Analysis of Meat Consumption in Slovakia in the third Millennium

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Abstract
The aim of the paper is to analyze the total meat consumption, consumption of individual types of meat in Slovakia in the third millennium with predictions to 2030. The consumption of fish in comparison with meat consumption is also presented. Data from the Statistical Office are presented in the paper. The data consist of beef, veal, pork, and poultry consumption. The analysis was carried out by means of mathematical statistics using a simple moving average. Moving averages are one of the core indicators in economic analysis, moving average is the easiest moving average to construct. It is simply the average consumer over the specified period. The paper also lists the factors affecting meat consumption (meat price, meat quality, environmental impact.) Knowing the values of meat consumption is important for pricing policy and consumer behavior for other types of food. The research results showed an increase in the consumption of chicken and pork and a decrease in the consumption of veal and beef.

Keywords: meat consumption, analysing the consequences, statistical results, environment, health

JEL Classification: Q13, L11, L66

1. Introduction

Interest in meat consumption and its impact on the environment and health has grown significantly over the last few decades. World food organisations present data at international and regional level, analyse the consequences of the deficiencies identified, and examine the environmental and health effects of meat consumption. Based on the results, they propose recommendations on meat consumption. They point to a lot of processed data, what kind of meat is processed, and present data on meat consumption. Of particular interest are also data on bone weight, food loss and waste, cooking weight loss and non-meat ingredients. Depending on the methods used to handle these ambiguous factors, statistical results for per capita meat consumption may vary by different factors.

Food statistics provide a clear but useful indicator of food consumption trends. Delgado (2003) cited an analysis by the Food and Agriculture Organization of the United States that meat consumption in the world increased by almost 60% between 1990 and 2009. Bogueva et al. (2017) explored reasons behind meat consumption. Their aims were find out, what motivates meat consumers and explore the opportunities of social marketing. Delgado (2003) found that the amount of meat consumed in developing countries increased three times as much as in developed countries between the early 1970s and mid-1990s, reflecting different income growth rates. Hawkesworth et al. (2010) report the factors that influence meat consumption in selected countries and link it to the trend of increasing fat consumption.

Meat consumption is also a current issue in Slovakia. Slovakia has recently gone through economic stages as well as the economic crisis in the process of globalization; these factors affect the standard of living and behaviour of households. The behaviour of the population in the market of goods and services is also affected by changes in economic conditions in the context of the
transformation process. In the long run, consumer behaviour is mainly influenced by demographic developments and social and political conditions (Pachingerová, M. 2000). Various food networks are being developed, offers in food markets throughout the country are being made and the market situation is being assessed. The already mentioned individual components of the food network enable us to react immediately to the offer. (Zentková, I. - Hošková, E. 2010). The standard of living of the population is usually compared according to food consumption, i.e., also meat consumption; we compare the share of consumer expenditure spent on food products measured as the percentage of total consumer expenditure per person. Kubicová (2008) writes about the share of consumer expenditure spent on food products as the percentage of the total consumer expenditure. Gradually increasing revenues turn into rising food spending, which leads to changes in consumer patterns. Income growth per capita is associated with slower growth in food spending, while housing, energy, health and transport spendings are rising.

Sans and Combris (2015) analysed dietary models for meat; they used data from 183 countries for the period 1961-2011, and pointed to the relationship between annual per capita gross economic product and meat consumption. They highlighted the sharp increase in meat consumption in China and Brazil. DE Baker at all. dealt with the idea of "Real men eat meat." Their results show that men who look more masculine consume less meat, have a greater tendency to reduce meat intake and have more positive attitudes towards vegetarians. Research has shown that not only biological differences between the sexes but also social and cultural differences between the sexes should be taken into account when analysing meat consumption.

Bonet et al. (2020) and Zur (2014) discussed the regulation of meat consumption in developed countries. Specifically, they discussed possible justifications for this regulation in terms of environmental, health and animal welfare considerations.

### 2. Data and Methods

For the analysis of meat consumption, we used data obtained from the website of the Statistical Office of the Slovak Republic. For data processing, we used basic mathematical statistics. We will analyse meat consumption in the first 20 years of the new millennium, compare meat consumption and fish consumption. Finally, we will compare the year 1993, when the Slovak Republic was established, with the year 2020. Table 1 shows the statistical data on meat and fish consumption between 2001 and 2010.

