COVID-19 and the food industry in Hungary

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Abstract

The COVID-19 pandemic has wreaked havoc on all sectors of the global and local economies. It has been widely reported that the food industry has been one of most affected sectors of the economy. However, empirical studies are yet to quantify the extent of the impact of the industry and also how the various sub-sectors of the industry have been affected. Focusing on Hungary as a case study, this paper seeks to empirically quantify the extent of the pandemic's impact on the food industry by answering the following question: How has the COVID-19 pandemic impacted businesses in the food industry? To answer this question the study employs descriptive statistics, correlation analysis and paired samples t-test to analyse quarterly turnover data of 27 businesses sectors of the food industry for the period 2016 to 2020. The study finds no significant difference in the mean quarterly turnover of businesses during the first year of the pandemic and the previous year (t= -0.0344; df=107; p=0.731). However, a trend analysis revealed that over the past 5 years, it was only during the first year of the COVID-19 that businesses in the food industry recorded quarter-on-quarter reductions in turnover. The worse affected businesses in the food industry were enterprises involved in the retail sale of beverages in specialized stores, event catering, restaurants and mobile food service activities. Our findings suggest that while the pandemic adversely affected some enterprises in the food industry, others flourished during the first year of the pandemic.

Keywords: COVID-19 pandemic, food industry, turnover, food security, Hungary

JEL Classification: E32, I15, L25, L66, O52

1. Introduction

The food industry is arguably the single most important sector of the global economy. This is because, the food industry ensures that people have access to food, which is a human right as well as an essential basic need that all human beings require for survival (HLPE, 2020; Ryan & Deci, 2017). In recognition of this fact, the ILO et al. (2020) emphasised that guaranteeing the safety, better incomes, and protection of all agri-food workers in the food value chain from the primary producers to those

involved in food processing, transport and retail, including street food vendors in every economy was very critical for saving lives and achieving food security during the COVID pandemic. Without the food industry, the human right to food and the Sustainable Development Goal (SDG4) to end hunger and ensure that all people have access to safe, nutritious and sufficient food all year round by 2030 (UN, 2017; HLPE, 2020; FAO et al., 2020) would not be possible. Meanwhile, the COVID-19 pandemic which had claimed over 3.7 million lives globally as at 8th June 2020 (WHO, 2021), has also impacted the global economy affecting businesses in all sectors including the food industry thereby posing a threat to food security.

According to FAO (2020), food markets faced many months of uncertainty as a result of the COVID-19 pandemic. The COVID-19 caused a global economic recession in 2020 with the IMF estimates indicating that the global economy contracted by 3.5 percent in 2020 (IMF, 2021). While most markets and sectors faced a major global economic downturn FAO (2020) that the agri-food sector was likely to display more resilience to the crisis compared to other sectors. Meanwhile, some studies also suggest that at the global level some aspects of the food industry such as restaurants and food services were among the hardest by the COVID-19 pandemic since businesses in this sector were forced to close down their face-to-face services to the public as part of measures to prevent the spread of the coronavirus (ILO, 2021). While it is obvious that the various locked down measures adopted to limit the spread of the pandemic has affected every sector of the economy including the food industry in one way or another, empirical studies are yet to quantify the extent of the impact. Using Hungary as a case study, this study seeks to answer the following questions: How has the COVID-19 pandemic impacted businesses in the food industry? Which sub-sectors of the Food Industry were most affected?

To answer the research questions the study utilises trend analysis and paired samples t-test to analyse quarterly turnover data of businesses in 27 sub-sectors of the food industry for the last 5 years (2016-2020). The next section discusses the scope of the food industry and highlights some key features of the food industry in Hungary. This is followed by the data and statistical methods used in this study. The study concludes with key findings and recommendations.

