dissonance-reducing buying behaviour

In dissonance-reducing buying behaviour consumer involvement is very high, this might be due to high price and infrequent purchase. In addition, there is a low availability of choices with less significance differences among brands; therefore, in this case a consumer buys a product that is easily available (Clootrack, 2021).

Consumers will be forced to buy goods that do not have too many choices and so consumers will be left with limited decision making. Based on the products available, time limitation or the budget limitation, consumers buy certain products without a lot of research.

For example, a consumer who is looking for a new collapsible table that can be taken for a camping, quickly decides on the product based on few brands available. The main criteria here will be the use and the feature of the collapsible table and the budget available with him.

Marketers should run after-sale service camps that deliver focused messaging. These campaigns should aim to support consumers and convince them to continue with their choice of their brand. These marketing campaigns should focus on building repeat purchases and referrals by offering discounts and incentives.

3.2.1.3 Habitual buying behaviour

Clootrack (2021) highlights that the habitual buying behaviour is depicted when a consumer has low involvement in a purchase decision. In this case the consumer is perceiving only a few significant differences between brands.

When consumers are buying products that they use for their daily routine, they do not put a lot of thought. They either buy their favourite brand or the one that they use regularly – or the one available in the store or the one that costs the least.

For example, while a consumer buys a loaf of bread, he tends to buy the brand that he is familiar with without actually putting a lot of research and time. Many products fit into this category. Everyday use products, such as salt, sugar, biscuits, toilet paper, and black pepper all fit into this product category.

Consumer just go for it and buy it – there is no brand loyalty. Consumers do not research or need information regarding purchase of such products.

Habitual buying behaviour is influenced by radio, television and print media. Moreover, consumers are buying based on brand familiarity. Hence marketers must use repetitive

advertisements to build brand familiarity. Further to initiate product trial, marketers should use tactics like price drop promotions and sales promotions.

Marketers should attract consumers using visual symbols and imagery in their advertising. Consumers can easily remember visual advertisements and can associate with a brand.

3.2.1.4 Variety seeking behaviour

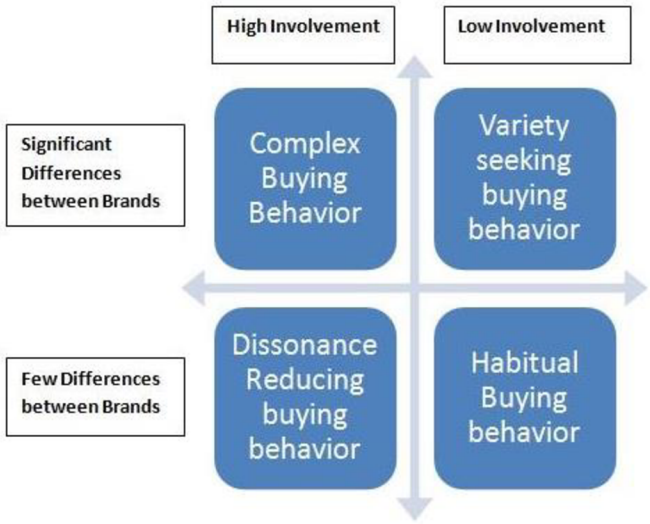
According to Clootrack (2021), in variety seeking consumer behaviour, consumer involvement is low. There are significant differences between brands. Here consumers often do a lot of brand switching. The cost of switching products is low, and hence consumers might want to try out new products just out of curiosity or boredom. Consumers here, generally buy different products not because of dissatisfaction but mainly with an urge to seek variety.

For example, a consumer likes to buy a cookie and choose a brand without putting much thought to it. Next time, the same consumer might may choose a different brand out of a wish for a different taste. Brand switching occurs often and without intention.

Brands have to adopt different strategies for such type of consumer behaviour. The market leader will persuade habitual buying behaviour by influencing the shelf space. The shelf will display a large number of related but different product versions.

Marketers avoid out-of-stock conditions, sponsor frequent advertising, offer lower prices, discounts, deals, coupons and free samples to attract consumers.

Figure 3.2: Types of consumer behaviour



Source: Clootrack (2021)

3.2.2 Buying behaviour patterns

The Omniconvert's article "Consumer behaviour in marketing – patterns, types, segmentation" written by Valentin Radu (2022), explains thoroughly the dynamics that guide consumers in their purchasing decisions.
The distinction between "Buying behaviour patterns" and "buying habits" is brought up: habits are developed as tendencies towards an action and they become spontaneous over time, while patterns show a predictable mental design.
Moreover, the latter are collective and offer marketers a unique characterization, instead the habits are strictly personal and subjective of each customer.
Customer behaviour patterns can be grouped into (Radu, 2022):

1. Place of purchase

Usually, customers will split their purchases among several stores even if all the items are available in the same one. That is because most of them prefer to buy products from shop that are specialized in selling what they are looking for. Consider the example of a hypermarket: although clothes and shoes can be found there, often those items are bought from actual clothing brands.
Another interesting aspect of the place of purchase is customer's loyalty towards the store. In fact, when a customer has the capability and the access to purchase the same products in different stores, they are not permanently loyal to any store, unless that's the only store they have access to.

2. Items purchased

Analysing a shopping cart can give marketers lots of consumer insights about the items that were purchased and how much of each item was purchased. Necessity items can be bought in bulk while luxury items are more likely to be purchased less frequently and in small quantities.
The amount of each item purchased is influenced by the perishability of the item, the purchasing power of the buyer, unit of sale, price, number of consumers for whom the item is intended, etc.

3. Time and frequency of purchase

Customers will go shopping according to their feasibility and plans, probably they will want a service even during the oddest hours; especially now in the era of e-commerce where everything is accessible with only a few clicks.

It is beneficial for the businesses to meet these demands by identifying a purchase pattern and match its service according to the time and frequency of purchases; also because they might even make more profits from a service provided in unusual times or with some offer proposed for specific hours or days.

One thing to keep in mind: seasonal variations and regional differences must also be taken into account.

4. Method of purchase

A customer can either walk into a store and buy an item right then and there or order online and pay online via credit card or on delivery.

The method of purchase can also induce more spending from the customer (for online shopping, you might also be charged a shipping fee for example).

The way a customer chooses to purchase an item also says a lot about the type of customer he/she is. Gathering information about their behaviour patterns helps to identify new ways to make customers buy again, more often, and higher values.

3.3 Consumer's behaviour in situations of scarcity

One of the effects produced by the pandemic has been exposing people to situations of scarcity that never experienced before in their lives, forcing them to adapt to a new context. The COVID-19 crisis triggered several simultaneous forms of scarcity: hoarding and disruptions to the supply chain left many store shelves bare (product scarcity) and closure of nonessential businesses left many without a steady income (resource scarcity).

Naturally, the adaptive behaviour was different from person to person and so was the approach to scarcity, which can be faced in different ways.

In their article Goldsmith et al (2020) identify four main research perspectives about scarcity:

- Scarcity as a mindset: related to resource scarcity and their allocation.
- Scarcity as a threat: focusing on how consumers deal with external risks deriving from the environment.

- Scarcity as a reference point: observing the discrepancy between a certain level of resources and a superior one, due to the social comparison.
- Scarcity as a journey: examining scarcity throughout its different stages in time.

In considering scarcity as a mindset, Mullainathan and Shafir (2013) observe that when a resource is particularly limited consumers tend to focus on that one, trying to figure out how to exploit it optimally. If on one hand this leads to a more efficient use of the resource, on the other it might induct the consumer to tunnelling, so he or she would dedicate too much effort in the management of the specific resource neglecting others.

This process can be considered as a cognitive "bandwidth tax," such that scarcity of one resource, like money, occupies so much of somebody's mind that scant cognitive resources remain available for other tasks (Mani et al. 2013).

During the pandemic this kind of behaviour has been quite recurrent among large part of the global population, because of the heavy economic crisis caused by anti-Covid restrictions; most of the businesses that need human contact in order to work have suffered massive economic losses and lots of people lost their financial stability. Obviously, this scenario affected people's cognitive activities, tunnelling it to how to get over the emergency.

Van Kerckhove et al (2020) propose that financial scarcity increase consumers' desire for a larger choice set, that is due to the fact that financial scarcity poses a threat to consumers' freedom of choice, which a larger choice sets can help to better satisfy their needs according to their budget; basically, consumers who feel financially weak often seek out variety in their assortments.

Oppositely, product scarcity narrows the set of choices because the consumer perceives it as more valuable, given that he or she sees a good as more valuable when it is scarce; this technique is frequently used in marketing for increasing the interest toward a product. The common point is that both appear more valuable to the consumer in case of scarcity (resource VS product), but they have different effect on the solutions that the individual seeks for (large set of choices VS narrow set of choices).

It is interesting to observe how differently individuals react to scarcity manifested as threats coming from the environment around them. First of all, we need to consider that for humans there is the constant dilemma about where to invest the scarce resource that they dispose, either in a somatic effort (e.g., professional carrier) or in a reproductive one (e.g.,

courtship), the first one produces results on the long-term meanwhile the second mostly on the short one.
According to Goldsmith et al (2020), these reactions are strongly influenced by the person's childhood, so the context where he or she grew up in. In fact, it has been demonstrated that people raised in a stable and healthy environment, tend to respond to external threats with a more forward-thinking and safe approach; on the contrary, people who grew up in tough contexts with a low socioeconomic status, tend to invest their resources in way that guarantees them a certain output as soon as possible.
So, during an economic recession like the one derived from the pandemic, it is more likely that consumers with a healthy socioeconomic background will save more money trying to ensure a steady financial situation for the future. Instead, people raised in a poor socioeconomic context will tend to spend more money in the present with less concern for the future, consistent with their faster strategy of getting results (Mittal and Griskevicius, 2016).
Viewing scarcity as a journey, allows us to observe the impact of a chronic shortage through time in different stages. Here is again useful the distinction between resource and product scarcity: while on the short term the effects are not too affecting, on the long run a chronic resource scarcity would be much more influencing and long lasting than a product scarcity. Indeed, in the latter case, the consumer might just decide not to buy the product because it has always been scarce and not affordable for him/her, so consequences of this decision are marginal; instead, in the first case the constant lack of a resource forces the consumer to modify his/her decision-making process based on the optimization of the resource consumption, therefore forging a scarcity mindset throughout the time.

3.4 Covid-19 and consumers shopping habits

Pantano et al. (2020) point out that consumers reviewing their shopping habits, have discovered benefits from the services they never used before. In this context, it is also possible to consider that customers will change permanently their shopping habits on the long run. Sheth (2020) claims that there are four major contexts which govern or disrupt consumer habits:

- Social context (e.g., changes in the workplace and in interaction with neighbours and friends): it has been nullified eliminating almost any kind of social interaction at every level.
- Implementation of new technology: as breakthrough technologies emerge, they break the old habits. The most important one in recent years are smart phones, internet and ecommerce, which all acquired even a more essential role with the Covid-19 outbreak.
- Rules and regulations: decisions take by politicians and law-makers which directly affect people's lives, limiting their freedom of consumption especially in public spaces.
- Uncertain surrounding context: the development of the external circumstances that is out of consumers' control, such as natural catastrophes, military conflicts, economic crisis or global pandemics.

Sheth (2020) in his article "Impact of Covid-19 on consumer behaviour: Will the old habits return or die?", observes eight immediate effects that the pandemic outbreak had on consumers behaviour which are summarized below:

1.Hoarding:

Consisting in stockpiling essential goods (e.g., bread, toilet paper, disinfecting and cleaning products) because of the fear of stockouts and shortages; hoarding is a very common adaptive behaviour to unexpected situations. In this context the grey markets play an important role, in fact who could not get the desired product asks it to some unauthorized middlemen that take advantage of the situation and sell the good overpriced; it was the case of masks and disinfecting gels during March/April 2020.

2.Improvisation:

Consumers learn to improvise when there are constraints. Therefore, existing habits are discarded and new ways to consume are invented. The coronavirus unleashed the creativity and resilience of consumers for such tradition bound activities as weddings and funeral services. Sidewalk weddings and Zoom funeral services substitute for the traditional location centric events.

3.Pent-Up demand:

In times of crisis and uncertainty the general tendency is to postpone purchase and consumption of discretionary products or services; especially when it comes to durable goods such as automobiles, homes, and appliances, since they usually require a major economic effort and in such context people are less willing to spend money.

4.Embracing digital technology:

This has been one of the fastest technological embracement ever, obviously because the digital tools have suddenly become vital for carrying out any task; for example, software that allow to organize meetings online either for didactic or working purposes.

5.Store comes home:

Companies have been focusing much more on online shopping and home delivery that guaranteed the minimization of human contact. Furthermore, the home entertainment had a huge boost (services like Netflix).

6.Blurring of Work-Life boundaries:

In this unprecedented situation, individuals found themselves constrained home, with the chance of having much more discretion in carrying out their everyday activities (working, socialization, shopping and so on). This led to a blurring of boundaries between personal and working activities, which requires a sort of schedule and compartmentalization in order to make home a more efficient and self-disciplined environment.

7.Reunions with family and friends:

every activity related to social life has been absent during the pandemic; all the connections have been reduced to online meetings and chats.

8.Discovery of Talent:

since the amount of spare time available for everyone grew exponentially, many people have had the chance to practise personal talents and to discover new ones; creativity of some people has been thriving during this time.

When it comes to the influence that Covid-19 will have on consumers' habits, Sheth (2020) hypothesizes that after the end of the pandemic most of them will go back to normality; however, some will die, some will be modified and others will be created. The dying habits are linked to the fact that consumers discovered some better way to satisfy their need during the lockdown, therefore they will change their consumption behaviour. For instance, those who never bought groceries online before once they used the service during the lockdown, when the stringency of the restrictions was released, they kept purchasing them online instead of going to the supermarket.

