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Savings Rate and Its Determinants in Households in Poland

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Abstract:

Purpose: *The primary objective of the research was to diagnose the level of the savings rate generated by households in Poland from 2018 to 2022 and to identify its demographic and socio-economic determinants. The study considered key factors influencing the savings rate, such as disposable household income, household size, the education and age of the household head, and place of residence. Additionally, the research attempted to determine the extent to which demographic and social determinants modified the effect of income on the savings rate.*

Design/Methodology/Approach: *The study drew on unpublished microdata from the Household Budget Surveys (HBS) conducted between 2018 and 2022 by the Central Statistical Office (CSO) in Warsaw, Poland. Representative samples included approximately 30,000 households each year, totaling around 150,000 over the entire period. The savings rate in Polish households was analyzed in groups distinguished by various demographic and socio-economic determinants adopted as the grouping criteria. To identify statistically significant determinants of the savings rate, a robust regression model was estimated for quantitative, binary, and categorical explanatory variables. This model also included interactions between socio-demographic variables and income.*

Findings: *The pandemic period significantly increased the household savings rate. In the year of the outbreak, its growth was about six times higher than in the previous year. The slight decrease after the easing of restrictions in 2021 suggests that the 2020 growth was only partly forced and largely driven by precautionary motives. The research confirmed that household income was the primary determinant of savings rates, with its influence growing during the pandemic. Higher age of the household head and education beyond the basic level weakened this influence. Moreover, an increase in household size before the pandemic weakened income's effect on saving propensity, while during the pandemic, it strengthened it.*

Practical Implications: *Diagnosing household saving propensity and its determinants is vital for assessing both household and national economic growth. Household savings are a key source of financial capital, driving economic growth and providing protection against financial shocks. This research highlights the pandemic's impact on savings behavior and underscores the need for strategies to mitigate such effects in the future. Governments and financial institutions can use these insights to manage economic stability, while educational programs can emphasize the importance of savings. Additionally, households can make more informed financial decisions by understanding the factors influencing their savings behavior.*

Originality/Value: *The value added of the research lies in the use of a robust regression model for quantitative, binary, and categorical explanatory variables to measure their*

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influence on the savings rate. Moreover, the research drew on large databases of over 150,000 records.

Keywords: *Household savings rate, determinants of saving, robust regression.*

JEL Codes: *D12, D14, G51.*

Paper type: *Research article.*

1. Introduction

The accumulation of household savings holds great importance for the entire economy, providing a significant source of capital formation and investment, essential for long-term economic growth (Wójcik, 2007; Świecka, 2014). Savings are also crucial for individual households, as they form the foundation for financial stability, enable consumption smoothing, and create intergenerational wealth transfers (Świecka, 2014). These transfers ensure a higher standard of living for future generations and further contribute to economic development.

The ability and resolve to generate financial surpluses are primary factors—besides income stability, debt management, and insurance planning—that shape households' financial situations (Szustak *et al.*, 2021; Wereda and Prokopowicz, 2017; Głowicka-Wołoszyn *et al.*, 2024). Among the various aspects of a sound financial condition, savings play a crucial role in providing a cushion to help households absorb income shocks, such as loss of employment or spending shocks related to medical emergencies and other unforeseeable events.

Research by Głowicka-Wołoszyn *et al.* (2024) and Szustak *et al.* (2021) demonstrated that during the pandemic, particularly in its later stages, Polish households showed a greater inclination to compensate for reduced income using savings rather than incurring debt in the form of loans or credit. Additionally, survey studies by Październik and Majek (2021) revealed that among various strategies to safeguard against future shocks, Polish households indicated savings accumulation as the preferred strategy.

Due to the importance of savings for economic growth and the financial stability of individual households, it becomes crucial to identify the factors that influence household decisions to abstain from spending all disposable income on current consumption. Economic theories explain household savings behavior, decisions, and practices as dependent upon their economic, social, and demographic environments. These environments, in turn, can be described by a few key variables, such as disposable income, education, and household size, as well as behavioral factors related to human nature and the motives behind individual decisions.

The primary objective of the research was to diagnose the level of the savings rate generated by households in Poland from 2018 to 2022 and to identify its demographic and socio-economic determinants. The study considered key factors influencing the savings rate, such as disposable household income, household size, the education and age of the household head, and place of residence. Additionally, the research attempted to determine the extent to which demographic and social determinants modified the effect of income on the savings rate.

The study conducted by the authors aimed to answer the following research questions:

RQ1: Did the household savings rate in Poland during the COVID-19 pandemic, specifically from 2020 to 2022, remain at a level similar to the pre-pandemic period?
RQ2: Did economic and socio-demographic factors influence savings rates, meaning that households with characteristics representing different levels of each factor exhibited different savings rates?
RQ3: Did socio-demographic factors moderate the impact of income on the savings rate, meaning that the impact varied at different levels of each factor?

