Risk exposure to the COVID-19 pandemic situation and the socio-economic sensitivity of rural areas and agribusiness

Irena Jędrzejczyk

Abstract

The subject of the study is the parallel of the risk exposure to the COVID-19 pandemic situation and the socio-economic sensitivity of rural areas and agribusiness to the effects of this situation.

The main goal is understanding the spatial diversity of risk exposure to COVID-19 and social sensitivity to the effects of a pandemic, with particular emphasis on the specificity of rural areas and the agribusiness sector. The methodological goal included using the risk exposure index and the economic and social sensitivity index to the effects of the COVID-19 pandemic situation as research tools and to modify both indicators so that they can be used to identify differences between the city and the countryside. The application objective is offering conclusions for effective pandemic risk management, taking into account the socio-economic sensitivity and specificity of the countryside. The basic problem to be solved is reducing the socio-economic sensitivity of rural areas and agribusiness to the effects of the COVID-19 pandemic situation. In the analytical considerations, the hypothesis stating that the exposure of villages to the pandemic risk of COVID-19 is lower than in cities, but the socio-economic sensitivity of villages to the effects of a pandemic situation is significantly higher is verified.

The study will use the results of domestic and foreign research and other sources of information.

Keywords: risk exposure, rural areas, agribusiness sector, socio-economic sensitivity, COVID-19 impact, socio-economic sensitivity, risk management, spatial diversity.

Irena Jędrzejczyk, prof. dr hab., Department of Management, University of Technology and Humanities in Bielsko-Biała.

Introduction

The phenomena and processes related to the COVID-19 pandemic, which were, and will probably be, a difficult experience for the Polish countryside and Polish agribusiness, bring to the foreground the currently extremely important topic of mass risk management – in terms of the number of people and the size of personal and property losses.

This article presents the increase in the exposure of the Polish agricultural sector and Polish countryside to a pandemic risk due to the occurrence of SARS-CoV-2 and COVID-19, as a result of which the expected losses may be catastrophic, even if the increase in this exposure would be lower than in cities.

The author assumes that the effects of the COVID-19 pandemic risk for villages may be greater than for cities, despite a lower exposure, due to the very high and constantly growing socio-economic vulnerability of rural areas in Poland. Due to this rural-specific feature, recommendations are made regarding the management of the COVID-19 pandemic risk in rural areas and in agribusiness.

However, we mustn't forget that even the best-designed pandemic risk management system adapted to the sensitivity of rural areas, including those associated with subsequent COVID-19 shock waves, cannot completely eliminate the socio-economic effects of this threat, but can reduce the risk through appropriate education, preventive activities and adaptation measures, and even through its transfers outside the agricultural sector or outside rural areas.

The subject of the study is the parallel of the risk exposure to the COVID-19 pandemic situation and the socio-economic vulnerability of rural areas and agribusiness to the effects of this situation.

The main goal is understanding the spatial differentiation of exposure to COVID-19 risk and social sensitivity to the effects of a pandemic situation, with particular emphasis on the specificity of rural areas and the agribusiness sector.

The methodological objective is to use the risk exposure index and the economic and social sensitivity index to the effects of the COVID-19 pandemic situation as research tools and to modify both indicators so that they can be used to identify differences between the city and the countryside.

The application goal is to provide conclusions that will be used to effectively manage pandemic risk, taking into account the socio-economic sensitivity and specificity of the countryside.

The basic problem to be solved is reducing the socio-economic sensitivity of rural areas and agribusiness to the effects of the COVID-19 pandemic situation.

The initial statement, not requiring proof and already reliably confirmed in national and international studies, on which both the conceptualization and operationalization stages of the research process will be based, takes for granted the existence of spatial differences in risk exposure between urban and rural areas[1]. Therefore, it is assumed a priori in this study that there are spatial differences in exposure to the risk of the effects of the COVID-19 pandemic situation between urban and rural areas. Moreover, it is justified to suppose that the map of catastrophic (climate) risk taking into account spatial diversity largely coincides with the results of mapping the risk of pandemic effects, and the level of socio-economic sensitivity to this risk and to catastrophic (climate) risk is very similar, which will be verified in the second stage of the research process.

The methodological assumptions of the study are built both on the classical approach, i.e. quantitative (and this approach will be more widely used in the second stage of the research process), and on a qualitative approach with elements of well-established theory. The grounded theory methodology will be used for both the first and the last stage of the research process, in particular, a processual and intuitive approach will be used[2].

In the analytical considerations of the first stage of the research process, the main hypothesis is verified, which states that the exposure of villages to pandemic risk related to COVID-19 is lower than in the city, but the socio-economic sensitivity of villages to the effects of a pandemic situation is significantly higher.

The following detailed hypotheses underlying the main hypothesis are subject to verification:

1. Rural areas, as a rule, are less exposed to the risk of the effects of a pandemic situation due to a lower population density than in highly urbanized areas.
2. The socio-economic sensitivity of the countryside and agribusiness to the risk of the effects of a pandemic situation is significantly greater than in the city due to: lower level of wealth, poorer infrastructure and poorer access to health services (public and commercial health services).

1. More on the subject of spatial differentiation, see for example A. Śliwiński; see A. Śliwiński, *Analiza ryzyka śmierci w ujęciu terytorialnym na przykładzie Wielkiej Brytanii i Polski* [in:] Zeszyty Naukowe Uniwersytetu Ekonomicznego w Poznaniu "Studia Ubezpieczeniowe" 2009, nr 127, and A. Śliwiński, *Spatial analysis of risk vp. efficiency of life insurance contracts, Proceedings of 2011 International Conference on Technology Innovation and Industrial Management*, Oulu University, Finland 2011; and many other publications by this author.

2. A hypothesis in the traditional sense requires measuring the strength of the relationship between the variables that can be conceptualized. The methodology of "grounded theory" is not about measurement, but about empirically grounded indication of the existence of relationships between concepts. Here, the verification is carried out by comparing the conditions under which the hypothesis functions in different social groups (e.g. city – village) and/or different contexts (for example in the context of a climate hazard or a pandemic threat).

The classical methodology is used in this paper in terms of two key measurement tools, namely the COVID-19 pandemic risk exposure index and the socio-economic vulnerability index of rural areas and agribusiness to the pandemic. It will be drawn from the quantitative theory of risk management, which clearly distinguishes between two phenomena, i.e. risk exposure and risk tolerance, also known as risk sensitivity[3]. In insurance practice, both the measurement of risk exposure, along with spatial differentiation of this exposure (the graphic technique used to present the results of this measurement is called risk mapping), and the measurement of risk tolerance (risk sensitivity) are commonly used[4]. The dispute in science over the terminological correctness of the terms "risk management" and "management in risk situations" has no meaning for this study, but for scientific accuracy one should be aware of its existence[5].

Both research tools are general in nature and require modification according to:

- type of risk, i.e. instead of different types (e.g. climate, catastrophe, personal risk, etc.), the risk of the consequences of the COVID-19 pandemic will be presented as a certain aggregate;
- entities exposed to risk (instead of the full territorial scope of the country, only rural areas will be exposed, instead of business, only agribusiness entities will be presented);
- differences in the characteristics of the rural and urban community, in particular the feature of socio-economic sensitivity to the effects of a pandemic situation, as a collective aggregate of risk tolerance (the lower the risk tolerance, the higher the sensitivity to pandemic effects).

Both the traditional and qualitative approaches will use commonly known and used methods such as induction, deduction and verification[6].

3. Referring to the theory of grounded risk management, it is necessary to first to refer to the collective work presenting the classic quantitative approach. *Zarządzanie ryzykiem a ubezpieczenia*, authored by C.A. Williams Jr., M.L. Smith and P.C. Young, which was published in the Polish translation by the Scientific Publishers PWN in Warsaw in 2002., p. 25–67 (part I) as well as p. 68–139 (part II).

4. Example: Climate Report *How prevention and insurance can reduce the impact of disasters on the environment*, prepared and published by the Polish Chamber of Insurance in cooperation with Deloitte Sustainability Consulting Central Europe – Deloitte Advisory Sp. z o.o, Warsaw 2019; also the Prudential Family Index 2020 study, *Savings and finances of Poles in the era of the SARS-CoV-2 pandemic*, September 2020/nationwide study/representative sample 25–45 years/study conducted in September 2020/CAWI/IQS and many others.

