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Determinants of income poverty in an underprivileged area of Hungary

This study investigates the determinants of income poverty in Borsod-Abaúj-Zemplén county, one of Hungary's most disadvantaged areas. Using household-level survey data collected through online and community-based channels, we apply multiple regression analysis to identify the socio-economic factors most strongly influencing per capita monthly net income. Our results highlight three significant determinants of income poverty: education level, household size, and distance from the county seat. Higher educational attainment substantially increases income, underscoring the importance of human capital in reducing poverty risks. Conversely, larger household size reduces per capita income, reflecting demographic pressures on limited resources. Distance from the county center also has a strong negative effect, pointing to the role of spatial inequalities and infrastructural disadvantages in shaping poverty outcomes. These findings highlight the importance of education, regional development, and demographic factors in shaping poverty risks. Policy implications include the need for integrated strategies that strengthen educational opportunities, improve infrastructure and accessibility, and target support for disadvantaged groups. Such measures are essential to break persistent cycles of deprivation and promote inclusive regional development.
Keywords: poverty; education; household composition; spatial accessibility; Borsod-Abaúj-Zemplén
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Introduction

Poverty is a social and economic problem that spans across continents, affecting Africa the most. The poverty situation of the African continent remains one of the most critical issues in global development policy. According to data from the United Nations Development Programme (UNDP, 2024) and the World Bank (2023), Sub-Saharan Africa is the region with the highest poverty rate in the world: approximately 35–40% of the population lives on less than USD 2.15 per day. The causes of poverty are complex and closely linked to historical, economic, social, and environmental factors. The legacy of colonization, marginalization within the global economy, political instability, low levels of industrialization, and the effects of climate change (particularly drought and desertification) all contribute to persistent impoverishment (African Development Bank, 2025).
Among the countries on the continent, South Africa occupies a distinctive position: despite its economic strength, it is characterized by extremely deep social inequalities. According to the World Bank's 2024 report, the Gini coefficient exceeds 0.63, making South Africa one of the most unequal countries in the world. The roots of this inequality lie in the legacy of the apartheid system, which for decades maintained racially based economic and geographical segregation. Although the political transition to democracy occurred after 1994, much of the economic structure has remained unchanged: more than 70% of land remains in the hands of a small portion of the population (Land Audit Report, 2021).

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Poverty is concentrated primarily in rural areas and urban slums (townships). The unemployment rate remains around 30%, and among the 15–24 age group it exceeds 55% (Statistics South Africa, 2023). The quality of education is highly unequal along spatial and social lines: there is a deep divide between urban, middle-class schools and rural, underfunded institutions. In the field of healthcare, the long-term social and economic impacts of the HIV/AIDS epidemic continue to exacerbate the reproduction of poverty.

The South African government seeks to alleviate extreme poverty through its system of social transfers. The Social Grants Programme provides monthly support to more than 18 million people—about one-third of the population (South African Social Security Agency, 2023). While these programs help prevent a humanitarian crisis, they do not resolve the structural problems: the lack of land reform, educational reform, and labor market integration continues to hinder sustainable development.

From an international economic perspective, South Africa represents a "dual economy" in the classical sense. A modern, capital-intensive, export-oriented sector (particularly mining, finance, and technology) coexists with a large, informal, low-productivity economic sphere. The COVID–19 pandemic and recent inflationary pressures have further deepened inequalities, while social tensions – such as energy supply disruptions ("load shedding") and corruption – continue to undermine investor confidence (OECD, 2025).

Addressing poverty in Africa – and within it, South Africa – is not merely an economic issue but also a structural and socio-political one. Economic growth alone cannot guarantee poverty eradication: it is essential to promote social justice, improve access to quality education, and implement profound reforms in land and wealth distribution. South Africa's example clearly illustrates that the sustainability of development depends on eliminating historical inequalities and building an inclusive institutional system.

Considering that poverty is a problem not only in Africa but also — to a lesser extent — in Europe, this study presents poverty and the development of its determinants in Hungary. This study focuses on Borsod-Abaúj-Zemplén county, one of the areas most severely affected by poverty. To understand the case of poverty in the county, the study below provides an overview of poverty in Hungary.

