
Stanisław Kowalczyk

Food sector in times of pandemic

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Summary: The article is an attempt to determine the impact of the SARS-CoV-2 virus on the food sector. Against the background of global economic processes (global markets, stock exchanges), the course of phenomena taking place on the agricultural commodities and food market is analysed. The basic scope of the analysis refers to the Polish food sector, its condition, and the current behaviour of business entities. The globalisation of economic processes makes it necessary to take into account international implications in the analysis of each national sector. Especially, when the subject of the analysis is the Polish food sector, which is widely connected with the global market. Both the supply side of the sector (behaviour of entities and agricultural markets, price dynamics) and the demand side, i.e. consumer behaviour, were analysed.

Keywords: food sector, agricultural markets, consumers, pandemic, agriculture in the economy, the impact of the coronavirus on the food sector in Poland

Sektor żywnościowy w czasach pandemii

Streszczenie: Celem artykułu jest próba określenia wpływu pandemii wirusa SARS-CoV-2 na sektor żywnościowy. Na tle globalnych procesów gospodarczych (rynków światowych, giełd) analizowany jest przebieg zjawisk zachodzących na rynku surowców rolnych i żywności. Podstawowy zakres analizy odnosi się do polskiego sektora żywności, jego kondycji oraz bieżących zachowań podmiotów gospodarczych. Globalizacja procesów ekonomicznych sprawia, że w analizie każdego sektora krajowego konieczne staje się uwzględnianie implikacji międzynarodowych. Szczególnie, gdy przedmiotem analizy jest polski sektor żywnościowy szeroko powiązany z rynkiem globalnym. Analizie poddano zarówno stronę podażową sektora (zachowania podmiotów i rynków rolnych, dynamika cen), jak i popytową, czyli zachowania konsumentów.

Słowa kluczowe: sektor żywnościowy, rynki rolne, konsumenci, pandemia, rolnictwo w gospodarce, wpływ koronawirusa na sektor żywnościowy w Polsce

JEL: O11, O13, Q17, Q18

The major pandemics of the modern world, i.e. the plague in the mid-14th century or the Spanish flu at the end of the second decade of the 20th century, had a significant impact on the economic, social and, according to some, religious

life (Reformation) of the world at that time. Above all, due to a significant reduction in the population, the price of labour increased, which improved, although mainly in the short term, the financial situation of those who survived. The current coronavirus pandemic has not yet had a significant impact on the economy and social structures, but it is difficult to predict the future, as the further course of the pandemic is unknown.

Today, some politicians, economists and commentators think that virtually nothing has happened and that, “in a moment”, the world economy will be back on track of development. The track of the liberal market economy as we have known it since the first, and certainly since the second half of the 20th century. W. Scheidel believes that this will be a rather short crisis, as a result of which the level of inequalities and political views will change somewhat, but it will not be a fundamental change (Koronawirus, 2020, p. 59). Some are of the opinion that the experience of the pandemic can cleanse and put our modern world on the right track, including, for example, convince people of the need to halt climate change (Wyns, 2020; Sikora, Lisowski, 2020; Ulanowski, 2020; Wójcik, 2020). At the other extreme, and more and more often, there are views that the world is going through a metamorphosis that it has not undergone for at least 100 years (Mazzucato, 2020; Czupryn, 2020). According to M. Mazzucato, the world is facing a threefold crisis: a health crisis, an economic (financial) crisis with unimaginable consequences, and a climate crisis that business-as-usual is unable to cope with. The consequence will be a drastic manifestation of the inefficiency of the modern global economy, particularly significant in relation to the labour market, which is increasingly dominated by the gig economy (Mazzucato, 2020). There is, however, no unanimity on this matter, because according to W. Scheidel, following the pandemic, it is precisely the precariat who will be the main beneficiary of the increased state protection (Koronawirus, 2020, p. 59).