5. Cf. Karmańska A., *Management under risk and the issue of gambling in insurance* [in:] *Management under risk conditions: the 40th anniversary of professional work. dr. hab. Tomasz Michalski*, ed. A. Śliwiński, Warsaw, Oficyna Wydawnicza SGH, 2019; the author presents in point 3.1. view on the interpretation of the terms 'risk management' and 'management of risk situations'.

6. In a very methodologically important work (AL Strauss, *Qualitative analysis for social scientist*, Published by the Press Syndicate of the University of Cambridge, Cambridge 1987, pp. 11–14) devoted to grounded theory, it is stated that each scientific research uses deduction, induction, verification. They are closely related and it cannot be said that there is a sequential relationship between them, because they are used alternately (e.g. with the inflow of new data).

The scope of the article covers the issues that will be presented in the proper content, consisting of four parts and structured according to the methodological assumptions.

The first part will discuss the increase in the exposure of the agricultural sector and rural areas to the pandemic risk associated with SARS-CoV-2 in two sections, i.e. first, the main trends of changes will be presented on a global scale, and then, on a national scale, the features of the processes of exposure to COVID-19 pandemic risk in rural areas in Poland will be specified.

In the second part, as a result of a review of national surveys, more significant factors increasing the socio-economic sensitivity to the COVID-19 pandemic situation will be identified, namely: social mood (deteriorating even before the pandemic situation) and the financial condition of households (including its worsening as a result of a pandemic situation).

The third part will be entirely devoted to the socio-economic sensitivity of the countryside and agribusiness to the pandemic situation, in particular, there will be examples of research activity on this topic in Germany and Switzerland, and – in qualitative terms (in line with the well-established theory) – an example of sensitivity will be created of a Polish farm as a case study.

The last part of this study will present the research stages that are underway or whose implementation will begin in the near future thanks to gaining access to new empirical data and reporting statements. This section presents the results of a qualitative (including intuitive) approach to spatial differentiation of the level of socio-economic sensitivity to the effects of the COVID-19 pandemic situation, with an assumption similar to the socio-economic sensitivity to the effects of climate change. The impact of the effects of the pandemic on the citizens of the EU Member States will be described as an ongoing research topic, carried out by the JRC Joint Research Center. The fourth part ends with the identification of research stages and topics based on the results of agricultural economic accounts for the reporting year 2020, prepared by the Central Statistical Office and scientific institutions cooperating with it, including those resulting from EUROSTAT obligations and IAFE-NRI research carried out on the basis of agricultural accounting conducted under FADN.

The background for the main thread of this study is the important results of foreign research on the impact of the pandemic situation on the general economic situation, on various economic sectors and on the daily life of the inhabitants of Poland and other countries.

Benchmarking will be limited in scope in terms of both domestic and foreign research results, most of which are of a survey and general nature, very rarely targeting the specificity of rural areas.

Increased exposure of the agricultural sector and rural areas to the pandemic risk associated with SARS-CoV-2

Exposure in the world – main trends

The degree of urbanization can be measured by many different indicators, but the size of the built-up area of the country was used to present the deep differences between countries in the world (Table 1).

Table 1. The built-up area of the country in km² in the years 1990, 2000, 2014

Year	United States of America	European Union	China	India	Nigeria
1990	110869	110766	57317	16490	5404
2000	130152	125041	73776	22082	7305
2014	150856	144550	102888	32375	12221

Source: Own study based on OECD and World Bank data[7].

Losses from the COVID-19 pandemic are increasing faster in more densely populated urban areas. The higher the degree of urbanization, the greater the loss of people, property and income from economic activity in all sectors of the economy.

Exposure to pandemic risk is significantly increasing due to the massive population growth projected below.

The city is a compact development that hinders isolation and evacuation. A characteristic feature of the city is a small proportion of biologically active areas and a small amount of retained water.

According to forecasts, by 2030 the world population will increase by approx. 1 billion and will reach a record 8.6 billion people[8]. This increase will mainly result from the demographic situation in Africa and Asia.

7. Compilation by Deloitte based on data from https://statp.oecd.org/index.aspx? queryid=82507, access 30.11.2020.
8. ONZ, *World Population Prospectp. Key findings & advance tables, 2017 revision*, Genewa 2018, https://reliefweb.int/report/world/world-population-prospects-2017-revision-key-findings-and-advance-tables, access 30.11.2020.

Table 2. Population by regions of the world – forecast increase until 2100 (in millions of people)[9]

Year	North America	Europe	Asia	Latin America and the Caribbean	Africa	Australia and Oceania	World
2017	361	742	4504	646	1256	41	7600
2030	395	739	4947	718	1704	48	8600
2050	435	716	5257	780	2528	57	9800
2100	499	653	4780	712	4468	72	11200

Source: Own study based on World Population Prospects 2017.

The following data show that urbanization is progressing intensively. According to the data for 2015, 53.9% of the world's population lived in cities, while in 1950 it was only 29.6%. In Poland, the urban population in 2015 accounted for 60.3% of the population. This places Poland above the world average, but below the European average of 73.9%. The UN forecast indicates that by 2050 urbanization will increase and in Poland it will reach approx. 70%. In the world, by 2050, the number of urban residents may increase by up to 2.5 billion people[10].

The number of people living in rural areas will systematically decrease, and its share in the total population will also decrease – see Table 3.

Table 3. Changes in the population structure of the world, Europe and Poland in the years 1950–2050 (share in %)

Share of the rural population	World	Europe	Poland
1950	70,4	48,3	61,7
2000	53,3	26,1	39,7
2050	31,6	16,3	29,6
Share of the urban population	**World**	**Europe**	**Poland**
1950	29,6	51,7	38,3
2000	46,7	73,9	60,3
2050	68,4	83,7	70,4

Source: Own study based on World Urbanization Prospects 2018. Population of Urban and Rural Areas at Mid-Year (thousands) and Percentage Urban, 2018.

9. ONZ, *World Population Prospects 2017*, Genewa 2017, https://www.un.org/development/desa/publications/world-population-prospects-the-2017-revision.html, access 30.11.2020.
10. *Inspiring Future Cities & Urban Servicep. Shaping the Future of Urban Development & Services Initiative*, World Economic Forum 2016, https://www.weforum.org/reports/inspiring-future-cities-urban-services-shaping-the-future-of-urban-development-services-initiative, access 30.11.2020.

Cities therefore have a key impact on the pandemic situation, including greater exposure to contagion and disease risks and the economic impact of a pandemic (loss of people, environment, resources and urban infrastructure)[11] It is in cities that a significant proportion of economic assets, private wealth and human capital are concentrated. At the same time, the city is a compact development that makes isolation and/or evacuation difficult.

As shown in Table 3, the exposure of rural areas to the risk of losses in human capital, but also in property, is lower than in urban areas.

The main reason for the decreasing exposure to the pandemic risk of rural areas associated with the SARS-CoV-2 virus is the declining share of their inhabitants in the total population.

Exposure to the COVID-19 pandemic risk in rural areas in Poland

Population density analysis based on GUS statistical information[12] shows low, although regionally differentiated, population density indicators in rural areas, which confirms the thesis that the exposure to risk is low (certainly lower than in urban areas).

In 2019, there was a slight increase in the number of inhabitants in rural areas – by 14,654 people (100.1% compared to the previous year). As in the previous year, the largest share was recorded in the following voivodships: Wielkopolskie (11,859, 100.7%), Pomorskie (8,323, 101.0%) and Małopolskie (7,524, 100.4%). The decrease in the number of inhabitants of rural areas was the greatest in the following voivodeships: Świętokrzyskie (9 540 people, 98.6%) and Podkarpackie (5 761 people, 99.5%), which is largely the result of changes in the territorial division, described in the section on changes in population in urban areas (joining rural areas to cities). Spatial differentiation of changes in population in rural areas can be presented in conjunction with land development indicators, which will be possible to precisely calculate after the completion of the building census by the Central Statistical Office planned for 2021.

Among the 2,477 units at the commune level, the highest population density is found in municipalities in the Mazowieckie Voivodeship: Legionowo, Legionowo

11. Por. C. B. Field et al., *Technical summary in Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspectp. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge, United Kingdom and New York, NY, USA Cambridge University Press, p. 70.
12. GUS, *Informacja Statystyczna GUS: Powierzchnia i ludność w przekroju terytorialnym w 2019 r.*, p. 16–17.

poviat (3,993 people/km^2, increase by 2 people/km^2) and Piastów, Pruszkowski poviat (3,934 people/km^2, decrease by 13 people/km^2).