Poverty has long been one of the most pressing socio-economic challenges in Hungary, deeply influenced by the country's transition from socialism to a market economy in the early 1990s. This transformation was marked by high unemployment, inflation, and widening social inequalities, leading to a substantial increase in poverty (Andorka, 2006). Over time, multiple studies have identified a complex interplay of factors shaping poverty in Hungary, including education, labor market conditions, regional disparities, demographic characteristics, and ethnic background (Gábos & Szivós, 2002; Darvas & Tausz, 2002; Szoboszlai, 2004).

Regional differences are particularly striking, with peripheral areas in northeastern and southwestern Hungary consistently facing deeper poverty than more developed central regions (Pénzes 2014). Long-term unemployment, limited economic opportunities, weak educational outcomes, and infrastructural deficits contribute to the persistence of poverty, especially among marginalized communities such as the Roma population (Spéder, 2000; Hegyi-Kéri & Horváth, 2017). These factors not only undermine individual well-being but also reinforce cycles of social exclusion and intergenerational disadvantage. Borsod-Abaúj-Zemplén County, located in Northern Hungary, provides a critical case study of these dynamics. Once a heavily industrialized area, the county suffered disproportionately from deindustrialization, leading to structural economic decline, high unemployment, and significant emigration (Blazek & Netrdová, 2011; Bakos, 2006). Despite attempts at re-industrialization, the county continues to struggle with persistent poverty, a distorted labor market, and the social exclusion of disadvantaged groups, particularly the Roma community (Siposné 2021). Against this backdrop, understanding the determinants of poverty in this region is essential for formulating targeted policies that address not only income disparities but also the structural and demographic roots of deprivation.

The present study examines the determinants of poverty in Borsod-Abaúj-Zemplén County using household-level survey data. Specifically, we investigate the effects of education, employment status, household composition, and regional accessibility on per capita income through multiple regression analysis. By focusing on a region emblematic of Hungary's socio-economic challenges, this research contributes to a deeper understanding of the structural and individual-level drivers of poverty.

Poverty and its determinants in Hungary

Poverty is a complex and multidimensional concept, and scholars have proposed several approaches to define and measure it. The three most widely discussed perspectives are absolute, relative, and subjective poverty, each of which captures different aspects of deprivation (Posel – Rogan 2014).

Absolute poverty is usually understood as the lack of basic necessities required for survival, such as adequate food, safe drinking water, shelter, and access to health care. This approach establishes a fixed threshold below which individuals are considered poor, regardless of the broader societal context. The World Bank's international poverty line of USD 1.90 per day (PPP) is a widely used indicator of extreme poverty (World Bank, 2018). This definition is particularly useful for global comparisons and for highlighting life-threatening deprivation in low-income countries. However, it has been criticized for being too rigid and for failing to account for social and cultural variations in what constitutes a "basic" standard of living (Alkire & Foster, 2011).

In contrast, relative poverty focuses on inequality within a given society. Rather than assessing whether people can survive, this perspective examines whether they can participate fully in the social, cultural, and economic life of their community. Accordingly, individuals can be considered poor if they lack the resources necessary to achieve the living standards that are customary in their society. Relative poverty is often measured by setting the poverty line at 50% or 60% of median household income (OECD 2011, European Commission 2010). This approach emphasizes social exclusion and inequality, making it particularly relevant for high-income countries. However, its dependence on societal averages means that relative poverty can persist even when general living standards rise.

A third perspective, subjective poverty, highlights people's own perceptions of their economic situation. It is typically measured through survey questions asking whether households consider their income sufficient to make ends meet or whether they feel deprived compared to others. Subjective poverty acknowledges that poverty is not only an objective condition but also a lived experience shaped by expectations, reference groups, and cultural norms (Ravallion, 2016; Bila – Biyase 2023)). Another way of measuring subjective poverty is to examine what people think about poverty in general. This approach captures aspects of well-being that income-based measures may miss, but it is also sensitive to individual biases and cultural differences in self-assessment.

