

Human Mortality Effects of Economic Growth Fluctuations

of Austrian population based on 1960-2017 data

Recently, researchers have seen the need to study the increase in life expectancy and thus, mortality decline throughout the years in order to understand population structure for policymakers, individuals, governments, pension funds and insurance companies.

INTRODUCTION

- 1 **TOPIC**
Effects of macroeconomic factors on human mortality
- 2 **QUESTION**
Is economic growth related to human mortality?
- 3 **HYPOTHESIS**
The variables are negatively related
- 4 **OBJECTIVES**
Fit and forecast the data

CONCEPTUAL FRAMEWORK

The first and most accepted mortality model is the one of Lee and Carter (1995) and has been widely used in different papers in order to fit and forecast mortality.

The GDP (Gross Domestic Product) per capita parameter in US\$, considered as a good indicator of a country's economic growth, will be added into the model as proposed by Niu and Melenberg (2014) in order to allow for more precise interpretations of the model.

EMPIRICAL STRATEGY

LEE-CARTER MODEL

Parameter estimation by SVD (Singular Value Decomposition)

$$\ln(m_{x,t}) = \hat{a}_x + b_x k_t + \varepsilon_{x,t}$$

NIU & MELENBERG

Fitting mortality and economic data with correlation coefficients

$$\ln(m_{x,t}) = \hat{a}_x + b_x k_t + d_x g_t + \varepsilon_{x,t}$$

FORECAST

Future trends for next decade with 95% confidence intervals

$$\text{ARIMA}(p,d,q) \rightarrow \text{ARIMA}(0,1,0)$$

$$k_t = \theta + k_{t-1} + \delta_t$$

DATA

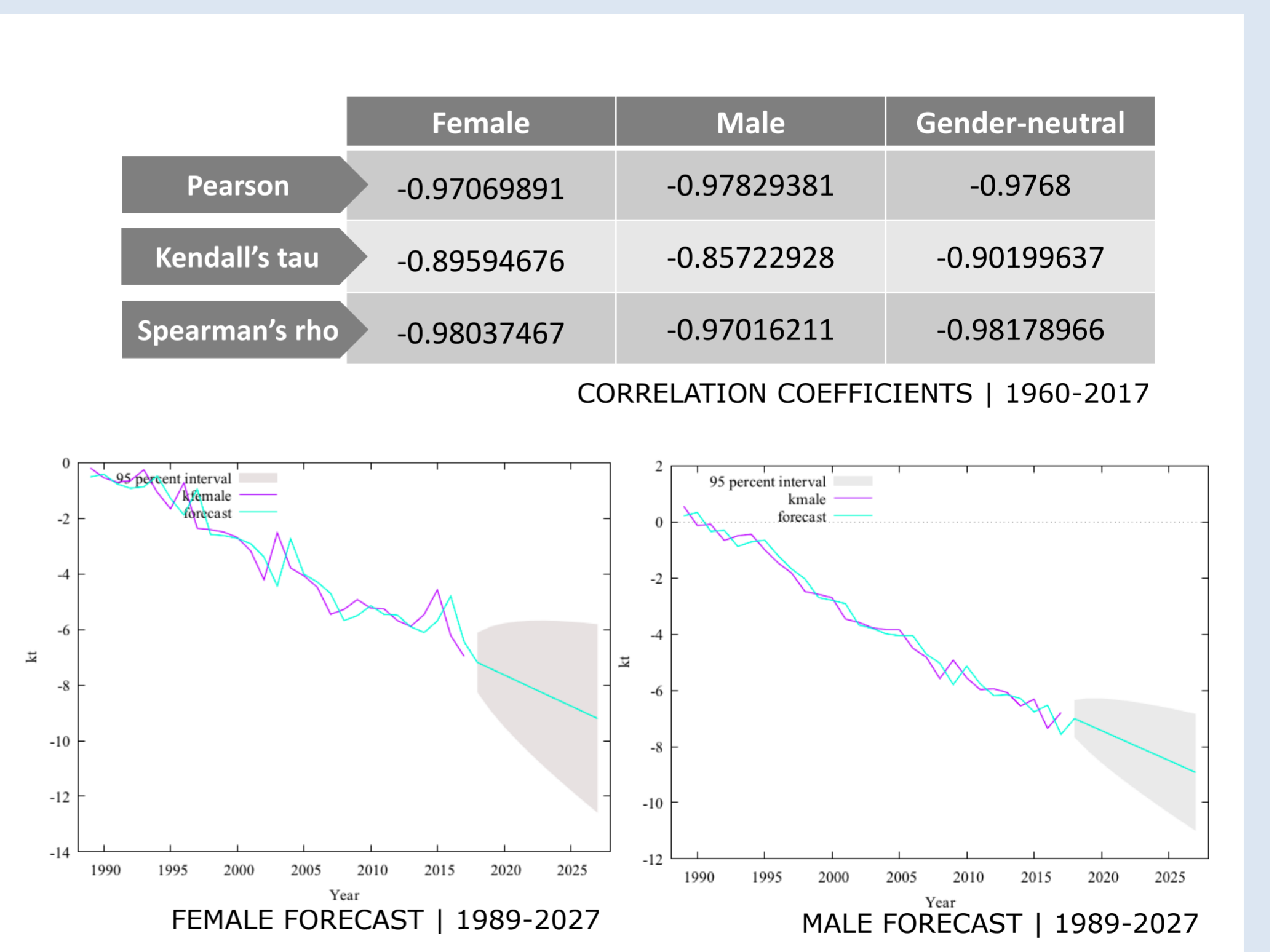
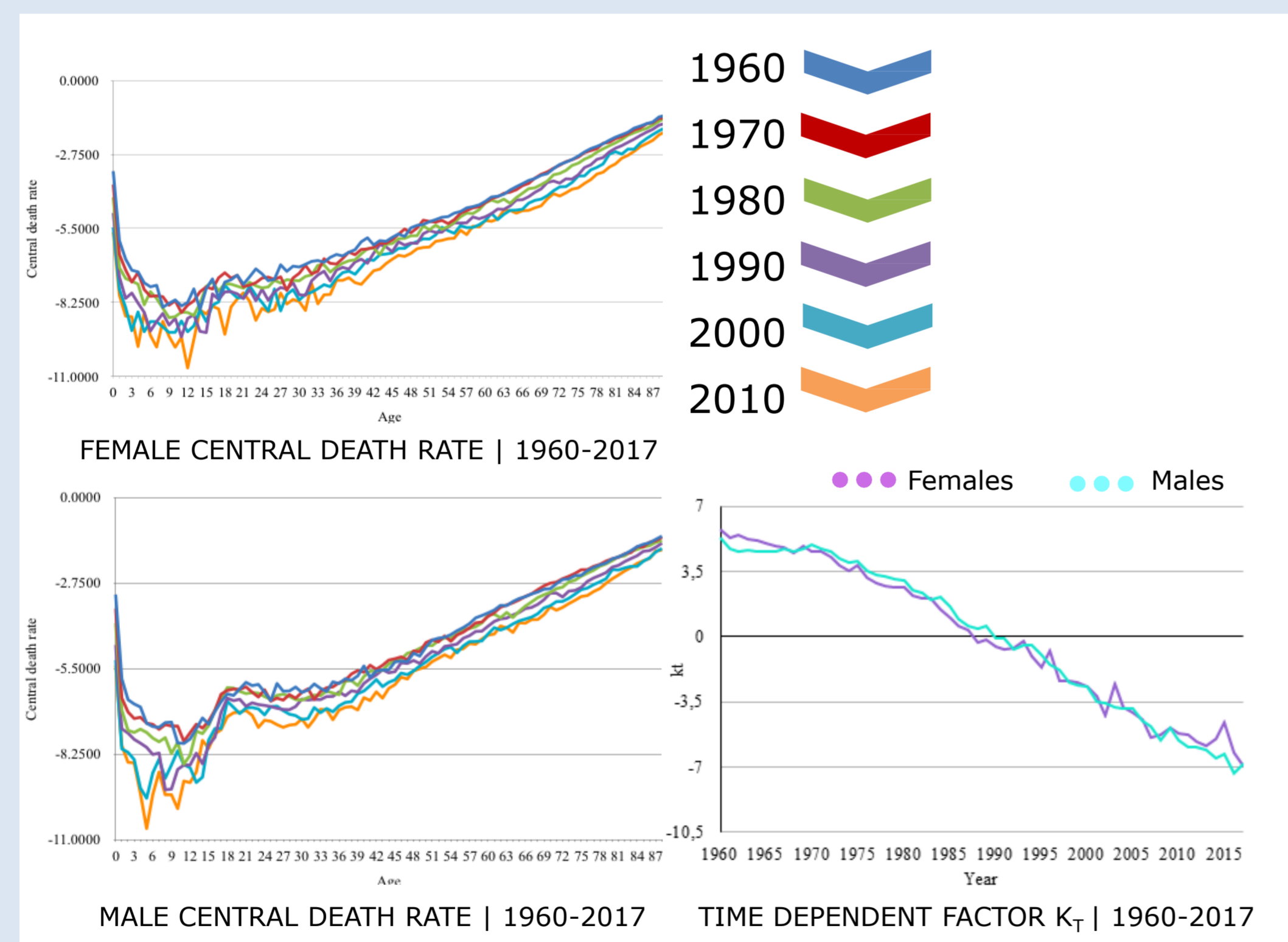
POPULATION

Austrian population
From 0-89 years old
Sex-specific

SOURCES

Human Mortality Database
The World Bank Group

RESULTS



CONCLUSIONS

KEY TAKEAWAYS

Variables are negatively related
Ceteris paribus mortality will continue to decrease

RELEVANCE

Governments and policymakers
Insurance companies that strive against longevity risk uncertainty
Social security: price financial instruments
Individuals: plan retirement income

LIMITATIONS

Causality not answered
Morbidity not included
Econometric models

BIBLIOGRAPHY

- Lee, R. D. (1992). *Modeling and forecasting U.S. mortality* (L. R. Carter (Ed.)). Web.Archive.Org. https://web.archive.org/web/20160303215407/http://faculty.washington.edu/samclark/soc533/Syllabus/Readings/7/1/Lee-R-etal_1992_Modeling-Forecasting-US-Mortality.pdf.
- Niu, G., & Melenberg, B. (2013). Trends in Mortality Decrease and Economic Growth. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2391617>.