

RESEARCH ARTICLE

Financial Hardship and Health Borrowing in Central and Eastern Europe: Evidence from the Global Findex Database

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Abstract

Financial protection against healthcare costs is a defining objective of modern health systems, yet EU member states deliver it unevenly, particularly across the post-transition economies of Central and Eastern Europe (CEE). This study asks whether the persistent CEE-Western Europe gap in health borrowing reflects a fixed regional characteristic or is mediated by identifiable institutional factors. The analysis draws on Global Findex Database (World Bank) microdata from 2014, 2017, and 2021, combined with IMF COFOG fiscal indicators, WHO out-of-pocket expenditure data, and Worldwide Governance Indicators for 22 European countries (66 country-wave observations). Pooled OLS models with HC3 robust standard errors are estimated using four progressive specifications. Descriptive results confirm a persistent gap: the unweighted CEE mean borrowing rate reached 5.99% versus 3.60% in Western Europe ($t = 3.10$, $p = 0.003$), with Romania recording 12.53% in 2021 and an income-based inequality gap of 6.63 percentage points. In regression analysis, out-of-pocket payment shares are positively associated with borrowing ($\beta = 0.11$, $p = 0.082$), while government effectiveness shows the expected negative association ($\beta = -1.60$, $p = 0.192$). The CEE structural dummy, significant in the baseline model ($p < 0.001$), loses significance once governance quality enters the specification (R^2 rises from 0.247 to 0.370), indicating that the regional divide is substantially mediated by institutional quality rather than geography per se. These findings suggest that reducing household financial hardship requires not merely higher public spending, but targeted reforms in allocative efficiency, informal payment control, and governance capacity.

Keywords: financial protection; health borrowing; Central and Eastern Europe; Global Findex; out-of-pocket payments; institutional governance

JEL Classification: I13; I18; H51; C23

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1. INTRODUCTION

When a household borrows money to cover the cost of medical treatment, the health system has already failed at one of its most basic functions. Both the World Health Organization (2000) and the European Commission (2014) treat financial protection as a core dimension of health system performance, yet the gap between this aspiration and the experience of millions of European households remains large (European Observatory on Health Systems and Policies, 2019). In practice, the absence of adequate protection materializes as depleted savings, sold assets, and most visibly, as borrowing. Wagstaff and van Doorslaer (2003) and Xu et al. (2003) documented these patterns early; what makes health borrowing particularly damaging is that it commits future resources, creating a debt cycle that extends vulnerability far beyond the initial illness episode. A household that borrows to pay for surgery today enters the next health shock with fewer resources and less capacity to cope.

Health borrowing has nonetheless attracted less analytical attention than catastrophic expenditure or medical impoverishment. The gap is especially striking for Central and Eastern Europe, where post-communist transition produced health systems with a distinctive combination of features: formal coverage that looks adequate in statutory terms, but informal payments that persist, waiting lists that redirect patients toward private alternatives, and institutional fragmentation that undermines even well-designed coverage policies (Lewis, 2000; Tambor et al., 2014; Rechel et al., 2013). The Global Findex Database (Demirguc-Kunt et al., 2022) makes it possible to measure health borrowing directly and comparably across countries and over time. That comparability is the analytical opportunity this study exploits.

Three objectives guide the analysis. First, we document how widespread health borrowing is across CEE relative to Western Europe, using all three available Findex waves (2014, 2017, 2021) and their built-in disaggregations by gender, age, and income. Second, pooled OLS regression models are used to identify which country-level factors, public pharmaceutical expenditure, out-of-pocket payment shares, governance quality, are most strongly associated with borrowing rates. The analytical contribution lies in testing whether the observed CEE-Western Europe gap survives the introduction of institutional quality controls, or whether it is substantially mediated by governance variables. Third, the study draws policy implications, asking specifically what it would take for increased public spending to translate into reduced financial burden at the household level.

The structure of the paper is as follows. Section 2 reviews the theoretical framework and relevant literature. Section 3 describes data and methodology. Section 4 presents results. Section 5 discusses implications. Section 6 concludes.

2. LITERATURE REVIEW

2.1. Financial Protection and Health Borrowing: Conceptual Foundations

Medical costs differ from other household expenses in fundamental ways. They are unpredictable, often unavoidable, and tend to concentrate precisely when the household is already vulnerable through illness or incapacity to work. The concept of catastrophic expenditure, formalized by Wagstaff and van Doorslaer (2003), captures the situation where out-of-pocket payments breach a threshold of household income. Xu et al. (2003) refined the approach by measuring costs against the household's capacity to pay after subsistence needs are met.