2. Literature Review

The first comprehensive theory of saving was developed by Keynes (1936), who believed that the marginal propensity to save increases with income. In other words, as income increases, people tend to save a larger portion of their additional income. Keynes presented an extensive list of saving motives, including prudence (securing against future income uncertainty), taking advantage of higher interest rates, increasing wealth, achieving financial independence, or passing on inheritance (Keynes 1936, as cited in Bańbuła, 2006).

These motives were presented to respondents in an extensive survey conducted by the Polish Central Statistical Office between 1997 and 2003, with a follow-up by Pentor in 2005. The results indicate that prudence was the dominant motivation behind most Polish household saving decisions (Wójcik, 2007)..

The thesis that wealthy households save more has found substantial evidence since Keynes, particularly in cross-sectional studies (Chengze, 2013). However, it proved inconsistent with time-series data. As early as 1946, Kuznets discovered that the U.S. savings rate remained stable from 1869 to 1938, despite rising incomes. This "consumption puzzle" led to the development of the life-cycle hypothesis by Modigliani and Brumberg (1954) and the permanent-income hypothesis by Friedman (1957).

The Permanent Income Hypothesis (PIH) has garnered significant support, with researchers examining Polish household data and validating various aspects of the

theory. PIH suggests that permanent income, defined as the average income gained over a lifetime, better predicts savings rates than current income (Anioła and Gołaś, 2012). Essentially, the theory posits that consumption patterns remain stable despite fluctuations in current income. This "consumption smoothing" implies that households save during periods of high income and draw on those savings during low-income periods (Rószkiewicz, 2008; Thalassinos *et al.*, 2022).

Additionally, more stable income and predictable growth translate into lower savings rates at the same income level (Liberda, 1999). Supporting these findings is the notion that optimistic expectations of future income increases can lead to higher current consumption and relatively lower savings. For instance, individuals with higher education, anticipating income growth, tend to save less than those with lower education who are less optimistic about income improvement (Fatuła, 2002).

The Life Cycle Hypothesis (LCH), developed by Modigliani, outlines a systematic progression of income levels throughout the working life. According to this hypothesis, individuals experience increasing income during their working years, which peaks before retirement. The theory posits that people plan their consumption and savings behavior over their lifetime to maintain a stable standard of living.

Consequently, they accumulate savings during their high-earning years to support consumption during retirement when their income declines (Gourinchas & Parker, 2002). However, empirical studies on Polish households do not confirm LCH's predicted relationship between age and savings rate (Rószkiewicz, 2008; Liberda, 1999). Some of the problems with the LCH's assumptions have led to the development of the Behavioral Life-Cycle Hypothesis, which focuses on analyzing actual human behaviors rather than purely rational ones (Bańbuła, 2006).

Regardless of the embraced hypothesis, household disposable income is universally seen as the principal factor motivating households' saving decisions. Other factors, differing in nature, direction, and strength, can affect the savings rate and its relationship with income.

Those factors can be divided into external and internal. External ones include economic variables – general economic situation and its outlook, government policy, interest, inflation rates, and taxes – but also the culture of savings that prevails within the social group of the household (Wójcik, 2007; Frączek, 2012). Recent research also highlights the importance of social trust, education, and clear and stable institutional rules (Góra, 2016).

Internal factors can be broadly categorized into demographic and socio-economic. Demographic factors include household size and the age of its members, while socio-economic factors encompass education, type of employment, and economic activity (Callen and Thimann, 1997; Liberda, 1999; Rytlewska and Kłopocka, 2010; Krupa, 2012; Wołoszyn and Głowicka-Wołoszyn, 2015; Kochaniak, 2017).

Researchers generally identify variables such as household size (Kochaniak, 2017), the number of children (Liberda, 2000; 2016), and the very early or very late life stages (Frączek, 2012; Grzega, 2013) as disincentives to savings. Conversely, factors believed to stimulate savings include the presence of middle-aged members (Frączek, 2012) and higher levels of education (Kochaniak, 2017; Wołoszyn and Głowicka-Wołoszyn, 2015).

The impact of some of those factors on household savings is complex due to their strong interconnection with other determinants. One example is the education of the household's head, which is a good predictor of income. Research highlights a positive correlation between savings rate and educational attainment (Fatuła 2010, cited in Anioła and Gołaś 2012).

However, the link between education and income can obscure its direct effect on savings. When income is held constant, the results vary: some studies confirm a positive influence of education on savings rates (Solomon 1975), while others indicate a negative impact (Liberda 1999; Wołoszyn and Głowicka-Wołoszyn, 2015).

Numerous studies also highlight geographical factors such as country (Kochaniak, 2017), region (Strzelecka, 2018), and the type of locality (Głowicka-Wołoszyn *et al.,* 2024). Empirical research further suggests that consumption expectations are an important element shaping savings behavior (Katona 1975, cited in Rószkiewicz 2008)

3. Research Methodology

The study drew on unpublished microdata from the Household Budget Surveys (HBS) conducted between 2018 and 2022 by the Central Statistical Office (CSO) in Warsaw, Poland. Representative samples included approximately 30,000 households each year, totaling around 150,000 over the entire period. The analysis examined households across various criteria, which are presented in Table 1 together with the groups they formed.