2. Literature Review

The food industry is an indispensable component of every society and economy. The food industry has been defined as companies that produce, process, manufacture, sell, and serve foods, beverages, and dietary supplements (Nestle, 2013; Malagie, et al. 1998). According to Nestle (2013), the concept of the food industry encompasses the entire collection of enterprises involved in the production and consumption of food and beverages. These enterprises include producers and processors of food crops and animals (agribusiness); companies that make and sell fertilizer, pesticides,

seeds, and feed; those that provide machinery, labor, real estate, and financial services to farmers; and others that transport, store, distribute, export, process, and market foods after they leave the farm (Nestle, 2013; Malagie, et al. 1998). In addition, the food service sector which includes food carts, vending machines, restaurants, bars, fast-food outlets, schools, hospitals, prisons, and workplaces and associated suppliers of equipment and serving materials are all considered to be part of the food industry.

In his book *Food Politics* Nestle (2013) points out that the food industry plays a major role in what people eat, the number of times people eat, the quantity of food people eats, and the places where people eat. Although, Nestle (2013) accuses the food industry of promoting unhealthy eating habits among the populace, the industry still plays a very critical role in the realisation of the human right to food and the global agenda to achieve food security by 2030 as promised by the SDGs. The FAO defines food security as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2001; HLPE, 2020). Without the food industry, there would be insufficient food for people to access.

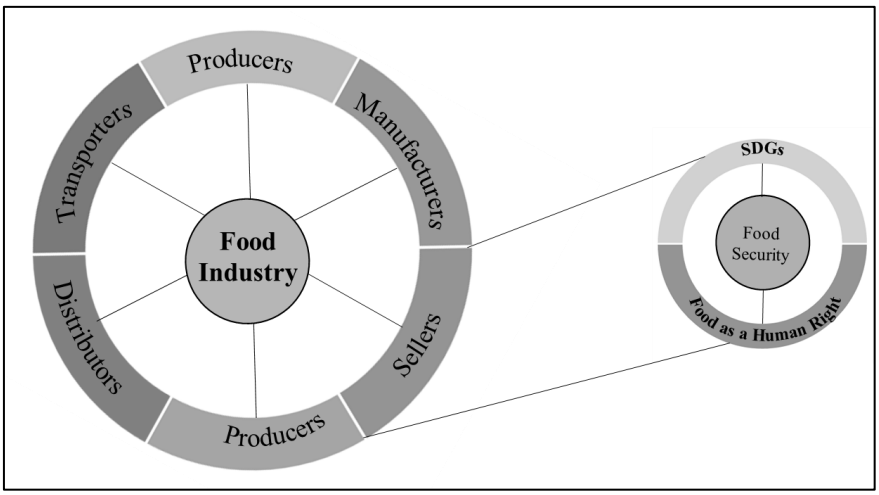

Figure 1. Players of the food industry
Source. Authors' construct

2.1. Impact of shocks on the food industry

Economic shocks have been found to have adverse effects on the food industry. The last time the world witnessed a shock that has caused as deep of recession as the COVID-19 pandemic was during the global financial crisis in 2008–9, which was closely followed by another recession in 2011-12 (Jones & Sloman, 2017). Plunkett (2010) points out that the global financial crisis created vast new challenges for all parts of the food industry. As a result of the crisis, restaurant sales in developed countries

dipped considerably as consumers cut back on discretionary purchases, resisted the consumption of luxury foods, and return to simpler, made-at-home meals. Plunkett further notes that many American restaurant firms were taken to bankruptcy whiles food supermarket chains also had to modify their merchandising to meet the needs of cost-conscious shoppers (Plunkett, 2010).

Prior to the global financial crisis, Plunkett (2010) notes that the global agriculture sector enjoyed an intense five-year boom in farm commodity prices until that turned to a bust in mid-2008 putting a serious damper on commodity prices and markets tumbled. It is possible that the effects of the COVID-19 pandemic on the food industry could have more dire consequences than the global financial crisis. For instance, FAO (2020) and HLPE (2020) have observed that food chains across the world were disrupted due to the COVID-19 pandemic. Across Europe and other parts of the world, consumers also engaged in panic buying, restaurants had to close to the public, whiles the preferences of some consumers shifted to canned foods due to uncertainty. All these changes impacted the food industry in one way or another especially considering that in recent times processed and packaged food industries have become much more globalized.