Sheth (2020) points out that there is a universal law of consumer behaviour: when an existing habit or a necessity is given up, it always comes back as a recreation or a hobby (e.g., hunting, fishing, gardening, baking bread). Therefore, it will be interesting to see if

certain existing habits will be affected in such way by the pandemic; for example, will shopping become more an outdoor activity or hobby or recreation? Time will tell.
Speaking about the modified habits, they will be mostly related to health concerns; continuing with the shopping example, from now on any physical purchasing process needs to be conducted according to the Anti-Covid guidelines such as wearing masks, disinfection and social distance.
Last but not least, the new habits will be probably generated by three main drivers: public policy, technology, changing demography.
Regarding the public policy an example could be the improved security in the airports after 9/11, just as we got used to that will get used to more screening and boarding procedures including taking the temperature, testing for the presence of the virus and boarding the flight.
When it comes to technology it is suitable to speak about digital technology, because especially in the last two decades it has been transforming consumers' habits turning wants into needs (e.g., we would potentially survive without cell phone but now it is essential for everyone). Therefore, will be interesting to see if the new habits created during the lockdown such as online teaching, online shopping, online dating will become stable habits in people's lives.

3.5 Generational cohort study

Before I proceed with the exposition of my practical work, I want to report the research conducted by Eger L. Komarkova L, Egerova D. and Micik M. (2021), which gives an interesting frame of Czech people's feelings and perceptions at the beginning of the second wave in September 2020.
The negative impact of COVID-19 pandemic has been massive at every level of the society, heavily affecting people's health, economy and social life worldwide. Since such important aspects of our lives have been upset by this extraordinary event, it is interesting to observe individuals' reactions to it through a generational cohort perspective; it allows to segmentate the population in groups according to a relative homogeneity within generations, and at the same time guarantees heterogeneity across generations (Eger et al, 2021). This division is based on the idea that members of the same generation tend to act similarly, as discussed by Chaney et al. (2017) that is probably related to common factors which shape their behaviours like: experiences, beliefs, core values, attitudes, and

preferences. In their article Eger et al (2021) analysed consumers' behaviour in Czech Republic at the beginning of the second wave (September 2020), considering three generations: Baby boomers, Generation X, Generation Y.
The research was based on the analysis of data coming from questionnaire survey distributed with an online panel. The respondents were adult consumers (aged 18+) living in the Czech Republic. The sample size was set at 1000 respondents, which is the usual size for surveys within the Czech population (cf. CVVM, 2021). Due to the collection via the Talk Online Panel and using the quota sampling (Burs et al., 2017), it was possible to ensure an adequate distribution of respondents in the sample according to the basic demographic characteristics of the population, such as gender and age, but also the region. Therefore, the sample could be considered as representative of the Czech Internet population. However, the sample contains only 36 participants from Generation Z and 47 from the Silent Generation. These two groups of participants were therefore excluded from analysis, which means that the final sample consists of 917 participants (Baby Boomers = 302, Generation X = 323, Generation Y = 292).

3.5.1 Generations' description

3.5.1.1 Baby boomers

The people who were born during the period 1945-1964 are called Baby Boomers, because of the huge demographic increase registered in those years (i.e., baby boom). They are described as individualistic, competitive free agents, with strong interests in self-fulfilment through personal growth (Eger et al, 2021); this strong attitude towards working was probably caused by the post-war period in which they grew up, a time full of working opportunities and flourish economy following the dark years of the World War II.
The Boomers are considered as "digital immigrants" because they had to adapt to the new digital technologies that totally changed our lives, this is the key difference between them and the other generations. They are more used to traditional ways of communication, such as face-to-face, telephone and e-mail; also, when it comes to the media, they have a more traditional approach preferring television, radio, magazines, and newspapers.
About their behaviour as consumers, Baby Boomers are more likely to shop at one location near home, they seek for products which are reliable, fairly priced, and budget friendly

(Williams and Page, 2011); they still prefer cash payments and to perform transactions by themselves rather than online.

3.5.1.2 Generation X

Individuals born in the years between 1965-1982 belong to the Generation X, so defined because it lacked a blatant cultural identifier (Kasasa, 2021). Nevertheless, they grew up in a technological context where ICT had started to develop, computers and mobile phones were emerging (naturally with different timing across the countries). Because of this, members of Generation X are more competent and comfortable with computer mediated communication. Generally, they like to use computer mediated communication but they are not as comfortable with face-to-face communication as the previous generation, and do not like written communication such as writing formal letters (L. Eger et al, 2021). About their relationship with the media, they still follow the traditional ones but simultaneously spend a considerable amount of time on the new ones (Social medias, online forums etc.).
Concise communication is a really important aspect to them, which can make the difference, especially when it comes to some purchase experience; that is also connected to their sophisticated nature as consumers (Brosdahl and Carpenter, 2011), visible in the necessity to get products specifically designed for their needs. This approach leads to a low-price sensitivity but also to price consciousness (Williams and Page, 2011).

3.5.1.3 Generation Y

People born during the period 1983-2000 are the Generation Y, so called because comes chronologically after the Gen. X and therefore the alphabetic order was followed. They are also known as Millennials, the Internet Generation or digital natives, since they grew up in a quite advanced technological context which gave them the opportunity to learn how to use digital instruments already as children; of course, traditional medias are almost marginal in their lives, dominated by the digital ones. Naturally, this aspect of their childhood forged their technological skills, making them the most confident generation in the digital world among the ones analysed in this paper; Generation Z (2000-2012) is probably even more confident but it will not be considered here.
Members of Generation Y are usually confident, ambitious, speak various foreign languages and are achievement-oriented (L. Eger et al, 2021). They are well-informed

about all the news and look for changes and innovations and usually make purchase decisions having undertaken prior research on the topic (Lissitsa and Kol, 2016). Millennials use alternative purchase channel beside the traditional ones, such as online shopping, due to the fact that they can get considerable advantages from them (i.e., easy ordering, low prices).

People of Generation Y, just like the ones from Generation X, are quite sophisticated as consumers: they seek for products that match their personality and lifestyle, often they want a specific brand; although they also like the speedy shopping, which makes them less rational in certain situations (on the contrary of the Baby Boomers).

3.5.2 Theory of fear appeal

The general definition of Fear is: "an unpleasant emotional state characterized by anticipation of pain or great distress and accompanied by heightened autonomic activity especially involving the nervous system" (Merriam-Webster, 2002).

Fear evolved as a mechanism to protect humans from life-threatening situations. As such, nothing is more important than survival and the evolutionary primacy of the brain's fear circuitry (Williams, 2012). The mechanism is that fear appeals rely on a threat to an individual's well-being which motivates him or her towards action; e.g., increasing control over a situation or preventing an unwanted outcome.

A fear appeal is composed of three main concepts: fear, threat, and perceived efficacy. Fear is a negatively valenced emotion that is usually accompanied by heightened physiological arousal. Threat is an external stimulus that creates a perception in message receivers that they are susceptible to some negative situation or outcome. Finally, perceived efficacy is a person's belief that actions can be taken and will effectively reduce the threat depicted in the message. (Gore et al., 1998)

Recent literature has pointed out that conscious (planned) or subconscious (impulsive) purchase patterns are driven mainly by hedonic (emotional) and utilitarian (practical) stimuli (Ahmed et al., 2020; Leverin and Liljander, 2006). So, the theory of Fear Appeal can help to analyse the COVID-19 scenario, since fear has played a key role for all individuals: elder people were scared for their own health since they are the weakest ones exposed to the disease, younger people instead were more concerned about transmitting the virus to subjects at risk rather than about their own sake.

This theory identifies two types of control that we should deal with: fear control and danger control. The first one is related to handle the emotional reactions caused by some risky situations constituting a threat, meanwhile the second is about managing the actions needed to avoid or minimize the danger. For instance, the stockpiling tendency at the beginning of the pandemic has been an adaptive behaviour caused by the fear of not having access anymore to the basic goods; basically, purchase decisions instead of being taken after an analysis of pros and cons, they were moved by an impulse (impulse purchase behaviour).

According to Maslow's hierarchy of needs, the first physiological need usually appears at a time of fear, distress or deprivation, in this case, the COVID-19 pandemic (Eger et al, 2021). The certain basic human needs serve as motivation for consumers to take action, including buying action (Seeley, 1992). Therefore, other needs like psychological and self-fulfilment become secondary.

3.5.3 Research hypotheses and statistical methods

The following research hypotheses were developed by the authors:

• H1: The level of health fears influences the change in customer shopping behaviour during the COVID-19 pandemic crisis.

• H2: The level of economic fears influences the change in customer shopping behaviour during the COVID-19 pandemic crisis.

• H3: Consumers, during the COVID-19 pandemic crisis, are focused more on basic needs than self-fulfilment needs.

• H4: The level of fears about health (own and others) and fears about the economic situation (job loss and economic situation in society) differs between the selected generations.

• H5: There are differences in purchasing of selected items during the COVID-19 pandemic in relation to fears of the selected generations in brick-and-mortar shops and online shops.

• H6: There are generational differences in the needs that influence consumer shopping of the selected generations during the COVID-19 pandemic.

The survey elaborated by the authors, and the relative questions, is organized in four main parts:

- Level of fear related to health or economic situation.

- Changes in shopping behaviour.
- Changes in shopping patterns.
- Reasons for shopping new items.

The questions could be answered through a five-levels Likert scale (1 – strongly agree, 5 – strongly disagree), except for the fourth part where the answers were binary. The distribution of responses is presented according to generations B, X and Y, also the total distribution is reported. In order to verify the hypothesis, Eger et al (2021) analysed the questionnaire data using descriptive statistics, namely sample means and frequencies. In particular, based on relative frequencies, the ranking of consumer needs was determined to verify H3. Successively, formal statistical methods were used to verify the other five hypotheses: to verify H1 and H2, the effect of fears on shopping behaviour was assessed using multiple regression analysis, instead the generational differences on fear level were assessed using a one-way ANOVA; those differences (H4) were then detected by Tukey's multiple comparison method. Multiple regression analysis was also used to estimate of the partial effects of the fears and generation variables on changes in the purchase of selected items (H5). Whereas in the case of examining the partial effects of fears and generation on needs (H6), multiple logistic regressions were chosen with respect to the binary response (1-belonging to the top 3 needs, 0 – not belonging to the top 3 needs).

3.5.4 Research development and results

3.5.4.1 Health and economic fears

Table 3.1

The level of fears for health (own and others), job loss and economic situation by generation: average levels and percentages.

Characteristic	Average Level				Percentage for Levels 1 and 2			
Need/Generation	B	X	Y	Total	B	X	Y	Total
Own Health	2.58	2.77	3.13	**2.82**	45.0	38.1	27.4	**37.0**
Health of Others	2.38	2.36	2.48	**2.41**	55.6	59.4	53.1	**56.2**
Job Loss	3.62	2.99	2.99	**3.20**	19.9	35.3	38.4	**31.2**
Economic Situation	1.81	1.88	1.75	**1.81**	78.1	79.6	82.5	**80.0**

Source: Eger et al (2021)

Generations' members who expressed concerns about their own health were respectively: 45% of generation B, 38% of generation X, 27% of generation Y, with a total average value of 37% (as shown in table 1 above).
When it comes to the level of fear for the others' health, the question in the survey referred to the people sentimentally close to the respondents; on the average, the level of fear for the health of others turned out to be higher than the level of fear for their own health (2.41 vs 2.82). More than a half (56%) of the individuals agreed with this fear, specifically: Generation X 59%, then Generation B 56% and slightly lower, Generation Y 53%.
The group that expressed the biggest fear of losing their jobs was Generation Y (38%), followed by Generation X (35%); members of Generation B were not really afraid about this because most of them are already retired and receiving their pensions.
The biggest concern of the respondents was surely the general economic situation, precisely for the 80% of them; the distribution among the generation does not change much ((B 78%, X 80%, Y 83%).
In order to conduct further analyses, Eger et al (2021) created two variables: "FearH" representing health fears and "FearE" representing economic fears. The first variable was calculated by averaging the items fear for own health and fear for the health of others, while the second was created by averaging the items fear for job loss and fear for the economic situation.
Successively, an ANOVA F-test on the two fear variables was run and significant statistical results were found in both cases. Through a post hoc analysis based on Tukey's method, with p-values adjusted for multiple comparisons (Padj. in Table 2), the authors observed a significantly bigger health fear for Generation Y, instead when it comes to the economic fear, the generation that differs the most is Generation B which is significantly less afraid than the others; the results confirm the Hypothesis H4.

3.5.4.2 Changes in shopping behaviour

Eger et al (2021) in the second part of the survey, collected data about changes in shopping behaviour through 13 questions, also in this case the answers were given on a five-point Likert scale (1-strongly agree, 5 – strongly disagree). The 13 items are about:

1. More health products
2. Basic product selection
3. Thoughtful purchase
4. More from local retailers
5. Unimportant purchase place
6. Known brands
7. Brands research before shopping
8. Less shopping
9. Larger shopping
10. Shopping for others
11. Cheaper products
12. Minimize food waste
13. Change in shopping

Among the most relevant results it can be observed that about 65% of them tried to minimize waste food, the 41% of them purchased more thoughtfully, the 38% selected more basic products. After collecting this data, the authors run 13 different regression models, with the fear variables as independent and each one of the 13 items as dependent. As the findings summarized in the Table 2 below show, consumer behaviour during shopping generally depends on fear; the greater the fear, the greater the change in behaviour. The exception is item 5 ("it didn't matter where I shopped"), which did not depend on health fears, and, moreover, depends on economic fears in the opposite direction (effect estimate: -0.10). The highest sensitivity to the health fears was for items 1 ("I bought more health products") and 13 ("overall, I think I changed my shopping as a result of the crisis") with slope estimates 0.36 and 0.37, while in terms of economic fears, it was for item 11 ("I bought cheaper products to save money"), 3 ("Thoughtful purchase") and 8 ("Less shopping") respectively with slope estimate 0.26, 0.17 and 0.17. Therefore, it is

established that Hypotheses H1 and H2 are supported: health fears and economic fears impact significantly the shopping behaviour.

Table 3.2

Changes in shopping behaviour in relation to fears related to the COVID-19 pandemic and generation: multiple linear regression results.