Borrowing for health represents a step beyond catastrophic spending. It signals that the household has exhausted its current resources and is committing its future income. The Global Findex Database (Demirguc-Kunt et al., 2014, 2018, 2022) introduced a direct survey question about medical borrowing, creating the first cross-country comparable indicator tracked over time. The survey asks respondents whether they borrowed money in the past 12 months specifically to pay for medical expenses, and the resulting variable can be disaggregated by gender, age group, income quintile, and urban or rural residence. The limitation is real, Findex captures whether people borrow for health, not the amount involved or the terms of the borrowing, but as a triannual indicator covering over 140 countries with nationally representative samples of at least 1,000 adults, it fills a gap that national household surveys cannot easily address. No other cross-country data source provides this level of temporal consistency and geographic breadth for measuring health-related financial distress.

Why would people borrow for health in countries with formal insurance coverage? The answer typically lies in failures of effective risk pooling. Insurance may exist in law but not cover enough in practice; copayments may be too high; medications may fall outside reimbursement lists; informal payments add hidden costs; or services may be geographically inaccessible without significant expense (Tambor et al., 2014; Arsenijevic et al., 2016). In each of these scenarios, the formal system provides less protection than its statutory design would suggest, and households bear the residual risk through savings depletion or borrowing.

2.2. Health Systems in CEE and Financial Pressures on Households

Following 1990, CEE health systems took divergent reform paths from a broadly similar starting point: Semashko-era structures with universal coverage on paper, state budgetary financing, and sprawling facility networks that provided wide access at low efficiency (Rechel et al., 2013). Most countries adopted some variant of a Bismarckian social health insurance model, which in practice meant reduced public resources, partial privatization, and increased cost-sharing for patients. The transition was rarely smooth. New institutions were grafted onto old practices, creating hybrid systems where formal rules and actual behaviors diverged considerably.

The net effect for households was greater exposure to direct costs. Lewis (2000) documented extensively how informal payments in CEE added an invisible layer of cost-sharing that official statistics fail to capture. These payments, ranging from cash gifts to physicians to side payments for hospital admissions, are not accounted for in OOP statistics and represent a burden that formal coverage indicators systematically understate. Tambor et al. (2014) found that across Poland, Hungary, Bulgaria, and Romania, many people either forgo necessary care for financial reasons or borrow to cover it. Formal insurance coverage, it turns out, does not automatically eliminate real financial burden; it merely shifts the question from whether coverage exists to how effectively it functions.

Romania illustrates this pattern clearly. Its health insurance system, launched in 1998, formally covers most of the population. But chronic underfunding, institutional fragmentation, geographic disparities in access, and persistent informal payments mean that formal coverage and effective protection are different things (Vladescu et al., 2016; European Observatory on Health Systems and Policies, 2021). Out-of-pocket spending runs at approximately 20% of total health expenditure, well above the EU average. A disproportionate share of public resources flows to acute hospital care rather than to outpatient services or medication reimbursement, which is where household financial protection is most directly generated. In this context, health borrowing is less an anomaly than a predictable consequence of the system's architecture.

2.3. Determinants of Health Borrowing

The existing literature identifies determinants of health borrowing at multiple levels, and the interaction between them is what makes the problem difficult to address through any single policy instrument. At the macro level, countries with larger public health budgets and predominantly public financing consistently show lower rates of catastrophic spending (Van Doorslaer et al., 2007; Xu et al., 2007). Xu et al. (2007) estimated across 89 countries that shifting from out-of-pocket financing toward public or insured systems reduces catastrophic payments by roughly a third, holding other factors constant. The mechanism is straightforward: when the state absorbs more of the cost, households absorb less.

Yet the volume of public spending tells only part of the story. How that spending is managed, which populations it reaches, and whether the institutional machinery delivers what the budget promises are questions that the aggregate expenditure figure does not answer. Wagstaff (2010) and Evans et al. (2001) documented substantial efficiency variations across health systems, even after controlling for spending levels. A public pharmaceutical budget of 1% of GDP in a country with high governance quality may deliver more effective financial protection than the same share in a country where procurement is opaque, reimbursement lists are outdated, or distribution channels are fragmented. This institutional dimension has been underexplored in the health borrowing literature specifically, though the broader health economics field increasingly recognizes its importance.

At the household level, income remains the dominant predictor. Lower-income households borrow more for health because they lack the savings to absorb unexpected medical costs and depend more heavily on public services that tend to be of lower quality or harder to access (Arsenijevic et al., 2016). Rural residence adds another layer of disadvantage through transport costs and lost work days. Gender differences, while less studied, are visible in the Findex data. Women tend to report higher borrowing rates, plausibly linked to caregiving roles that expose them to medical costs for other family members, limited access to independent financial resources, and reproductive health needs that generate expenses not always covered by insurance schemes (Demirguc-Kunt et al., 2022). The interplay between household-level vulnerability and system-level deficiencies is where the problem concentrates, and it is this interplay that aggregate indicators often fail to capture.