However, regardless of the possible consequences, it must be acknowledged that the pandemic has surprised the world. Questions are increasingly being asked about the future of the economy and why contemporary economic theories cannot respond to these challenges. However, a vast majority seems to agree on one issue. Without a radical change of the role and importance of the market and the state, definitely for the benefit of the state, the problem cannot be solved and the pandemic cannot be overcome (Reddy, 2020). Although, according to J.K. Galbraith, compared to war, the pandemic can be relatively easily defeated if the government (in the quoted article, the US government) rises to the challenge (Galbraith, 2020). This means providing people with reliable information about the course of the pandemic, financing all the expenditure necessary from a medical point of view from the budget (!), and, most of all, setting up a special agenda to counter the effects of the pandemic, along the lines of the Reconstruction Finance Corporation, which was set up at the beginning of the 1930s to support the economy and citizens after the great crisis.

There have been various so-called future shocks in history. The point here is not a matter of futurological speculations – of which the best-known example and at the same time the subject of criticism were the works of A. Toffler (1928-2016)¹ – but far-reaching helplessness in terms of possible paths of further development, no longer only of the world economy, but of the current phase of civilisation. Today, we are dealing

¹ A. Toffler's main work in this area is: *Future Shock*, Random House, 1970, and *The Third Wave*, Bantam Books, 1980.

with a growing “shock of the present” and an increasingly pronounced “panic of the future”, and the SARS-CoV-2 pandemic has only reinforced these uncertainties.

Dynamics of economic change

The geography of pandemic movement indicates that, in the first period, the major centres of the world economy, such as China, Europe and then the USA, were affected. In the second period, the pandemic moved to raw material regions, such as South America and the Middle East. It turned out that the pandemic is transmitted through globalisation and the accompanying processes of mass communication.

The predictions for the future of national economies and the world economy as a whole are not optimistic. In the first days of April 2020, J. Bullard, the head of the Federal Reserve Bank of St. Louis, one of the Federal Reserve System banks (FED), estimated that up to 47 million US residents could lose their jobs in the aftermath of the SARS-CoV-2 pandemic, and the unemployment rate will reach 32% (Bullard, 2020). After about a month, at the beginning of May, the forecast was already fulfilled in 2/3 (33.3 million, BBC, 2020), and in the first days of June in over 80% (40.0 million, Kohl, 2020). According to the IMF, the pandemic has already pushed the world into a recession (Bluedorn, Gopinath, Sandri, 2020). On the other hand, every pandemic is unpredictable and therefore it is so difficult to determine its consequences. Thus, at the moment, all forecasts are mainly of the nature of uncertain guesswork, and not of substantiated events.

The SARS-CoV-2 pandemic has marked its impact on the markets and the global economy. This is predominantly apparent in the major stock exchanges. Since the outbreak of the pandemic (here: from December 31, 2019, to May 31, 2020) the indices have lost: FTSE – 19.9%, Dow Jones – 12.1%., CAC – 21.5%, Nikkei – 7.5%, DAX – 12.5%. WIG20, from the first case of coronavirus in Poland to May 31, lost 7.4% of its value. It must be acknowledged, however, that investors are still optimistic, as at the end of May, the major stock exchanges had already made up more than a half of the losses in relation to the major drops that took place on March 18-23, 2020.

According to the IMF, the pandemic will have serious consequences for the global economy. Assuming that it will be over in the second half of the year, the global GDP will fall by 3% compared to 2019, which is more than was the case during the crisis in 2009 (IMF, 2020, p. 5). GDP forecasts are differentiated by region and country, and are as follows: advanced economies – (-)6.1% (1.7 – in 2019), EURO zone – (-)7.5% (1.2%), Germany – (-)7.0% (0.6%), France – (-)7.2% (1.3%), Japan – (-)5.2% (0.7%), China – (+)1.2% (6.1%), USA – (-)5.9% (2.3%), UK – (-)6.5% (1.4%). Overall, a much smaller decline is forecast for emerging markets and developing countries. Here the decrease should be only 1%. Interestingly, the IMF forecasts growth for two world-relevant economies – of India and China.

