Doctoral School of Economics, Business and Informatics
Corvinus University of Budapest

Thesis Booklet

Economics Meets Mortality

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1. Research Background

This dissertation consists of three chapters corresponding to three different empirical analyses. All studies aimed to demonstrate the deep interconnection between economic conditions and mortality outcomes. Through different datasets and methods, I explored how unemployment and other economic factors shape mortality rates, as well as the disparate impact of Covid-19 deaths across countries. The findings highlighted the importance of designing macroeconomic and health policies that recognise the complex ways economic forces influence mortality.

2. Methods Used in the Dissertation

The dissertation utilised a variety of empirical strategies (see Table 1): instrumental variable two-stage least squares panel estimations with fixed-effects (IV 2SLS with FE), first difference (FD), pooled ordinary least squares (pooled OLS), between (BE) and within (WE) estimators, two-way fixed-effects (TWFE), interrupted time-series analysis

(ITS), machine learning technique Lasso, and ordinary least squares (OLS). The richness of individual-level data in Chapter 1, the breadth of cross-country panels in Chapter 2, and the variable selection robustness in Chapter 3 combined to support tentative causal claims and contextual interpretation.

Chapter	Research Focus	Methods
The Silent Killer	Does unemployment causally affect mortality in Hungary?	2SLS IV regression using 'Mass Lay-Off'; panel with FE (time and industry) with cluster-robust standard errors
On the Edge of Despair	How does unemployment relate to suicide globally and in Hungary?	Cross-country: Pooled OLS, FD, BE, WE, TWFE Hungary: ITS analysis
Analysing Covid-19 Death Outcomes	What pre-existing conditions predict Covid-19 death rates across countries?	Lasso variable selection, OLS regression (cross-country)

Table 1: Summary of Dissertation Chapters

3. Scientific Results of the Dissertation

3.1 The Silent Killer: The Impact of Unemployment on Mortality

This chapter investigated whether unemployment causally affected mortality in Hungary. Using the Admin3 dataset, a rich panel of administrative records covering half of the population in Hungary from 2003 to 2017, I restricted the analysis to adults who experienced unemployment during this period. The graphs compared the sample of Admin3 and the Hungarian Central Statistical Office (HCSO) mortality and unemployment data and indicated the external validity of the results (see Figures 1-2). To address endogeneity concerns of old and ill employees, the health history of the treated and control groups was compared. Then, unemployment was instrumented by mass layoffs at the firm level.

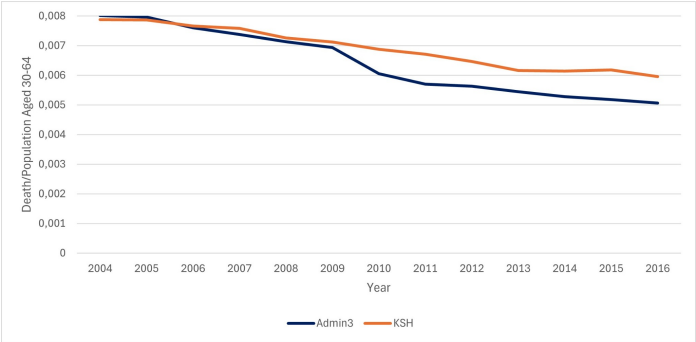

Figure 1: Comparison of HCSO and Admin3 Mortality Data

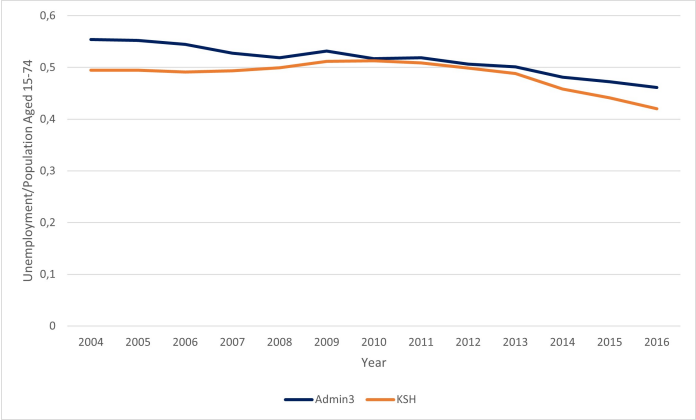

Figure 2: Comparison of HCSO and Admin3 Unemployment Data

I estimated two-stage least squares regressions with time and industry fixed effects and cluster-robust standard

errors. The results showed a statistically significant positive relationship: for every 100,000 unemployed individuals, there were nine more deaths compared to an employed cohort. This effect was also heterogeneous. The increase in mortality was concentrated among men, especially those in the "Old" age group (last 14 years before retirement). The most affected region was Northern Hungary.

To interpret these findings in context, I analysed macro indicators: suicide rates, alcohol consumption, and divorce statistics. These variables provided suggestive evidence on the pathways linking unemployment and mortality, such as health deterioration.

This chapter was novel both in its methodological rigour and in framing mortality from a labour economics perspective, using tools that allow for a causal interpretation of what is often a correlational topic in demography and health research.