Table 1. *Household classification criteria and their derived groups*

Classification criterion	Household group
equivalent disposable income	1st income group (20% of poorest households)
	2nd income group
	3rd income group
	4th income group
	5th income group (20% of wealthiest households)
educational attainment of household head	primary (including lower secondary or no school education)
	vocational (basic vocational and basic sectoral)
	secondary (secondary general, secondary

	vocational/sectoral, and post-secondary)
	tertiary
household size	1-person 2-person 3-person 4-person 5-person 6-person and more
size of residence area	rural areas
	urban areas with less than 20 thousand inhabitants
	urban areas with 20-99 thousand inhabitants
	urban areas with 100-499 thousand inhabitants
	urban areas with 500 thousand inhabitants or more

Source: *Own elaboration based on Zeszyt metodologiczny (2018).*

Classification into income groups was based on equivalent disposable income. To compare incomes between households of varying sizes and demographic compositions, equivalence scales that account for scale effects were used (Dudek 2011). In assessing income disparities, EUROSTAT and the Polish CSO recommend the modified OECD scale.

This scale assigns a weight of 1 to the first adult in the household, 0.5 to each subsequent adult, and 0.3 to each child. The sum of these weights represents the number of equivalent persons in a household, and the ratio of the household's income to the number of equivalent persons is referred to as equivalent income.

The household savings rate was defined as the ratio of the difference between disposable income and total expenditures to disposable income (Fatuła, 2013). The literature also offers another definition that uses consumption expenditures instead of total expenditures (Liberda, 1999; Fatuła, 2013) but both definitions yield similar savings rates estimates. For economists, analyzing savings as the difference between disposable income and total expenditures provides insight into the financial resilience of households and their ability to invest or save for future needs.

In financial planning and assessing economic stability, it is crucial to consider all expenditures, not just consumption-related ones. This approach helps understand how much income remains after meeting all financial obligations, offering a clearer picture of financial health and saving capacity. Indeed, the difference between disposable income and consumption expenditures would not account for significant obligations, such as mortgage repayments or insurance premiums.
Hence:

$$S_i = \frac{Y_i - E_i}{Y_i} \tag{1}$$

where S_i was the savings rate in the i-th group of households, Y_i – their disposable

income, and E_i – total expenditures.

The household savings rate calculated at the microeconomic level from HBS data differs from the household sector savings rate derived at the macro level from national accounts. As Fatuła (2013) emphasizes in his research, the differences between the two savings rates can be significant, and changes in subsequent years may occur in opposite directions.

A small percentage of households reported negative disposable incomes. For self-employed individuals, such as small business owners and farmers, negative income can occur when their business expenses surpass their revenues. This situation is particularly common in agriculture, where variable market prices, high input costs, and unfavorable weather conditions can lead to financial losses.

When these households report their income to the Household Budget Survey (HBS), they deduct business expenses, depreciation, and other costs from their gross income, which can result in a negative net income. In accordance with CSO guidelines for such cases, negative income values were replaced with zero (Zeszyt metodologiczny, 2018). The adjustment only slightly increased the savings rate in the first income group, but at any rate it is important to approach the results for this group with caution.

Two issues related to negative income are abnormally low positive one and abnormally high. The latter occurs when investments accumulated over the year are cashed in during the month of HBS reporting. Moreover, HBS may also encounter problems concerning expenditures, particularly lumpy ones. These are substantial, infrequent costs that can significantly impact a household's budget, sometimes even exceeding the household's income.

Common examples include major home repairs, medical bills, purchasing a vehicle, or taking an annual vacation. One can see that monthly HBS data can be somewhat erratic, containing noise and some outliers that can obscure the true variability. Issues such as heteroscedasticity and non-normality may also surface. Using classical methods to estimate underlying relationships can either reduce statistical power, failing to reveal existing relationships, or lead to overfitting, uncovering spurious ones that do not actually exist. One way to deal with such problems is employment of robust methods.

Robust regression methods offer a superior approach to ordinary least squares (OLS) regression by effectively minimizing the influence of outliers, resulting in more reliable estimates. These techniques, which prioritize the central tendency and penalize model complexity, help mitigate issues like data volatility and overfitting. By down-weighting extreme values, robust regression enhances the overall model fit, leading to more accurate predictions of saving behavior. In this article, we employed robust regression using Huber's psi function (Venables and Ripley, 2002),

which assigns weights to observations based on their residuals. Observations with small residuals received full weight, while those with larger residuals were down-weighted, reducing their impact on the model.