According to the World Bank, the GDP in 2020 will fall by 5.2% compared to 2019. The world is therefore facing the deepest global recession in eight decades, since the end of World War II. The GDP drop, according to the WB, in advanced economies will be -7.0%, in the EURO zone -9.1%, Japan -6.1%, USA -6.1%, in emerging markets and developing countries the drop will be at the level of -2.5%, in India -3.2%, in Brazil -8.0%, in Argentina -7.3%. An increase of 1.0% is projected for China (World Bank, 2020, p. 4).

A decrease in the dynamics of the Polish GDP is also forecast – by 3.4% according to the Polish government (Update, 2020), by 4.3% according to the European Commission, and by 4.2% according to the World Bank. Generally, the above forecasts signify an unfavourable situation for Poland, as they assume a relatively mild recession on the markets that are the main ones for the Polish exports – first and foremost – for the exports of agriculture and food products. Besides, this may imply disruptions to supply chains, which will result in difficulties in supplying, in particular, the markets linked to regions in the recession (Sąsiada, 2020).

The above may indicate an evolution towards a more or less acute crisis. G.W. Kołodko estimates that an additional deficit in the Polish budget will amount to 6 to 8%, half of which as a result of expenditure related to the coronavirus, and the other half as a consequence of abandoning the collection of certain levies and taxes, including mainly social security contributions to ZUS (Social Insurance Institution) (Kołodko, 2020).

According to the experts from the Australian National University (ANU), the global economy may lose between USD 2.4 trillion, even up to USD 9.2 trillion, including 1.8 trillion by the US economy and 1.6 trillion by the Chinese economy (Business Insider Poland, 2020).

The pandemic has already had a different impact on individual sectors of the economy. First, it hit the areas closely linked to the movement of people, that is tourism and communication, and second, the areas linked to the movement of goods, that is trade, and then related sectors, that is the fuel or car industry. The falls are also affecting global financial markets. In general, there have been significant disruptions to the global supply chains of most products and services (World Bank, 2020, p. 10).

Food sector in the economy

The longer the pandemic lasts, the more areas and economic sectors are affected. This also applies to agribusiness and food production. The situation here is all the more sensitive because this sector meets a basic human need, namely the need to satisfy hunger. The achievements of the modern economy, its innovation, new technologies, digitalisation, virtuality, “knowledge base” and so on, have reduced the interest of researchers in the food sector. It seemed traditional, unfashionable, unattractive in research terms, not to say *passé*. These trends were further reinforced by the undoubted success of this sector, which was increasingly cheap food. Food is physically and economically accessible to a growing part of the world’s population.

The pandemic has already begun to partly change this picture. Naturally, not to the extent that breakthrough studies in this field would already start to emerge in great quantities, but it is only a matter of time. This potentially growing interest of science in the food sector, under the influence of the fears created by the pandemic, can trigger additional research processes and works whose results will allow to obtain food in the future from sources which we do not yet know today, or on the basis of new innovative technologies. Consequently, it may contribute to the loosening of today’s still strong dependence between the volume of agricultural production and natural and environmental conditions and constraints. Food production, despite the significant achievements of technical progress, mainly biological, is still predominantly based on living organisms (plants, animals), and this means that the constraints of biological processes control food production.

However, changes in this area are not to be expected in the short or probably even in the medium term. The results of scientific work, the achievements of biological progress and new and more effective production techniques, especially in the field of agricultural production, can be expected within a few or more years. The impetus of the pandemic may prove more effective in this regard than the scourges of hunger and malnutrition, appeals from international organisations or various communities and professional groups. Mostly, because the pandemic affects everyone, including those who have funds, and hunger only affects those who do not have such funds.