In six other municipalities, which are also urban, there are over 3,000 people per 1 km^2. Four of them: Warsaw, Ząbki (Wołomin poviat), Pruszków (Pruszków poviat) and Mińsk Mazowiecki (Minsk poviat) are located in the Mazowieckie voivodeship, two: Świętochłowice and Chorzów (the above-mentioned cities with poviat rights) – in the Śląskie voivodship. The commune of Wołomin in the district of Wołomin, Mazowieckie voivodship, remains the most densely populated urban-rural commune (842 people/km^2). In the group of rural communes, the highest number of people per 1 km^2 is in the Buczkowice commune in Bielski poviat, Śląskie voivodship (574 persons/km^2, decrease by 4 persons/km^2). Andrespol in the eastern district of Łódź, Łódź Voivodeship, in 2018 the first place in the group of rural municipalities, despite the increase in the population, fell to the 3rd position (population density in 18th position at 547 people/km^2 – a decrease by 38 people/km^2), which was, among others the effect of territorial changes consisting of the incorporation of areas from the Koluszki commune. In the case of units with the lowest population density index, the situation is similar to the previous year, i.e. 2018. The lowest (less than 10 people/km^2) is the population density in six communes located in the following voivodeships: Podkarpackie (3), Podlaskie (2) and West Pomeranian Voivodeship (1). Among these units, only the Nowe Warpno commune (Zachodniopomorskie voivodship, Police poviat) has an urban-rural character, the rest are rural communes, such as the commune of Lutowiska in the Bieszczady poviat, Podkarpackie voivodship, which has the lowest population density in the country (4 people/km^2). When analyzing the distribution of communes by population density, taking into account their type, it can be said that the largest percentage of communes in the scale of the entire country are sparsely or moderately populated. If we take the value of 100–149 people per km^2 as the threshold, 78.4% of all municipalities in Poland fall in this range. When we increase the range to 150–199 people per km^2, the percentage of municipalities below this range increases to 83.2%. Another visible relationship is the population density characteristic of a given type of unit. In the case of rural and urban-rural communes, the highest number of units falls within the low density ranges (up to 150–199 people per km^2). In turn, urban communes are the most numerous in the higher ranges. 94.4% of all municipalities are in the range of over 200 people/km^2. The distribution of communes in Poland by population density (without taking into account the division into the type of units) is analogous to that for rural and urban-rural communes, because it is determined by the large number of these units in relation to urban communes.

The results of the population density analysis lead to the conclusion that a smaller percentage of the population at risk of COVID-19 lives in the countryside, which can be reduced to confirming the thesis that rural areas are less exposed to the risk than urban areas.

The highest exposure ratio is characteristic for highly urbanized areas with the largest cities – Warsaw comes first, followed by Kraków and the Tri-City. Due to the largest population and the largest number of fixed assets in large cities, this is the expected result.

More significant factors increasing socio-economic sensitivity to the COVID-19 pandemic situation – national research

While the risk exposure to the COVID-19 pandemic is greater in cities, although with significant spatial differentiation (because human and capital resources, including the number of companies and the value of assets, are concentrated in cities), the socio-economic sensitivity of villages to the effects of the pandemic is greater, while also geographically varied. This greater sensitivity results mainly from the lower, in statistical terms, income level of inhabitants, worse financial condition of households for which farms are the main source of income, lower quality of public services, less developed infrastructure and the degree of space saturation with this infrastructure.

In the first stage of the research process, the socio-economic sensitivity is verified through the prism of two factors, namely through the social mood and assessment of the financial condition of rural households..

Deteriorating public sentiment before and during the pandemic in the light of the research results

Signs of deepening pessimism are visible in the six-month forecasts for the economic situation of households, enterprises and the country's economy. Such an opinion was formulated on the basis of a sentiment survey in October 2020 commissioned by the Polish Bank Association, the results of which were published in the Banking Monitor (November 2020).

The sentiment surveys, the results of which are the basis for macroeconomic forecasts, are also particularly worrying. In recent months, the indicators describing the economic situation of enterprises, households and the country's economy have

significantly deteriorated – they returned to the lowest levels recorded in March and April 2020[13].

Before the results of the research on public sentiments in 2020 are discussed in detail, it is worth referring to slightly older research, i.e. from last year, from before the pandemic. Even then, the inhabitants of Poland were the most pessimistic when it comes to their life expectancy, among the inhabitants of the ten countries of the European Economic Area that took part in the survey[14].

In the August 2019 survey conducted by Insurance Europe in cooperation with the national insurance self-government (in the case of Poland with the Polish Insurance Association), on a sample of 10,000. inhabitants, the following countries took part: Poland, Austria, France, Germany, Hungary, Italy, Luxembourg, Portugal, Spain and Switzerland.

Table 4. Beliefs regarding life expectancy and the possibility of saving for an additional pension from free funds in Poland in relation to the European average in 2019

Poland vs European average	Poland	European average
The respondent's expected living age in years	77,4	82,1
Not saving up for retirement in % of answers	47	43
Willing but not saving for lack of means of free disposal in % of answers	41	43
Not interested in saving, also in the future in % of answers	23	28
The expected payments not less than the paid contributions in % of answers	49	60

Source: Own study based on the results of the Insurance Europe survey in 2019 in cooperation with the PIU or other self-governing insurance institutions from the member states[15].

The term "living age" found in the second column of Table 4 is used in the literature, reports and statements with several different meanings. The living age may mean, in statistical terms, the average life expectancy in a given country. This figure is published every year in the report entitled Human Development Report prepared by UNDP as a stand-alone indicator or as a component of the synthetic aggregated

13. See: commentary of Krzysztof Pietraszkiewicz – President of the Polish Bank Association, Monitor Bankowy, Warsaw, November 2020, https://www.zbp.pl/raporty-i-publikacje/raporty-cykliczne/PENG-AB, access 30.11.2020.
14. Polish Insurance Association, https://piu.org.pl/oszczedzanie-na-emeryture-nie-jest-dla-nas-wazne/, access 30.11.2020.
15. Own study based on: https://piu.org.pl/oszczedzanie-na-emeryture-nie-jest-dla-nas-wazne/, access 30.11.2020.

welfare index HDI (Human Development Index). The following factors determine the value of HDI, which informs about the quality of life: average life expectancy (living age), health care, education, wages expressed in purchasing power parity.

The term "living age" is also used in the insurance jargon used by commercial insurers of section I, or life insurance. The living age means the moment determined as the age of the insured (or beneficiary), after which the given insurance benefit is paid out in accordance with the contract (policy), e.g. the living age of 18 is a condition for the payment of the benefit under the marriage policy, the living age of 60 is a condition for the payment of retirement benefits under the endowment policy, etc.

The term "living age" is sometimes used in interviews or surveys in which respondents are asked about the subjectively expected survival age, i.e. the respondent's predicted age at the time of death[16].

Three surprising conclusions can be drawn from the data in Table 4:

1. Low, or actually the lowest (as shown in Table 5) in relation to the citizens of other surveyed countries, the expected living age of the respondents in Poland (almost 5 years is a very significant difference), which may indicate the mood of full resignation even before the pandemic or the realistic assessment of the poor access to health and care services in the country.
2. A similar share of respondents from Poland (41% of respondents) and other countries of impoverished Europe (43% of respondents), whose incomes are so modest, they do not have access to disposable funds that could be used for retirement savings (see data in column 4)[17].
3. The Polish citizens very low level of trust in financial market institutions, including the institutions of both capital pillars of the pension system (see data from the last column of Table 4), while the opinions of respondents as to the expected level of payments not lower than their contributions concern the first basic pillar (administered by public institutions such as ZUS or KRUS)[18]. Only 49% of respondents in Poland cannot imagine that the value of pension savings

16. The terms "living age" and "life expectancy" are not synonymous The term "life expectancy" is sometimes also referred to as "expected life expectancy" and this quantity is presented in the so-called life expectancy tables used by ZUS, KRUS, GUP. This value in statistical (averaged) terms is calculated as the difference between the estimated future survival age and the actual age already reached by the person, e.g. life expectancy for a person aged 72 is 5 years.