3. METHODOLOGY

3.1. Data Sources and Variables

The study uses the Global Findex Database (Demirguc-Kunt et al., 2014, 2018, 2022), produced by the World Bank through triannual surveys of nationally representative samples of at least 1,000 adults per country. The primary dependent variable is the percentage of adults who reported borrowing money to cover medical costs in the past 12 months, available for the 2014, 2017, and 2021 waves.

The analysis combines Findex data with several complementary sources:

Government expenditure on medical products (% GDP), from IMF Government Finance Statistics (COFOG classification, indicator GF0701), covering the general government sector.

Out-of-pocket payments as a share of total health expenditure, from the WHO Global Health Expenditure Database (WHO, 2023). This indicator has the most direct expected relationship with borrowing.

Government Effectiveness, from the Worldwide Governance Indicators (Kaufmann et al., 2010). A continuous variable normalized on the interval $[-2.5, +2.5]$, used as a proxy for institutional capacity to convert public expenditure into actual protection.

Control of Corruption, from the same WGI source, used in robustness checks.

GDP per capita (PPP, constant USD), from World Development Indicators (World Bank, 2023), as a control for overall economic development.

The sample includes 22 European countries: 12 CEE states (Romania, Bulgaria, Poland, Hungary, Czechia, Croatia, Greece, Portugal, Slovenia, Estonia, Latvia, Lithuania) and 10 Western European states (Germany, France, Italy, Spain, Austria, Belgium, Netherlands, Sweden, Denmark, Finland). The balanced panel contains 66 observations (22 countries $\times$ 3 waves). Greece and Portugal are grouped with CEE rather than Western Europe because their health system financing patterns, including high out-of-pocket burdens, governance scores below the Western European median, and fiscal pressures comparable to post-transition economies, place them closer to the CEE cluster on the

variables of interest. This classification follows a substantive rather than purely geographic criterion; sensitivity checks excluding these two countries do not materially alter the main findings.

3.2. Analytical Strategy

The analysis proceeds in two stages. The first stage documents levels, trends, and internal inequality of health borrowing across CEE versus Western Europe, using disaggregated Findex data. The difference between group means is tested using the independent samples t-test.

The second stage uses pooled OLS models with heteroskedasticity-robust standard errors, estimating four progressive specifications that gradually introduce additional explanatory variables. The progressive approach serves an analytical purpose: it allows the reader to observe how the explanatory power shifts as structural, institutional, and fiscal variables enter the model. This is particularly informative for the CEE dummy, which behaves differently depending on what other controls are present.

Model M1 (bivariate):

$$HealthBorrowing_{it} = \alpha + \beta_1 \cdot COFOG_{it} + \varepsilon_{it}$$

Model M2 (structural):

$$\begin{aligned} &HealthBorrowing_{it} \\ &= \alpha + \beta_1 \cdot COFOG_{it} + \beta_2 \cdot CEE_i + \beta_3 \cdot Year2017_t + \beta_4 \cdot Year2021_t \\ &+ \varepsilon_{it} \end{aligned}$$

Model M3 (extended, preferred specification):

$$\begin{aligned} &HealthBorrowing_{it} \\ &= \alpha + \beta_1 \cdot COFOG_{it} + \beta_2 \cdot CEE_i + \beta_3 \cdot OOP_{it} + \beta_4 \\ &\cdot GovEffectiveness_{it} + \beta_5 \cdot Year2017_t + \beta_6 \cdot Year2021_t + \varepsilon_{it} \end{aligned}$$

Model M4 (robustness):

Same as M3, with Control of Corruption replacing Government Effectiveness.

Standard errors are corrected for heteroskedasticity using the HC3 method (MacKinnon & White, 1985), chosen for its superior finite-sample properties compared to HC0 or HC1 in panels of this size. Multicollinearity is assessed through VIF, heteroskedasticity through the Breusch-Pagan test, and residual normality through the Jarque-Bera test. GDP per capita (PPP, log) was initially included as a control for economic development but was excluded from the preferred specification due to severe multicollinearity with both the CEE dummy and the governance variable (VIF = 12.55). The correlation between GDP per capita and Government Effectiveness in this sample is 0.84, reflecting the well-documented association between economic development and institutional quality in Europe. Retaining both would inflate standard errors without adding independent explanatory power.

4. RESULTS

4.1. Descriptive Analysis

Global Findex data for the three waves indicate a persistent differentiation between CEE and Western European countries. In 2021, the unweighted CEE mean was 5.99%, compared to 3.60% for Western Europe, a difference of 2.39 percentage points that is statistically significant ($t = 3.10$, $p = 0.003$).

Romania ranks in the upper decile, with a rate of 12.53% in 2021, compared to 13.26% in 2014. The trajectory is non-linear: a sharp drop to 6.66% in 2017 followed by a rebound in 2021. This volatility contrasts with the more gradual dynamics observed in other CEE states and cannot be easily explained by spending trends alone.