The position of the food sector in the modern economy, although far from what was 30 or 50 years ago, cannot be underestimated. The place of agriculture and agribusiness as a whole in the economy can be determined at least by their share in the creation of the national income, employment, foreign trade, and consumption. When analysing the changes that have taken place over the last 70 years on the example of two countries representing different levels of development, i.e. Poland and the USA, we can see a definite change in the position of the agricultural and food sector in the economy. In the period of almost 70 years (since 1950), the share of agriculture as a workplace and a way to provide for a family has been reduced by about 90% (in the USA from 10.0 to 1.3%, in Poland from 47.2 to 3.0%). The decline in the share in the value added/GDP creation was similar (in the USA from 8.0 to 1.0%, in Poland from 25.2 to 2.0%). While the decline in the share of the food sector in trade is much smaller. In the case of Poland, it amounted to about 1/3 (change from 16.3 to 10.6%), while in the case of the USA – about 2/3 (from 8.0 to 2.6%). Similarly, the decrease in spending on food in household budgets is also lower. In the analysed period it was 50% less in Poland (from over 50.0 to 25.9%) and 2/3 less in the USA (from 30.0 to 9.7%).

This means that the position of the food sector, both in the foreign trade of the countries analysed as well as in household expenditure, is much higher than the sector's production potential in the economy. This particular position is a consequence of the role and importance of food in meeting human needs, as has been mentioned earlier. For these reasons, too, the situation that will take place in the near future under the influence of the coronavirus epidemic deserves special attention both from the state and the policies implemented, as well as from science and researchers. The areas that are particularly sensitive in this regard are those analysed below.

Situation on agricultural markets

Agricultural markets, just like other markets, feel the impact of the pandemic on the behaviour of entities and thus on prices of agricultural raw materials. The main factors shaping the level of prices in these conditions include restrictions related to international trade and restrictions on the internal markets of individual countries, including, above all, restrictions on the operation of many plants and companies associated with the food sector, such as food establishments, restaurants, bars, canteens, and so on. Unfortunately, both factors cause a reduction in the demand for food and, consequently, for agricultural raw materials. This is unfavourable to the Polish agribusiness because we are a significant exporter of agricultural and food products.

Agricultural prices are currently under strong pressure associated with the seasonality of the market and the risks caused by the pandemic. For example, the prices of pork livestock in Poland at the end of May 2020 were on average 7.3 PLN/kg of carcass (which was 2.2% less than the year before), of cattle – 11.8 PLN/kg (2.4% less), and of broilers – 3.0 PLN/kg (12.6% less), milk – 1.34 PLN/l (1.4% less), wheat – 822

PLN/t (3.6% more), corn – 757 PLN/t (7.4% more), rapeseed – 1,707 PLN/t (7.4% more). During the year, the prices of some fruit have even risen by almost 200% (e.g. apples), and vegetable prices fell between 30% and 80% over the same period (ZSRIR, 2020). These changes were largely a consequence of the pandemic and restrictions on international trade (no possibility of exports, for example, of vegetables, and imports of fruit, especially citrus fruit).

Changes have also taken place in the largest agricultural commodities exchanges. The price of corn on the Paris MATIF exchange in the initial months of the pandemic, i.e. from December 31, 2019, to May 31, 2020, fell by 1.7%, rapeseed by 9.8%, wheat by 0.3%. In turn, the prices of skimmed milk powder on the EEX exchange (Leipzig, Germany) at the same time fell by 15.6%, and of liquid milk by 7.7% (June 5, the lowest level in 2 years), butter by 14.6% (May 7, the lowest level in 2 years). Wheat prices on the Chicago Board of Trade fell by 7.5%, soybeans by 9.9%, soybeans oil by 14.5%, corn by 16.0% (April 28, the lowest level in two years). The price of beef on the Chicago Mercantile Exchange fell by 7.5% (March 16, the lowest level in two years) and cattle by 20.3% (April 6, the lowest level in two years). So, the pandemic has reduced the prices of many agricultural products to the lowest levels in two or even five years (beef). These changes are primarily the result of a drastic reduction in international trade and a consequent reduction in demand for many agricultural products.