Variable	FearH		FearE		Gen	X – B		Y – B		Y – X	
Subject (Item)	Effect	P	Effect	P	P	Diff	Padj.	Diff	Padj.	Diff	Padj.
1: More Health	0.36	0.000	0.12	0.001	0.628	-0.03	0.938	0.05	0.823	0.07	0.603
2: Basic Product	0.17	0.000	0.15	0.000	0.000	0.31	0.000	0.32	0.000	0.02	0.973
3: Thoughtful P.	0.26	0.000	0.17	0.000	0.004	0.24	0.006	0.22	0.016	-0.01	0.979
4: Local Retail	0.19	0.000	0.12	0.001	0.308	-0.05	0.802	-0.04	0.886	0.01	0.989
5: Unimp. Place	-0.01	0.856	-0.10	0.010	0.173	0.09	0.495	-0.06	0.768	-0.15	0.155
6: Known Brand	0.10	0.003	0.09	0.016	0.022	0.15	0.102	0.20	0.022	0.05	0.748
7: Brand Search	0.12	0.001	0.14	0.000	0.866	0.02	0.952	0.04	0.853	0.02	0.963
8: Less Shopp.	0.11	0.001	0.17	0.000	0.385	0.11	0.382	0.09	0.559	-0.02	0.966
9: Large Shopp.	0.26	0.000	0.12	0.004	0.640	0.07	0.707	-0.00	1.000	-0.07	0.690
10: for Others	0.22	0.000	0.15	0.000	0.000	-0.40	0.000	-0.38	0.000	0.02	0.977
11: Cheaper P.	0.18	0.000	0.26	0.000	0.507	0.08	0.565	0.00	0.999	-0.07	0.596
12: Min. Waste	0.18	0.000	0.16	0.000	0.000	0.27	0.000	0.35	0.000	0.08	0.521
13: Change	0.37	0.000	0.15	0.000	0.350	0.10	0.427	0.10	0.405	0.01	0.995

Source: Eger et al (2021)

3.5.4.3 Changes in shopping patterns (Brick and mortar VS Online)

The authors focused also on changes in individual shopping patterns, for both Brick and Mortar and online. In order to do that they asked to the respondents 8 questions (9 for the online shopping), the scale for the answers was: 1 (more frequently than before), 5 (more infrequently than before). For online shopping, a specific Internet entertainment item was added.

It emerged that Medicines (21.2%, 20.2%), drugstores (14.7%, 17.2%) and food (11.6%, 12.3%) were bought more both in brick-and mortar shops and online shops.

After that, like they did previously, regression analysis was conducted for each one of the items; the results are reported in Table 3 and 4 below.

Eger et al (2021) found out that the frequency of shopping in brick-and-mortar shops was statistically significant related to health fears for: drugstores and hygiene ($p = 0.024$), medicines and medical supplies ($p < 0.001$) with the positive correlation (the greater the fear, the greater the frequency of purchases), and sporting goods ($p = 0.046$) and hobbies ($p = 0.006$) with the negative correlation (the greater the fear, the lower the frequency of purchases).

Due to economic fears, there was a decrease in purchases for two items, namely (4 (electronics) and 5 (household equipment). The generational differences were observed for

five items (clothing, electronics, home appliances, sporting goods, hobbies), where Generation B reduced the purchase of these items compared to the other two generations.

When it comes to the online shopping, the health fears influenced the following items: food ($p = 0.031$), drugstore and hygiene ($p = 0.002$), medicines and medical supplies ($p < 0.001$) with the positive correlations (the greater the fear, the greater the frequency). Instead, in relation to the economic fears impact, the most relevant results regard: electronics ($p = 0.004$), sports equipment ($p = 0.036$) and paid online entertainment (0.014) with the negative correlations (the greater the fear, the lower the frequency).
In this case the generational influence was detected for all the items, with Generation B significantly reducing the purchase of these items compared to the other two generations. In addition, Generation X, compared to Generation Y, limited purchases of clothing and entertainment on the Internet.
Concerning Hypothesis H5, the influence of generation was identified for most items (five out of eight) in brick-and-mortar shops and all nine items in online stores. Thus, Hypothesis H5 is partially supported by the results.

Table 3.3

Changes in the purchase of selected items in brick-and-mortar stores in relation to fears related to the COVID-19 pandemic and generation: multiple linear regression results.

Variable	FearH		FearE		Gen	X – B		Y – B		Y – X	
Subject	Effect	P	Effect	P	P	Diff	Padj.	Diff	Padj.	Diff	Padj.
1: Food	0.04	0.052	0.01	0.730	0.069	0.03	0.857	-0.09	0.225	-0.11	0.064
2: Drugstore	0.05	0.024	0.01	0.697	0.262	-0.04	0.761	-0.09	0.233	-0.05	0.580
3: Clothing	-0.03	0.255	-0.05	0.129	0.000	-0.27	0.000	-0.25	0.002	0.02	0.946
4: Electronics	-0.02	0.511	-0.11	0.002	0.000	-0.28	0.000	-0.31	0.000	-0.03	0.881
5: Home Appl.	-0.04	0.144	-0.08	0.026	0.000	-0.29	0.000	-0.29	0.000	0.00	0.999
6: Sport. Goods	-0.06	0.046	-0.06	0.099	0.000	-0.45	0.000	-0.51	0.000	-0.07	0.632
7: Hobbies	-0.08	0.006	-0.03	0.325	0.000	-0.43	0.000	-0.50	0.000	-0.07	0.597
8: Medicines	0.11	0.000	0.04	0.143	0.946	0.01	0.976	-0.01	0.993	-0.02	0.943

Source: Eger et al (2021)

Table 3.4

Changes in the purchase of selected items in online shops in relation to fears related to the COVID-19 pandemic and generation: multiple linear regression results.

Variable	FearH		FearE		Gen	X – B		Y – B		Y – X	
Subject	Effect	P	Effect	P	P	Diff	Padj.	Diff	Padj.	Diff	Padj.
1: Food	0.07	0.031	0.02	0.534	0.000	-0.36	0.000	-0.36	0.000	0.00	1.000
2: Drugstore	0.10	0.002	-0.02	0.666	0.000	-0.32	0.000	-0.36	0.000	-0.04	0.870
3: Clothing	0.05	0.117	-0.06	0.106	0.000	-0.39	0.000	-0.64	0.000	-0.26	0.004
4: Electronics	0.03	0.391	-0.08	0.040	0.000	-0.45	0.000	-0.54	0.000	-0.10	0.406
5: Home Appl.	0.00	0.970	-0.05	0.203	0.000	-0.43	0.000	-0.45	0.000	-0.02	0.963
6: Sport. Goods	-0.01	0.830	-0.08	0.036	0.000	-0.56	0.000	-0.67	0.000	-0.11	0.306
7: Hobbies	-0.02	0.601	-0.05	0.194	0.000	-0.59	0.000	-0.65	0.000	-0.06	0.681
8: Medicines	0.14	0.000	0.05	0.193	0.000	-0.28	0.001	-0.25	0.005	0.03	0.890
9: Internet	0.04	0.280	-0.09	0.014	0.000	-0.58	0.000	-0.87	0.000	-0.29	0.001

Source: Eger et al (2021)

3.5.4.4 Consumer's needs

As a further part of the research, respondents were asked to choose from a list the three main needs that were the most important to them at the time, and then they had to rank them. Successively, the authors elaborated the average ranking and it turned out to be:

1. Health of family and friends (top 1: 48%, top 3: 77%).
2. Personal health (top 1: 14%, top 3: 48%).
3. Food security and health care (top 1: 8%, top 3: 45%).

Considering these outcomes, we can see that Hypothesis H3 is confirmed, so consumers during the pandemic crisis have made the basic needs an absolute priority.
Also for this part of the research, Eger et al (2021) run multiple regression models in order to see what was the relation between fears and needs.
According to the obtained results, health fears increased needs for 1/health of family and friends, 2/personal health, and 3/food and medicine safety. Further, it decreased needs for 1/personal success, 2/hobbies, and 3/entertainment.
When it comes to the economic fears, it is observable that it increased the need for financial security and decreased the need for entertainment. There were also generational differences in the eight out of eleven needs: 1/personal success, 2/hobbies, 3/entertainment, 4/education, 5/friendships, 6/ health of family and friends, 7/food and medicine safety, and 8/personal health. Thus, Hypothesis H6 was partially supported.

3.5.4.5 Research conclusions

In this research, Eger et al (2021) studied some unusual consumer behaviour patterns that showed up during the early days of the second wave of the COVID-19 pandemic crisis in Czech Republic.
The study proved that fear played a major role in influencing consumers' actions: the greater the fear, the more significant is the variation in the behaviour.
The initial research hypothesises were all confirmed by the results, either fully or partially. In H1 and H2 the authors stated that the level of health or economic fear change customer shopping behaviour during the COVID-19 pandemic crisis. These two hypotheses have

been supported by the first regression analysis, which showed that the most sensitive items to health fear were: purchase of more health products, change in shopping. Meanwhile the most sensitive items to the economic fear tuned out to be: cheaper products, purchasing thoughtfully and less shopping.

H3 sustains that consumers, during the pandemic, are focused more on basic needs than self-fulfilment needs. It has been supported by the relative frequencies of the respondents' answers about the ranking the needs by importance. The three necessities that people cared the most about were: health of the others, personal health, food. All of them basic needs.

In H4 it was hypothesized that the level of fear differs across the generations. This was confirmed by the differences detected among the respondents' answers.

The generation most concerned about its own health was fairly the Boomers (45%), followed by Gen X (38%) and Gen Y (27%). Speaking about the concern for the others' health, Gen X has been the most worried (59%), then Gen B (56%) and Gen Y (53%). Gen Y was the one with the highest fear of losing the job (38%), then Gen X (35%) and Gen B (20%). The Boomers were not really afraid of that since most of them are retired. The biggest concern of the respondents was surely the general economic situation, the distribution among the generation is quite similar ((B 78%, X 80%, Y 83%).

H5 states that there are differences in buying certain items due to fears of the selected generations in brick-and-mortar shops and online shops. The generational influence was identified for most items (five out of eight) in brick-and-mortar shops and all nine items in online stores. It emerged that Generation B significantly decreased the purchase of selected items compared to the other two generations in both brick-and-mortar stores and online shops; the only exception was the purchase of basic items (food, drugstores and hygiene, medicines) in traditional shops. Thus, Hypothesis H5 is partially supported.

Finally, in H6 the authors supported that exist generational differences in the needs that influence consumer shopping. Those discrepancies were found in eight out of eleven needs: 1/personal success, 2/hobbies, 3/entertainment, 4/education, 5/friendships, 6/ health of family and friends, 7/food and medicine safety and 8/personal health. Therefore, Hypothesis H6 was partially supported.

4 Practical Part

The practical part of my thesis will be based mainly on the linear regression analysis. The chapter 5.1 wants to give a generic overview of how Czech Consumers economic confidence has been affected by the pandemic during its first 20 months, so the observation period will be from February 2020 to September 2021; to do so I will utilize a simple linear regression model (Model 1) with two explanatory variables.
In the chapter 5.2 I will start to dig more into the Czech Food and Non-alcoholic Beverage sector, analysing the collected data first and then I will build a linear regression model that combines economic and psychological factors for explaining the trend in the Food and Non-alcoholic Beverage households' expenditure during the years 2011-2019 (Model 2A). The model will be more complex than the first one, including five exogenous variables and one endogenous. Afterwards I will run an identical model (Model 2B) but adding the observation for the year 2020 and I will compare the models, analysing eventual variations.
Later, in chapter 5.3 I will present the linear regression model explaining the Alcohol and Tobacco expenditure in Czech Republic during the years 2011-2019 (Model 3A). The data set utilized is the same as in the previous chapter, however the endogenous variable changes; before the Alcohol and Tobacco expenditure was exogenous and the Food and Non-Alcoholic drinks expense was endogenous, in Model 3A they swap their position so the first one becomes dependent and the second independent.
Then, the same approach used in the previous chapter is applied, so another model with analogous structure is build (Model 3B) but the year 2020 is included in it, also here I will compare the models and describe eventual changes.

4.1 Consumers' confidence Regression model

4.1.1 Data set 1

The variables of the data set for the model 1 are: Consumer Confidence Indicator (also called with acronym "COF"), Covid Stringency Index (CSI), Average New Daily Cases (ANDC) per month. They are all relative to the Czech Republic for the period February 2020 – September 2021.
The model wants to explain how the restrictions stringency and the pandemic trend affected the Consumer Confidence Indicator (which is therefore the dependant variable).

The Covid Stringency Index is available on OurWorldinData.org database, it is a composite measure indicating how severe are the anti-Covid restrictions in a certain country during a certain period; it is monthly based and the value is included from 0 to 100. This index is built using 9 sub-indicators related to the Government response to the evolution of the pandemic. The indicators are:

1. School closures
2. Workplace closures
3. Public events cancellation
4. Restrictions on gatherings
5. Close public transports
6. Public information campaigns
7. Stay at home
8. Restriction on internal movement
9. International travel controls
10. Contract tracing
11. Face coverings
12. Vaccination policy

According to the user guide (European commission user guide, 2021), the Consumer confidence indicator gives a good insight of how consumers of a certain country are feeling in a specific moment respect to the economic and financial context. In order to do that, the indicator is composed by the balances of four items from the EU Consumer survey which are:

- Household financial situation over the last 12 months.
- Expectation of the household financial situation over the next 12 months.
- Expectation of the general economic situation over the next 12 months.
- Major purchases expectation over the next 12 month.

The survey is carried out on a monthly basis, the value can range from -100 to +100 a higher value indicates a better confidence of the consumers.

The variable "Average New Daily Cases per month" was chosen because it has been the data, especially during the first phase of the pandemic, that was influencing the most people's frame of mind. It was calculated simply by averaging the number of daily cases for each month; also in this case the source is OurWorldinData.org.