Table 1

Health Borrowing Rates in European Countries, 2014–2021 (%)				
Country	2014	2017	2021	Change
Romania	13.26	6.66	12.53	−0.73 pp
Greece	3.90	6.10	14.49	+10.59 pp
Bulgaria	4.98	3.61	14.29	+9.31 pp
Latvia	6.39	4.34	9.92	+3.53 pp
Poland	4.44	6.10	9.33	+4.89 pp
Lithuania	8.10	14.97	7.92	−0.18 pp
Croatia	5.90	4.41	6.31	+0.41 pp
Estonia	4.31	1.98	4.65	+0.34 pp
Slovenia	4.05	1.50	3.99	−0.06 pp
Czechia	1.84	1.42	3.31	+1.47 pp
Hungary	3.67	1.83	2.97	−0.70 pp
Portugal	5.91	3.88	2.28	−3.63 pp
Germany	2.24	4.72	8.43	+6.19 pp
Austria	5.24	5.50	7.45	+2.21 pp
Spain	5.08	4.59	4.95	−0.13 pp
Denmark	3.34	2.31	4.78	+1.44 pp
Belgium	3.92	2.15	4.07	+0.15 pp
France	2.09	5.43	4.03	+1.94 pp
Sweden	3.17	0.97	3.00	−0.17 pp

Italy	5.82	1.34	2.74	−3.08 pp
Netherlands	3.14	0.99	2.34	−0.80 pp
Finland	1.14	0.80	2.06	+0.92 pp
CEE Mean	5.56	4.73	7.67	+2.11 pp
Western EU Mean	3.52	2.88	4.39	+0.87 pp

Source: Global Findex Database (World Bank, 2014, 2017, 2021). Author's own calculations.

Several patterns in Table 1 deserve attention beyond the aggregate means. Greece and Bulgaria experienced dramatic increases in borrowing between 2017 and 2021, reaching 14.49% and 14.29% respectively, likely linked to accumulated fiscal pressures and pandemic-related demand for medical services. At the opposite end, Portugal reduced its borrowing rate from 5.91% to 2.28% over the same period, a trajectory consistent with improvements in institutional quality and financial protection mechanisms documented by the WGI data. Western European countries are not uniformly low: Germany's borrowing rate reached 8.43% in 2021, a figure that complicates any simple CEE-versus-West narrative and suggests that country-specific factors beyond regional classification play a meaningful role.

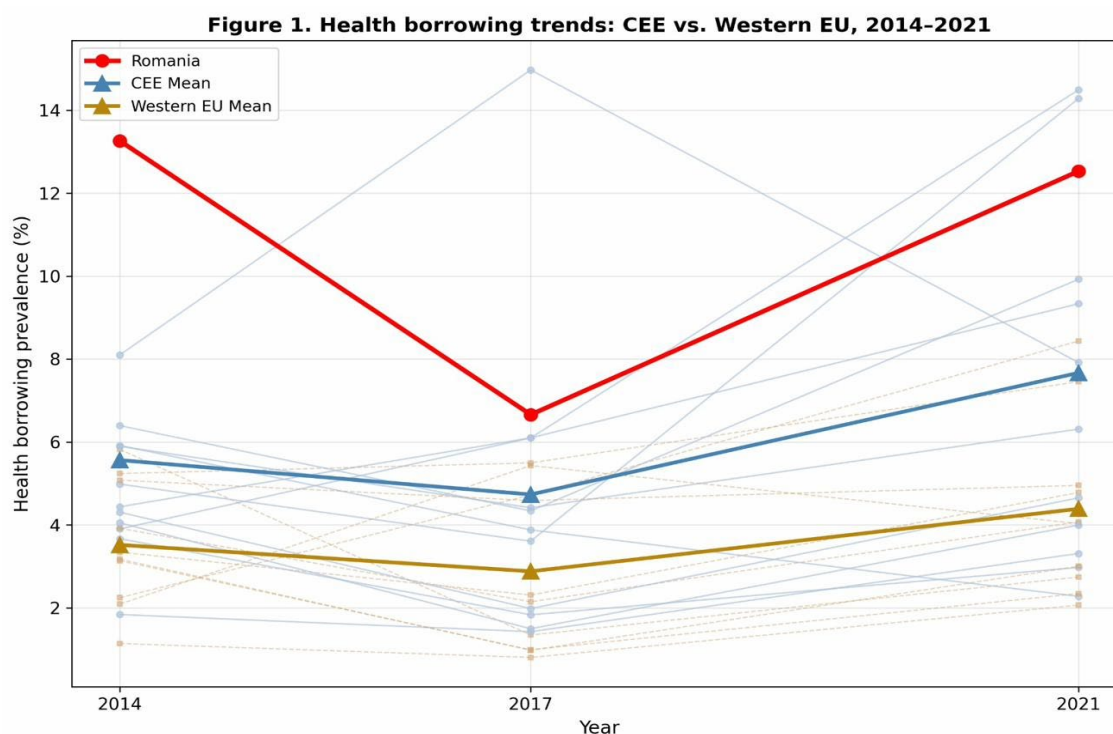


Figure 1. * Health borrowing trends in European countries, 2014–2021. Romania (red) is highlighted alongside CEE mean (blue) and Western EU mean (gold).