17. Question no. 3: Are you interested in starting an extra retirement savings in the near future? As many as 41% of respondents from Poland and as many as 43% of respondents from the surveyed countries in total declare: "Yes, but at the moment I cannot afford it".

18. It is not about some administrative decisions or statutory provisions as a result of which the payment of benefits would be lower than the value of the contributions paid, but about the free play of market forces, in which financial institutions of the second and third capital pillar participate, investing the collected contributions and achieving as a result games desired positive returns on investment contributions or undesirable negative returns.

will decrease as a result of poor investment policy of pension institutions, while the requirements of citizens of other countries towards pension institutions are greater, because as many as 60% expect to maintain at least the current value of contributions accumulated for retirement. Such a large discrepancy, as much as 11 percentage points, could have been influenced by reprehensible practices of commercial insurers regarding the product, which are life insurance policies with an equity fund, or experience with the Open Pension Funds, which are being dissolved at first, and then voluntary pension contributions of citizens (cf. the so-called second capital pillar of the general pension system). Although the problem of OFE did not directly concern farms, the employees of the entire agribusiness sector were effected.

In the context of the above-formulated conclusions, and especially application no. 2, the title of "Saving up for retirement is not important to us"[19] presented on one of the PIU blogs demonstrates the misinterpretation of the survey results and the reduction of the problem of Poles' reluctance to save for an additional pension.

Table 5. The expected living age of citizens of selected countries of the European Economic Area – the results of a survey conducted by Insurance Europe in cooperation with PIU in August 2019 per 10 thousand people

Country	Expected/anticipated by the respondent living age – average	Median
Poland	77,4	78
Austria	83	84
France	83,3	80
Germany	82	78
Hungary	78,8	80
Italy	83	80
Luxembourg	82	80
Portugal	83,2	80
Spain	83,7	82
Switzerland	84,5	85
Overall	82,1	80

Source: Own study based on the results of the Insurance Europe survey in 2019 in cooperation with PIU or other self-governing insurance institutions from the member states [20].

19. Lieutenant Polish Chamber of Insurance, https://piu.org.pl/oszczedzanie-na-emeryture-nie-jest-dla-nas-wazne/, access 30.11.2020.
20. Own study based on: https://piu.org.pl/oszczedzanie-na-emeryture-nie-jest-dla-nas-wazne/, access 30.11.2020.

According to the Central Statistical Office, in 2018, the average life expectancy of men living in cities was 74.2 years, i.e. one year more than men in rural areas, while both urban and rural residents lived on average 81.6 years[21].

In Poland, as in other countries, there is an excess of male mortality, but the scale of this phenomenon is much greater than in most European countries. Although in the 1990s the difference between the average life expectancy of women and men decreased (in 1991 – 9.2 years; in 2001 – 8.2 years), the first decade of the 21st century brought an increase in this value to 8.7 years (in the years 2006–2008). By 2013, it had dropped to 8.0 years. Since then, it has remained at a similar level, in 2018 it amounted to 7.9 years.

The distribution of death rates by causes is uneven in the relation between urban and rural areas. Rural residents more often die from cardiovascular diseases. They, too, are more likely to suffer accidents, injuries and poisoning, and respiratory diseases.

The current epidemiological situation is presented in the report on Poland, Europe and the world[22].

Deterioration of the financial situation of households as a result of the pandemic situation

Referring to the results of the nationwide Prudential Family Index 2020 study, conducted on a representative sample of people aged 25–45, a clear deterioration in the financial situation of households in half of the respondents can be observed. This study was conducted in September 2020 using the CAWI/IQS method[23].

Half of the respondents expressed opinions about the deterioration of the financial situation and the lack of financial security for the future. Research shows that only 25% of the sample size has a so-called financial cushion, i.e. savings valuing at least six-months earnings.

The surprising result of the research is that despite the further increase in cases, number of deaths and the high probability of another wave of SARS-CoV-2 virus, this age group, in fact, pays less attention to the immediate risk of contracting COVID-19 than to the risk of losing financial liquidity. The study shows that

21. Health Policy, https://politykazdrowotna.com/47975,gus-jaka-jest-przecietna-dlugosc-zycia-polakow-od-dwoch-lat-skraca-sie, access 30.11.2020.
22. Health Policy, https://www.politykazdrowotna.com/56875,covid-19-raport-polska-spadek-liczby-zakazen-57-tys-nowych-przypadkow, access 30.11.2020.
23. Por. British Polish Chamber of Commerce, *Oszczędności i finanse Polaków w dobie pandemii SARS-CoV-2, IX 2020*, http://bpcc.org.pl/pl/aktualnosci/w-czasie-pandemii-polacy-bardziej-boja-sie-o-swoje-finanse-niz-o-zdrowie, access 20.11.2020.

every third respondent (i.e. approx. 33% of respondents) is more afraid of the further deterioration of the financial situation than of getting sick, while the fear of contracting COVID-19 is the most important among all stressors for 16% of respondents.

Among the reasons for the deterioration of the financial situation, the following three were named as the most important:

– high prices in stores (over 50% of indications),
– necessity to reduce expenses due to the loss or reduction of salaries (approx. 33% of responses),
– increase in disease-related expenses.

One of the ways to reduce expenses was to forgo vacation or allocate the leave for renovation and other household works in order to save on the costs of construction, repair and modernization works.

According to the survey, Poles who already save and Poles declaring their readiness to save in the future constitute as much as 92% of all respondents. A declaration of maintaining savings at least the current level, despite the worsening pandemic situation, was declared by 43% of people, including 27% said that they would save more than before.

The interpretation of the survey results is quite shallow, as it does not take into account the relationship between Poles' disposable income and their expenses, and as a result, the lack of a financial cushion is assessed as neglect or low financial awareness. The authors also do not take into account the amount of household debt with banks and the amount of other financial liabilities.

The study of the households' situation conducted by the NBP and published quarterly in the form of reports was clearly better in terms of interpretation, but also methodology. Unfortunately, the last such report was prepared for the first quarter of 2017, and since then this publication has ceased to be published. NBP reports on the condition of households were based on GUS data and on data from its own quarterly financial accounts.

Quarterly financial accounts present financial assets and liabilities of the various groups of resident entities, grouped into institutional sectors and sub-sectors, and of the rest of the world sector, broken down by type of financial operations represented by financial instruments. They are compiled on the basis of the principles contained in the ESA 2010 and taking into account the requirements of the European Central Bank.

In the last NBP annual report on households with a breakdown by various socio-economic groups, it was found that, compared to 2015, a relatively large differentiation of average monthly income and expenditure between individual socio-economic groups was maintained also in 2016.

The highest average monthly disposable income and average monthly expenditures per person (as in previous years) were recorded in 2016 on farms of self-employed persons outside a farm – they amounted to PLN 1,792 and PLN 1,315, respectively. Income in this group of households was 21.6% higher than the average total household income, and expenditure was 16.2% higher than the average total expenditure (in 2015, 25.5% and 20.1%, respectively). As in 2015, the lowest average monthly disposable income per capita in 2016 belonged to farmers' households (PLN 1,151) and it was by 21.9% lower than the average for households in general (in 2015, it was lower by 24.5%). Farmers also recorded the lowest expenditure (PLN 815), which was 28.0% lower than the average total expenditure for farms (in 2015 – 28.6% lower).

As can be seen, the NBP reports in question would be very useful for the analyses outlined in the title of this article, namely with regard to the issue of socio-economic sensitivity. The results contained in the quarterly report and other NBP analyses would allow for a proper and methodologically correct assessment of the financial condition of households, including farmers' households, for which the main source of financial support is income from the farm. The methodological correctness of this assessment would be ensured by, among other things, an analysis of farm debt as well as an analysis of their financial liquidity. A farmer may have a very good financial result (accounting), but unfortunately as a result of delays in buyer payments for products from their farm, they may be at risk of losing financial liquidity. In the accounting sense, the farm shows income, but does not have real resources for purchasing seed materials or for the herd renewal, or for replacement investments, and some fixed assets may have already been depreciated. The condition of a farm is determined not only by income, but also by the share of receivables in this income and the existing debt of the farm and its structure (e.g. long and short-term liabilities). It is possible that the loss of financial liquidity is a consequence of a farm's over-investment.