Taken together, these definitions underscore that poverty cannot be reduced to a single indicator. Absolute poverty captures material deprivation at its most severe, relative poverty highlights inequality and exclusion, while subjective poverty reflects people's perceptions and lived realities. Many contemporary studies therefore adopt a multidimensional approach that integrates objective and subjective measures to better reflect the complexity of poverty (Alkire & Santos, 2014).

Poverty in Hungary has been a big issue for long decades. The economic and political transition around 1990 in Hungary resulted in a significant rise in unemployment and inflation, leading to a dramatic increase in poverty and income inequality. The wealthiest decile saw their income share grow, while the lowest decile and middle-class experienced declines (Andorka 2006) (see Figure 1).

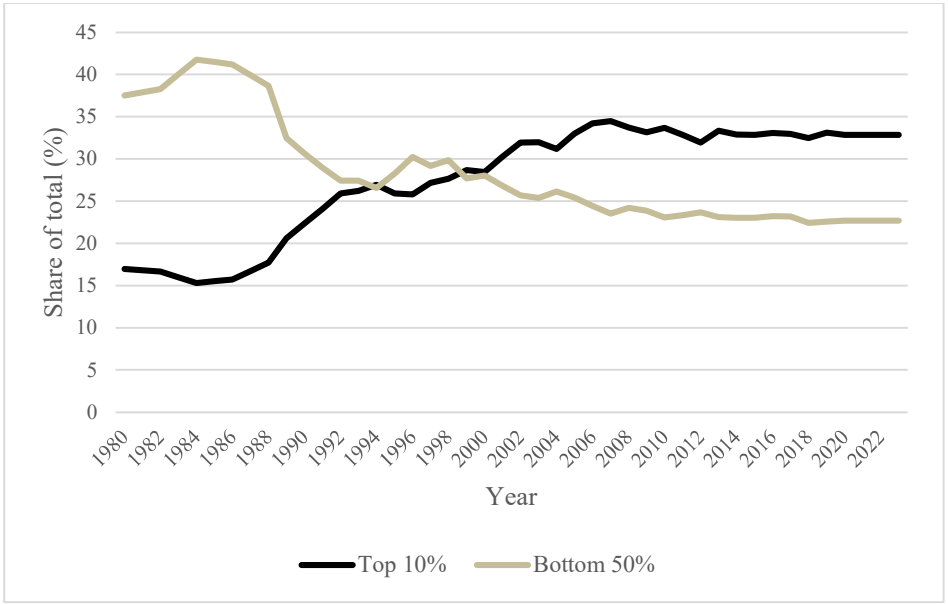

Figure 1 Income inequality (share of top 10% and bottom 50%) in Hungary, 1981-2023
Source: own compilation based onWorld Inequality Database (https://wid.world/country/hungary/)

By the late 1990s, poverty levels remained stable until the early 2000s (Branyiczki - Gábos 2018). Research by Gábos and Szivós (2002) identified key factors contributing to poverty risk around 2000, including unfavorable labor market conditions, low education levels, adverse territorial characteristics, and demographic factors.

Darvas and Tausz (2002) highlighted additional risk factors such as large households with many children, poor housing conditions, and belonging to the Roma minority, which faces significant socio-economic challenges.

Social exclusion was attributed to ethnic origin, age and religious discrimination, cultural deficits, and rising unemployment rates by Szoboszlai (2004) as well. The Roma population, Hungary's largest ethnic minority, suffers from deep poverty, characterized by lower education levels and high unemployment rates (Havasi 1999, Hegyi-Kéri - Horváth 2017).

Following the Great Recession of 2008, income poverty and material deprivation worsened, particularly affecting groups such as the poorly educated, unemployed individuals, large families, and those living in less populated areas. (Branyiczki - Gábos 2018) However, since 2012, there has been a reversal in trends, with decreases in income poverty and severe material deprivation. Győri (2017) noted that issues like housing crises, ethnic origin, and large family sizes are interconnected, creating compounded disadvantages for affected groups.