Source: Author's elaboration based on Global Findex data.

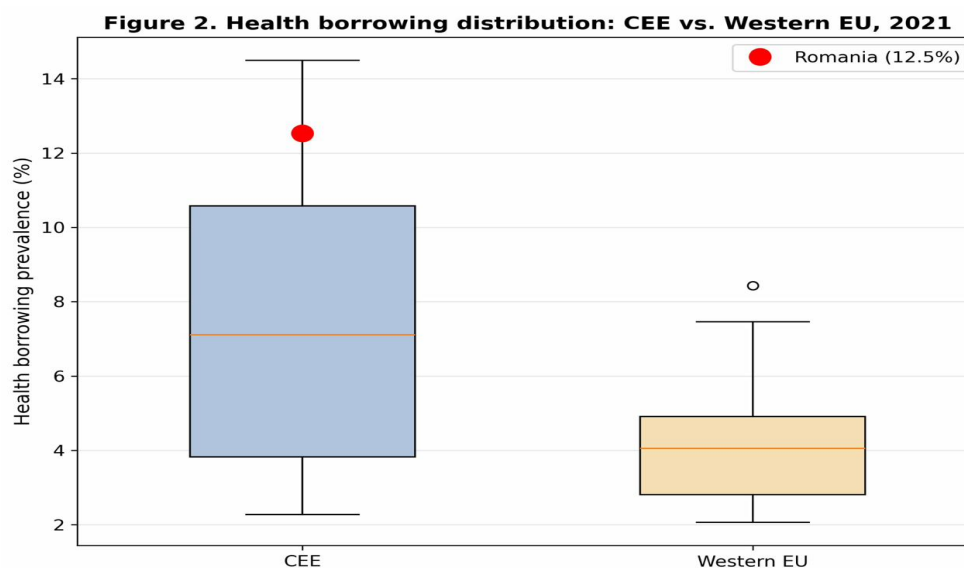


Figure 2. * Health borrowing distribution: CEE vs. Western EU in 2021. Romania (red dot) sits near the top of the CEE distribution.

Source: Author's elaboration based on Global Findex data.

4.2. Internal Inequality in Romania

The disaggregated analysis reveals that income inequality is the strongest source of internal variation. Households in the lowest income quintiles (poorest 40%) registered a health borrowing rate of 16.51% in 2021, compared to 9.88% for the richest 60%, a gap of 6.63 percentage points reflecting the structural vulnerability of low-income households. The gender difference is also notable: women reported 14.04% compared to 10.94% for men in 2021, consistent with literature on differential access to financial resources and caregiving exposure.

Table 2

Internal Inequality of Health Borrowing in Romania, 2014 and 2021 (%)

Dimension	Category	2014	2021	Difference
Income	Poorest 40%	17.75	16.51	-1.24 pp
Income	Richest 60%	10.28	9.88	-0.40 pp
Income	Gap	7.47 pp	6.63 pp	,
Gender	Female	16.86	14.04	-2.82 pp
Gender	Male	9.35	10.94	+1.59 pp
Age	15–24 years	7.41	7.49	+0.08 pp
Age	25+ years	14.26	13.29	-0.97 pp

Source: Global Findex Database (World Bank, 2014, 2021). Author's own calculations.

4.3. Regression Results

The pooled OLS estimation results for the four progressive specifications are presented in Table 3.

Table 3

OLS Estimation Results, Dependent Variable: Health Borrowing Prevalence (%)				
Variable	M1	M2	M3 (Preferred)	M4 (Robustness)
COFOG (% GDP)	0.934 (1.261)	1.696 (1.054)	1.561 (1.215)	1.776 (1.373)
CEE dummy	,	2.666 (0.753)	0.454 (1.059)	1.061 (1.597)
OOP share (%)	,	,	0.110 (0.063)	0.131 (0.074)
Gov. Effectiveness	,	,	-1.602 (1.226)	,
Control of Corruption	,	,	,	-0.891 (0.981)
Year 2017	,	-0.719	-0.715	-0.794
Year 2021	,	1.526	1.548	1.437
Constant	4.071	1.671	2.390	-11.043
R ²	0.010	0.247	0.370	0.347
Adj. R ²	-0.005	0.197	0.306	0.269
F-statistic	0.549	4.026	3.917	3.234
N	66	66	66	66

Notes: HC3 robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. GDP per capita (log) excluded from M3/M4 due to multicollinearity (VIF = 12.55).