In studies on the financial condition of households commissioned by the Polish Bank Association, thee so-called financial strength is also assessed. According to the results of these studies, the financial strength of a farmer's household is lower by almost one third than the average of all households in the country, despite the efforts of the state and the EU supply, it has not improved significantly until today. The confirmation of this thesis can be found in the practice of banks that refuse to finance farmers – either due to the high level of current debt, or due to a negative assessment of the farmer's creditworthiness as an applicant. The scale of refusals is so great that banks on the Polish market characterized by high over-liquidity are afraid of a drop in profitability due to the fact that the most profitable business line, which is lending, during the pandemic encountered such restrictions that the rural population is almost unable to meet. Therefore, the banks demand that the

restrictions adopted during the pandemic be relaxed in order to be able to conduct any credit activity at all.

According to the already quoted Banking Monitor from November 2020[24] the general index of customer activity in the household loan market fell by 10 points from month to month and in November is minus 16 points. The balance of assessments of customer activity in the consumer loan market month to month is 28 points lower, and year to year, i.e. compared to 2019, it fell by 31 points. The balance of ratings for the housing loan market fell by 14 points month to month, and year to year it is 23 points lower. The index of the three-month forecast for the household loan market fell month-to-month by 20 points to minus 20 points.

The general indicator of the assessment of entrepreneurs' activity in the market of loans to business entities decreased month to month by 14 points and is minus 8 points. In the case of entrepreneurs' activity on the investment loan market, the index fell by 13 points month to month, and 28 points lower year to year. The rating index for the working capital loan market fell month-to-month by 18 points, and year-to-year is lower by 22 points. The index of forecasts for the market of corporate loans dropped month to month by 8 points and is now minus 10 points.

November 2020 saw another significant deterioration in the six-month macroeconomic forecasts. The forecast for the economic situation of enterprises is minus 64 points, month-to-month is 10 points lower and year-to-year is 42 points lower. The economic outlook for households is minus 68 points, month-to-month is 12 points lower and year-to-year dropping by 66 points. The forecast for the economic situation of the country's economy is minus 70 points, month-to-month is 11 points lower and year-to-year is 46 points lower.

In concluding this part of the discussion on the condition of the economy, enterprises and households, including farmers' households, it is worth recalling the research financed by grant-making institutions in Poland, the subject of which were and are the effects of the implemented climate policy, but the results of these studies also refer to the condition of financial farms. The poor financial condition of a household during the energy transformation, in particular as regards winter conditions and individual land development in rural areas, contributes to energy poverty of the rural population[25]. Energy poverty refers to the inability to adequately heat houses and other buildings, and difficulties in paying electricity and gas bills, which affect access to energy sources.

24. The Union of Polish Banks, https://www.zbp.pl/raporty-i-publikacje/raporty-cykliczne/PENGAB, Monitor Bankowy, Warszawa, listopad 2020, access 30.11.2020.

25. K. Przedworska writes more on this subject in the article entitled *Niezdolność do odpowiedniego ogrzania mieszkania w gospodarstwach domowych Unii Europejskiej i krajach stowarzyszonych*, „Wiadomości Statystyczne. The Polish Statistician" 2020, Vol. 65, No. 10, p. 49–65.

The countryside's socio-economic sensitivity to the COVID-19 pandemic situation

Research activity – the example of Germany and Switzerland

This spring, a meeting of experts from the best German universities was organized. Its participants identified, using the Delphi method, the most critical difficulties that German villages and agriculture will encounter due to the COVID-19 pandemic situation.

The meeting entitled "Auswirkungen der Corona-Pandemie auf die Landwirtschaft und Lebensmittelversorgung" was attended by:

- prof. dr Sebastian Hess, Head of the Agrarmärkte Division, Institut für Agrarpolitik und Landwirtschaftliche Marktlehre, Fakultät Agrarwissenschaften, Universität Hohenheim,
- prof. dr Achim Spiller, Professor für Marketing für Lebensmittel und Agrarprodukte, Department für Agrarökonomie und Rurale Entwicklung, Georg-August-Universität Göttingen,
- prof. dr Klaus Dittert, Head of the Pflanzenernährung und Ertragsphysiologie Department, Department für Nutzpflanzenwissenschaften, Georg-August-Universität Göttingen and Research Directed for the Institute of Applied Plant Nutrition (IAPN), Göttingen,
- prof. dr Sebastian Lakner, Professur für Agrarökonomie, Agrar- und Umweltwissenschaftliche Fakultät, Universität Rostock,
- prof. dr Christa Kühn, Abteilung Genomphysiologie, Institut für Genombiologie, Leibniz-Institut für Nutztierbiologie (FBN), Dummerstorf und dort Sprecherin des Programmbereichs Tierwohl und Tiergesundheit,
- prof. dr Uta König von Borstel, Professorin für Tierhaltung und Haltungsbiologie, Instituts für Tierzucht und Haustiergenetik, Justus-Liebig Universität Gießen.

Responses related to the risk exposure associated with the COVID-19 pandemic in those areas that are the subject of scientific research of each of the above-mentioned individuals. The results of the discussions lead to very valuable conclusions[26], essential for the country's food security, sustaining the supply chain and protecting

26. Bundesministerium für Ernährung und Landwirtschaft, *Auswirkungen der Corona-Pandemie auf die Landwirtschaft und Lebensmittelversorgung*, 17.03.2020; BMEL materials and press reports.

the domestic agribusiness. A comparative study was also announced for both China and other countries of the world[27]. Some of the results of the comparative research relating to Poland were introduced at the meeting of Polish graduates and trainees from Swiss universities in November 2020[28]. The results of the comparative research were presented by prof. Dr. Anna Lupina-Wegener from the University of Geneva, and they concerned employees working in hybrid work conditions.

Table 6. Factors influencing the effectiveness of hybrid work 2020 (indications in % in the Polish and Swiss research samples)

What are the biggest challenges in balancing your work and personal life do you observe right now?	Poland	Switzerland
I have a problem getting myself motivating to work (arriving at the office earlier determined my rhythm of life)	27	19
My working hours have increased (I work longer than usual due to the current crisis)	60	44
My working hours have shortened (the number of tasks I have to perform has decreased due to the slowdown in business, and I do not know how to spend my time)	11	10
It frustrates me that all other activities (sports, culture, entertainment, social life, etc.) apart from family life are impossible or very difficult to do	54	26

Source: Study based on the results of a Polish-Swiss research team led by prof. Dr. Anna Lupina-Wegener, Geneva 2020[29].

As can be seen from the data in Table 6, the study was clearly prepared with regards to the problems of city residents and/or office workers employed in municipal institutions.

The problem of remote work, and perhaps most of all distance learning for children, certainly also applies to rural households, because in their busy schedule, farm families must find additional time for this purpose, at the expense of activities performed directly on the farm[30].

27. The results of research on the impact of SARS-CoV-2 were announced by China in mid-February 2020, cf. *Auswirkungen der Corona-Pandemie auf die Landwirtschaft und Lebensmittelversorgung*, Bundesministerium für Ernährung und Landwirtschaft, 17.03.2020.
28. Swiss Embassy in Warsaw, 18.11.2020.
29. Ibid, results available in the form of presentations.
30. A similar topic to that presented by the Polish-Swiss team is taken up by Anna Dolot, scientifically associated with the University of Economics in Krakow, in a research project entitled *The impact of the Covid-19 pandemic on remote work – employee perspective*. She published the results of her research in May 2020 in an article under the same title. Por. E-Mentor, DOI: 10_15219/em83_1456, access 30.11.2020.

An attempt at a qualitative approach to socio-economic sensitivity to the COVID-19 epidemic – a case study of a farmer's household in Poland

The example of a farmer's household presented below, which is an attempt to qualify the socio-economic sensitivity to the COVID-19 epidemic, was created on the basis of justifications drawn from rejected loan applications at two banks present on the Polish market, while maintaining the applicants' full anonymity.