The main conclusion, therefore, which already emerges from the observation of agricultural markets today, is that agricultural prices can change rapidly and in different directions over a short (several months) or even medium (1-2 years) period. The duration of these turbulences will depend on the intensity and future scale of the pandemic.

Consumer behaviour: increasing demand for food

One of the consequences of the SARS-CoV-2 coronavirus pandemic are the unpredictable, rapid changes in the demand for food. This is a typical phenomenon caused by consumers' fear about the continuity of the food supply. This is a unique challenge for the whole agribusiness sector, but also "beneficial" in terms of its short-term economic effects. First of all, the effects related to an additional demand for food and a possible price increase. However, this phenomenon also poses a certain risk arising from this unusual situation caused mainly by the threat of speculations and economic crimes in the area of foods, resulting from the desire to achieve extraordinary revenues. A simple consequence of such behaviour will be an increase in adulterated food, poor-quality food, or even contaminated food, which means a decrease in food safety in general. If the turbulences on the global markets intensify, and the agricultural and food product prices increase, after a period of weakened international trade dynamics, this may also lead to a breakdown in food security, at least for some countries. Primarily, for those for whom food imports is an important element in ensuring this security (food supply).

Consumer behaviour is one of the important elements shaping the market supply in the short term. This is particularly true of articles that satisfy basic needs, such as food products. How sensitive this market segment is was already experienced in the first weeks of the pandemic (March 2020), when, following information on the progress of the coronavirus epidemic, shortages of long-life items, such as groats, flour, pasta and canned goods, occurred in many retail chains. Consumer behaviour, caused by unclear and atypical information, can result in violent and dangerous events for the normal

functioning of the market. An example is the sudden purchase of meat and poultry products in the period of March-April 2020, which caused the price of these products to rise by up to 60% (portalspozywczy.pl, 2020a). This was a short-term growth, but it illustrates well the possible consumer behaviour and its impact on the food market.

Economic situation in times of pandemic

The SARS-CoV-2 pandemic is not evenly distributed in all countries and regions of the world. However, it has affected the main centres of the global economy, which will undoubtedly slow down the economic growth at best, and in a less optimistic scenario, it may be the beginning of a global recession. Agricultural markets, as they are part of global supply chains, will also not avoid the turmoil and turbulence that this situation will create. Taken together, this will lead, on the one hand, to sudden price changes in these markets, both for reasons associated with business trends (e.g. lower supply) and for speculative reasons. Since rich countries (e.g. Arab countries) are able to purchase land in other regions of the world on a massive scale (land grabbing) in order to ensure food security of their citizens, these countries are all the more able to make massive purchases of basic agricultural raw materials. On the other hand, it is conceivable that more and more countries will introduce restrictions on the exports of agricultural products, which could lead to the disorganisation of agricultural markets. For food-exporting countries, such as Poland, in the short term, this may mean an increased supply directed to the internal market. This was already the case in Poland at the beginning of the previous decade, when Russia imposed an embargo on Polish products, including apples, and now also on the beef market, when, due to the pandemic, exports to Italy, in particular, were significantly reduced. In general, this may lead to a temporary increase in the supply of goods redirected from exports to the internal market and a fall in their prices. Producers, especially those who produce more expensive products, will then be forced to reduce or even cease production, which will consequently limit the supply and automatically increase prices.

Summary

The coronavirus pandemic has and will have certain consequences for both the economy and agribusiness, which is already visible. The course and depth of this impact will be an outcome of many processes, including mostly the duration of the pandemic, its scale and the commitment of states to eliminate future effects. As far as the sector is concerned, the changes that we are seeing are not yet taking place too violently, apart from selected sectoral markets, predominantly the most internationalised ones. The first observations indicate possible directions for further changes, with a rapid reduction in the supply of imported food coming to the fore.