Source: Global Findex Database, IMF COFOG, WGI, WHO GHED. Author's own calculations using Python (statsmodels).

Diagnostic tests (Model M3): Breusch-Pagan LM = 9.70 ($p = 0.138$), no significant heteroskedasticity; VIF: all below 2.5 (COFOG = 1.26, CEE = 2.18, OOP = 1.66, GovEff = 2.40); Durbin-Watson = 1.84; Jarque-Bera = 20.83 ($p < 0.001$), positive skewness (0.94), discussed below.

Figure 3. OLS diagnostic plots – Model M3b

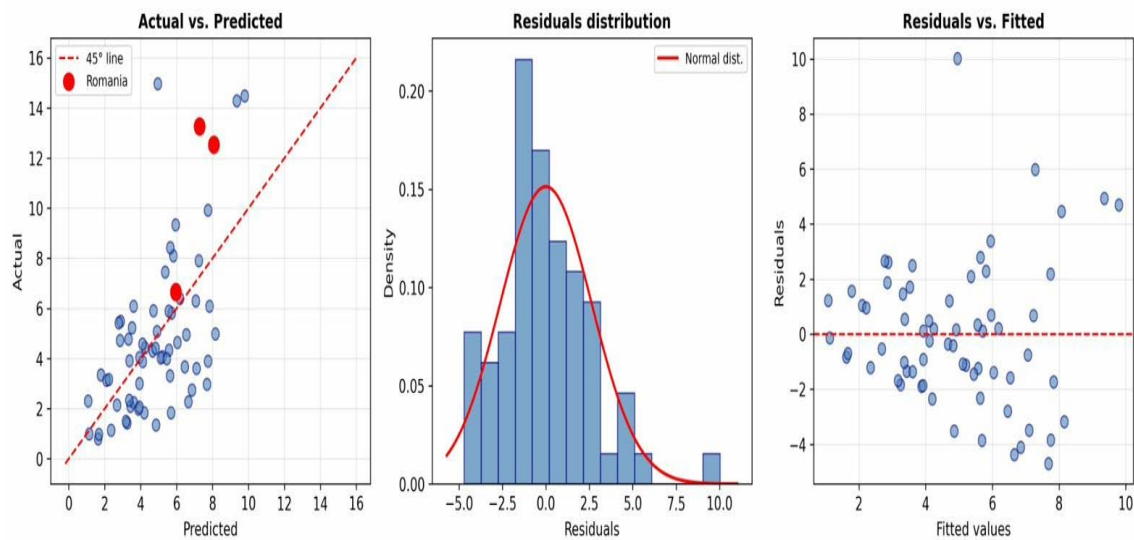


Figure 3. * OLS diagnostic plots, Model M3: (a) Actual vs. predicted values; (b) Residuals distribution; (c) Residuals vs. fitted values.

Source: Author's elaboration using Python.

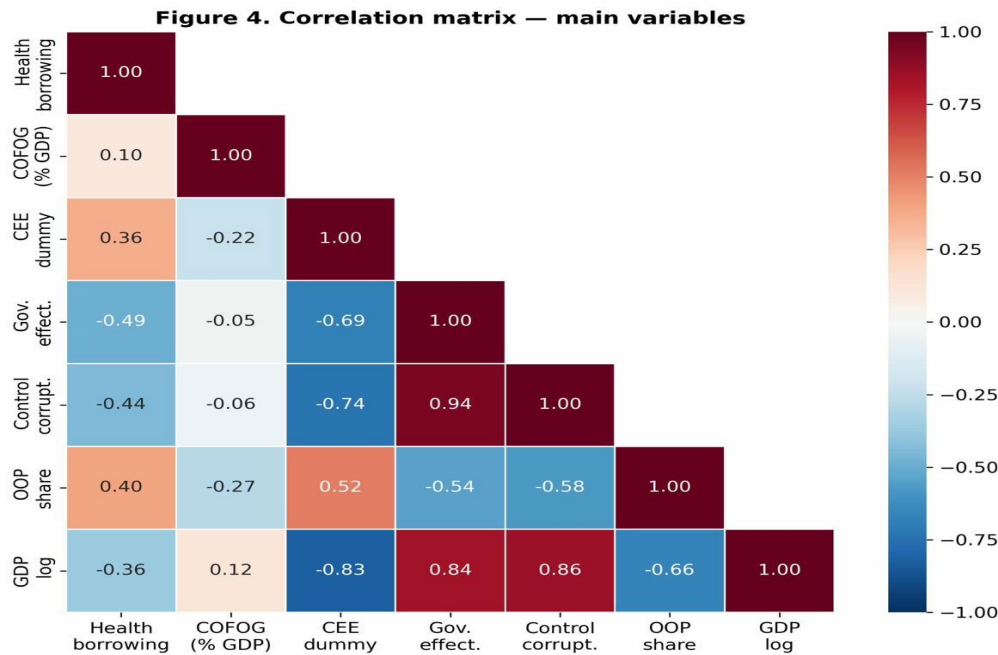


Figure 4. * Correlation matrix of main variables.