In production economics theory, it is generally assumed that the primary objective of every firm is to maximise profits (Rasmussen, 2012). Therefore, empirical studies have used various measures related to profitability to assess the performance of firms. In the European Union, all member countries are required to main regular data on the performance of firms in accordance with the *European Commission Regulation (EC) No 588/2001* of 26 March 2001 implementing Council Regulation (EC) No 1165/98 (HCSO, 2007). The 3 main indicators used by EU countries for measuring the performance of firms are turnover, the volume of sales, and the volume of production (Eurostat, 2021). Prior to the *EC Regulation No 588/2001, the Short-Term Statistics Regulation (Council Regulation (EC) No 1165/98 of 19 May 1998)* had already introduced a requirement for EU member countries including Hungary to provide statistics on the turnover of services on a quarterly basis (Eurostat, 2008). The turnover of firms is defined as the sales value of all products, goods, materials and services, including price subsidies, registration and energy taxes, as well as excise duties, excluding value added tax (HCSO, 2007). According to the HCSO, the purchase value of goods and services resold, as well as indirect services are included in the calculation of turnover.

2.2. Hungarian food industry

Hungary is a landlocked country located in the Carpathian Basin in Central Europe. The country officially joined the European Union on May 1, 2004. Hungary is among 8 of the current 27 member countries of the EU that are yet to adopt the Euro as the official currency. The official currency of Hungary is the Hungarian Forint (HUF). As at 8th June, 2021 the country had officially recorded 806,008 and 29,770 coronavirus

cases and deaths respectively (WHO, 2021). After officially recording its first 2 cases on the 4th of March 2020, the government of Hungary introduced a special legal order state of danger on March 11, 2020 starting with bans on flights from Korea, China, Iran and Italy. Since then, the government has taken a wide range of measures to contain the COVID-19 outbreak which has impacted various sectors of the country's economy including agriculture and the food industry.

Hungary's agriculture sector has been increasing steadily since 2010 recording the fastest growth within the European Union between 2010 and 2018, from HUF 1,686 billion to HUF 2,720 billion at current prices (NAK, 2019). In 2018, the production value of the food sector exceeded HUF 3,217 billion and provided for about 9.8 million Hungarian consumers (NAK 2019). About 60% of food production is consumed locally while 40% is exported. In 2019, agriculture and the food industry accounted for a significant part of the economic growth surplus in Hungary with significant increases in Hungarian wages playing a major role leading to an expansion in consumption (FIT, 2020). Hungary is primarily a raw material producing country, with the two major pillars of the domestic agro-food economy being plant cultivation and animal husbandry, producing commodities like wheat, maize, rice, sunflower and other seeds, animal meat, milk, fruits and vegetables.

3. Methodology

Since the objective of the study was to investigate the impact of the COVID-19 pandemic on businesses in the food industry, we focused on the performance of all the enterprises in the sector during the first year of the pandemic and the last 5 years prior to the pandemic (2016-2020). The turnover variable was adopted as the measure of firm performance since this is a standard measure in the EU and also the turnover gives an indication of the profitability of a firm for the reference period. We used quarterly turnover data measured in million HUF, seasonally and calendar effects adjusted for enterprises with more than 4 employees in the food industry. The enterprises were categorised into 27 sub-sectors within the food industry (See Appendix 1). The data was obtained from the Hungarian Central Statistical Office (HCSO, 2021). The Stringency Index obtained from Hale et al. (2021) was also used to capture the various lockdown measures adopted by the government.

The data were analysed using various statistical techniques including descriptive statistics, Pearson's Product Moment Correlation analysis, and Paired Samples t-test. Each of the techniques was used to answer various aspects of the research questions. For instance, year-on-year as well as quarter-on-quarter changes in turnover of businesses were computed using the following equation:

$$\Delta T = \frac{100(T_2 - T_1)}{T_1}$$

Where ΔT represents the change in turnover of businesses; T1 represents the turnover in the base period (previous year and previous quarter respectively); In the quarter-on-quarter analysis, T2 is the turnover for the current time period whereas in the year-on-year analysis T2 represents the first year of the COVID-19 pandemic (2020). These analyses were done to determine if there were any changes in turnover before and during the first year of the pandemic. These analyses were further disaggregated by the 27 sub-sectors of the food industry in order to determine if some sectors were more affected than others. In addition to investigating the changes, the t-tests were done to determine if there were any statistically significant changes in turnover before and during the first year of the pandemic. The correlation analysis was also used to investigate whether there was a relationship between the turnover of the enterprises and lockdown measures (Stringency index). The results of the various analyses are presented in the next section.