#### Table 1: The consumption of meat from 2001 to 2010 (values are in kilograms)

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>58.7</td>
<td>59.7</td>
<td>61.5</td>
<td>60.1</td>
<td>61.6</td>
<td>61.3</td>
<td>59.0</td>
<td>58.2</td>
<td>58.7</td>
<td>55.8</td>
</tr>
<tr>
<td>Beef</td>
<td>6.9</td>
<td>6.7</td>
<td>6.8</td>
<td>6.2</td>
<td>6.2</td>
<td>5.3</td>
<td>5.3</td>
<td>4.9</td>
<td>4.9</td>
<td>4.3</td>
</tr>
<tr>
<td>Veal</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0</td>
<td>0</td>
<td>0.1</td>
<td>0.1</td>
<td>0</td>
</tr>
<tr>
<td>Pig</td>
<td>31.8</td>
<td>31.3</td>
<td>32.3</td>
<td>31.9</td>
<td>32.9</td>
<td>32.2</td>
<td>32.2</td>
<td>32.3</td>
<td>32.0</td>
<td>30.8</td>
</tr>
<tr>
<td>Lambs, goat and horse</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Fowls</td>
<td>18.5</td>
<td>20.1</td>
<td>20.7</td>
<td>20.4</td>
<td>21.1</td>
<td>22.3</td>
<td>19.9</td>
<td>19.3</td>
<td>20.7</td>
<td>19.0</td>
</tr>
<tr>
<td>Venison</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
<td>0.4</td>
<td>0.4</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.7</td>
</tr>
<tr>
<td>Other meat</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Fish</td>
<td>4.5</td>
<td>4.4</td>
<td>4.2</td>
<td>4.4</td>
<td>4.4</td>
<td>5.1</td>
<td>4.7</td>
<td>4.9</td>
<td>4.6</td>
<td>5.1</td>
</tr>
</tbody>
</table>

Source: http://datacube.statistics.sk/
Table 2 shows the statistical data on meat and fish consumption between 2011 and 2020, the values have been rising since 2014, from 2011 to 2014 we observe a decline in meat consumption.

Table 2: The consumption of meat from 2011 to 2020 (values are in kilograms)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>56.6</td>
<td>52.5</td>
<td>53.3</td>
<td>47.9</td>
<td>50.6</td>
<td>58.4</td>
<td>62.8</td>
<td>64.3</td>
<td>69.3</td>
<td>69.9</td>
</tr>
<tr>
<td>Beef</td>
<td>3.7</td>
<td>3.6</td>
<td>4.4</td>
<td>4.2</td>
<td>4.3</td>
<td>4.7</td>
<td>5.2</td>
<td>5.2</td>
<td>5.2</td>
<td>5.3</td>
</tr>
<tr>
<td>Veal</td>
<td>0.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pig</td>
<td>31.6</td>
<td>30.0</td>
<td>30.9</td>
<td>28.0</td>
<td>30.9</td>
<td>35.4</td>
<td>35.9</td>
<td>35.4</td>
<td>35.7</td>
<td>37.5</td>
</tr>
<tr>
<td>Lambs, goat, and horse</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Fowls</td>
<td>19.9</td>
<td>17.7</td>
<td>14.5</td>
<td>14.1</td>
<td>16.9</td>
<td>20.2</td>
<td>22.2</td>
<td>26.9</td>
<td>25.6</td>
<td></td>
</tr>
<tr>
<td>Venison</td>
<td>0.7</td>
<td>0.9</td>
<td>0.8</td>
<td>0.9</td>
<td>0.9</td>
<td>1.1</td>
<td>1.1</td>
<td>1.2</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Other meat</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Fish</td>
<td>4.7</td>
<td>4.8</td>
<td>5.1</td>
<td>5.4</td>
<td>5.3</td>
<td>5.1</td>
<td>5.5</td>
<td>5.5</td>
<td>5.6</td>
<td>5.9</td>
</tr>
</tbody>
</table>

Source: http://datacube.statistics.sk/

3. Results and Discussion

Meat consumption per capita was the lowest in 2014, then in 6 years, meat consumption increased by 22 kg per capita, which represents an increase of 31%. The largest contributor to the decline in total meat consumption was an increase in poultry consumption of 11.1 kg, which represents an increase of 79%. From available EU data in 2014, the high consumption of meat per capita was in Denmark (108.3 kg), Austria (103.4 kg), and Portugal (101.5 kg). Recorded consumption of meat in Slovakia significantly lagged behind EU-countries which characterized a middle level of meat consumption for instance Germany (87.0 kg) and Nederland (88.2 kg). Figure 1 show the moving average on meat consumption between 2001 and 2020.

![Figure 1: Meat consumption – moving average (values are in kilograms)](image)

Source: author’s calculations

Figure 2 shows the percentage of meat species between 2001 and 2019, that the change took place in 2015, when there was a decrease in pork consumption and an increase in chicken consumption began.
Figure 2: Percentage of meat species

Source: author’s calculations

Figure 3 shows a comparison of pig, fowls and fish in percentages. The European Union estimates that total per capita meat consumption over the next 10 years will be similar to 2019 and 2020. Changes in consumer preferences, as well as changes in the dairy sector, will influence the meat market until 2030. Total meat consumption in the EU is projected to be at 67 kg in 2030, driven by lower meat availability.