To identify statistically significant determinants of the savings rate, a robust regression model was estimated for quantitative, binary, and categorical explanatory variables. This model also included interactions between socio-demographic variables and income:

$$S = \beta_0 + \beta_1 logY + \beta_2 HSize + \beta_3 HSize{:}\,logY + \beta_4 Age10 + \beta_5 Age10{:}\,logY + \beta_6 Edu.vocat + \beta_7 Edu.vocat{:}\,logY + \beta_8 Edu.second + \beta_9 Edu.second{:}\,logY + \beta_{10} Edu.tert + \beta_{11} Edu.tert{:}\,LogY + \beta_{12} SoRA + \varepsilon \quad (2)$$

where Y was disposable income, $HSize$ – household size, $SoRA$ – size of residence area, and ε – the random, normally distributed error term; the others were characteristics of household head: $Age10$ – age divided by 10, $Edu.vocat$ – vocational education, $Edu.second$ – secondary education, and $Edu.tert$ – tertiary education.

4. Research Results and Discussion

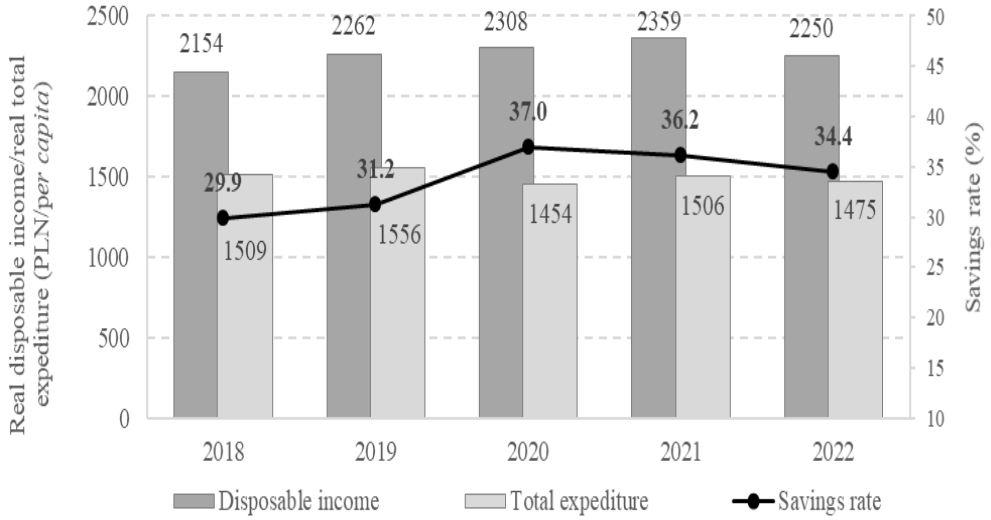
Average monthly disposable real household income in Poland increased continuously from 2018 to 2021 (Figure 1). The COVID-19 pandemic outbreak in 2020 did not alter this trend, though it slowed it slightly down. The annual income growth from 2019 to 2021 was about 2%, which was 3 percentage points lower than between 2018 and 2019, before the pandemic. A decline in income of about 5% was recorded only in 2022, the year the pandemic ended, coinciding with a new economic crisis in Poland due to the outbreak of the Russia-Ukraine war in February 2022.

Following the outbreak of the pandemic, governments in many countries, including Poland, implemented measures to limit the spread of the disease and protect public health. The imposed lockdowns and mobility restrictions led to significant changes in the labor market. Many service sector companies, such as those in tourism, gastronomy, and transportation, were forced to reduce their operations, temporarily halt them, or even declare bankruptcy. These disruptions reduced household incomes due to enforced downtime or even job losses.

To mitigate the effects of the economic crisis caused by the pandemic, the Polish government introduced various legal and organizational solutions, starting with a shielding package to support job retention and provide economic security for workers. These solutions, collectively known as the Anti-Crisis Shield (Ustawa z dnia 31 marca 2020 r.), included subsidies for employees' salaries, coverage of social security premiums (previously paid by employers), and additional childcare

benefits to compensate for the closure of nurseries, kindergartens, and schools (Korzeniowska *et al.*, 2023, Dębkowska *et al.*, 2021). Six Anti-Crisis Shields were introduced by the end of 2020, with additional measures implemented the following year, which directly contributed to improving the income situation of households in Poland.

Figure 1. *Trends in household disposable income, total expenditures, and savings rates*



Source: *Own elaboration based on non-identifiable microdata from BBGD (2018-2022).*

Household expenditures responded immediately to the outbreak, decreasing from 2019 to 2020 by 6.5% (Figure 1). The decline resulted from lockdowns and the closure of shopping malls, service establishments (e.g., beauty salons, hairdressers), private healthcare facilities, hotels, and resorts. In the following year, as restrictions eased, expenditures rose by 3.5%. Still, this growth was significantly smaller than the previous decline, suggesting that some households also reduced spending as a precaution against an uncertain future and potential financial problems.

Following changes in income and expenditure levels, the household savings rate in Poland increased by about 6 percentage points in 2020 –nearly six times higher than the 1 percentage point increase the year before(Figure 1). It was a dramatic change even if much of the expenditure reduction was forced. In the subsequent years, 2021 and 2022, the savings rate decreased by approximately 1 and 2 percentage points, respectively. In 2021, this was mainly due to rising expenditures, while in 2022 – to deteriorating income.