4. Results

Results of the paired samples t-test showed that there was no statistically significant difference in the mean quarterly turnover of businesses in the food industry in 2020 when compared the previous year before the onset of the COVID-19 pandemic (t= -0.0344; df=107; p=0.731). On a year-on-year basis the industry only experienced 0.8% increase in turnover.

Table 1. Paired-samples t-test result

Year	Mean Turnover (HUF)	df	t	Sig. (2-tailed)
2019	62,272,789.09	107	-0.344	0.731
2020	62,770,098.80			

Source. Authors' calculations

A trend analysis showed that, prior to the COVID-19 pandemic, the turnover of businesses in the Hungarian food industry trended upwards gradually on a quarterly basis. However, the trend in 2020 was unstable. There was a sharp decline in turnover during the second quarter of 2020. This was the only time the food industry recorded a quarter-on-quarter reduction in turnover over the 5 years that were analysed. This period coincided with the first wave of the pandemic when the country went into lockdown. However, in the third quarter, the turnover increased sharply when the lockdown measures were temporarily lifted but it declined again in the 4th quarter during the second wave of the pandemic when the country went into lockdown again (See Figure 2).

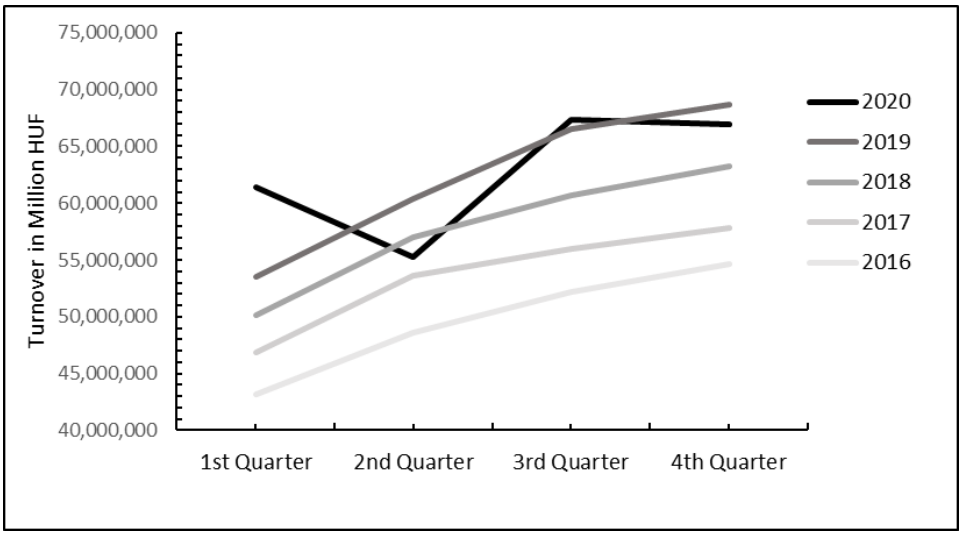

Figure 2. Trend of turnover of enterprises in the Hungarian Food Industry 2016-2020
Source. Authors' construct

Pearson's Product Moment Correlation analysis results also indicate that there was no significant relationship between the lockdown measures and the quarterly turnover of the enterprises in the food industry. However, analysis of the year-on-year changes in turnover for the enterprises in the 27 sectors of the food industry revealed that the impact of the COVID-19 pandemic was asymmetrical within the industry. Whereas some enterprises experienced a recession during the first year of the pandemic, others also experienced a boom. For example, enterprises in the retail sale of beverages in specialised stores were the most adversely affected in the food industry during the first year of the COVID-19 pandemic recording a year-on-year turnover loss of about 50% followed by enterprises involved in event catering activities and then restaurants and mobile food service activities (See Figure 3).