During the first wave of the COVID-19 pandemic in 2020, many low-income workers (like those employed in hospitality, tourism, and seasonal agricultural jobs) lost their jobs or a significant portion of their income due to economic shutdowns. Long-term unemployment and income loss considerably increased poverty risks, especially among already vulnerable groups (single parents, Roma communities, and elderly people with small pensions). In peripheral, disadvantaged regions, the economic downturn had more severe consequences, as these areas already had fewer job opportunities and weaker social infrastructure (Dávid et al. 2021).

The main research works that have described the determinants of poverty since 1990 are summarized in Table 1.

Table 1 Some research works about the determinants of poverty since 1990 in Hungary

Author	Gábos – Szivós	Darvas – Tausz	Szoboszlai	Győri	Branyiczki – Gábos	Dávid -Szabó – Huszti - Bukovics
Year of publica-tion	2002	2002	2004	2017	2018	2021
Determinants of poverty	unfavorable labor market conditions	large households with many children	age	poor housing conditions	low education levels	unfavorable labor market conditions
	low education levels	poor housing conditions	religious discrimination	large households with many children	unfavorable labor market conditions	adverse territorial characteristics
	adverse territorial characteristics	belonging to the Roma minority	cultural deficits	belonging to the Roma minority	large households with many children	belonging to the Roma minority
	age		belonging to the Roma minority		adverse territorial characteristics	single parent, elderly people with small pensions

Source: own compilation

Numerous research works (like Gábos-Szivós 2002, Branyiczki – Gábos 2018, Dávid et al. 2021) revealed that poverty in Hungary is a regionally highly differentiated phenomenon, which is most evident in the country's northeastern and southwestern peripheral areas (Pénzes 2014). The social and economic situation of the population living in these regions is influenced by numerous factors that interact with each other, reinforcing the persistence of disadvantage. Among the regional determinants of poverty, deficiencies in transportation and infrastructure play a particularly significant role. In peripheral settlements, access to public services, healthcare, and quality education is limited. The lack of accessibility also reduces employment opportunities, as mobility poses difficulties for residents. Low levels of infrastructural development further entrench territorial disadvantages. Almost 20% of the peripheral settlements in Hungary is situated close to the border line between Hungary and Eastern Slovakia in Borsod-Abaúj-Zemplén county (Pénzes 2018).

Unfavorable labor market conditions can also significantly contribute to impoverishment. Long-term unemployment is one of the most important determinants of poverty. Disadvantaged regions are characterized by a lack of jobs, multigenerational unemployment within the Roma population, child poverty, the backwardness of the economic structure, and the decline of agricultural employment. For the population with low educational attainment, the labor market offers few opportunities, while skilled young people often migrate to more developed regions or abroad. This process further weakens local human resources and sustains the reproduction of poverty (Spéder 2000).

Low education attainment often results in impoverishment. Education plays a key role in reducing poverty; however, in disadvantaged regions the performance of educational institutions often lags behind the national average. High rates of early school leaving, low progression to higher levels of education, and segregated forms of schooling all contribute to limiting children's chances of social mobility. Educational disadvantages particularly affect Roma communities, which are present in large numbers in these areas. The weakness of human capital in the long run also narrows labor market opportunities.

Overall, the socio-economic landscape in Hungary has been shaped by a complex interplay of factors leading to persistent poverty and inequality, particularly among marginalized communities.