Figure 3: Percentage of meat species

Source: author’s calculations

Consumption will also be affected by lower incomes among some population groups. By 2030, the European Commission expects pork and beef consumption to fall, while poultry consumption will increase. This is according to the European Union's agricultural outlook for 2018-2030, published by the European Commission. EU pork consumption will fall from 37.5 kg per capita in 2020 to 31.7 kg in 2030. Poultry will be the only meat to see a significant increase in EU production and consumption by 2030, according to the EC. Compared to other meats, it has
certain advantages such as affordability, absence of religious restrictions, lower production costs, and lower investment required.

Comparing 1993 and 2020, there has been a gradual reduction in veal and beef consumption; with veal consumption falling to almost zero and beef consumption falling by almost 70% (table 3). This is probably due to higher prices for beef and especially veal, but also to higher consumption of poultry and fish regarding healthier lifestyles. We can state that we have been eating less meat since 1993, the year the Slovak Republic was founded.

Table 3: Comparing 1993 and 2020 (1993 and 2020 values are in kilograms)

<table>
<thead>
<tr>
<th></th>
<th>1993</th>
<th>2020</th>
<th>difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>64.8</td>
<td>69.9</td>
<td>5.1</td>
</tr>
<tr>
<td>Beef</td>
<td>14.9</td>
<td>5.3</td>
<td>-15.4</td>
</tr>
<tr>
<td>Veal</td>
<td>0.7</td>
<td>0</td>
<td>-0.7</td>
</tr>
<tr>
<td>Pig</td>
<td>36.2</td>
<td>37.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Venison</td>
<td>0.3</td>
<td>1.1</td>
<td>0.8</td>
</tr>
<tr>
<td>Fisch</td>
<td>3.8</td>
<td>5.9</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Source: author’s calculations

Total meat consumption has fallen by 10 percent. When we analyse poultry consumption, we find that consumption has increased by 114%. This is due to the fact that the cost of rearing and processing poultry has not increased, unlike the cost of rearing cattle.

Fish consumption increased by a third. In percentage terms, our consumption of venison, in particular, has increased [by 200%] and, by comparison, our consumption of cheese, has increased from less than 5 kg to over 11 kg per person. We can conclude that meat is now being displaced by fish, pasta, and cheese.
4. Conclusion

The aim of the paper was to show the difference in consumer behaviour between different types of meat and fish in Slovakia. The Slovak Republic has similar consumer preferences as neighbouring countries. Consumption of meat is not only about satisfying the basic needs of life, but it is also important from the environmental point of view; efforts are made to find such farming options that meat is of high quality without polluting the environment. The results of the research showed a change in consumer behaviour (a significant increase in the consumption of chicken meat due to its low price). Rising prices of beef and veal lead to progressively lower per capita consumption. Consumption behaviour is also influenced by a quality and balanced diet, which is reflected in an increase in per capita consumption of fish, a doubling of cheese consumption. Fish, pasta and cheese dominate the menu.

On the basis of these results, we can say that overall meat consumption will continue to decrease. Meat is a valuable source of all amino acids and has high biological values. It is also a good source of usable iron, zinc and vitamin B12. The optimal consumption of meat is 150 to 200 grams per day.

Meat consumption, has been a hot topic of research recently, as some studies have shown a link between meat consumption and health complications including diabetes, heart disease, cancer and obesity. According to Norat et al. (2002) the hypothesis that consumption of red and processed meat increases colorectal cancer risk is reassessed in a meta-analysis of articles published during 1973–99. Larson et al. (2005) points out, that high consumption of red meat may increase the risk of colorectal cancer, and data by subsite within the colon are sparse. The objective of their study was to prospectively examine whether the association of red meat consumption with cancer risk varies by subsite within the large bowel.

Modernisation, innovative technologies and changes in farming practices will lead to more efficient and environmentally friendly meat production. Consumer concerns about the environment and climate change will lead to greater attention being paid to the production process and the origin of products. Godfray et al. (2018) says, that the global average per capita consumption of meat and the total amount of meat consumed are rising, driven by increasing average individual incomes and by population growth.

The consumption of different types of meat and meat products has substantial effects on people's health, and livestock production can have major negative effects on the environment. Troy and Kerry (2010) analyse the relationship between consumer perception of quality and the food industry's drive to satisfy consumer, science and innovation play a major role in equipping the industry to respond to consumer concerns and expectations. Halkier (2010), assumes, that consumers can enact societal agency and help change the world. In Europe meat consumption rising so much because meat is still identified with wealth.

Other factors for changing consumption habits are likely to be health and nutrition issues, as well as convenience linked to the shift in demand for more processed meat and semi-processed products.

References


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