The case study relates to a farmer's household, who is the main breadwinner. It would seem that there are circumstances conducive to the further development of the farm, such as high income and high propensity to invest. The agricultural holding of the farmer in question experienced a deterioration in its financial condition as a result of over-investment in the farm. The three tractors are not used, because only one of them suffices in operating this farm (which can still be used by a neighbor from time to time). When buying a third tractor, a personal contribution was required, which was financed with a preferential loan, still being repaid. The profitability index and production profitability are quite high, but the receivables from buyers are not paid in a timely manner. With a general market increase in prices, demand shrinks and sales revenues decrease. Due to the energy transformation, the farmer is not able to properly heat the farm buildings. In fear of the effects of too low of a temperature in these buildings, endangering breeding and seedlings prepared for spring, the farmer also limits the heating of the apartment building to save costs. Despite the still relatively decent income, the first symptoms of energy poverty appear, and in order to protect against them, the farmer intends to sell off some of his assets, starting with two less needed farm buildings. As it turns out, no one is willing to buy this type of real estate, because farm buildings are not liquid assets, so the farmer will still have to bear the costs of their maintenance. If, as a result of COVID-19, the health and financial situation of the buyers of the farmer's products worsens, and suppliers do not want to grant him a trade credit for seeds, fertilizers, etc. or supply chains will be broken, the financial condition will systematically deteriorate. We mustn't forget that the profit shown at the end of the reporting year will not protect against the loss of financial liquidity, if the receivables are not paid on time.

The possibility of obtaining a bank loan to maintain current liquidity is severely limited for two reasons. First, the farmer's credit history shows that he/she is still repaying the loan for the personal contribution made when purchasing the third tractor. Secondly, the regulations on granting loans by banks, tightened immediately after the global financial crisis of 2006–2009, were further toughened in connection with the COVID-19 pandemic. The new revised algorithm for calculating the

creditworthiness index will reject the farmer's loan application, despite the fact that both the potential borrower and the lender show great interest in the loan. The farmer is interested, because he/she is applying for a loan to maintain liquidity, and the bank granting this loan is also interested, because it is suffering from financial over-liquidity, Moreover, the bank would very much like to implement a plan of its lending activity with a certain number and value of loans guaranteeing the bank's profitability.

The above rationale proves how much it would be necessary to continue the analyses conducted by NBP until 2017, which were presented, among others, by indebtedness of farms, which to a large extent determines their financial condition, and thus their socio-economic sensitivity to a possible pandemic situation. The indication of the lack of continuity of these analyses highlights the information barriers faced by researchers of socio-economic sensitivity to the current COVID-19 pandemic.

Ongoing research directly and indirectly concerning villages – preliminary results

Initial results of the study of spatial differentiation of the level of Socio-economic sensitivity to the effects of the COVID-19 pandemic situation

At the current stage of the research process, as part of the author's own research, it was not possible to verify the empirical assessment of the pandemic situation in the countryside and its likely impact on rural areas and agribusiness through direct research (e.g. in the field, for example due to restrictions in interpersonal contacts). At this stage of the research, empirical and statistical verification is not possible due to the lack of reporting data, for at least two reasons:

1) the beginning of the pandemic in Poland occurred in March 2020,

2) the deadline for completing the first stage of personal research is November 2020.

None of the institutions authorized to collect the resulting data compile data of which 9 months removed are removed from reporting period, amounting to one year (i.e. 12 months). Neither the methodology of the CSO nor the methodology of research institutions cooperating with the CSO allow this. Daily, monthly and quarterly data on price volatility, exchange rates or quotations of financial instruments such as shares of agricultural processing companies come from current market monitoring. The resulting data, such as income, debt, value of fixed assets, profit, etc., require considering the entire accounting period (reporting), i.e. the year. The availability of this data covers various sections, and moreover, the time needed

to collect, process and elaborate means that they are made available only after a few, and sometimes even several months from the end of the reporting period.

Having a choice of several possible solutions (despite the above-mentioned informational limitations), it was possible to continue with the first stage of personal research and do the following:

1) perform the widest possible review of outside studies, even very fragmentary ones before COVID-19 and after the disease emerges, try to merge them and use them as a tool for preliminary verification of own hypotheses (perhaps treat them qualitatively as test hypotheses);
2) and/or conduct an expert survey as a preliminary diagnosis of phenomena and processes;
3) and/or look for analogies to outside studies already performed, also regarding exposure to various types of high risk, but caused by a factor other than the pandemic, e.g. a natural disaster or a catastrophe (industrial, nuclear or other);
4) and/or wait patiently for the publication by the Central Statistical Office of Poland and institutions cooperating with the Central Statistical Office of the results for the reporting period, which is 2020.

It should be added that next year, results of the new agricultural census will be made available, which are very important for researchers. The first inventory of buildings will also start next year, which aims to calculate Poland's urbanized area. The data obtained from both censuses will be an extremely valuable source of information that can be used, among others, in the analyses of spatial diversity of rural and highly urbanized areas due to various criteria.

In the initial stage of personal research, the first, second and third method of continuation were decided upon, thanks to which preliminary results of the research work planned for several stages, currently including a literature query, studies of secondary sources (reports from foreign research, conference materials, legal acts and expert opinions preceding their adoption) were obtained. We can hope that the CSO data on various areas (NUTS 1, NUTS 2, NUTS 3) and on various sectors and industries of the economy will be used in the next stage of research on risk exposure and socio-economic sensitivity to the effects of this risk as part of the independent research. The resulting data, referred to above, may be used by those researchers from various scientific communities, which this article may inspire to new research investigations.

As a preliminary result of the analysis carried out, it is confirmed that the exposure index shows how many people and how many properties in a given area are exposed to the effects of a pandemic situation. The socio-economic sensitivity

index shows the sensitivity of the local society to the negative effects (direct and indirect) of extreme events related to the pandemic (short- and long-term effects).

Urban areas are rather low in terms of the level of the socio-economic vulnerability index. This is undoubtedly associated with better living conditions in cities and more advanced infrastructure that reduces socio-economic sensitivity to the effects of crises and disasters, including pandemics.

It can initially be assumed that the areas with the highest collective indicator of socio-economic vulnerability to extreme events include the following poviats (NUTS 2):

– Włocławek poviat with the indicator 1,0;
– Tarnów poviat with the indicator 0,99;
– Inowrocław poviat with the indicator 0,97;
– Grudziądz poviat with the indicator 0,92;
– Krosno poviat with the indicator 0,90;
– Bytom poviat with the indicator 0,86;
– Jelenia Góra poviat with the indicator 85;
– Nysa poviat with the indicator 0,82;
– Gorzów Wielkopolski poviat with the indicator 0,78;
– Łódź poviat with the indicator 0,76[31].

From the pandemic risk managers' point of view, places where there is both high risk exposure and high socioeconomic sensitivity are particularly important. In the event of a pandemic situation, its costs will be the highest in such places, and the liquidation of damages and reconstruction may take longer, which will also extend the negative consequences of an extreme event or its entire combination. Silesia is an area with a relatively high concentration of residential buildings and high socio-economic sensitivity.

The impact of the effects of a pandemic on citizens EU Member States – JRC Joint Research Center study

Certainly, the research (with the use of a questionnaire survey) of citizens of European Union Member States, carried out by the Joint Research Center (JRC), will bring very interesting results. The JRC is the scientific backbone of the European Commission. According to the European Commission, independent scientific advice

31. Cf. Climate Report *How prevention and insurance can reduce the impact of disasters on the environment*, prepared and published by the Polish Chamber of Insurance in cooperation with Deloitte Sustainability Consulting Central Europe – Deloitte Advisory Sp. z o.o., Warsaw 2019, as well as the Prudential Family Index 2020 study entitled *Savings and finances of Poles at the time of the SARS-CoV-2 pandemic*, September 2020/nationwide survey/representative sample of 25–45 years/survey conducted in September 2020/CAWI/IQS and many others.

guarantees that public policies created at the EU level will be based on reliable scientific foundations, including data from primary sources of information (e.g. obtained from surveys). The survey is an online anonymous survey of citizens of the EU Member States on the impact of the epidemic on their professional and everyday lives. The JRC intends to use the results of this study to shape strategies to reduce the negative effects of the COVID-19 pandemic in EU countries. An extensive survey includes questions about employment conditions, living conditions, household relations, care for family members, as well as the level of trust in national and European institutions and restrictions that were introduced due to the epidemic. Due to the fact that the survey form contains a short record of the place of residence, although without specifying the name of the city, but with the address code and indication of the number of inhabitants of the city, it will be possible to identify differences in the answers of respondents living in the countryside compared to the responses of respondents living in cities.