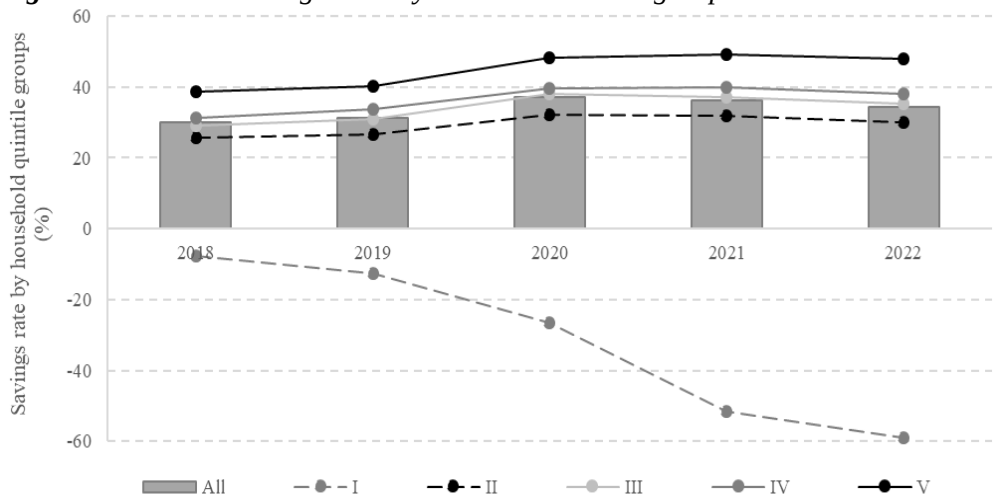
Across the quintile groups, higher income levels corresponded to higher savings rates. Moreover, except for the poorest one, changes in savings rates almost mirrored the changes for the overall household population. In fact, the rates were increasing in

those groups for a year longer than in the general population, and decreased in 2021-2022 (Figure 2).

Throughout the analyzed period, the disparity between the wealthiest income group (the fifth) and the overall household population increased (Table 2). In 2018, the savings rate in that group was 8.8 percentage points higher than the overall rate, rising to 13.5 percentage points in 2022. This group also experienced the highest increase during the period, over 9 percentage points. A widening gap from the national average was also observed for the fourth income group.

In 2018, the difference was only 1.3 percentage points, but it increased to 3.5 percentage points in 2022. The savings rate in the third income group was closest to the overall rate, being slightly lower before the pandemic and higher during 2020-2022. The second income group had a savings rate consistently lower than the national average by nearly 5 percentage points.

Figure 2. *Trends in savings rates by household income groups*



Source: *Own elaboration based on non-identifiable microdata from BBGD (2018-2022).*

Table 2. *Savings rates by household income groups*

Quintile groups	Savings rates by households income groups (%)					2022/2018
	2018	2019	2020	2021	2022	(p.p.)
I	-7.6	-12.6	-26.5	-51.5	-59.0	-51.5
II	25.6	26.7	32.1	31.8	30.0	4.4
III	29.2	30.9	37.9	37.0	35.3	6.1
IV	31.2	33.9	39.6	40.0	37.9	6.7
V	38.7	40.3	48.2	49.1	47.9	9.2
All	29.9	31.2	37.0	36.2	34.4	4.5

Source: *Own elaboration based on non-identifiable microdata from BBGD (2018-2022).*

The analysis across income groups reveals that the savings rate increased by approximately 4-5 percentage points between the second and third groups, by 2-3 percentage points between the third and fourth, and by 8-10 percentage points between the fourth and fifth. This confirms Keynes's hypothesis that the marginal propensity to save increases with income.

The savings rate in the poorest group was markedly different. Throughout the analyzed period, it remained at a negative level and systematically decreased each year. This indicated insufficient funds for these households to function. However, analyzing this income group requires caution. Due to monthly reporting of income and expenditures (Zeszyt metodologiczny, 2018), this group might include households that had to make large payments or purchases during the survey month, resulting in a negative budget balance.

An analysis of the savings rate by educational attainment revealed that in households where the household head had secondary or tertiary education, the rate was very close to the overall average (Figure 3, Table 3). The absolute differences were close to 1 percentage point. Additionally, the savings rate was slightly higher in the tertiary education group than in the secondary (except for 2022).