The continuation of restrictions on international trade will lead to an increasing prevalence of local products manufactured within individual countries. This will be a process unfavourable both to food-exporting countries because of the need to reduce the previous production which during the pandemic will be directed exclusively to internal markets, and to importing countries because of the threat to their food security (food supply). This situation could be an extra impulse for the increased interest in the food of local origin. Products that give a sense of greater security and certainty of supply in times of exceptional turbulence and unreliability of the global market.

However, regardless of how long the SARS-CoV-2 pandemic is going to last, the Polish economy, including agribusiness, will undergo changes related to the economic

slowdown or even recession (Zbytniewska, 2020). Particularly sensitive areas for the food sector will include:

- low supply, and in many regions a shortage of seasonal workers in agriculture; restrictions on movement, including in the international system, may result in the lack of labour force in the Polish agriculture; such a phenomenon has been observed in some EU countries since the beginning of the 2020 spring work season (PAP, 2020a); according to analysts, this problem will affect primarily Western European countries (PAP, 2020b), but these deficiencies will also affect Poland, especially farms specialising in labour-intensive crops (soft fruit, vegetables, orchards);
- turbulences in the supply of and demand for food, including in particular the products of selected industries, will result in the increase in unused production capacities, bankruptcies and consolidation of these industries, all the more so because the level of utilisation of production capacities in the Polish food industry already before the pandemic was estimated on average at around 80%; during the pandemic, the hospitality industry was in the most difficult situation; due to labour shortages in agriculture and the resulting decline in production of selected plant production branches, companies from the fruit and vegetable processing industry may find themselves in a difficult situation; in turn, the problems of processing industries due to the decline in the demand for their products (mainly due to trade restrictions) will be transferred to agriculture; this is a typical transmission of events and phenomena affecting some elements of the supply chain to those directly adjacent to them;
- temporary plant closures are by far the greatest risk for the food industry, associated with a possible coronavirus infection found in the employees of these companies; the first such cases have already taken place (meat plants in the Świętokrzyskie Province and the production of frozen food and ice cream in the Łódzkie Province)²; if this phenomenon takes a larger scale, then not only a decrease in the supply of food products but also the management of agricultural raw materials may become a problem;
- an increase in food fraud; crisis situations (and pandemics are such) are conducive to the increase in the number of food falsifications, the introduction of contaminated food of poor health quality; it is particularly evident in the situation of a decrease in the supply of food products; food control systems then weaken, and on the part of some entrepreneurs, there is a growing interest in introducing adulterated and under-quality food to the market; in addition, cases of typical food fraud may occur due to a decrease in caution on the part of consumers when making purchasing decisions (portalspozywczy.pl, 2020b).

Hence, in general, the phenomena accompanying the pandemic have an adverse effect on market processes. They increase the uncertainty about future events, business risks, create turbulence and chaos in the market. The main drivers are restrictions on international trade, restrictions on communication and the movement of goods and people. This situation particularly applies to industries with a high share of exports, which, in the Polish conditions, pertains to the food sector, including in particular such industries as meat and its products, cereals and cereal products, confectionery and dairy products. On the other hand, the time of the epidemic is also difficult for industries

² In the Brazilian state of Rio Grande do Sul, coronavirus was found in workers at 24 meat plants (Wieczorek M., 2020).

based on imports, which, in the Polish reality, relates to the production of livestock, the processing of fish and fruit (not just citrus fruit) and the processing of oilseeds and high-protein plants.

In the long term – especially if the collapse of the global economy were to follow the L-shaped pattern – factors reducing the level of production and thus of the food supply will be dominant. However, according to most forecasts, the global economy will be able to cope with the pandemic in 2021, which is why the global GDP is forecast to grow during that time by 4.2% by the World Bank and 5.8% by the IMF. Nonetheless, these optimistic forecasts are in a certain contradiction with the pessimistic assessments of the future in the reports of the same institutions, as well as of many others.