Social and economic position of Borsod-Abaúj-Zemplén County, Hungary

The significant increase in regional disparities in wealth and deprivation in the transition period of 1989-1990 in Hungary was particularly evident in Northern Hungary, specifically in Borsod-Abaúj-Zemplén County, where the economic landscape was drastically altered by deindustrialization. (Blazek – Netrdová 2011; Keller et al. 2016)

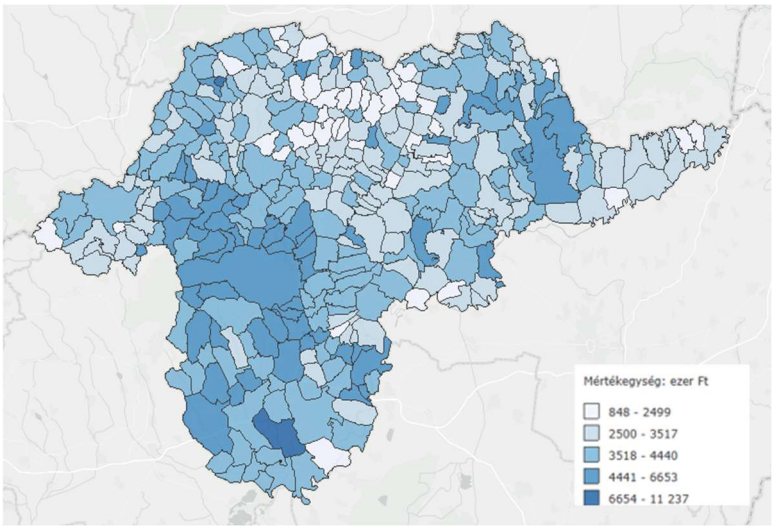

Figure 2: Personal income tax base income per taxpayer, 2023 (thousands HUF)[13]
Source: HCSO TIMEA

The decline of industrial activities, particularly in metallurgic companies, led to a regional crisis characterized by high unemployment, a distorted economic structure, and large-scale emigration. The 1990s were especially challenging for this region, as failed privatization efforts and underdeveloped infrastructure further exacerbated the situation (Bakos 2006). Reindustrialization did not begin to take shape until after 2003, with a focus on the industrial and energy sectors, which brought some structural changes to the economy(Barta et al. 2008).
Despite these developments, Borsod-Abaúj-Zemplén County continues to struggle with high unemployment and poverty rates, alongside a significant outflow of its population caused by limited economic opportunities (Varga – Tóth -Nagy 2021). The average personal income tax base income per taxpayer is one of the lowest in Borsod-Abaúj-Zemplén County, with the deepest poverty found in the northern part of the county (Figure 2). The region has the highest emigration rate in the country, with many residents relocating to Central Hungary in search of better prospects. Socioeconomic challenges are further compounded by the large proportion of ethnic Roma people, who represent the country's most disadvantaged minority.

[13] The current HUF/USD mid-exchange rate is 1 USD = HUF 335. Accordingly, the categories shown in the figure are: USD 2,531–7,460; USD 7,461–10,499; USD 10,500–13,254; USD 13,255–19,860; and USD 19,861–33,543.