Source: Author's elaboration using Python.

5. DISCUSSION

5.1. Interpretation of Main Results

The central finding emerges from comparing Models M2 and M3. In M2, the CEE dummy is the only significant predictor ($\beta = 2.67$, $p < 0.001$), explaining a 2.67 percentage point higher borrowing rate for CEE countries. When governance quality and out-of-pocket shares are introduced in M3, two things happen: R^2 increases substantially (from 0.247 to 0.370), and the CEE dummy loses significance ($\beta = 0.45$, $p = 0.668$). This pattern suggests that what initially appeared as a structural regional difference is, in considerable part, attributable to institutional quality and the burden of direct payments on households.

The implication is conceptually important. The CEE label is a geographic shorthand that bundles together governance deficits, informal payment prevalence, allocative inefficiency, and lower institutional capacity. Once the model accounts for governance directly, the regional dummy has little independent information to contribute. This does not mean the CEE-Western divide is irrelevant; it means that the mechanisms underlying it are identifiable and, at least in principle, addressable through targeted reform rather than merely through economic convergence.

The out-of-pocket share emerges as the variable with the most consistent relationship to borrowing across specifications ($\beta = 0.11$, $p = 0.082$ in M3). Each additional percentage point of OOP burden is associated with approximately 0.11 percentage points of higher borrowing prevalence. Although marginally significant, this coefficient is robust to alternative specifications and aligns with what the health financing literature would predict. The practical implication is direct: reducing what households pay out of pocket for health, whether through broader medication coverage, lower copayments for vulnerable groups, or control of informal payments, is the most effective lever available to policymakers seeking to reduce borrowing (Xu et al., 2007; Van Doorslaer et al., 2007).

Government Effectiveness, while not reaching conventional significance in M3 ($\beta = -1.60$, $p = 0.192$), shows the expected negative direction and contributes meaningfully to the overall explanatory power. The lack of statistical significance likely reflects the limited power inherent in a 66-observation panel rather than the absence of a real relationship. The bivariate correlation between governance and borrowing is substantial ($r = -0.49$), and related analyses using the same data sources suggest that COFOG spending is significant only in countries with above-median governance, which provides additional support for the relevance of this variable.

The COFOG coefficient remains positive and insignificant across all specifications. This seemingly counterintuitive result does not mean that public pharmaceutical spending increases borrowing. Instead, it reflects the confounding structure of the data: several high-spending countries (Germany, Greece, France) happen to report relatively high borrowing rates for reasons unrelated to their pharmaceutical budgets. The COFOG variable, in the absence of country fixed effects, captures too many unobserved national characteristics to isolate its independent effect in this panel.

Nicolau (2025) makes a related observation regarding the digitalization of financial control systems in EU-funded projects, arguing that institutional capacity for monitoring and transparency directly shapes how public funds translate into outcomes. Vasile and Pantazi (2021) reinforce this point by noting that harmonized financial reporting standards are a precondition for meaningful cross-country expenditure comparisons.

5.2. Romania's Case

Romania, with a health borrowing rate of 12.53% in 2021, illustrates the disconnect between formal coverage and effective protection more starkly than any other country in the sample. Its out-of-pocket share (20.1%) sits above the EU average, and its Government Effectiveness score (−0.09 in 2021) places it among the lowest in the European Union. The combination of moderate public pharmaceutical spending (COFOG = 0.86% of GDP, close to the sample median) with weak institutional capacity generates a situation where increased budgets alone are unlikely to deliver proportional protection.

The temporal trajectory is also informative. Romania's borrowing rate dropped sharply from 13.26% in 2014 to 6.66% in 2017, only to rebound to 12.53% by 2021. Public health spending did not move in ways that would explain this volatility. The 2017 dip may reflect changes in survey methodology, sampling variation, or short-term policy effects that reversed quickly. What is clear is that the underlying structural vulnerability remained, and the 2021 figure confirmed it.

The income inequality within Romania is equally telling. The 6.63 percentage point gap between the poorest 40% (16.51%) and the richest 60% (9.88%) reflects a compounding of disadvantages: lower self-insurance capacity, greater dependence on underfunded public services, higher exposure to informal payments in settings where opting for private alternatives is financially impossible, and geographic concentration of poverty in regions with the weakest health infrastructure (Vladescu et al., 2016). The gender dimension is also worth considering. Women's higher borrowing rates (14.04% vs. 10.94% for men in 2021) are consistent with caregiving roles that generate medical expenses for other household members, not only for themselves.