Table 4.1: Data set 1

	Consumer Confidence Indicator	**Covid Stringency Index**	**Average new daily cases per month**
	Y1	**X1**	**X2**
Feb-20	-1.8	16.86	0
Mar-20	-2.8	57.5	106.7

Apr-20	-16.7	66.9	145.8
May-20	-9.1	51.9	51.2
Jun-20	-8.3	38.10	90
Jul-20	-6.6	35.93	149
Aug-20	-8.6	36.11	259
Sep-20	-8.8	38.24	1538
Oct-20	-16.4	54.3	8527.1
Nov-20	-18.7	71.5	6273.2
Dec-20	-12.6	66.6	6302.0
Jan-21	-15.1	75.3	8584.3
Feb-21	-16.0	77.9	8953.8
Mar-21	-17.1	80.0	9575.9
Apr-21	-8.3	66.30	3281
May-21	-6.5	53.79	984
Jun-21	-4.9	44.57	201
Jul-21	-7.0	36.17	203
Aug-21	-4.3	31.99	181
Sep-21	-6.3	32.41	410

Source: created by the author

The data contained in the grey cells in Table 3, correspond to the first and second wave of the Covid-19 outbreak, so March-June 2020 and October 2020 – April 2021. If we look at the Covid Stringency Index, it shows the highest values in the highlighted months; the peak was reached in February-March ’21 with the values of 77.9 and 80 (written in red), instead the maximum during the first wave was 66.9 in April ’20. Therefore, the restrictions in Czech Republic during the second wave have been significantly stricter than during the first wave, this is confirmed by the average CSI of the periods: 53.6 for the first wave, 70.3 for the second. The minimum CSI (16.86) in the data set was registered in February ’20 right before the beginning of the first lockdown, the second minimum is represented by 32 in August-September ’21 (values written in blue).

Just like the CSI, also the other two variables show critical values during the lockdown months; specifically, they share the negative peak in the same months, also highlighted in red, except for the COF whose worst value is the one registered in November ’20 (-18.7). The COF and ANDC best values match perfectly with the ones of the Covid Stringency Index (February ’20, August-September ’21).

4.1.2 Model 1 specification, correlation matrix and estimation

In Model 1 I will consider the Consumer Confidence Indicator (dependent variable) as a function of the Covid Stringency Index and the Average New Daily cases per month (independent variable). The model specification is reported below (1):

- Economic model: $COF_t = f(CSI_t, ANDC_t,)$
- Econometric model: $COFt = \gamma 1 CSIt + \gamma 2 ANDCt + E\,t$ [1] ***(1)***

I will now examine the correlation matrix of the data set, successively I will proceed with the coefficients' estimation.

Table 4.2: Correlation matrix 1

	ANDC	**CSI**	**COF**
COF	-0.7899	-0.7801	1
CSI	0.7587	1	
ANDC	1		

Source: created by the author (using the software Gretl)

Observing the correlation matrix, we can see that the COF shows a significant negative correlation (-0.79, -0.78) with both the independent variables, instead the latter ones are positively correlated but since the coefficient is lower than 0.8 high multicollinearity does not occur between the explaining variables.

At this point, I conducted a regression analysis with the data described above, utilizing the Consumer Confidence Indicator as explained variable, whereas the Covid Stringency Index and ANDC per month as regressors. The model has been run through the software Gretl, its parameters have been estimated with the Ordinary Least Square method and the chosen p-value significance level is "$p < 0.05$".; the results are shown in the Figure below.

[1] E_t stands for the error term.

Figure 4.1: Model 1 estimation

```
Model 9: OLS, using observations 2020:02-2021:09 (T = 20)
Dependent variable: ConsumerConfidenceIndicator

                      coefficient   std. error   t-ratio  p-value
  ---------------------------------------------------------------
  const                -1.65460      2.54435     -0.6503  0.5242
  CovidStringencyI~    -0.121954     0.0582673   -2.093   0.0517
  Averagenewdailyc~    -0.000660983  0.000288433 -2.292   0.0350

Mean dependent var   -9.795000   S.D. dependent var   5.200959
Sum squared resid     153.6804   S.E. of regression   3.006663
R-squared             0.700981   Adjusted R-squared   0.665803
F(2, 17)              19.92633   P-value(F)           0.000035
Log-likelihood       -48.77020   Akaike criterion     103.5404
Schwarz criterion     106.5276   Hannan-Quinn         104.1235
rho                   0.073362   Durbin-Watson        1.828529
```

Source: created by the author (using the software Gretl)

Unexpectedly, the results of the regression report a quite weak influence of both independent variables, as shown by the coefficients: -0.123 for the CSI, -0.001 for the ANDC. The initial idea was that the more the pandemic was affecting people's lives wihth more restrictions or growing cases, and the less confident the individuals would have felt; however the relationship seems too weak for confirming this hypothesis.

4.1.3 Model 1 verification

In order to proceed with the model verification, it is opportune to look at the R-squared and Adjusted R-squared to measure how well the model explains the relationships among the variables. They are respectively 0.70 and 0.67, which means that the explained part of the model is the 67% (considering the Adj. R^2), which is a good and reliable result.

The overall p-value of the model is 0, so it is definitely significant. The explanatory variables CSI and ANDC per month show respectively 0.05 and 0.03 level of significance, therefore they are in the range. In order to verify their significance, I tested the null hypothesises for both of regression parameters, so assuming them equal to 0 ($H1_{0:}$ ANDC = 0, $H2_0$: CSI = 0). The two tests confirmed that the variables are both significant since the results show p-values equal or lower than 0.05 ($H1_{0:}$ 0.035, $H2_0$: 0.05), therefore I rejected the null hypothesises.

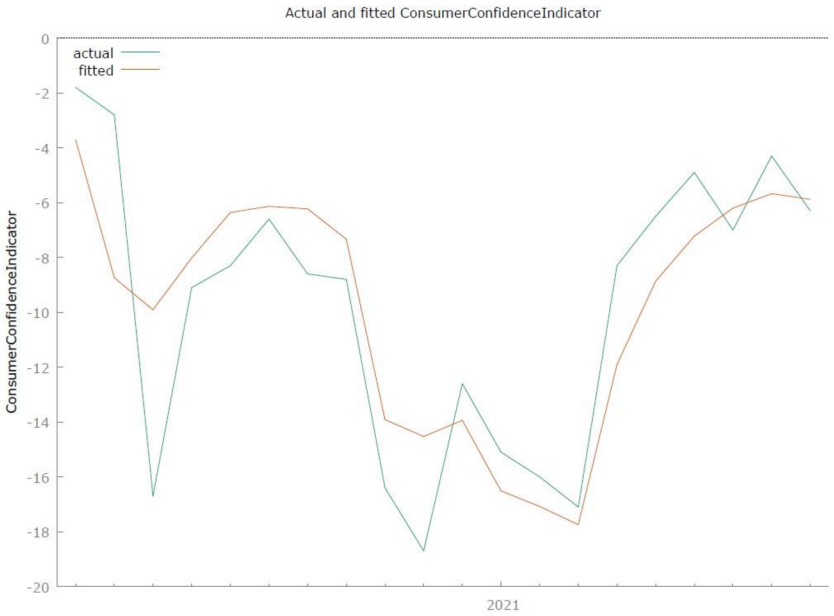
At this point it can be stated that in Czech Republic during the period February '20 and September '21, the Consumer Confidence Indicator has been slightly negatively affected by the strictness of the anti-Covid measures and by the number of New daily cases per day.

The final form of the model is reported in the following equation (2):

- $COFt = -1.66 - 0.12CSIt - 0.001ANDCt + E\,t$ **(2)**

The Durbin-Watson value of 1.83 indicates a slight positive autocorrelation in the residuals, however it can be ignored since it is not so high (D -W of 2 means no autocorrelation) despite it biases slightly the model. The test for heteroscedasticity did not show any presence of it. The following chart reports the actual trend and the one estimated by the model of Consumer Confidence Indicator. The graph shows that the fitted trend (orange) is a discrete fit of the real one (green).

Chart 4.1: Actual VS Fitted Consumer Confidence Indicator



Source: created by the author (using the software Gretl)

4.2 Food and non-alcoholic beverages linear regression models

4.2.1 Data set 2

In this second chapter of the practical part, I will analyse the impact of the pandemic on Czech households' expenditure on Food and Non-alcoholic beverages for the year 2020 (Y1); the values are intended on an average base per capita. In order to do so, I will first build a model that explains how the trend was affected by certain factors throughout the last 9 years before COVID-19 (2011-2019), after I will estimate another model with identical structure but based on a span of 10 years including the observations for 2020; at this stage I will describe the differences between the two models.

The factors selected as explanatory variables are: Alcoholic beverages and Tobacco average expenditure per capita in CZK (Y2), Consumers' perception of prices trend (X1), Sales Index in Food & Beverage service activities (X2), Average disposable Income per capita (X3), Major purchases at the moment (X4).

The variables X1 and X4 are qualitative data derived from the EU consumer survey, which are converted into a quantitative form through the balances, as explained previously in the Methodology (Chapter 3.2). They measure the balance between positive and negative answers to the following questions:

1. By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months?
2. In view of the general economic situation, do you think that now it is the right moment for people to make major purchases such as furniture, electrical/electronic devices, etc.?

According to the Czech Statistical Office the Sales Index includes food and beverage serving activities providing complete meals or drinks fit for immediate consumption, whether in traditional restaurants, self-service or take-away restaurants, whether as permanent or temporary stands with or without seating; crucial is the fact that meals fit for immediate consumption are offered.

The Disposable income per capita indicates the amount of money available to the individual after paying the taxes.

All the observations for each variable are reported in the data set below (Table 5.3).

Table 4.3: Data set 2

YEAR	Expenditure Food NonAlcohol	Expenditure Alcohol Tobacco	Prices Trend Perception	F&B Service Activities Index	Income	Major purchases
	Y1	**Y2**	**X1**	**X2**	**X3**	**X4**
2011	22546	3383	46.23	100.0	152567	-4.4
2012	23777	3381	39.88	94.8	154962	-19.3
2013	24448	3386	25.85	94.9	158678	-16.0
2014	24800	3505	20.02	95.1	154849	-9.5
2015	24537	3610	17.49	100.0	161795	5.8
2016	24953	3671	12.99	106.5	168926	15.8
2017	28222	4556	25.09	117.4	178837	13.3
2018	28829	4684	26.82	119.0	191470	17.3

2019	29445	4640	34.59	120.5	206032	13.6
2020	30985	4978	36.32	79.6	216114	-13.8

Source: created by the author

For each variable in the table have been highlighted the maximum (red) and minimum (blue) values for the observation period. The expenditures and the income report all their minimum in 2011 and their maximum in 2020; it is expectable since they are variables which usually grow steadily through the years (from 2% to 4% per year).

When it comes to the Prices trend perception the maximum is reported in 2011 with 46.23, so most of Czech consumers in that moment thought that the prices would have increased in the following months; this bad feeling was probably due to the dark period 2008-2011 caused by the 2008 global crisis which discouraged the consumers. There is a similar pattern in 2020, the registered value is the highest since the years 2011/12 (36.32) and it coincides with the COVID-19 outbreak, proving how these negative events affected consumers' perception.

The sales index in F&B service activities had its maximum and minimum in the last two observations; in 2019 the peak was reached, showing the sector was thriving in Czech Republic till then, however the pandemic had a disruptive impact reducing the sales of about 34% in 2020.

There was a remarkable and anomalous variation in 2017 of Food and Non-alcoholic beverages expenditure, Alcoholic beverages and Tobacco expenditure, Sales Index in Food & Beverage service activities. In relative terms, compared with the previous year, they increased respectively of 13.10 %, 24.11 % and 10.14%. This anomaly was due to various reasons: for the expenditures it was due to the significant prices increase occurred in 2017, meanwhile the Sales index was pushed by the advent of online food delivery services.

Finally, the variable Major Purchases X4 reported negative values for the first four observations (2011-2014), so the consumers considered that one as a bad period to make major purchases. Later the trend was inverted and we can see only positive values in the following years (with a peak in 2018), till 2020 when the balance became again negative; again, like for the prices' perception, it is visible that when critical circumstances happen they worsen consumers' frame of mind.

The table below expresses the data set 2 in relative changes, except for the variables X2 and X5 whose calculation would not be useful being balances which already indicate percentages. In the bottom row are reported the average variation rates for each variable

before 2020, so that they can be compared with the 2020 variation to see whether the latter has been unusual or not.

At first glance it is visible that all the variables in 2020 show a significant difference with the average rate from the previous years. The one that was heavily hit by the pandemic was the Sales Index in Food & Beverage service activities, which reported a decrease of -33.94% against the +2.45% average rate. Both the Expenditures registered increases above the average, respectively 5.23% (Food & Nonalcohol.) and 7.28% (Alcohol. & Tobacco), which differ from the average rate of +1.76% and +3%.

Table 4.4: Data set 2 relative changes

YEAR	Expenditure Food NonAlcohol	Expenditure Alcohol Tobacco	F&B Service Activities Index	Income
2012	5.46%	-0.06%	-5.16%	1.57%
2013	2.82%	0.15%	0.16%	2.40%
2014	1.44%	3.51%	0.19%	-2.41%
2015	-1.06%	3.00%	5.13%	4.49%
2016	1.70%	1.69%	6.55%	4.41%
2017	13.10%	24.11%	10.14%	5.87%
2018	2.15%	2.81%	1.40%	7.06%
2019	2.14%	-0.94%	1.24%	7.61%
2020	5.23%	7.28%	-33.94%	4.89%
Average variation rate before 2020	*3.47%*	*4.28%*	*2.45%*	*3.87%*

Source: created by the author

4.2.2 Focus on the consumption expenditures of Food, Beverages and Tobacco in the year 2020

Food and Non-Alcoholic beverages and Alcoholic beverages and Tobacco are two macro categories of the COICOP classification, so they can be broken down into several sub-categories which all contribute to the total expense (e.g., meat, vegetables, wine).

In order to give an insight of what happened to the expenditure on Food, Beverage and Tobacco in 2020, I decided to analyse the individual sub-categories in terms of relative changes from the previous year, furthermore the expenditure is also divided by net income per person; the data source is the Czech Statistical Office.

First of all, I built three tables expressing the variations in percentage from the previous year of the single products categories and the macro-ones; the tables are referred to the years 2017-18, 2018-19 and 2019-20, in order to benchmark the 2020 with two previous years (they can be found in the Appendix).

Comparing the variation rates of the macro categories it is immediately visible that the in the year 2020 the consumption expenditure increased substantially compared to the previous periods. Food and Non-Alcoholic beverages for the years 2018 and 2019 registered respectively +2.15% and -2.14%, while in 2020 the variation has been equal to +5.23%. When it comes to Alcoholic beverages and Tobacco the change in 2020 was even more relevant registering a +7.28% increase, meanwhile in the preceding years the variations were +2.81% (2017) and +0.94% (2018).