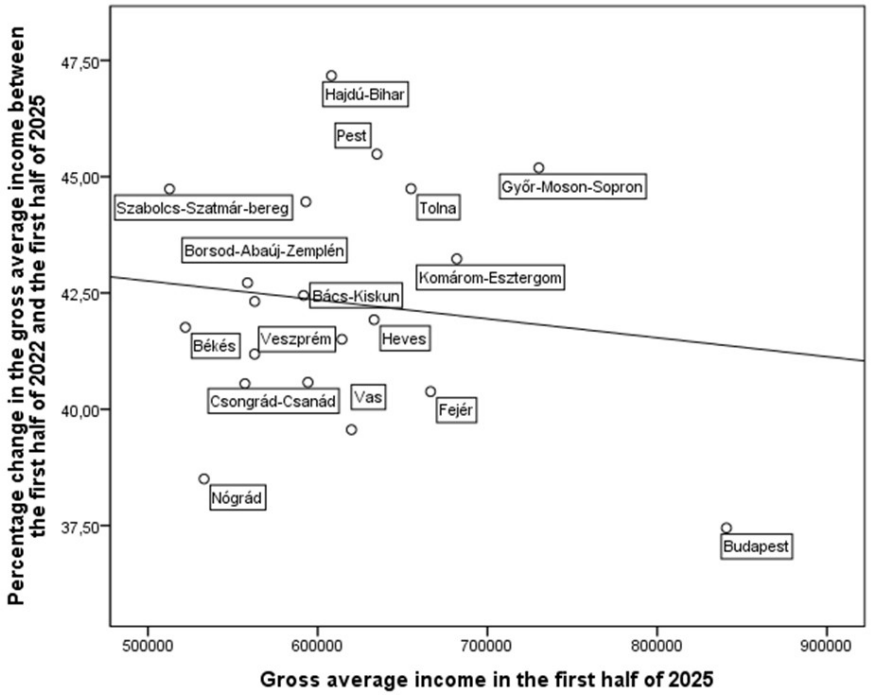

Figure 3 Gross average income in 2025 and its percentage change between 2022 and 2025 in the counties of Hungary, HUF
Source: own compilation based on HCSO data

Data on income levels also highlight the county's unfavorable position While Győr-Moson-Sopron stands out as the most prosperous county, and Nógrád the most disadvantaged with both low per capita income and minimal growth, Borsod-Abaúj-Zemplén lies close to the lower part of the national trend line, marked by relatively low income levels and only moderate income growth (Figure 3).
Borsod-Abaúj-Zemplén County exemplifies the challenges faced by post-socialist regions in Hungary, particularly in terms of economic disparity and the integration of marginalized communities such as the Roma. Persistent unemployment, poverty, and social discrimination continue to hinder the region's development and undermine the well-being of its inhabitants.

Methodology

The aim of our research was to find the main determinants of poverty in Borsod-Abaúj-Zemplén County. We used household-level survey data to test whether the determinants of poverty revealed by other research works (described in Table 1) still have a significant effect on income level.
To collect data about poverty in Borsod-Abaúj-Zemplén County, we created a questionnaire focusing on the households' socio-economic and demographic characteristics.[14] Our questionnaire asked closed-ended questions about income, education, ethnicity, number of children, and distance from the county seat.
The questionnaire was created using Google Forms and distributed from November 2024 to February 2025. Online convenience sampling was employed for this investigation. The results should not be extrapolated due to bias (Malhotra et al. 2017). For exploratory study, however,

[14] We thank Mohammad Jaber for his assistance with the conceptualization and the development of the questionnaire.

convenience sampling is adequate. Due to resource restrictions, Facebook was used to engage with local populations in the study area for data gathering. Facebook was effective in data collection during the COVID-19 epidemic (Jaber – Szép, 2024). By 2024, Hungary had over seven million Facebook users out of a total population of ten million (Facebook Users by Country, 2025), making it easier to reach the study's target group and gather results quickly. Most cities and towns have Facebook groups for local issues and communication. These locally embedded platforms for survey dissemination can boost research credibility and respondent confidentiality. We conducted the survey through community-based Facebook groups to reach and engage the intended participants. Sample collection did not involve paid ads. Besides the online platform, we asked the representatives of local municipalities to put on ads with a QR code leading to our questionnaire outside their building. In this way, even people without a Facebook profile could get access to our questionnaire.

As a result, a total of 404 people completed the questionnaire, of which 336 valid responses remained after data cleaning.

A multiple linear regression analysis was conducted to examine predictors of poverty. The dependent variable was the per capita monthly net income of the household, which we calculated using the answers for questions about the informants' income level and the number of people living in the household. For the question about the income level, informants could choose from nine options (less than HUF 145,000; between HUF 145,000 and HUF 199,999; between HUF 200,000 and HUF 304,999; between HUF 305,000 and HUF 499,999; between HUF 500,000 and HUF 699,999; between HUF 700,000 and HUF 999,999; between HUF 1,000,000 and HUF 1,499,999; between 1,500,000 and HUF 2,199;999; more than HUF 2,200,000).

The independent variables entered the initial model were number of children living in the household, distance from the county seat (as an indicator of adverse territorial differences), level of education, and employment status. The effect of ethnicity was not examined, as only 7 informants indicated ethnicity. Education level among respondents was assessed using a categorical variable (0: none, 1: primary education, 2: secondary education, 3: tertiary education). As for employment status, two categories were defined: 1: employed, 2: not employed. The distance from county seat was calculated from the city/village where the informant lives. Then these distances were categorized into the following categories: 1: 0-10km, 2: 10.1-30km, 3: 30.1-50km, 4: 50.1-70km, 5: 70.1km.