The role of the Central Statistical Office and cooperating scientific institutions in the field of agricultural economic accounts during the pandemic

Agricultural activity is the subject of a study carried out on a permanent and systemic basis by the Central Statistical Office and institutions cooperating with it, as part of Poland's fulfillment of Eurostat requirements for EU membership[32].

The impact of the COVID-19 pandemic on agricultural activity and rural areas is not a separate or independent research task of this institution. It seems, however, that the effects of a pandemic will be most acute in the study of the economic situation in agriculture. The CSO collects farmers' opinions on the situation of farms and profitability of agricultural production as well as on the development of demand both on the domestic and foreign markets. On the basis of the obtained data, indicators of the economic situation will be calculated, and cognitive conclusions will be drawn from the results of the analysis of the production and economic situation in agriculture. Certain difficulties are expected in forecasting development trends in the conditions of such high uncertainty and instability in agricultural markets. Signal information on the economic situation for the first half of the year was made available in September 2020, and the following ones will be made available in March

32. The expression "in a permanent and systemic manner" used means maintaining the continuity and comprehensiveness of GUS surveys (throughout the text of this study, many difficulties were indicated by researchers, resulting from the omission of continuation of some NBP analyses or the fragmented nature of studies by other institutions). Point 4 also emphasizes the importance of institutions constantly cooperating with the Central Statistical Office, including the Institute of Agricultural and Food Economics, which, as the State Research Institute, carries out research on the basis of agricultural accounting conducted under the FADN.

2021 in the publication "Business trends in agricultural holdings in the first/second half of 2020" (September 2020, March 2021).

In 2020, the results of direct observation and standardized interviews will be available because the continued work related to the 2020 General Agricultural Census will be completed by the end of November 2020. The EU and national legal basis is Regulation (EU) 2018/1091 of the European Parliament and of the Council of 18 July 2018 on integrated farm statistics and the act on the general agricultural census.

The results of the land use survey as well as the number and size of farms, as well as other results of the GUS research for 2020 (e.g. crops of agricultural and fodder crops as well as field vegetables and strawberries) will be available in the following publications planned for 2021, namely:

– *Statistical Yearbook of Agriculture 2021* (December 2021),
– *Agriculture in 2020* (November 2021),
– *Production of agricultural and horticultural crops in 2020* (December 2021),
– *Announcement of the President of the Central Statistical Office on the agricultural commodity price index in 2020* (May 2021),
– *Production and foreign trade in agricultural products in 2020* (November 2021),

Local Data Banks will be presented and made available within the online databases:

– *Agriculture, forestry and hunting* (December 2021).

As part of the production and market evaluation in agriculture, farms of legal persons and organizational units without legal status, farms of natural persons who are users of agricultural land and farms selling agricultural products at marketplaces, as well as entities purchasing agricultural products will be examined. The next group of surveyed entities consists of producers and importers of: plant protection chemicals, calcium and calcium-magnesium fertilizers, mineral fertilizers, animal feed, and agricultural machinery. Information on the factors determining the development of agriculture is reported periodically monthly or quarterly in the publication entitled "Socio-economic situation of the country in 2020" (February 2020, March 2020, April 2020, May 2020, June 2020, July 2020, August 2020, September 2020, October 2020, November 2020, December 2020, January 2021). Periodic reports "Socio-economic situation of the country in 2020" do not refer directly to the pandemic situation and its current socio-economic consequences. The obligations of the Central Statistical Office imposed on them by the provisions of international law are included in Regulation (EC) No. 138/2004 of the European Parliament and of the Council of 5 December 2003 on economic accounts for agriculture in the Community. The content of this document is also important for the European Economic Area.

Publishing and sharing this form and scale of data aggregation and the scope of their interpretation has an even more distant perspective, not until mid-2022. Even if the studies listed below include the identification and perhaps assessment of the impact of the pandemic situation on the macroeconomic accounts of agriculture, with such dynamic changes, they can quickly become obsolete and therefore their usefulness for crisis risk management may be low or even nonexistent.

Economic accounting results will be released rather late for risk management needs in online databases such as:

- Databases of Eurostat and other international organizations – Eurostat Database – Agriculture – Agricultural Economic Accounts (November 2020, January 2021, September 2021),
- Databases of Eurostat and other international organizations – Eurostat Database – Agriculture – Regional Economic Accounts of Agriculture (September 2022),
- publication of the Institute of Agricultural and Food Economics – National Research Institute in the field of market reports on individual agricultural markets and FADN (system for collecting and using accounting data) for farms.

Among the many expected results of the survey of agricultural economic accounts, the following results will be particularly important due to the assessment of the socio-economic sensitivity of villages to the pandemic situation:

- income of an entrepreneur running agricultural activity, by country;
- object structure of agricultural production in the following sections: country, macro-regions, regions;
- value, volume and prices of selected agricultural production units by country;
- gross fixed capital formation in agriculture, by country.

Information on both income and propensity to invest will answer the question whether the farm has lowered its risk tolerance, i.e. whether it is less sensitive to the effects of the pandemic and whether it is optimistic about the future, wants to and can develop because it possesses the means to finance this development.

In the socio-demographic analyses carried out for the period between the first and the second National Census, i.e. between 2011 and 2020, the Central Statistical Office, unfortunately, does not declare a study of the impact of the pandemic situation on demographic processes, although this impact will probably be indirectly visible.

The Central Statistical Office announces that the fertility analyses will take into account changes in procreation attitudes, observed changes in the creation and break-up of families, problems of reconciling work with family responsibilities, as well as the broadly understood social policy of the state. The mortality analysis is

mainly based on the assessment of Poland's lag behind the European level. It seems, however, that under the pressure of the effects of the pandemic situation, GUS will want to take into account its impact on mortality rates.

In 2020, the results of the population forecast for 2019–2060 will be disseminated. Preparatory work for the 2021 population and housing census is underway. In 2020, on April 1–31, a second trial census was carried out in 16 municipalities. As a result of this census, it will be possible to determine the area of built-up areas in the country, also broken down into built-up areas in urban areas and built-up areas in rural areas.

Conclusions

The results of the analysis carried out in the article allow to initially identify spatial differences in risk exposure to the pandemic effects and to assess the socio-economic sensitivity of rural areas and agribusiness to these effects.

The article also indicates some factors increasing this vulnerability of rural areas both before the COVID-19 epidemic and after it emerged at the beginning of 2020, and in particular the deterioration in the mood and financial situation of households.

The results of the analysis contained in this study allow for the formulation of the following cognitive conclusions:

1. There are spatial differences in risk exposure to the COVID-19 pandemic effects between urban and rural areas.
2. Rural areas are less exposed to the risk of the effects of a pandemic situation due to a lower population density than in highly urbanized areas.
3. The socio-economic sensitivity of the countryside and agribusiness to the risk of the effects of a pandemic situation is significantly higher than in the city due to a lower level of wealth, poorer infrastructure and poorer access to health services (especially commercial health services).

The results of the analysis also allow for the formulation of practical conclusions, including the urgent need for action by the state, the European Union and international banking bodies (responsible for the new capital agreement called Basel III) to alleviate difficulties in access to bank lending due to loss of creditworthiness, assessed according to the new the methodology imposed on banks.

The results of the analysis revealed energy poverty in a large part of rural households, as farmers own residential and farm buildings, which are not able to be properly heated during the winter. The heating needs of farmers are many times greater than that of the owner of a city apartment. Therefore, an application should be formulated for more aid to farmers from the funds allocated to the energy transformation.

The results of the study, especially in qualitative terms, lead to the methodological conclusion that the mapping of catastrophic (e.g. climate) and extreme events risks largely coincides with the results of mapping the risk of pandemic consequences, and the level of socio-economic sensitivity to this risk and catastrophe (climatic) is very similar.

Verification of the truthfulness of statements derived from qualitative approaches should be carried out at a later stage of research in the classical (quantitative) approach. This stage is needed for:

- estimating changes in human capital in rural areas under the influence of the pandemic situation, which will be possible thanks to GUS data for 2020 on income, professional activity, health condition and mortality rates, as well as thanks to data on propensity to procreate, which will be published in 2021;
- estimating changes in fixed assets in rural areas under the influence of a pandemic situation, which will be possible thanks to the Central Statistical Office data on depreciation and propensity to invest, which will be published in 2021;
- estimating changes in the financial resources of rural households due to the pandemic situation, which will be possible thanks to the Central Statistical Office data on the level and directions of expenditure, which will be published in 2021;
- estimating how many inhabitants and entrepreneurs in the countryside are affected by poor credit availability, thanks to the data of the Polish Bank Association on the number and value of rejected loan applications due to the applicant's lack of creditworthiness.