In order to focus on the year 2020, I elaborated the Table 5.4 below which sums up the most relevant changes occurred to the subcategories[2]; the selection has been based on the total households' expenditure, but in addition to that in the other columns of the table are reported the variations differentiated by the income quintiles (divided in fifths).

The Food and Non-Alcoholic beverages expenditure increased about 5% for all the income segments, except for the third and the fourth which reported respectively +0.91% and 8.98%. This pattern is repeated for the Alcoholic beverages and Tobacco expenditure, third and fourth segment registered variation different from the rest (about 5%), namely 3.32% and 15.18%.

The Food item with the sharpest increase was Fish (11.51%), especially among the people with low income (+21.65%), followed by Fruit (+10.08%) and Sweets (+6.95%); also for the latter items the people in the segment of low income have been the ones that increased the most their expense. The Non-Alcoholic beverages registered a contained growth of +3.89%.

Among the Alcoholic drinks wine was the one that register the biggest increase (12.08%), followed by beer (8.05%) and spirits (4.53%). In this case second and third segment did not report a substantial variation (3.18% and 2.19%), meanwhile all the others had a double figure increase of about 12%.

For the Tobacco expenditure we can observe very heterogenous variations, two negatives and three positives, all of them quite relevant especially for the fourth one (+21.60%).

[2] Categories and sub-categories in Table 5.4 are numbered according to the COICOP classification

Table 4.5: Break down of the relative changes per category (year 2020)

Categories	Households, total	Lowest 20 %	Second 20 %	Third 20 %	Fourth 20 %	Fifth 20 %
1. Food and Non-Alcoholic beverages	**5.23%**	**5.28%**	**5.95%**	**0.91%**	**8.98%**	**4.58%**
1.1 Food	*5.36%*	*5.69%*	*5.98%*	*0.95%*	*9.09%*	*4.63%*
1.1.3 Fish	11.51%	21.65%	8.33%	5.08%	12.55%	10.45%
1.1.6 Fruit	10.08%	13.85%	6.10%	5.75%	12.52%	11.33%
1.1.8 Sugar, jam, honey, chocolate and confectionery	6.95%	11.94%	9.37%	10.10%	6.65%	-3.02%
1.2 Non-Alcoholic beverages	*3.89%*	*1.25%*	*5.63%*	*0.39%*	*7.87%*	*4.09%*
2. Alcoholic beverages and Tobacco	**7.28%**	**5.39%**	**5.51%**	**3.32%**	**15.18%**	**5.90%**
2.1 Alcoholic beverages	*8.38%*	*12.10%*	*3.18%*	*2.19%*	*11.93%*	*11.16%*
2.1.2 Wine	12.08%	12.55%	15.81%	7.04%	9.26%	15.51%
2.1.3 Beer	8.05%	8.59%	-1.30%	3.03%	17.51%	11.36%
2.1.1 Spirits	4.53%	18.64%	-0.69%	-4.45%	6.39%	5.07%
2.2 Tobacco	*5.35%*	*-4.72%*	*9.80%*	*5.10%*	*21.60%*	*-6.34%*

Source: Created by the author, data source Czech Statistical Office

4.2.3 Model 2A specification, correlation matrix and estimation

The model 2A will explain the trend of Food & Non-Alcoholic beverages expenditure before the pandemic, so the observations are referred to the years 2011-2019. The exogenous variables of the model are: Alcoholic beverages and Tobacco average expenditure per capita in CZK (Y2), Consumers' perception of prices trend (X1), Sales Index in Food & Beverage service activities (X2), Average disposable Income per capita (X3), Major purchases at the moment (X4). The model specification is reported below (3):

- Economic model: $Y1_t = f(Y2_t, X1_t, X2_t, X3_t, X4_t)$
- Econometric model: $Y1t = \gamma 1 Y2t + \gamma 2 X1t + \gamma 3 X2t + \gamma 4 X3t + \gamma 5 X4t + Et$ [3] ***(3)***

Before to proceed with the estimation of the parameters, I will analyse the correlation matrix of the data set.

[3] Et stands for the error term.

Table 4.6: Correlation matrix 2

	X4	X3	X2	X1	Y2	Y1
Y1	0.7074	0.9453	0.9134	-0.1574	0.9714	1
Y2	0.7804	0.9307	0.9695	-0.0581	1	
X1	-0.3719	-0.0391	-0.0351	1		
X2	0.8665	0.9319	1			
X3	0.7503	1				
X4	1					

Source: created by the author (using the software Gretl)

We can see that the endogenous variable presents high positive correlation with Y2, X2 and X3, slightly lower value for X4, meanwhile the connection with X1 is negative and weak.

Looking at the exogenous ones, it can be noticed that X2 and X3 might cause some problems of high multicollinearity with other explanatory variables, given their great correlation with them (especially with Y2). However, in this case the high degree of correlation is justified by the nature of the variables, since the income and the sales index will obviously have a strict connection with the expenditure, and moreover between themselves. I tried to eliminate the multicollinearity dynamizing the model through lags or variables in the form of first difference, although none of the results was statistically satisfying so I decided not to intervene.

Once verified the correlation among the variables, I estimated the model 2A parameters through the Ordinary Least Square method on Gretl.

The regression results reported in Figure 5.2 below, show that the variables X4 and X1 have an important negative influence on the endogenous Y1 (respectively -67.24 and -54.4); the intention to make major purchases induced the Czech people to save money on Food & Non-Alcoholic beverages, the same outcome occurred when the consumers perceived that the prices would grow in the following 12 months.

The expenditure on Alcoholic beverages and Tobacco did not affect heavily the one on Food & Non-Alcohol., reporting a coefficient of +3.28. So consuming Alcohol and Tobacco produced a slight positive effect on the food consumption.

The Income is significant for the model but seems to be neutral to the food expenditure, since the parameter for X4 is +0.05; when it comes to the F&B Sales index, it is appropriate to test for its statistical significance first because its p-value is much higher

than 0.05 (p = 0.5262). All the other variables are significant since they all have a p-value lower than 0.05.

Figure 4.2: Model 2A estimation

```
Model 1: OLS, using observations 2011-2019 (T = 9)
Dependent variable: FoodNonAlcoholExpenditure

                      coefficient    std. error    t-ratio  p-value
  ---------------------------------------------------------------------
  const                2819.61       2363.85         1.193   0.3187
  AlcoholTobaccoEx~       3.27786       0.541056     6.058   0.0090
  PricesTrendPerce~     -54.3966        8.90620     -6.108   0.0088
  FBServiceActivit~      33.6881       47.1118       0.7151  0.5262
  Income                  0.0489313     0.00811529   6.030   0.0091
  Majorpurchases        -67.2357       15.5726      -4.318   0.0229

Mean dependent var   25728.56   S.D. dependent var   2452.105
Sum squared resid    57549.19   S.E. of regression   138.5029
R-squared            0.998804   Adjusted R-squared   0.996810
F(5, 3)              500.9105   P-value(F)           0.000140
Log-likelihood      -52.20471   Akaike criterion     116.4094
Schwarz criterion    117.5928   Hannan-Quinn         113.8558
rho                 -0.656697   Durbin-Watson        3.083047
```

Source: created by the author (using the software Gretl)

4.2.4 Model 2A verification

The exogenous variables of the model explain very well the variations of the endogenous, as proved by R^2 and adjusted R^2 both equal to 0.99; so, the model is a good fit for the data. The overall p-value of the Model 2A is 0, meaning that the model is significant. When it comes to the individual p-values of the exogenous variables, the only one that is above the significance level of 5% is the Sales Index in F&B service activities (X2). Consequently, I run a test omitting X3 from the model to verify if it would still be relevant ($H1_{0:}$ X3 = 0). The results reported in Figure 5.3 below display that the p-value for the Null hypothesis is 0.53, so it is accepted. This outcome is supported by the fact that the reduced model is still significant, as well as each independent variable, moreover R^2 and adjusted R^2 remain excellent.

Figure 4.3: Test for the null hypothesis: $\gamma_3 = 0$

```
Test on Model 1:
  Null hypothesis: the regression parameter is zero for FBServiceActivities
  Test statistic: F(1, 3) = 0.511322, p-value 0.526192
  Omitting variables improved 3 of 3 information criteria.
Model 4: OLS, using observations 2011-2019 (T = 9)
Dependent variable: FoodNonAlcoholExpenditure
                      coefficient    std. error   t-ratio  p-value
  ------------------------------------------------------------------
  const                4437.88       639.735       6.937   0.0023  ***
  AlcoholTobaccoEx~      3.62147       0.232989    15.54    0.0001  ***
  PricesTrendPerce~    -49.3177        5.03446     -9.796   0.0006  ***
  Income                 0.0515375     0.00679349   7.586   0.0016  ***
  Majorpurchases       -57.1061        6.05960     -9.424   0.0007  ***
Mean dependent var   25728.56   S.D. dependent var   2452.105
Sum squared resid    67357.90   S.E. of regression   129.7670
R-squared            0.998600   Adjusted R-squared   0.997199
F(4, 4)              713.1335   P-value(F)           5.80e-06
Log-likelihood      -52.91293   Akaike criterion     115.8259
Schwarz criterion    116.8120   Hannan-Quinn         113.6978
rho                 -0.710474   Durbin-Watson        3.241802
```

Source: created by the author (using the software Gretl)

Given the above-described output of the test, I accept the Null hypothesis and exclude the variable Sales Index in F&B service activities (X2) from the Model 2A; therefore, the final structure of the model will be the one in Figure 5.3, namely (4):

- $Y1t = 4437.88 + 3.62Y2t - 49.32X1t + 0.052X3t - 57.12X4t + E\,t$ ***(4)***

The Durbin-Watson value of 3.24 indicates that there is a negative autocorrelation in the residuals, which could bias the model. Hence, I tested for the first order autocorrelation through the Breusch-Godfrey test which confirmed its presence with a p-value of 0.0465. However, when I tried to solve the autocorrelation with the Cochrane–Orcutt procedure (which adjusts the model for the autocorrelation in the errors), the new outcome of the model was still showing even higher negative autocorrelation according to the Durbin-Watson test. This ambiguity is probably caused the p-value which is so close to 0.05, indeed if it would have been higher the autocorrelation would not have been significant. Given that I decided not to do any further action about autocorrelation, even though the model will be slightly biased.

The last verification was about heteroskedasticity, through the Breusch-Pagan test whose output showed a p-value of 0.856>0.05, therefore heteroskedasticity is not present.

4.2.5 Model 2B specification, correlation matrix and estimation

The Model 2B will have an identical structure to Model 2A in terms of variables and data, the only difference will be about the numbers of observations which will be extended to 10 years including the 2020. Hence, the algebraic form corresponds to the one in equation 3:

- $Y1t = \gamma 1Y2t + \gamma 2X1t + \gamma 3X2 + \gamma 4X3t + \gamma 5X4t + E\,t$ [4] ***(3)***

Like in the previous regression analysis, at this point I will examine the correlation matrix for the data set; it will be interesting to see what differences with the Correlation matrix 2 (Chapter 5.2.2) will emerge when adding the pandemic year in the observations. In order to highlight the values variations of the two matrixes, I calculated their difference ($D_1 = C_3 - C_2$).

Table 4.7: Correlation matrix 3

	X4	**X3**	**X2**	**X1**	**Y2**	**Y1**
Y1	0.3390	0.9634	0.2163	0.0284	0.9791	1
Y2	0.4306	0.9478	0.3006	-0.0935	1	
X1	-0.4266	0.1372	-0.1885	1		
X2	0.8505	0.1621	1			
X3	0.3223	1				
X4	1					

Source: created by the author (using the software Gretl)

Table 4.8: Difference of the Correlation matrixes ($D_1 = C_3 - C_2$)

	X4	**X3**	**X2**	**X1**	**Y2**	**Y1**
Y1	-0.3684	0.0181	-0.6971	0.1858	0.0077	0
Y2	-0.3498	0.0171	-0.6689	-0.0354	0	0
X1	-0.0547	0.1763	-0.1534	0	0	0
X2	-0.016	-0.7698	0	0	0	0
X3	-0.428	0	0	0	0	0
X4	0	0	0	0	0	0

Source: created by the author (using the software Gretl)

[4] E_t stands for the error term.

When the 2020 is included in the data set of the model it is observable that in terms of correlation some changes occur (written in red in Table 5.7). The most considerable ones were registered for the variables X2, whose correlation coefficients were reduced of about 0.7 with Y1, Y2 and X3. The correlation variated substantially also for X4, whose coefficients with the variables Y1, Y2 and X3 decreased of about 0.4.
Except for X2-X4 and Y2-X3 which present correlation coeffients higher than 0.8, all the others are cointained in the interval: +0.8, -0.8. Therefore no high multicollineatiry occurs, and the high values mentioned before are not so relevant.
At this stage, I proceeded with the estimation of the Model 2B using again the Ordinary Least Square method, through the software Gretl; the output is reported in the following Figure (5.4).
The parameters do not present huge differences with the ones from the Model 2A, however all of them show lower values except for $\gamma 3$ which increased considerably ($\gamma 3$ = 33.69 in model 2A, Δ+9.4); also the p-value of X3 changed from the previous model, indeed in this case is lower than 0.05.