To examine the relationships between the dependent variable, per capita monthly net income, and the above -described set of candidate independent variables, we employed multiple linear regression with a backward elimination procedure. This approach begins with a full model that includes all candidate predictors, then sequentially removes variables that contribute least to the model until only statistically meaningful predictors remain. This approach is particularly useful when the goal is to identify the most parsimonious model while avoiding the exclusion of potentially important variables at the outset, as can occur with forward selection procedures.

Results

The distribution of the indicator of poverty, measured as per capita monthly net income, is skewed to the right, exhibiting a long tail that extends beyond the main cluster of data points (Figure 4). This positive skewness in income distribution is a well-documented and widely observed phenomenon consistent with established income distribution research. In fact, income data across various populations and contexts almost universally display positive skewness: the majority of individuals earn incomes concentrated around lower or middle values, while a smaller fraction of high-income earners create an extended right tail in the distribution (Cowell 2011; Atkinson & Bourguignon 2015). This asymmetry reflects structural economic inequalities where wealth and income are unevenly distributed, highlighting the persistent presence of high earners in contrast to more populous lower-income groups.

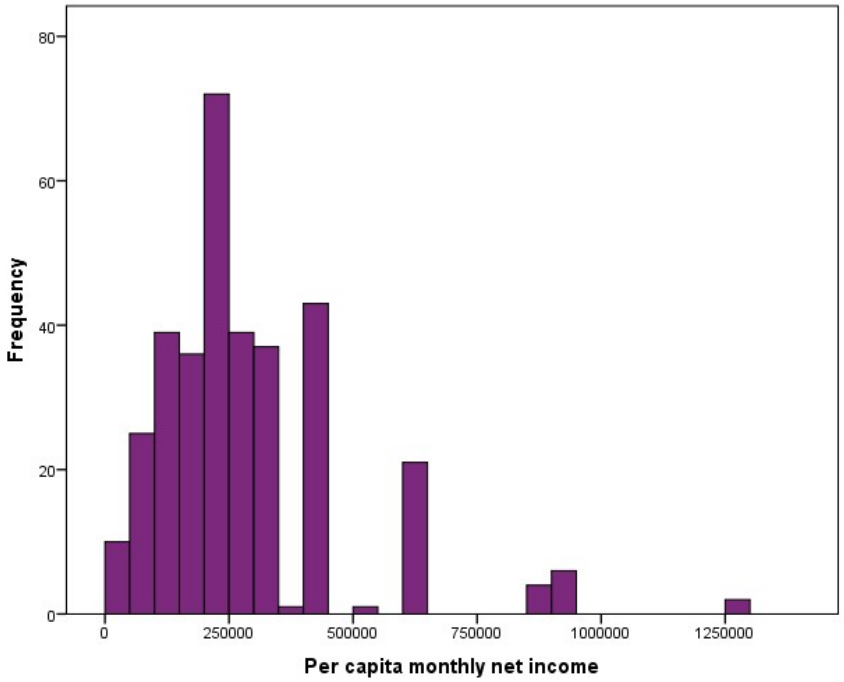

Figure 4 Frequency distribution of the income level of the respondents
Source: own compilation

In terms of model refinement, backward elimination procedures yielded a more parsimonious second regression model in which employment status was removed from the set of predictors, suggesting it did not add significant explanatory power beyond the other variables (Table 2). This streamlined model identified several key predictors significantly impacting per capita income and thus poverty levels.

One important predictor retained in the final model is the distance from the county seat, which showed a significant negative effect on income (see Table 2). This indicates that as the physical distance from the county administrative center increases, per capita income tends to decrease.

Similarly, the level of education emerged as a significant positive predictor of income, reinforcing the well-established relationship between higher educational attainment and increased earning potential. Individuals with more advanced educational qualifications likely have access to better-paying jobs, contributing to higher household incomes and thus lower poverty scores.