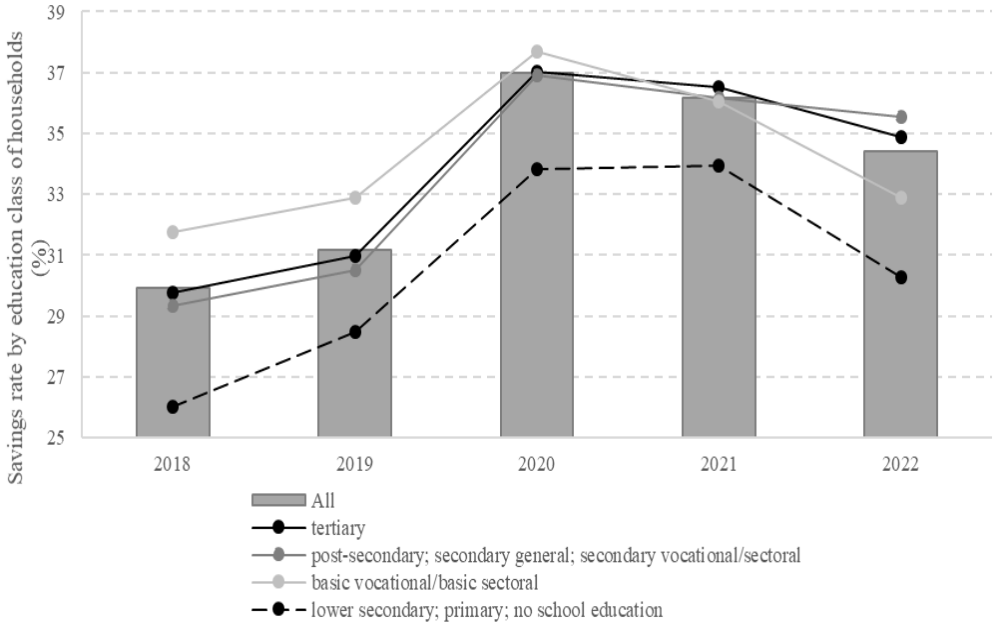
These results partially align with those obtained by Kochaniak (2017), who also found a greater propensity to save in households with higher education compared to secondary education in selected EU countries, although the differences were much larger. Slightly larger differences were noted between the vocational education group and the overall population.

The savings rate in this group was about 2 percentage points higher before the pandemic, about the same level in 2020 and 2021, and about 2 percentage points lower in 2022. The lowest savings rate was observed in households where the head had primary education, being consistently 4 percentage points lower than the overall rate.

Among the groups distinguished by household size, there was a strong and positive correlation between size and savings rates (Figure 4, Table 4). Single-person households had the lowest rate – about 12 percentage points lower than the overall average. Differences in savings rates between households with 2 to 5 members were not large, never exceeding 6 percentage points. The highest savings rate was observed in the largest households, those with at least 6 members, which was about 6-10 percentage points higher than the overall average.

This criterion of household classification reveals another important correlation: larger households have higher savings rates but lower average disposable incomes and expenditures. These relationships somewhat contradict the previously discussed correlation shown in Figure 2 and Table 2, which indicated that higher income correlates with a higher propensity to save.

Figure 3. *Trends in savings rates by educational attainment of household head*



Source: *Own elaboration based on non-identifiable microdata from BBGD (2018-2022).*

Table 3. *Savings rates by education class of households in Poland in 2018-2022*

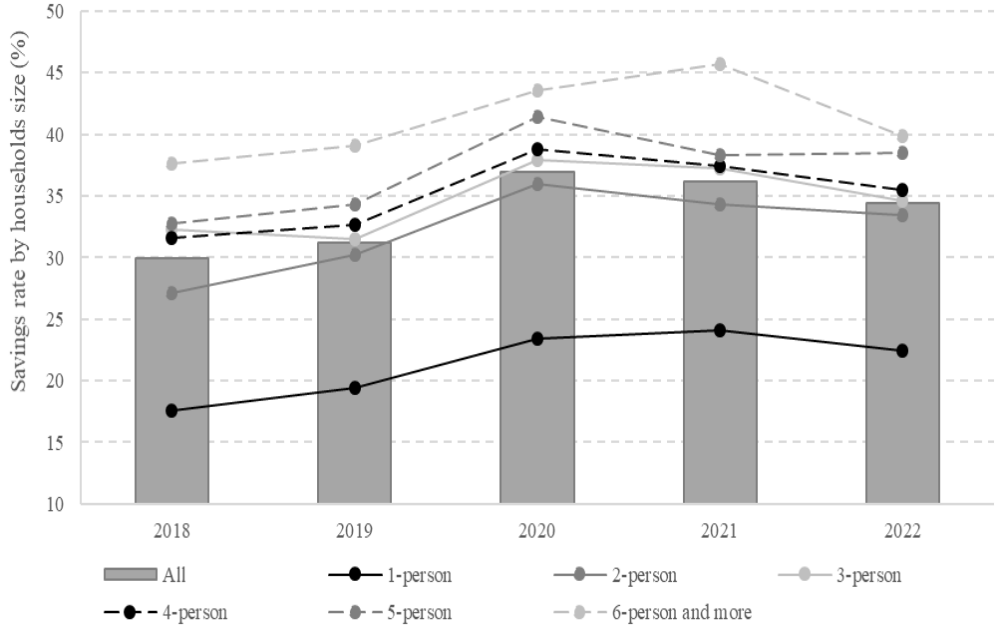
Education class of households	Savings rates by education class of households (%)					2022/2018
	2018	2019	2020	2021	2022	(p.p.)
tertiary	29.8	31.0	37.0	36.5	34.9	5.1
post-secondary; secondary general; secondary vocational/sectoral	29.3	30.5	36.9	36.2	35.5	6.2
basic vocational/basic sectoral	31.7	32.9	37.7	36.1	32.9	1.2
lower secondary; primary; no school education	26.0	28.5	33.8	33.9	30.3	4.2
All	29.9	31.2	37.0	36.2	34.4	4.5

Source: *Own elaboration based on non-identifiable microdata from BBGD (2018-2022).*

That being said, two key aspects should be considered when analyzing households by size. First is the economy of scale, where fixed expenses, mainly related to housing and energy costs, decrease as household size increases. Second is the savings motive. Larger households typically have more children, creating a need to secure them a better start in life.