Figure 4.4: Model 2B estimation

```
Model 1: OLS, using observations 2011-2020 (T = 10)
Dependent variable: ExpenditureFoodNonAlcohol
                      coefficient    std. error   t-ratio  p-value
  ---------------------------------------------------------------
  const                2387.24       884.010        2.700  0.0541
  ExpenditureAlcoh~       3.18097      0.220190     14.45   0.0001
  PricesTrendPerce~     -55.7618       5.07370     -10.99   0.0004
  FBServiceActivit~      43.0886       6.97706       6.176  0.0035
  Income                  0.0481022    0.00610907    7.874  0.0014
  Majorpurchases        -69.8962       7.28789      -9.591  0.0007
Mean dependent var    26254.20   S.D. dependent var   2847.411
Sum squared resid     58335.65   S.E. of regression   120.7639
R-squared             0.999201   Adjusted R-squared   0.998201
F(5, 4)               999.8879   P-value(F)           2.79e-06
Log-likelihood       -57.54630   Akaike criterion     127.0926
Schwarz criterion     128.9081   Hannan-Quinn         125.1010
rho                  -0.549106   Durbin-Watson        3.090306
```

Source: created by the author (using the software Gretl)

4.2.6 Model 2B verification

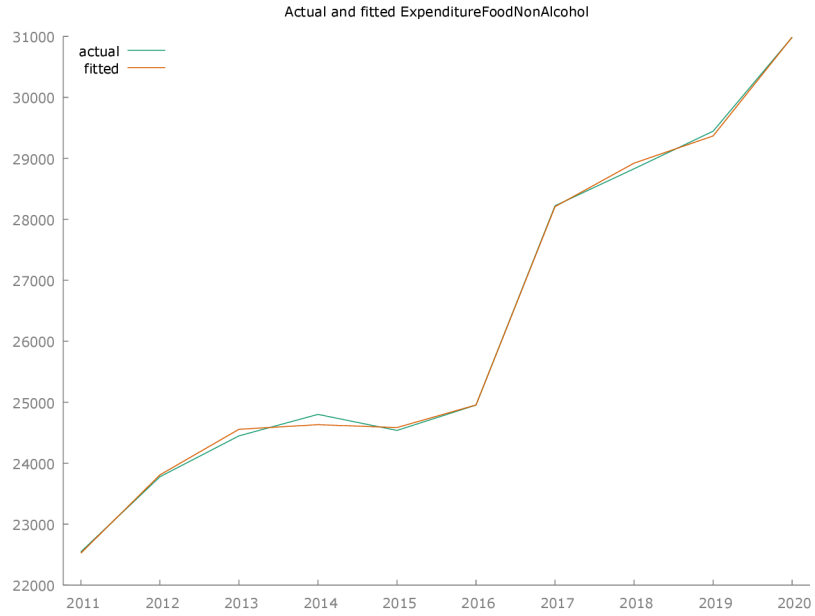
The R^2 and adjusted R^2 equal to 0.99 indicate that also in this model the independent variables are a suitable explanatory fit for the dependent variable.

The overall p-value of the model is 2.79e-06 which is far smaller than 0.05, the model is therefore significant. When it comes to the individual significance of the single variables, all of them report p-values lower than 0.05 meaning that they are all significant for the model. I tested the Null hypothesis ($H1_{0:}$ X = 0) for each variable, assuming the related parameter γ equal to 0; the results of the tests confirmed the initial assumption that all the variables are statistically significant, so all the null hypothesises are rejected.
Thus, after this opportune verification process, we can conclude that the model does not need any further modification, hence the final structure will be like the one assumed at the beginning:

- $Y1t = 2387.24 + 3.18Y2t - 55.76X1t + 43.09X2t + 0.05X3t - 69.90X4t + Et$ ***(5)***

The Durbin-Watson value of 3.09 signals the presence of negative autocorrelation among the resiudal terms, so I tried to apply the Cochrane–Orcutt procedure but it was not effective, showing a lower DW value (3.0) but still not considerably better. Hence, I conducted a Breusch-Godfrey test to test for the autocorrelation of the first order. Just like in Model 2A, the BG test proves that the negative autocorrelation is not significant since its p-value is 0.21> 0.05.
The Breusch-Pagan test for heteroskedasticity reports a p-value equal to 0.511, therefore it is not present and the variance among the residuals is constant.
In the following chart are reported the actual trend and the one estimated by the model of expenditure on Food and Non-Alcoholic beverages. The graph shows that the fitted trend (orange) is very close to the real one (green).

Chart 4.2: Actual VS Fitted Expenditure on Food and Non-Alcoholic drinks



Source: created by the author (using the software Gretl)

4.3 Alcohol and Tobacco linear regression models

I will now build the regression models explaining the trend of Czech Alcohol and Tobacco expenditure, the data set will be the same described in Table 5.3 (Chapter 5.2.1). Of course, the difference is in the explained variable, which now is the Alcohol and Tobacco expenditure, so the Food and Non-Alcoholic beverages expenditure becomes independent variable.

The approach will be the same one utilized previously, so I will first build the model for the years 2011-2019 and after a second model will be estimated including the observation for the year 2020.

4.3.1 Model 3A specification and estimation

For the Model 3A there is a "swap" between the variables Y1 and Y2, as shown in the following specification (6):

- Economic model: $Y2_t = f(Y1_t, X1_t, X2_t, X3_t, X4_t)$
- Econometric model: $Y2t = \gamma 1 Y1t + \gamma 2 X1t + \gamma 3 X2t + \gamma 4 X3t + \gamma 5 X4t + Et$ [5] ***(6)***

[5] Et stands for the error term.

When it comes to the correlation among the variables, equivalent assumptions made in the chapter 5.2.2 are valid since the data set is the same, only the hypothesized relationship among the variables is different.

Here below in Figure 5.5 is reported the parameters estimation with the Ordinary Least Square method, done through the software Gretl.

Figure 4.5: Model 3A estimation

```
Model 3: OLS, using observations 2011-2019 (T = 9)
Dependent variable: AlcoholTobaccoExpenditure

                      coefficient    std. error   t-ratio  p-value
  ------------------------------------------------------------------
  const               -1079.38       566.061      -1.907   0.1526
  FoodNonAlcoholEx~       0.282025     0.0465521    6.058   0.0090
  PricesTrendPerce~      14.5102       4.63741      3.129   0.0521
  FBServiceActivit~      -3.65753     14.8005       -0.2471  0.8208
  Income                 -0.0138775    0.00318416  -4.358   0.0223
  Majorpurchases         17.3553       7.07916      2.452   0.0915

Mean dependent var   3868.444   S.D. dependent var   578.4724
Sum squared resid    4951.494   S.E. of regression   40.62632
R-squared            0.998150   Adjusted R-squared   0.995068
F(5, 3)              323.7920   P-value(F)           0.000270
Log-likelihood      -41.16644   Akaike criterion     94.33287
Schwarz criterion    95.51622   Hannan-Quinn         91.77921
rho                 -0.719369   Durbin-Watson        3.156899
```

Source: created by the author (using the software Gretl)

From the estimation we can observe that the expenditure on Food and Non-Alocholic beverages (Y1) had a very slight influence on the Alcohol and Tobacco one (+0.28).

The Prices trend perception (X1) shows a positive connection with the endogenous variable, quantified in +14.51. The Income (X3), once again, seems to be not very influencial reporting a coefficient of only -0.01.

The F&B sales index (X2) and the Major purchases (X4) report parameters respectively equal to -3.66 and +17.36, however their level of signicance might non be adequate therefore it is opportune to test it in the model verification.

4.3.2 Model 3A verification

First of all, the R^2 and the adjusted one equal to 0.99 prove that the model is fitting well the data, since the 99% of the variance within the observations is explained by it.

At this stage we can evaluate the statistical significance of the model and of its variables. Being the overall p-value equal to 0, it means that the Model 3A is significant. If we consider the variables individually, we can se see that X2 and X4 show critical significance

values, so I will now test the Null hypothesis ($H1_0$: X = 0) for both variables singularly and together; the test implicates assuming the related parameter γ equal to 0.

For the first Null hypothesis $H1_0$, I assumed $\gamma 3$ and $\gamma 5$ both equal to 0. The results were not satisfying, since none of the information criteria improved and actually the other variables lost their significance. The p-value of the test was equal to 0.008<0.05, therefore the $H1_0$ is rejected.

The second Null hypothesis $H2_0$ considers only $\gamma 3$ equal to 0. This time the outcome is much better, showing all the other variables as significant (including X4) and 3 information criteria were improved. The test p-value is equal to 0.82>0.05, hence the $H2_0$ is accepted.

The second Null hypothesis $H3_0$ assumes only $\gamma 5$ equal to 0. The results are decent, although there would be some issues with the significance level of X1 and X4, moreover no information criterion was improved. The test p-value is equal to 0.09>0.05, which would allow to accept the $H3_0$, but since its outcome is not econometrically satisfying, I will reject it and proceed with the Null hypothesis $H2_0$. The $H2_0$ test output is reported in Figure 5.6 below.

Figure 4.6: Test for the null hypothesis: γ3 = 0

```
Test on Model 14:
  Null hypothesis: the regression parameter is zero for FBServiceActivities
  Test statistic: F(1, 3) = 0.0610691, p-value 0.820761
  Omitting variables improved 3 of 3 information criteria.
Model 17: OLS, using observations 2011-2019 (T = 9)
Dependent variable: AlcoholTobaccoExpenditure
                       coefficient    std. error   t-ratio  p-value
  ---------------------------------------------------------------------
  const                -1209.04       185.915      -6.503   0.0029  ***
  FoodNonAlcoholEx~        0.271634     0.0174758   15.54    0.0001  ***
  PricesTrendPerce~       13.4474       1.51711      8.864   0.0009  ***
  Income                  -0.0136173    0.00262880  -5.180   0.0066  ***
  Majorpurchases          15.6651       1.59877      9.798   0.0006  ***
Mean dependent var   3868.444   S.D. dependent var   578.4724
Sum squared resid    5052.289   S.E. of regression   35.53973
R-squared            0.998113   Adjusted R-squared   0.996225
F(4, 4)              528.8672   P-value(F)           0.000011
Log-likelihood      -41.25712   Akaike criterion     92.51424
Schwarz criterion    93.50036   Hannan-Quinn         90.38619
rho                 -0.719821   Durbin-Watson        3.190551
```

Source: created by the author (using the software Gretl)

Consequently, the final structure of Model 3A will be:

- $Y2t = -1209.04 + 0.27Y1t + 13.45X1t - 0.01X3t + 15.67X4t + Et$ *(7)*

The Durbin-Watson value equal to 3.19 indicates that there might be a problem of negative autocorrelation among the residuals, then I tried to fix it using the Cochrane–Orcutt

method but it did not work; actually the operation worsened the DW value, increasing it to 3.4. Hence, I tested for the autocorrelation of the first order utilizing the Breusch-Godfrey test which established that the autocorrelation was not significant, given its p-value higher than 0.05 (BG = 0.054).

The last test I conducted was the Breusch-Pagan for heteroskedasticity, which confirmed that it is not present showing a p-value of 0.901.

4.3.3 Model 3B specification and estimation

The Model 3B structure be identical to the Model 3A, they differ in the numbers of observations since in the 3B the year 2020 is included, therefore the specification is the same (6):

- Economic model: $Y2_t = f(Y1_t, X1_t, X2_t, X3_t, X4_t)$
- Econometric model: $Y2t = \gamma 1Y1t + \gamma 2X1t + \gamma 3X2t + \gamma 4X3t + \gamma 5X4t + Et$ [6] ***(6)***

Just like before, I already analysed the correlation matrix for this data set in the Chapter 5.2.4, thus the same assumptions are valid. The estimation of the coefficients is presented in Figure 5.7 at the end pf the paragraph.

The Model 3B shows some substantial differences from the Model 3A in terms of coefficients. Except $\gamma 1$ and $\gamma 4$ which are pretty much equal for both models, $\gamma 2$ and $\gamma 5$ increased considerably (respectively $+\Delta 2.69$ and $+\Delta 4.22$), finally $\gamma 3$ is the one that presents the biggest variation of $-\Delta 9.51$.

Although, the most important change can be seen in the variables significance, indeed in Model 3B all of them seem to be statistically significant.

[6] Et stands for the error term.

Figure 4.7: Model 3B estimation

```
Model 2: OLS, using observations 2011-2020 (T = 10)
Dependent variable: ExpenditureAlcoholTobacco
                      coefficient    std. error   t-ratio  p-value
  ------------------------------------------------------------------
  const                -759.712      263.902      -2.879   0.0451
  ExpenditureFoodN~       0.308457     0.0213517   14.45    0.0001
  PricesTrendPerce~      17.2022       1.97386      8.715   0.0010
  FBServiceActivit~     -13.1664       2.52806     -5.208   0.0065
  Income                 -0.0143483    0.00287101  -4.998   0.0075
  Majorpurchases         21.5782       2.67976      8.052   0.0013
Mean dependent var   3979.400   S.D. dependent var   648.5064
Sum squared resid    5656.780   S.E. of regression   37.60578
R-squared            0.998505   Adjusted R-squared   0.996637
F(5, 4)              534.4932   P-value(F)           9.76e-06
Log-likelihood      -45.87951   Akaike criterion     103.7590
Schwarz criterion    105.5745   Hannan-Quinn         101.7674
rho                 -0.531603   Durbin-Watson        3.053572
```

Source: created by the author (using the software Gretl)

4.3.4 Model 3B verification

Once again the R^2 and the adjusted one are both equal to 0.99, therefore the independent variables explain very well the variance of the dependent one, so the relationship between the model and the endogenous variable is quite strong.

The overall p-value of Model 3B is 9.76e-06, which much lower than 0.05, hence the whole model is significant. Furthermore, when the variables are taken individually, they all show good level of significance, with p-values lower than 0.05. However I tested the Null hypothesis for every single variable, considering the relative parameter γ equal to 0, and the results confirmed what was visible in the first place so all of them are significant and no test output improved the information criteria.