Additionally, the number of children in the household had a significant negative association with per capita income. This suggests larger household sizes dilute available income among more dependents, reducing income per capita and potentially increasing poverty risk within the family unit.

Collinearity diagnostics confirmed the robustness of the model, with all Variance Inflation Factor (VIF) values hovering around 1.0, indicating that multicollinearity among the predictors is not a concern. This ensures that each predictor's effect can be interpreted reliably without undue inflation from correlations with other variables.

Overall, the regression model exhibited a moderate yet meaningful explanatory power, with an R-value of 0.482 and an R^2 of 0.232 (adjusted $R^2 = 0.225$). This indicates that about 23 percent of the variability in poverty scores, as measured by per capita income, is accounted for by the three predictors included in the model. The model's statistical significance was confirmed by a highly significant omnibus F-test ($F = 30.88$, $p < .001$), which demonstrates that the combination of these predictors effectively distinguishes varying levels of poverty across the sample.

Table 2 Determinants of poverty

Predictor	*B*	*SE (B)*	*β*	*t*	*p*	*VIF*
(Constant)	135,136.9	47436.5	—	2.85	0.01	—
Number of children	-65,125.84	9672.57	-0.338	-6.733	0.00	1.00
Distance from county seat	-2,110.06	589.9	-0.18	-3.58	0.00	1.01
Education level	90,418.35	17,596.80	0.259	5.138	0.00	1.01

Source: own compilation

Conclusion

Our findings demonstrate that education, distance from the county seat, and household size significantly influence per capita income, while employment status did not remain significant in the final model. These results suggest that regional accessibility and human capital formation are critical drivers of poverty, and that demographic pressures such as large household size further exacerbate economic disadvantages.

The persistence of poverty in the region cannot be fully explained by labor market status alone but is instead reinforced by structural and spatial inequalities. Limited infrastructure, poor access to services, and weak educational outcomes sustain cycles of disadvantage, particularly in peripheral settlements. The findings are consistent with previous research emphasizing the interrelated roles of education, territorial disparities, and demographic factors in shaping poverty risks in Hungary (Darvas & Tausz, 2002; Spéder, 2000; Branyiczki & Gábos, 2018; Győri, 2017; Gábos & Szivós, 2002).

This analysis underscores the multifaceted nature of poverty, driven both by demographic factors like household size and education, as well as geographic aspects such as proximity to economic centers, and highlights the importance of targeted policies addressing these determinants to alleviate poverty. Policy responses must therefore move beyond short-term welfare measures and prioritize investments in education, regional development, and infrastructure to break the cycle of poverty. Supporting disadvantaged communities, especially Roma populations, through inclusive education and targeted local development programs could enhance opportunities for social mobility and reduce regional disparities.

A noteworthy result of this study is that employment status did not emerge as a significant determinant of per capita net income in the final regression model. This contrasts with the conventional understanding that employment is a primary safeguard against poverty, as shown in the research of Branyiczki and Gábos (2018) and Gábos and Szivós (2002). One possible explanation lies in the role of education and regional accessibility, which may overshadow the simple employed–unemployed distinction, since better-educated individuals and those living closer to economic centers tend to access higher-quality jobs. Another possible reason for the exclusion of employment status is that the sample is not representative of the total population. For example, most respondents (98%) had attained secondary or tertiary education, resulting in a much higher average education level than in the general population (77% in 2022 in Hungary). Further research, particularly field studies focused on poorer populations, is needed to better understand the effect of employment status on poverty.

Although based on a convenience sample, this study provides valuable exploratory insights into the socio-economic dynamics of poverty in one of Hungary's most disadvantaged counties. Future research using representative samples and longitudinal designs would allow for more robust conclusions and better inform policy interventions. Overall, addressing poverty in Hungary requires an integrated approach that recognizes the intersection of education, demography, spatial inequality, and social exclusion in shaping the life chances of vulnerable populations.

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