To sum up, with a high probability we can risk the hypothesis that the coronavirus pandemic will re-evaluate views on many laws that seemed indisputable, such as the dominant importance of the market mechanism, including its *infallibility*, the need for the state to withdraw from most social activities, and finally, the rationality and greed of *homo oeconomicus*. Surely, this re-evaluation will concern not only economic matters, but also social matters, and more broadly, civilisation matters as well.

References:

1. BBC (2020), *Coronavirus: US unemployment claims hit 33.3 million amid virus*, 7 Ma, <https://www.bbc.com>, access: 15/05/2020.
2. Business Insider Polska (2020), *Eksperci oszacowali, ile światowa gospodarka straci przez koronawirusa. Jest kilka scenariuszy*, March 6, 2020, <https://businessinsider.com.pl/finanse>, access: 28/03/2020.
3. Bluedorn J., Gopinath G., Sandri D. (2020), *An Early View of the Economic Impact of the Pandemic in 5 Charts*, “IMFBlog” Insights & Analysis on Economics & Finance, APRIL 6, 2020, <https://blogs.imf.org>, access: 12/04/2020.
4. Bullard J. (2020), on “*Face the Nation*,” April 5, CBS NEWS, <https://www.cbsnews.co>, access: 13/04/2020.
5. Cedro M. (2020), *Pandemia koronawirusa: Afryka szybciej reaguje na COVID-19*, „Dziennik Gazeta Prawna”, 30/03/2020, <https://www.gazetaprawna.pl/artykuly>, access: 03/04/2020.
6. Cox J. (2020), *Coronavirus job losses could total 47 million, unemployment rate may hit 32%*, *Fed estimates*, CNBC, MAR 30, 2020, <https://www.cnbc.com>, access: 05/04/2020.
7. Czupryn A. (2020), *Koronawirus. Czy pandemia zakończy świat, jaki znaliśmy do tej pory. Prof. Marcin Król: Pojawi się olbrzymia liczba ludzi zbędnych*, “Polska”, March 22, 2020, <https://polskatimes.pl>, access: 06/04/2020.
8. EC (2020), *Coronavirus: Commission stands ready to continue supporting EU's agri-food sector*, Press release, Brussels, March 25, 2020, <https://ec.europa.eu>.
9. Frith J. (2012), *The History of Plague – Part 1. The Three Great Pandemics*, “Journal of Military and Veterans ‘Health””, April, Volume 20, No. 2, <https://web.archive.org>, access: 06/04/2020.
10. Galbraith J.K. (2020), *How America Can Beat COVID-19*, “Project Syndicate”, March 3, 2020, <https://www.project-syndicate.org/commentary>, access: 06/04/2020.
11. GUS (2017), *60 lat badania budżetów gospodarstw domowych*, <https://stat.gov.pl>, access: 1.04.2020.
12. IMF (2020), *World Economic Outlook, April 2020: The Great Lockdown*, April, <https://www.imf.org>, access: 08/06/2020.
13. James H.B. (1956), *Agriculture in the national economy. “Increasing understanding of public problems and policies”*, Jan 1. 600 South Michigan Avenue, Chicago 5, Illinois, Farm Foundation.