After the verification process, we can conclude that the final structure of Model 3B will be:

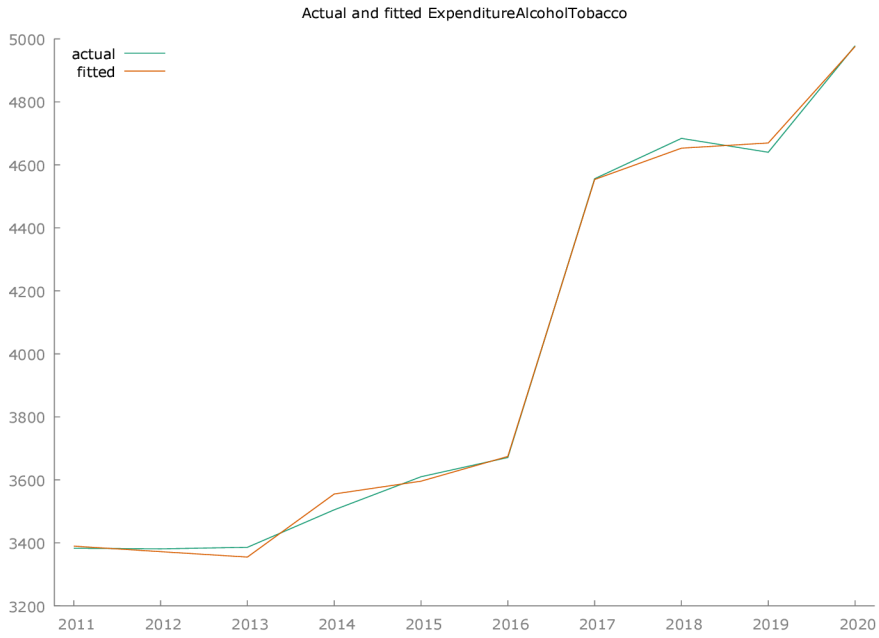
- $Y2t = -759.71 + 0.31Y1t + 17.2X1t - 13.17X2t - 0.01X3t + 21.58X4t + Et$ *(8)*

The Durbin-Watson value is 3.05 suggests that probably a negative autocorrelation among the error terms is present, so I tried to solve it through the Cochrane–Orcutt procedure but the output was not satisfying since the DW value was reduced only to 2.98; at this stage I tested the autocorrelation of the first order with the Breusch-Godfrey test, which proved that the autocorrelation is not relevant with a p-value of 0.2130>0.05.

The last verification was about heteroskedasticity, through the Breusch-Pagan test whose output showed a p-value of 0.665>0.05, therefore heteroskedasticity is not present.

In the following chart are reported the actual trend and the one estimated by the model of expenditure on Alcoholic beverages and Tobacco. The graph shows that the difference between the fitted trend (orange) and the real one (green) is very subtle.

Chart 4.3: Actual VS Fitted Expenditure on Alcohol and Tobacco



Source: created by the author (using the software Gretl)

5 Results and Discussion

5.1 Discussion Consumer Confidence Indicator

The conducted research led to some interesting findings, modifying some expectations that I had at the beginning before to start working on it.

The Chapter 5.1 highlighted the high negative correlation between the Consumer Confidence Indicator and the other two variables, Covid Stringency Index and the Average New Daily Cases per month. As shown also by the charts below in the paragraph, the COF has been decreasing when the CSI and ANDC were increasing and vice versa; I divided the variables into two graphs in order to have a clearer view of the trends, since including all of them in one graph would have been a bit confusing graphically because of the high values in absolute numbers of ANDC.

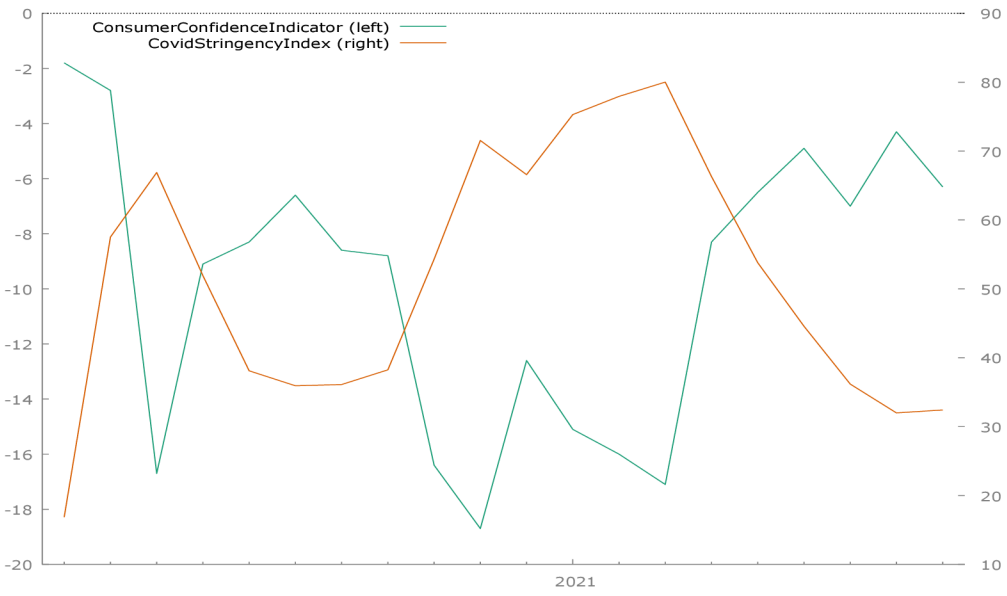
In the Chart 6.1 we can observe clearly how the economic confidence of Czech consumers has been fluctuating oppositely to the stringency of the restrictions. The largest gaps between the two variables were reported during the first two Covid-19 waves, so March-June 2020 and October 2020 – April 2021, where the COF touched its minimum since the times post 2008 financial crisis.

In the Chart 6.2 there is a similar pattern, but not for the first wave of the pandemic where the new daily cases per day in Czech Republic were quite low, so consumers were not affected that much. However, it is good to consider the low numbers of the beginning of the pandemic might also be related to a lower number of tests took in the country compared to the following periods.

In any case the Model 1 structure in equation 2 shows that the parameter for the ANDC is equal to -0.001, hence it had a very limited influence on this kind of indicator. When it comes to the stringency the strength of the relationship is higher, as indicated by the coefficient -0.12; considering the initial analysis of the trend I would have expected a stronger connection, but it is still in line with the reality. The coefficient value close to zero is probably due to the quantitative difference between the data related to dependent variable and the ones related to the independent variables.

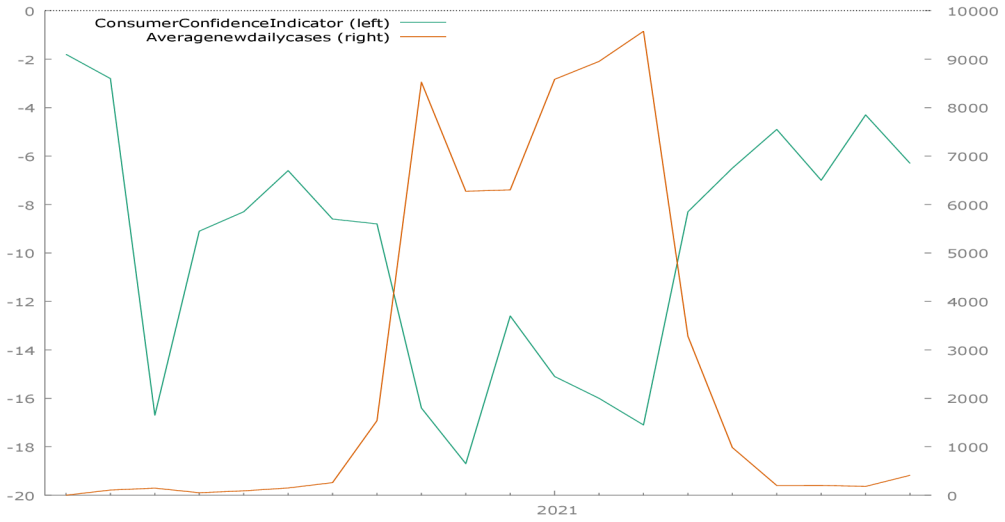
- $$COFt = -1.66 - 0.12CSIt - 0.001ANDCt + E\,t \qquad (2)$$

Chart 5.1: Graph against time of Consumer Confidence Indicator and Covid Stringency Index



Source: created by the author (using the software Gretl)

Chart 5.2: Graph against time of Consumer Confidence Indicator and Average New Daily cases per month



Source: created by the author (using the software Gretl)

5.2 Discussion on Food and Non-Alcoholic beverages

From Chapter 5.2 emerged that Czech consumers spent more money on Food and Non-Alcoholic beverages in the year 2020, with an increase of 5.23%, which was quite above the average of the past 9 years (1.76%) before 2020. In terms of proportion of the total consumption expenditure, Food and Non-alcoholic drinks accounted for the 20.68%, so that is the average amount of money allocated by a Czech individual for the 2020; which differs of +1.20% compared to the average level from the past 4 years (19.48%) and +1.46% from the previous one. Therefore, Czech people spent more money on gastronomic products in 2020 than the precedent years, probably caused by the more time spent home.

When it comes to the single products categories that fall under the macro-one Food and Non-Alcoholic beverages, all of them registered significant increases of at least 5%, except for Bread & Cereals and Oils & Fats; the most relevant were Fish (11.51%), Fruit (+10.08%), Sweets (+6.95%), Meat (+6.94%). This can be partially attributed to the higher prices that consumers paid in 2020, caused by the economic crisis that all players in the market had to face. Especially for products like Fish and Fruit, it is good to consider that Czech Republic is mainly importing those products and with the complications brought by the restrictions they became more expensive. The Non-Alcoholic beverages registered a contained growth of +3.89%.

Although, on a general level this substantial increase of the consumption expenditure reflects those behaviours of hoarding at the beginning of the pandemic; many people feared that even the shops selling food would have closed, so they stockpiled as many essential goods as they could.

In order to analyse some relevant factors that could have affected the consumption expenditure, I elaborated two regression models having as endogenous variable the Food and Non-Alcoholic beverages expenditure per capita in Czech Republic on two different observations spans (2011-2019, 2011-2020). The influencing factors selected as exogenous variables are psychological and economic. Price's perception and Intention to make major purchases are certainly psychological but related to economic drivers. Disposable Income, Expenditure on Alcohol & Tobacco and Food & Beverage service activities sales are economic; the last two are considered as alternatives to buy the food items, so alcohol or food processed by some gastronomic business (e.g., restaurant) and ready to consume.

Here below are reported the equations of the linear regression models, 4 (Model 2A) is related to the pre-Covid period (2011-20119) while 5 (Model 2B) includes the 2020 observation:

Model 2A

- $Y1t = 4437.88 + 3.62Y2t - 49.32X1t + 0.052X3t - 57.12X4t + E\ t$ ***(4)***

Model 2B

- $Y1t = 2387.24 + 3.18Y2t - 55.76X1t + 43.09X2t + 0.05X3t - 69.90X4t + Et$ ***(5)***

The first main difference is the impact of the F&B service activities (X2t), which in Model 2A resulted not significant so it is not present in the equation. So, during the period 2011-2019 the sales of F&B service activities did not have a determinant influence on Czech consumption expenditure on Food and Non-Alcoholic drinks (Y1t).

The situation changed in 2020, when the X2t dropped of 33,94% compared to 2019 so it acquired a certain significance in the model. Since people did not have the alternative to use restaurants and similar services, if not for takeaway, they increased their consumption expenditure in purchasing food products in the shops (brick and mortar or online); this assumption is related to the positive X2t coefficient +43.09.

The variables X4t and X1t have an important negative influence on the dependent Y1t in both models, the intention to make major purchases induced the Czech people to save

money on Food & Non-Alcoholic beverages, the same situation occurred when the consumers perceived that the prices would grow in the following 12 months. The difference here is in the strength of the negative relationship, which got importantly stronger with the pandemic, as shown by the variations of both coefficients (i.e., $\Delta\gamma 2 = -6.44, \Delta\gamma 5 = -12.78$).

The variables expenditure on Alcoholic beverages and Tobacco (Y1t) and Income (X3t) had slightly positive impacts on the Food & Non-Alcoholic drinks expense, the pandemic did not change significantly the entity of either the parameters.

5.3 Discussion on Alcoholic beverages and Tobacco

When it comes to Alcoholic beverages and Tobacco expenditure of Czech consumers, the reported variation for the year 2020 is equal to +7.28% which is the second highest in the observation period, indeed the average growth rate is +4.28%. Proportionally speaking, in 2020 Alcohol and Tobacco constituted the 3.32% of the average consumption expenditure per capita, which is sightly higher than the average from the past years (3.06%) and the difference with 2019 is +0.29%. Also in this case Czech consumers increased their expenditure, probably driven by the desire to distract and relief themselves from the tough consequences caused by the pandemic.

Looking at Alcohol and Tobacco individually in Table 5.5, it is interesting to see the different expenditure variations across the income segments.

We can observe that the poorest segment and the richest two are the ones who raised the most the expense on Alcoholic drinks (about 12%), instead the intermediate segments (second and third) did not increase it much (about 3%).

Assuming that a higher Alcohol consumption could be associated to an intense stress, an interpretation of this could be that people with medium income so working in sectors with more qualified jobs (mostly in service sectors), were not stressed about the potential loss of their job because in most of the cases they had the chance to keep it working from home. Instead, the low-income individuals have been struggling more on a professional level, since in some cases the jobs paying lower salaries are carried out in activities that were forced to close; for example: restaurants, hotels, clothes shops.

The richest people might have been stressing out because of the necessary adjustment to their businesses that they had to implement. On the other hand, another possible scenario could be that they simply had more time to consume Alcohol because of the lockdown.

For the Tobacco expenditure we can observe very heterogenous variations among the segments, two negatives and three positives, all of them quite significant especially for the fourth one (+21.60%).

The equations 7 and 8 below are the specification of the models 3A (2011-2019) and 3B (2011-2020) estimated in Chapter 5.3. They have the same structure of models 2A and 2B, the only difference is that the endogenous variable in this case is the Alcoholic beverages and Tobacco expenditure, while the Food and Non-Alcoholic beverages is exogenous; the rest of the exogenous variables remain unchanged.

Model 3A

- $Y2t = -1209.04 + 0.27Y1t + 13.45X1t - 0.01X3t + 15.67X4t + Et$ *(7)*

Model 3B

- $Y2t = -759.71 + 0.31Y1t + 17.2X1t - 13.17X2t - 0.01X3t + 21.58X4t + Et$ *(8)*

There are similar patterns to the models 2A and 2B. After the opportune tests the F&B activities sales index (X2t) resulted again not significant for the model A, while it acquired significance for the model B. However, here the influence is negative showing how through the years the F&B activities induced the consumers to buy less alcohol by their own and consume it in bars, restaurants etc.

The variables X4t and X1t exert a positive impact on the Alcohol and Tobacco expense in both models (higher in Model 3B). The intention to make major purchases in a certain moment might be related to the desire of celebrating it, implicating a higher consumption of these products. On the other hand, if the consumers have the perception that the prices will raise in the next future, this could be connected with a bad frame of mind about the general situation so consuming Alcohol and Tobacco is a way for the people to relax themselves. This assumption is supported by the increase of the coefficient for the variable X1t in Model 3B, where Covid-19 affected negatively consumers' confidence as shown in Chapter 5.1.