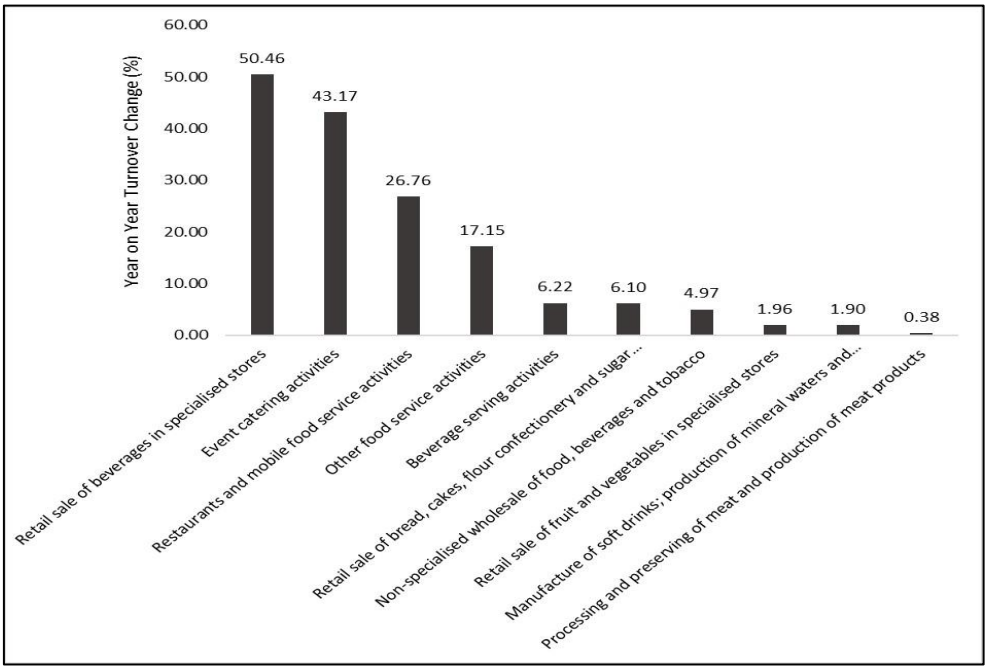

Figure 3. Worse affected sectors within the food industry during the first year of COVID-19
Source. Authors' construct

While some enterprises in the food industry experienced a decline during the first year of the pandemic, enterprises involved in the processing and preserving of seafood recorded over 100% increases in turnover when compared to the previous year. Wholesalers of dairy products, eggs, edible oils, and fats as well as manufacturers of vegetables and animal oils were among those enterprises in the industry that experience turnover gains (See Figure 4).