14. Kohl D. (2020), *The progression of COVID-19 impact on business*, June 2, <https://www.farmprogress.com>, access: 08/06/2020.
15. Kołodko G.W. (2020), *F-35 na koronawirusa*, "Dziennik Trybuna", 27/03/2020, <https://trybuna.info>, access: 28/03/2020.
16. Koronawirus (2020), *Koronawirus nie zmieni świata*, interview with W. Scheidel, "Newsweek", 22/2020.
17. Kowalski W. (2019), *665 lat temu w Europie wybuchła epidemia Czarnej Śmierci*, "dzieje.pl.", Historical portal, 17/08/2019, <https://dzieje.pl>, access: 06/04/2020.
18. Mazzucato M. (2020), *Coronavirus and capitalism: How will the virus change the way the world works?*, World Economic Forum, 02 April 2020, <https://www.weforum.org>, access: 06/04/2020.
19. OECD (2020), *Interim Economic Assessment Coronavirus: The world economy at risk*, 2 March 2020, <https://www.oecd-ilibrary.org>, access: 28/03/2020.
20. PAP (2020a), *Hiszpania: W rolnictwie brak rąk do pracy*, March 31, <https://www.sadyogrody.pl>, 16/06/2020.
21. PAP (2020b), *Analitycy: brak pracowników uderzy w ogrodnictwo, zwłaszcza w krajach Europy Zachodniej*, 31/03/2020, <https://www.wnp.pl>, access: 16/06/2020.
22. portalspozywczy.pl (2020a), *Skąd wzięł się duży wzrost cen drobiu w marcu?* <https://www.portalspozywczy.pl>, access: 16/06/2020.
23. portalspozywczy.pl (2020b), *Oszuści oferują mleko leczące COVID-19*, March 30, <https://www.portalspozywczy.pl>, access: 16/06/2020.
24. Convergence programme (2020), Update, Warsaw, April 2020.
25. Reddy S.G. (2020), *Coronavirus and the Limits of Economics*, "Foreign Policy", March 31, <https://foreignpolicy.com>, access: 06/04/2020.
26. Sasiada T. (2020), *Koronawirus uderzy w polską gospodarkę. Oto najnowsze prognozy*, Money.pl, <https://www.money.pl>, access: 29/03/2020.
27. Sikora A., Lisowski B. (2020), *Koronawirus: epidemia paniki vs. epidemia ignorancji*, "Krytyka Polityczna", March 12, 2020, <https://krytykapolityczna.pl>, access: 06/04/2020.
28. Szymczak J. (2020), *Czy koronawirus zainfekuje gospodarkę? Ekspert: możliwa lawina bankructw i zwolnień*, OKO.press, March 11, 2020, <https://oko.press>, access: 13/04/2020.
29. Ulanowski T. (2020), *Pandemia koronawirusa obnażyła dyktaturę idiotów. Dowód w ośmiu punktach*, "wyborcza.pl", April 3, 2020, <https://wyborcza.pl>, access: 06/04/2020.
30. Wójcik Ł. (2020), *Sztuka wyparcia. Iran udaje, że walczy z pandemią*, "Polityka", March 26, 2020, <https://www.polityka.pl>, access: 06/04/2020.
31. U.S. Bureau of the Census (1990), *Statistical Abstract of the United States, 1990*, January, (110th edition), Washington DC, <https://www2.census.gov/library>, access: 11/04/2020.
32. U.S. Bureau of the Census (1951), *Statistical Abstract of the United States, 1951*, (72nd edition), Washington DC, <https://www2.census.gov>, access: 11/04/2020.
33. USDA (2020a), *Food Prices and Spending*, <https://www.ers.usda.gov>, access: 11.04.2020.
34. USDA (2020b), *Agriculture and Food Sectors and the Economy*, Economic Research Service, March 03, <https://www.ers.usda.gov>, access: 08/04/2020.
35. Wieczorek M. (2020), *Koronawirus w zakładach mięsnych*, "topagrar.pl", June 2, <https://www.topagrar.pl>, access: 16/06/2020.
36. World Bank (2020), *Global Economic Prospects*, A World Bank Group Report, Washington, June, <https://www.worldbank.org>, access: 09/06/2020.
37. Wyns A. (2020), *How our responses to climate change and the coronavirus are linked*, "World Economic Forum", April 2, 2020, <https://www.weforum.org>, access: 06/04/2020.
38. Zbytnewska K. (2020), *Wpływ koronawirusa na gospodarkę Polski i Europy – prof. Witold Orłowski*, "EURACTIV.pl", March 17, <https://www.euractiv.pl>, access: 16/06/2020.