The expenditure on Food and Non-Alcoholic beverages (Y2t) and Income (X3t) did not affect relevantly the amount of money spent by Czech people on Alcohol and Tobacco in none of the models.

6 Conclusions and Recommendations

This work highlighted the impact of Covid-19 pandemic on Czech consumers during the year 2020. First, the individuals have been analysed from a more general point of view, considering psychological factors measured through qualitative data collected from existing research. The study conducted by Eger et al (2021) pointed out that fear played an important role in influencing Czech consumers' behaviour: the greater the fear, the more significant is the behavioural change. Specifically, the authors proved that the level of health or economic fear changed customer shopping behaviour during the Covid-19 pandemic crisis; although it needs to be taken into account that the level of fear differs across the generations.

Furthermore, the findings suggest that Czech consumers during the pandemic have been focusing more on basic needs rather than self-fulfilment needs; the three main priorities for the people were all basic needs: health of the others, personal health, food.

The Boomers (45%) were the ones most concerned about their own health, followed by Gen X (38%) and Gen Y (27%). When it comes to the concern for the others' health, Gen X has been the most worried (59%), then Gen B (56%) and Gen Y (53%). Gen Y was the one with the highest fear of losing the job (38%), then Gen X (35%) and Gen B (20%). The Boomers were not really afraid of that since most of them are retired. The biggest concern of the respondents was surely the general economic situation, the distribution among the generation is quite similar ((B 78%, X 80%, Y 83%).

There were differences in buying certain items in brick-and-mortar shops and online shops, it emerged that Generation B significantly decreased the purchase of selected items compared to the other two generations in both brick-and-mortar stores and online shops; the only exception was the purchase of basic items (food, drugstores and hygiene, medicines) in traditional shops.

Fear has been affecting not only the consumers' behaviour, but most likely also their frame of mind. As shown by the Model 1, the consumers economic confidence reported a significant negative relationship with the measures' stringency and the pandemic development: the stricter the restrictions, the higher the cases, the lower was the Consumer confidence indicator. This assumption is based on an observation period that goes from February 2020 till September 2021. These findings answer the research question number 1

(i.e., “In Czech Republic during the years 2020 and 2021, how was consumers’ economic confidence influenced by restrictions’ stringency and the new Covid cases?”.
In such context of fear and discouragement, the Food and Beverage sector experienced different impacts depending on the players. If we look at the restaurant and bars, the negative consequences that they suffered were massive; except for the ones working mainly with food to takeaway, for whom the adaptation process was not too hard. Throughout the years the activity level of these businesses, was not determinant when it came to the expenditure of Czech consumers on Food & Drinks items. However, in 2020 the huge drop that this segment suffered caused by the restrictions, pushed consumers to buy more food and beverages from shops and supermarkets as proved also by the increased consumption expenditure in 2020. The products that reported the highest increases were: Fish (11.51%), Fruit (+10.08%), Sweets (+6.95%), Meat (+6.94%). That is due in part to the higher prices that consumers paid in 2020, caused by the economic crisis that all players in the market had to face. For items like Fish and Fruit, we have to consider that Czech Republic is mostly importing those products and with the difficulties brought by the pandemic they became more expensive. The Non-Alcoholic beverages registered a contained growth of +3.89%.
From a general point of view, this substantial increase of the consumption expenditure is a consequence of hoarding at the beginning of the pandemic; since people feared that also the shops selling essential good would have closed, so they stockpiled as many as they could.
The Czech consumers expense in Food & Non-Alcoholic Beverages throughout the last 10 years, and particularly during the first pandemic phase, have been severely influenced by the perception of the prices trends and the intention to make major purchases in a specific moment; if they had the perception that the prices would grow in the following 12 months, then they would save some money on this kind of products. Buy some major item such as furniture, car, appliances, led to the same outcome, so also in this case Czech people have been saving money on F&B products. In the same time span the expenditure on Alcoholic drinks & Tobacco and the Disposable income were not very impactful for the expense on Food & Non-Alcoholic beverages. These findings answer the research question number 2 (i.e., What happened to the Czech consumption trend of Food and non-alcoholic beverages in 2020?).

Also in the case of Alcoholic beverages and tobacco expenditure, Czech consumers increased their expenditure, probably moved by the wish to get distracted and escape the tough reality brought by the pandemic; however, it differed according to the income segment of consumers related to. The poorest segment and the richest two resulted as the ones who increased the most the expense on Alcoholic drinks (about 12%), instead the intermediate segments (second and third) did not spend much more than 2019 (about 3%). When it comes to the Tobacco expenditure the variations were very heterogenous among the segments, two negatives and three positives, all of them quite relevant especially for the fourth one (+21.60%).

According to the regression results, thorough the years the F&B activities induced the consumers to buy less alcohol by their own and consume it in bars, restaurants etc. But during the pandemic this trend was of course inverted, since the activities were shut down. Alcohol and Tobacco expense got positively affected by the intention to make major purchases in a certain moment and by the perception that the prices will raise in the next future. Meaning that, for example, the desire of celebrating a major buy implicates a higher consumption of these kind of products. Or, if the consumers have the perception that the prices will grow in the next future, this could be connected with a negative mind frame about the general context, so consuming Alcohol and Tobacco is a way for the people to relax. The expenditure on Food and Non-Alcoholic beverages and Disposable income did not influence significantly the amount of money spent by Czech people on Alcohol and Tobacco, before and after the pandemic. These conclusions refer to the last research question (i.e., "What happened to the Czech consumption trend of Alcoholic beverages and tobacco in 2020?").

According to the outcome of this work, I would recommend to conduct further research on the relationship that consumers had and will have with the Food & Beverage service activities, since the study showed they can be a determinant factor in Food & Drinks consumption.

Moreover, it will be useful to identify new consumption habits that consumers developed during this unusual experience, and also which ones were "killed" by it.

Fear and stress played a crucial role in changing consumers behaviours in 2020, therefore I would suggest to investigate on how to predict the impact that these two factors exert on individuals. The reason why is because psychological factors proved to be more

influencing than the economic ones, when it comes to needs related to Food, Drinks and Tobacco.

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8 Appendix

- *Table 8.1: Break down of the relative changes from the previous year per category, divided by income (year 2018)*

	YEAR 2018	Households, total	Nejnižších Lowest 20 %	Druhých Second 20 %	Třetích Third 20 %	Čtvrtých Fourth 20 %	Pátých Fifth 20 %
01	**FOOD AND NON-ALCOHOLIC BEVERAGES**	2.15%	2.79%	1.49%	1.41%	2.22%	0.85%
01.1	**Food**	2.30%	3.01%	1.68%	1.39%	2.43%	1.02%
01.1.1	Bread and cereals	1.06%	1.66%	0.09%	-0.18%	2.56%	0.20%
01.1.2	Meat	2.00%	1.24%	3.36%	-0.28%	2.28%	1.36%
01.1.3	Fish	0.97%	6.99%	-3.38%	1.72%	-1.40%	-0.72%
01.1.4	Milk, cheese and eggs	4.73%	5.86%	3.76%	4.38%	4.14%	2.95%
01.1.5	Oils and fats	3.71%	5.34%	4.51%	2.90%	4.31%	2.02%
01.1.6	Fruit	2.98%	5.33%	1.61%	2.82%	1.48%	0.70%
01.1.7	Vegetables	1.16%	3.63%	-1.74%	0.16%	1.95%	-0.82%
01.1.8	Sugar, jam, honey, chocolate and confectionery	1.54%	3.87%	-1.59%	0.78%	2.20%	0.67%
01.1.9	Food products and preparations, flavourings	1.60%	-0.58%	3.71%	3.40%	0.16%	0.14%
01.2	**Non-alcoholic beverages**	0.68%	0.63%	-0.47%	1.67%	0.11%	-0.80%
01.2.1	Coffee, tea and cocoa	1.46%	2.04%	-0.32%	1.19%	2.10%	0.37%
01.2.2	Mineral water, soft drinks and juices	0.20%	-0.23%	-0.58%	2.02%	-1.42%	-1.70%
02	**ALCOHOLIC BEVERAGES, TOBACCO**	2.81%	1.83%	5.09%	1.56%	4.31%	1.62%
02.1	**Alcoholic beverages**	2.90%	3.08%	4.81%	2.62%	3.20%	0.87%
02.1.1	Spirits	3.98%	6.68%	5.68%	1.69%	6.79%	0.00%
02.1.2	Wine	3.01%	-0.96%	10.37%	2.72%	1.04%	2.22%
02.1.3	Beer	1.96%	3.77%	2.27%	3.35%	2.56%	0.28%
02.2	**Tobacco**	2.66%	0.16%	5.48%	-0.44%	6.33%	3.14%

Source: Created by the author through the software Excel, data source Czech Statistical Offiice

- *Table 8.2: Break down of the relative changes from the previous year per category, divided by income (year 2019)*

	YEAR 2019	Households, total	Nejnižších Lowest 20 %	Druhých Second 20 %	Třetích Third 20 %	Čtvrtých Fourth 20 %	Pátých Fifth 20 %
01	**FOOD AND NON-ALCOHOLIC BEVERAGES**	-2.14%	-1.21%	-5.28%	-6.52%	-1.76%	-3.44%
01.1	**Food**	-2.20%	-0.93%	-5.84%	-6.61%	-1.86%	-3.37%
01.1.1	Bread and cereals	-3.18%	-1.37%	-5.49%	-8.71%	-0.46%	-4.78%
01.1.2	Meat	-0.92%	-1.18%	-3.71%	-8.19%	0.55%	0.15%

01.1.3	Fish	-1.77%	2.40%	-16.73%	0.15%	-2.69%	-3.49%
01.1.4	Milk, cheese and eggs	-1.60%	0.44%	-7.07%	-4.02%	-3.46%	-2.58%
01.1.5	Oils and fats	12.84%	8.82%	14.26%	5.82%	21.34%	7.78%
01.1.6	Fruit	1.65%	3.84%	-2.80%	2.19%	-2.19%	-2.71%
01.1.7	Vegetables	-12.25%	-11.88%	-20.18%	-17.01%	-11.90%	-9.96%
01.1.8	Sugar, jam, honey, chocolate and confectionery	-4.31%	-0.53%	-9.62%	-6.41%	-2.74%	-10.40%
01.1.9	Food products and preparations, flavourings	-3.49%	0.59%	-1.03%	-9.25%	-10.14%	-3.96%
01.2	**Non-alcoholic beverages**	-1.39%	-4.04%	0.52%	-5.58%	-0.72%	-4.17%
01.2.1	Coffee, tea and cocoa	0.67%	1.00%	1.06%	-0.98%	3.43%	-8.57%
01.2.2	Mineral water, soft drinks and juices	-2.86%	-7.26%	0.14%	-8.90%	-4.05%	-0.87%
02	**ALCOHOLIC BEVERAGES, TOBACCO**	0.94%	-5.56%	8.35%	-14.96%	9.75%	-3.34%
02.1	**Alcoholic beverages**	-1.59%	-7.04%	-3.16%	-7.21%	5.91%	-8.94%
02.1.1	Spirits	4.69%	-1.94%	-17.59%	1.07%	16.79%	4.03%
02.1.2	Wine	-0.45%	5.45%	-16.67%	2.76%	-4.99%	-6.24%
02.1.3	Beer	-6.57%	-18.02%	9.03%	-20.08%	6.67%	-22.20%
02.2	**Tobacco**	5.24%	-3.33%	24.01%	-29.73%	16.50%	7.69%

Source: Created by the author through the software Excel, data source Czech Statistical Offiice

- *Table 8.3: Break down of the relative changes from the previous year per category, divided by income (year 2020)*

	YEAR 2020	Households, total	Nejnižších Lowest 20 %	Druhých Second 20 %	Třetích Third 20 %	Čtvrtých Fourth 20 %	Pátých Fifth 20 %
01	**FOOD AND NON-ALCOHOLIC BEVERAGES**	5.23%	5.28%	5.95%	0.91%	8.98%	4.58%
01.1	**Food**	5.36%	5.69%	5.98%	0.95%	9.09%	4.63%
01.1.1	Bread and cereals	0.82%	0.73%	1.21%	-2.35%	3.69%	0.58%
01.1.2	Meat	6.94%	2.73%	12.41%	0.26%	12.78%	6.82%
01.1.3	Fish	11.51%	21.65%	8.33%	5.08%	12.55%	10.45%
01.1.4	Milk, cheese and eggs	6.36%	11.72%	6.41%	0.62%	9.38%	3.09%
01.1.5	Oils and fats	-1.10%	0.26%	1.13%	-2.18%	1.53%	-6.76%
01.1.6	Fruit	10.08%	13.85%	6.10%	5.75%	12.52%	11.33%
01.1.7	Vegetables	4.79%	4.41%	-0.04%	0.57%	10.60%	7.97%
01.1.8	Sugar, jam, honey, chocolate and confectionery	6.95%	11.94%	9.37%	10.10%	6.65%	-3.02%
01.1.9	Food products and preparations, flavourings	4.40%	-1.05%	3.78%	-1.43%	9.26%	11.78%
01.2	**Non-alcoholic beverages**	3.89%	1.25%	5.63%	0.39%	7.87%	4.09%

01.2.1	Coffee, tea and cocoa	4.92%	-4.04%	4.41%	10.65%	8.16%	5.06%
01.2.2	Mineral water, soft drinks and juices	3.18%	4.22%	6.52%	-6.49%	7.66%	3.38%
02	**ALCOHOLIC BEVERAGES, TOBACCO**	7.28%	5.39%	5.51%	3.32%	15.18%	5.90%
02.1	**Alcoholic beverages**	8.38%	12.10%	3.18%	2.19%	11.93%	11.16%
02.1.1	Spirits	4.53%	18.64%	-0.69%	-4.45%	6.39%	5.07%
02.1.2	Wine	12.08%	12.55%	15.81%	7.04%	9.26%	15.51%
02.1.3	Beer	8.05%	8.59%	-1.30%	3.03%	17.51%	11.36%
02.2	**Tobacco**	5.35%	-4.72%	9.80%	5.10%	21.60%	-6.34%

Source: Created by the author through the software Excel, data source Czech Statistical Offiice