This leads to better budget planning and a greater need to save. The importance of securing children's futures as a savings motive was already emphasized by Keynes, a point also highlighted by Rytlewska and Kłopocka (2010) in studies on large families in Poland.

Figure 4. *Trends in savings rates by household size*



Source: *Own elaboration based on non-identifiable microdata from BBGD (2018-2022).*

Table 4. *Savings rates by household size*

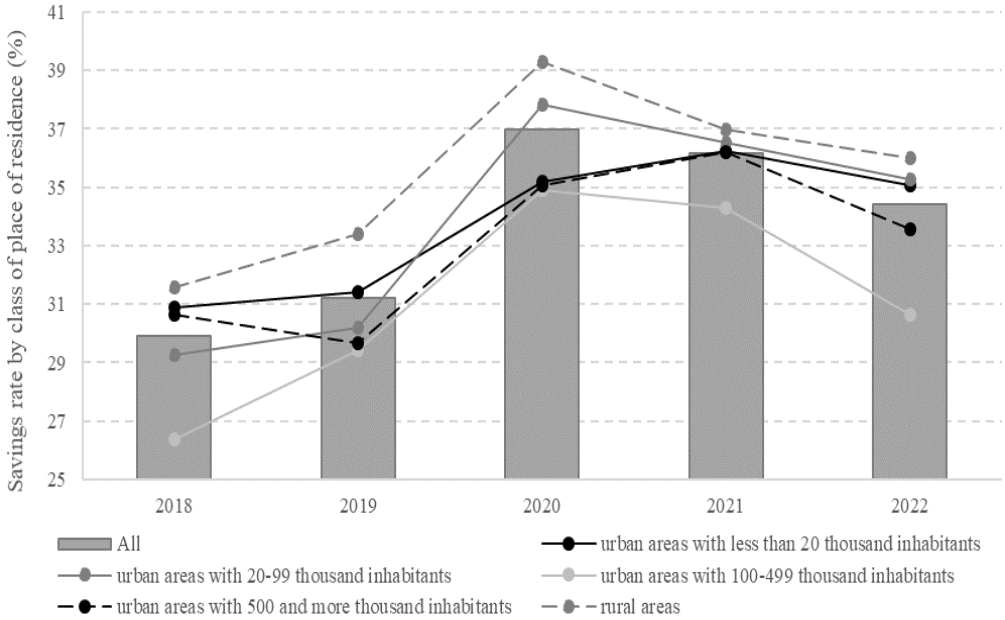
Household size	Savings rates by household size (%)					2022/2018
	2018	2019	2020	2021	2022	(p.p.)
1-person	17.6	19.5	23.4	24.1	22.5	4.9
2-person	27.1	30.3	36.0	34.3	33.4	6.3
3-person	32.3	31.5	37.9	37.2	34.6	2.3
4-person	31.6	32.7	38.7	37.5	35.5	3.9
5-person	32.7	34.3	41.5	38.3	38.5	5.8
6-person and more	37.7	39.1	43.5	45.8	39.9	2.2
All	29.9	31.2	37.0	36.2	34.4	4.5

Source: *Own elaboration based on non-identifiable microdata from BBGD (2018-2022).*

The last criterion of household classification was place of residence. During the entire study period, rural households showed a higher propensity to save than urban ones, their savings rate being about 2 percentage points higher than the national average. It should be noted that this group included farmer households, which tend to save more due to income seasonality and the need to accumulate funds for farming operations (Wołoszyn, 2013; Wołoszyn, 2020). The lowest savings rates characterized households living in cities with populations between 100,000 and 500,000, followed by those residing in the largest metropolises with over 500,000 inhabitants.

A regression model described by equation (2) was used to estimate the impact of income and other demographic and socio-economic determinants on the savings rate. Moreover, the model analyzed the effect these other determinants had on modifying the impact of income on the savings rate. The results are presented in Table 6. It was found that household income was the primary and statistically significant determinant of savings rates, with its influence increasing during the pandemic. In 2018, doubling the income would result in a 13 percentage point increase in the savings rate, while in 2022, it would result in a 14.6 percentage point increase.