Access to new data and analyses could be assessed as promising for the future and friendly to researchers. Unfortunately, there are no signs that the NBP data, comments and analyses on household budgets, including their debt level, will be resumed.

To conclude, the first stage of the research process leads to the confirmation of the assumptions formulated in the introduction, and in particular that the pandemic affected rural areas and urbanized areas to a different extent – highly urbanized areas suffer the greatest losses due to high population density, which translates into high risk exposure ti infections, while rural areas suffered more from losses (although they were less than urban ones) due to lower prosperity, energy poverty, weaker infrastructure, including access to healthcare, and much less funding to fight the pandemic.

The effects of a pandemic can therefore exacerbate imbalances that were a major challenge even before its occurrence.

The aftermath of the COVID-19 pandemic will be a breakthrough for the EU. The consequence may be a tightening of integration combined with a serious transformation of the economic system, or a change in the existing model of integration, resulting from the intensification of internal disputes. The EU response

to the pandemic, which has not been analyzed in this article, reveals issues in the review of foreign research which did not occur as a result of over-integration but from the lack of stronger coordination mechanisms, which may be of greatest importance to rural areas across the EU.

The objective scope of the article did not include climate issues in the context of the participation of rural areas and agribusiness, but such research, according to the author, must be undertaken in the near future[33]. It is estimated that greenhouse gas emissions in 2020 will most likely decrease by 4% to 7% (thanks to remote work, travel restrictions etc.) depending on the duration of the restrictions. However, emissions will increase again as business resumes. Thus, the current pandemic crisis does not mean the achievement of one of the goals of the climate policy – breaking the link between economic growth and emission growth (the so-called decoupling). It is true, however, that, according to the International Monetary Fund, in 2020, instead of the 3.3% growth in global GDP, we can observe its decline by 3%.

Bibliography

British Polish Chamber of Commerce, *Prudential Family Index 2020: Oszczędności i finanse Polaków w dobie pandemii SARS-CoV-2, IX 2020*, http://bpcc.org.pl/pl/aktualnosci/w-czasie-pandemii-polacy-bardziej-boja-sie-o-swoje-finanse-niz-o-zdrowie, access 20.11.2020.

Bundesministerium für Ernährung und Landwirtschaft, *Auswirkungen der Corona-Pandemie auf die Landwirtschaft und Lebensmittelversorgung*, post-conference materials BMEL, 17.03.2020.

Dolot A., *Wpływ pandemii Covid-19 na pracę zdalną – perspektywa pracownika*, e-Mentor, DOI: https://doi.org/10.15219/em83.1456, access 30.11.2020.

Field C.B. et al., *Technical summary. in Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge, United Kingdom and New York, NY, USA, Cambridge University Press.

GUS, *Informacja Statystyczna GUS: Powierzchnia i ludność w przekroju terytorialnym w 2019 r*.

33. The issues of climate policy, which will also affect the Polish countryside and Polish agribusiness, are the subject of subsequent scientific conferences organized in Switzerland, including remote or hybrid mode, e.g. such as *Könnte der Klimawandel die nächste Pandemie auslösen?*, as well as a scientific conference clearly focused on agricultural and food issues *Bold Actions for Food as a Force for Good*, as well as the last one this year *Race to Zero Dialogues*. These endeavors involve such well-known research communities as Tufts University's Friedman School of Nutrition Science & Policy, Wageningen University & Research and the Government of The Netherlands and many others. Business and non-profit organizations are also involved (including World Economic Forum, Global Alliance for Improved Nutrition (GAIN), International Fund for Agricultural Development (IFAD), World Farmers Organization, World Business Council for Sustainable Development, Unilever, PepsiCo, Royal DSM, Rabobank, One Young World).

Karmańska A., *Zarządzanie w warunkach ryzyka a kwestia hazardu w ubezpieczeniach* [in:] *Zarządzanie w warunkach ryzyka: jubileusz 40-lecia pracy zawodowej prof. dr. hab. Tomasza Michalskiego*, red. A. Śliwiński, Warszawa, Oficyna Wydawnicza SGH, 2019.

Lupina-Wegener A. et al., *Drivers of Effectiveness in the Hybrid Workplace 2020*, Raport z badań Uniwersytet w Genewie, referat wygłoszony 18 listopada 2020 r. na spotkaniu absolwentów i stażystów uniwersytetów Federacji Szwajcarskiej, Ambasada Szwajcarii w Warszawie (presentation of research results).

ONZ, *World Population Prospects 2017*, Genewa 2017, https://www.un.org/development/desa/publications/world-population-prospects-the-2017-revision.html, access 30.11.2020.

ONZ, *World Population Prospects. Key findings & advance tables, 2017 revision*, Genewa 2018, https://reliefweb.int/report/world/world-population-prospects-2017-revision-key-findings-and-advance-tables, access 30.11.2020.

Polityka Zdrowotna, https://www.politykazdrowotna.com/47975,gus-jaka-jest-przecietna-dlugosc-zycia-polakow-od-dwoch-lat-skraca-sie, access 30.11.2020.

Polityka Zdrowotna, https://www.politykazdrowotna.com/56875,covid-19-raport-polska-spadek-liczby-zakazen-57-tys-nowych-przypadkow, access 30.11.2020.

Polska Izba Ubezpieczeń, *Raport Klimatyczny: Jak prewencja i ubezpieczenia mogą ograniczyć wpływ katastrof na otoczenie?*, opracowanie Deloitte Sustainability Consulting Central Europe – Deloitte Advisory, Warszawa, PIU, 2019.

Przedworska K., *Niezdolność do odpowiedniego ogrzania mieszkania w gospodarstwach domowych Unii Europejskiej i krajach stowarzyszonych*, "Wiadomości Statystyczne. The Polish Statistician" 2020, Vol. 65, https://ws.stat.gov.pl/Article/2020/10/049–065, access 30.11.2020.

Regulation (EC) No 138/2004 of the European Parliament and of the Council of 5 December 2003 concerning economic accounts for agriculture in the Community, OJ Of UE L 33, February 5, 2004 as amended; Journal Of EU Polish special edition, chapter 3, vol. 42.

OECD and World Bank statistics, https://stats.oecd.org/index.aspx? queryid=82507, access 20.11.2020.

Strauss A.L., *Qualitative analysis for social scientists*, Published by the Press Syndicate of the University of Cambridge, Cambridge 1987.

Śliwiński A., *Analiza ryzyka śmierci w ujęciu terytorialnym na przykładzie Wielkiej Brytanii i Polski* [in:] Zeszyty Naukowe Uniwersytetu Ekonomicznego w Poznaniu „Studia Ubezpieczeniowe" 2009, nr 127.

Śliwiński A., *Spatial analysis of risk vs. efficiency of life insurance contracts, Proceedings of 2011 International Conference on Technology Innovation and Industrial Management*, Finland, Oulu University, 2011.

Williams C.A. (Jr), Smith L.M., Young C.P., *Zarządzanie ryzykiem a ubezpieczenia*, Warszawa, Wydawnictwo Naukowe PWN, 2002.

World Economic Forum, https://www.weforum.org/reports/covid-19-risks-outlook-a-preliminary-mapping-and-its-implications; ścieżka accessu do materiałów konferencyjnych serii planowanych konferencji naukowych: *Könnte der Klimawandel die nächste Pandemie auslösen?, Bold Actions for Food as a Force for Good, Race to Zero Dialogues*, access 30.11.2020.

World Economic Forum, *Inspiring Future Cities & Urban Services. Shaping the Future of Urban Development & Services Initiative*, World Economic Forum 2016, https://www.weforum.org/reports/inspiring-future-cities-urban-services-shaping-the-future-of-urban-development-services-initiative, access 30.11.2020.

World Urbanization Prospects 2018, *Population of Urban and Rural Areas at Mid-Year (thousands) and Percentage Urban*, 2018.

The Union of Polish Banks, https://www.zbp.pl/raporty-i-publikacje/raporty-cykliczne/PENGAB, Monitor Bankowy, listopad 2020, access 30.11.2020.

received: 01.12.2020
accepted: 11.12.2020