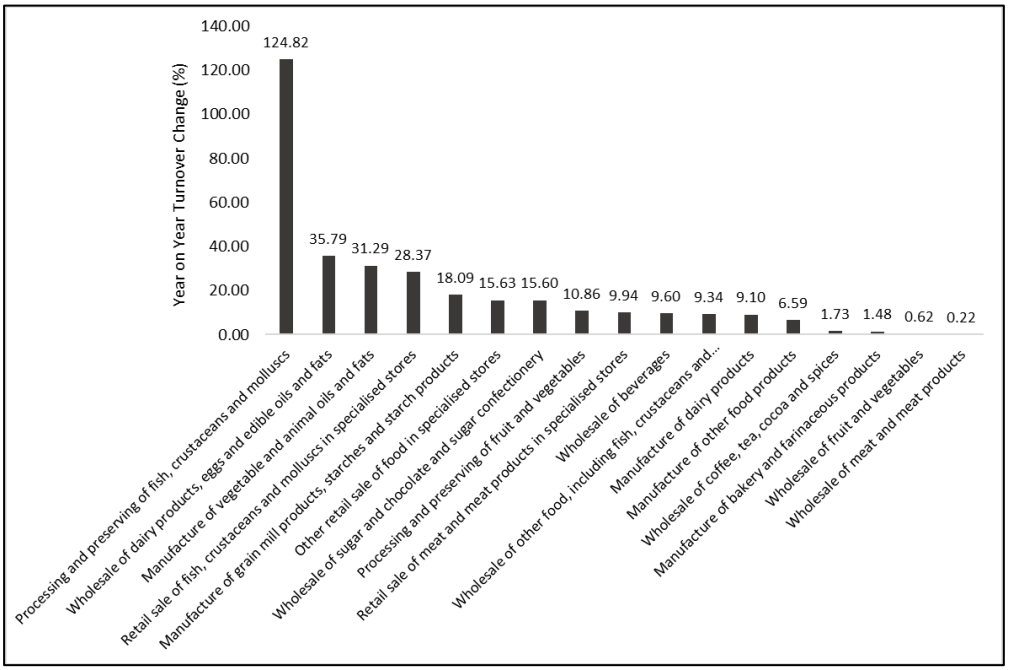

Figure 4. Enterprises that recorded annual increase in turnover during first year of COVID-19
Source. Authors' construct

5. Conclusions and recommendations

The study finds that there was no significant difference in the mean quarterly turnover of businesses in the food industry during the first year of the COVID-19 pandemic when compared to the previous year. However, over the past 5 years, it is only during 2020 the industry recorded quarter-on-quarter reductions in turnover. Our findings suggest that while some businesses were adversely affected by the pandemic others flourished during the first year of the pandemic as the impact of the pandemic was asymmetrical within the food industry. For example, the worse affected businesses were enterprises involved in the retail sale of beverages in specialized stores, event catering services, restaurants and mobile food service activities which recorded year-on-year turnover reductions of 51%, 43% and 26% respectively. In the short term this this trend was like to drive up the prices of goods and services in the affected sectors since businesses typical pass on the cost burden on to consumers when they experience losses and this has implications for the achievement of food security. On the other hand, business involved in processing and preserving of fish, crustaceans and molluscs had a year-on-year gain of 125%. In spite of the adverse impacts of the COVID-19 pandemic on some enterprises within the food industry, the situation could have been worse if it had not been for government interventions such as the National Food Economy Crisis Management Program - Decree 25/2020, the

establishment of a fund to support for enterprises in hard-hit economic sectors such as tourism and hospitality and Hungarian companies. This study focused only on the first year of the pandemic, it would be interesting to know how the sectors have performed since. In depth studies could also investigate the unique characteristics of each sector that determine their responsiveness and susceptibilities to shocks such as the COVID-19 pandemic.

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Appendices

Appendix A: List of 27 Sub-sectors of food industry analysed based on HCSO classifications

No	Sub-sectors of Food Industry
1	Processing and preserving of meat and production of meat products
2	Processing and preserving of fish, crustaceans and molluscs
3	Processing and preserving of fruit and vegetables
4	Manufacture of vegetable and animal oils and fats
5	Manufacture of dairy products
6	Manufacture of grain mill products, starches and starch products
7	Manufacture of bakery and farinaceous products
8	Manufacture of other food products
9	Manufacture of soft drinks; production of mineral waters and other bottled waters
10	Wholesale of fruit and vegetables
11	Wholesale of meat and meat products
12	Wholesale of dairy products, eggs and edible oils and fats
13	Wholesale of beverages
14	Wholesale of sugar and chocolate and sugar confectionery
15	Wholesale of coffee, tea, cocoa and spices
16	Wholesale of other food, including fish, crustaceans and molluscs
17	Non-specialised wholesale of food, beverages and tobacco
18	Retail sale of fruit and vegetables in specialised stores
19	Retail sale of meat and meat products in specialised stores
20	Retail sale of fish, crustaceans and molluscs in specialised stores
21	Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialised stores
22	Retail sale of beverages in specialised stores
23	Other retail sale of food in specialised stores
24	Restaurants and mobile food service activities
25	Event catering activities
26	Other food service activities
27	Beverage serving activities

Appendix B: Results of Correlation Analysis between turnover of enterprises and COVID response measures

Correlations

		Turnover	Stringency Index
Turnover	Pearson Correlation	1	-.010
	Sig. (2-tailed)		.915
	N	108	108
StringencyIndex	Pearson Correlation	-.010	1
	Sig. (2-tailed)	.915	
	N	108	108

Source: Authors' calculations