Figure 5. *Trends in savings rates by place of residence class in Poland in 2018-2022*



Source: *Own elaboration based on non-identifiable microdata from BBGD (2018-2022).*

Table 5. *Savings rates by size of residence area*

Residence area	Savings rates by place of residence class (%)					2022/2018
	2018	2019	2020	2021	2022	(p.p.)
urban with less than 20 thousand inhabitants	30.9	31.4	35.2	36.3	35.1	4.2
urban with 20-99 thousand inhabitants	29.3	30.2	37.8	36.5	35.3	6.0
urban with 100-499 thousand inhabitants	26.4	29.4	34.9	34.3	30.7	4.3

urban with 500 and more thousand inhabitants	30.7	29.7	35.1	36.2	33.6	2.9
rural	31.6	33.4	39.3	37.0	36.0	4.4
All	32.9	34.0	39.3	38.5	36.9	4.0

Source: *Own elaboration based on non-identifiable microdata from BBGD (2018-2022).*

An increase in the age of the household head by 10 years translated to a consistent growth in the savings rate by nearly 1 percentage point, but also weakened the influence of income by 0.2-0.3 percentage points. This suggests that at the same income level, younger households would save a little more than older ones. These results confirm the behavior of Polish households in line with the life-cycle theory.

It was also found that education beyond the basic level weakened the influence of income on the propensity to save. Moreover, an increase in household size before the pandemic weakened the income's effect, while during the pandemic – strengthened it.

Table 6. *Results of the regression analysis*

Term	2018	2019	2020	2021	2022
(Intercept)	0.2956	0.3114	0.3266	0.3191	0.2842
logY	0.1311	0.1367	0.1382	0.1447	0.1458
HSize	-0.0085	-0.0103	-0.0127	-0.0189	-0.0175
logY:HSize	-0.0022	*-0.0005*	0.0033	0.0046	0.0043
Age10	0.0087	0.0094	0.0067	0.0031	0.0053
logY:Age10	-0.0032	-0.0031	-0.0030	-0.0021	-0.0022
Edu.vocat	-0.0114	-0.0227	*-0.0085*	-0.0182	*-0.0021*
logY:Edu.vocat	*-0.0022*	-0.0099	-0.0100	-0.0192	-0.0170
Edu.second	-0.0374	-0.0436	-0.0170	-0.0234	-0.0130
logY:Edu.second	*-0.0064*	-0.0149	-0.0123	-0.0183	-0.0197
Edu.tert	-0.0566	-0.0558	-0.0289	-0.0438	-0.0182
logY:Edu.tert	-0.0160	-0.0230	-0.0180	-0.0250	-0.0240
SoRA	-0.0022	-0.0029	-0.0031	-0.0020	*0.0001*

Source: *Own elaboration based on non-identifiable microdata from BBGD (2018-2022).*

5. Conclusions

After the COVID-19 pandemic outbreak, declared in Poland in March 2020, authorities aimed to protect citizens' health and prevent the disease's spread. Schools, universities, and most retail establishments were closed, and temporary lockdowns were implemented. These measures helped maintain social distancing and limit mobility but were feared to negatively impact household incomes.

However, the Anti-Crisis Shields effectively protected household incomes from a sudden decline. Research showed that until 2021, the second year of the pandemic, real disposable incomes continued to rise, though at a slower rate. Only in 2022 was the feared income decline recorded. It is difficult to determine to what extent this decline was an effect of the last throes of the pandemic or the economic crisis triggered by the Russia-Ukraine war.

The pandemic did lead to a sharp decline in household expenditures in 2020, the exception being a significant increase in food spending. Further research is needed to determine the extent to which this reduction was forced or perhaps followed by a conscious decision driven by concerns about future income and the need for greater stability. These changes in income and expenditure levels resulted in a 6 percentage point increase in the savings rate, about six times higher than the increase recorded in the last year before the pandemic.

The slight decrease in the savings rate after the easing of restrictions in 2021 suggests that the large increase in 2020 was only partly forced and largely driven by precautionary motives. The slight decline in 2022 was due to a decrease in household incomes. Consequently, the savings rate at the end of the pandemic was 4.5 percentage points higher than before the pandemic.

These findings allow us to negatively answer the first research question (RQ1): *Did the household savings rate in Poland during COVID-19 remain similar to pre-pandemic levels?* It was found that the pandemic period significantly increased the savings rate.

The savings rate was analyzed in groups distinguished by various demographic and socio-economic criteria believed to differentiate households' propensity to save. In most cases, the levels and direction of changes during the analyzed period were similar to the national average. However, each criterion identified some household groups significantly different from the others. For income groups, the wealthiest had a savings rate 9-14 percentage points higher than the overall rate. The household size criterion highlighted single-person households, where the propensity to save was significantly lower.

Only the education level criterion identified groups where savings rate differences did not exceed 4 percentage points. Still, these results allowed a negative answer to the second research question (RQ2): *Did household groups distinguished by selected criteria have similar savings rates?*

Research confirmed that household income was the most important determinant of household savings rates, with its influence on the propensity to save increasing during the pandemic. Higher age of the household head and education beyond the basic level weakened this influence.

Moreover, an increase in household size before the pandemic weakened income's effect on saving propensity, while during the pandemic – strengthened it. These findings provided a positive answer to the third research question (RQ3): *Did selected demographic and social criteria modify the impact of income on savings rates in different ways?*

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