3.2 On the Edge of Despair: The Connection Between Unemployment and Suicide

Chapter 2 analysed the relationship between unemployment and suicide in two complementary studies. The first was a cross-country panel analysis of over 160 countries spanning from 2000 to 2019. I applied a variety of empirical models — pooled OLS with time dummies, first-difference, within-between estimators, and two-way fixed effects — to assess whether changes in unemployment were associated with changes in suicide rates. Countries were also grouped by median age to reduce distortions. Overall, the results showed a positive association (see Figure 3), but were found to be very sensitive to model selection.

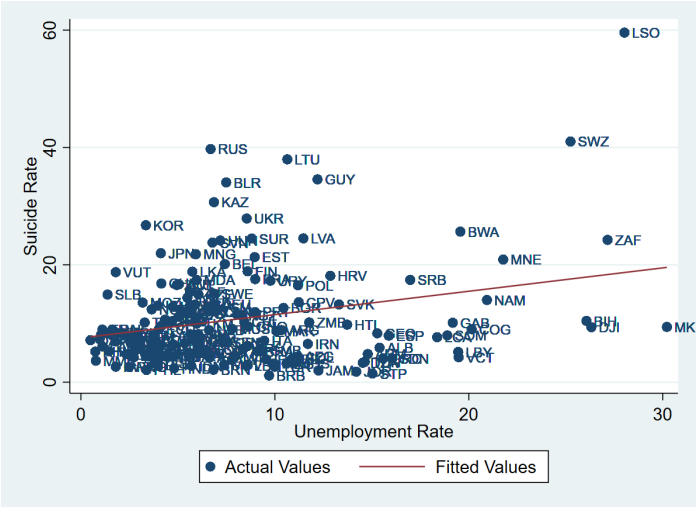

Figure 3: The Relationship Between Suicide and Unemployment

The second study narrowed in on Hungary, asking whether Covid-19 disrupted the long-term, decreasing suicide trend when controlling for unemployment. Using an interrupted time-series (ITS) regression with monthly data from 2009 to 2023, I evaluated whether male suicide rates (suicide is male-dominated in Hungary) shifted significantly post-pandemic onset. Results suggested that deviations after the Covid-19 were probably not always clearly attributable to the pandemic, raising caution about

overestimating short-term variation.

Together, these analyses pointed to a nuanced relationship between economic distress and suicide.

3.3 Analysing Covid-19 Death Outcomes: An Ex-Ante Approach

The third chapter evaluated how structural pre-pandemic characteristics shaped excess mortality during the Covid-19 pandemic. Building on a previous publication, I extended the analysis using a dataset of over 200 countries and territories, compiling 30 ex-ante (pre Covid-19) variables spanning demographic, health, economic, and institutional indicators. The goal was to explain variation in 'Mean Cumulative Excess Death' for the years 2020 and 2021. A 'Black-Box' approach was employed, meaning that regulations and government interventions during the pandemic were not incorporated into the analysis (see Figure 4).

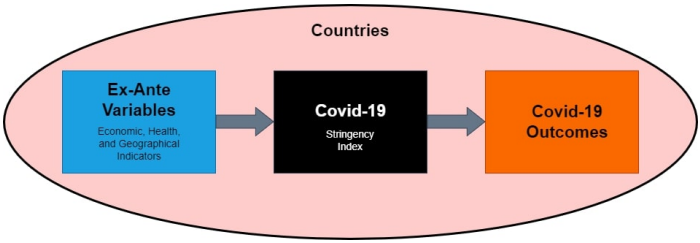

Figure 4: The Black-Box Approach

The analysis proceeded in two steps. First, I applied a machine learning algorithm, Lasso regression, to select the variables with the highest predictive power. Then, I ran an OLS regression using these selected variables to estimate the variance in excess mortality explained by ex-ante factors alone.

Key findings showed that countries with healthier populations, stronger healthcare systems, and higher state capacity experienced significantly lower excess mortality. Furthermore, socioeconomic development indicators like GDP per capita played a protective role. The final model explained approximately 60% of the variance in excess deaths.

This chapter demonstrated that Covid-19 outcomes were not merely shaped by the immediate policy response, but

by long-standing structural characteristics. It highlighted the importance of proactive investments in resilience long before crisis conditions emerge.

4. Publications of the Author

Journal Articles

- Kovács, E., & Mihályi, P. (2021). The predictability of COVID-19 mortality rates based on ex-ante economic, health and social indicators. *Acta Oeconomica*, 71(S1), 53–71. https://doi.org/10.1556/032.2021.00029

- Berde, É., Kovács, E., & Kurbanova, M. (2023). The two-sided paradox of ageism during the COVID-19 pandemic: The cases of Hungary, Tunisia and Uzbekistan. *Regional Science Policy & Practice*, 15(3), 606–626. https://doi.org/10.1111/rsp3.12564

- Berde, É., Kovács, E., Kurbanova, M., & Remsei, S. (2025). A comparison of ageism among Uzbek and Hungarian university students: Can we prepare older adults to adapt to technological changes as societies age? *Journal of Infrastructure, Policy and Development*, 9, 8894. https://doi.org/10.24294/jipd8894