For Romanian policymakers, the analysis suggests that the path to reduced health borrowing runs through three channels simultaneously: expanding effective medication reimbursement to close the gap between formal and actual coverage, controlling informal payments that add a hidden cost layer, and strengthening institutional capacity so that increased budgets translate into measurable improvements in financial protection. Budget increases without institutional reform have diminishing returns, a conclusion reinforced by the governance findings presented in Section 5.1 above.

5.3. Limitations

Several limitations should be acknowledged. The panel has only three time points (2014, 2017, 2021), which constrains statistical power and limits causal identification. With 66 observations, the models

can accommodate a limited number of regressors before degrees of freedom become a concern, and more complex specifications (including country fixed effects) are not feasible. Statistical power is a binding constraint in this context: the marginal p-values on Government Effectiveness (0.192) and OOP share (0.082) may reflect insufficient sample size rather than weak underlying relationships, and the line between approaching significance and not reaching it is thin in panels of this scale. The forthcoming 2024 Findex wave, when merged with updated COFOG data, will allow both a robustness check and a meaningful expansion of the panel.

The positive skewness in residuals (Jarque-Bera = 20.83, $p < 0.001$) reflects the asymmetric distribution of borrowing rates, with a cluster of high-borrowing outliers (Greece, Bulgaria, Romania in 2021). HC3 robust standard errors partially address the inferential implications, but the non-normality means that confidence intervals should be interpreted with some caution. As a sensitivity check, log-transforming the dependent variable reduces skewness and produces qualitatively similar coefficient signs and relative magnitudes, though significance levels shift marginally given the small sample. Excluding the three most extreme 2021 observations likewise preserves the core finding that the CEE dummy loses significance when governance enters the model. These checks suggest that the main results are not driven by a handful of outlier country-years, though a larger panel would provide more definitive reassurance.

There is also an endogeneity concern that the cross-sectional design cannot fully resolve. Countries with high borrowing rates may increase public spending in response, creating reverse causality. Alternatively, an omitted variable may drive both spending levels and borrowing rates simultaneously. Country fixed effects, available in a longer panel, would help address time-invariant confounders. Instrumental variable approaches represent a natural next step for future research.

Finally, Findex captures whether people borrow for health, but not how much. A country where many households borrow small amounts and one where fewer households borrow devastating sums look similar in the data. They are not similar in policy terms, and this distinction cannot be made with the available indicator.

6. CONCLUSIONS

Health borrowing in Central and Eastern Europe is persistent, unequally distributed, and rooted in institutional deficits at least as much as in fiscal constraints. Romania's rate of 12.53% in 2021, combined with an income-based gap of nearly 7 percentage points between the poorest and richest households, illustrates how formal insurance coverage can coexist with substantial financial vulnerability.

The regression analysis produces a finding with clear policy implications. When governance quality and out-of-pocket payment burden are introduced as controls, the CEE structural dummy loses significance, and R^2 increases from 0.247 to 0.370. The regional divide in health borrowing is not a

fixed characteristic of post-transition economies; it is substantially mediated by measurable institutional factors that reform can address. Out-of-pocket payments emerge as the most consistently significant predictor across all specifications, confirming that reducing direct household exposure to medical costs remains the most effective policy lever.

For health system reform across CEE, these findings suggest a dual priority. The first is fiscal: expand medication reimbursement, reduce copayments for vulnerable groups, and address the informal payments that create a hidden layer of cost-sharing invisible to official statistics. The second is institutional: invest in the governance capacity that determines whether public funds reach the populations they are intended to protect. The two priorities are complementary, not competing. Without institutional improvement, additional budgets risk being absorbed by inefficiency. Without additional resources, even well-functioning institutions face coverage gaps they cannot close.

Future research should exploit the 2024 Findex wave to test the robustness of these findings over a longer panel, apply instrumental variable methods to address endogeneity, and develop indicators that capture borrowing severity alongside prevalence.

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Conceptualization, M.S.; Methodology, M.S.; Data collection and analysis, M.S.; Writing, original draft, M.S.; Writing, review & editing, M.S. The author has read and agreed to the published version of the manuscript.

DECLARATION OF INTEREST

The author declares no conflict of interest.

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APPENDIX

Table A1

Descriptive Statistics, Panel Sample (22 European Countries, 2014–2021)

Variable	N	Mean	Std. Dev.	Min	Max
Health borrowing (%)	66	4.90	3.32	0.80	14.97
COFOG medical (% GDP)	66	0.89	0.36	0.06	1.77
OOP share (%)	66	20.45	8.11	9.00	37.90
Gov. Effectiveness	66	1.02	0.58	−0.16	1.96
Control of Corruption	66	0.89	0.80	−0.32	2.24
GDP per capita (log)	66	10.52	0.29	9.80	10.97
CEE dummy	66	0.55	0.50	0	1

Source: Global Findex, IMF COFOG, WGI, WHO GHED, WDI. Author's calculations.