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## Article

# Institutional quality and health outcomes : evidence from the EU countries

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## **Institutional quality and health outcomes: Evidence from the EU countries**

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### **Abstract**

This paper examines the relationship between the quality of economic institutions and health outcomes for the EU countries from 2000 to 2018. Using data from the World Bank and the Fraser Institute, the paper uses fixed effects and random effects models to investigate the link between institutional quality and health. The results suggest a positive association between the quality of economic institutions and health outcomes. Specifically, the results highlight that an efficient legal system, a stable macroeconomic environment, and fewer regulations are associated with better health outcomes in the EU countries. The paper also finds that higher per capita income, an increase in education, and faster urbanization are associated with improved health outcomes.

*Keywords:* Institutions; Economic freedom; Health; Panel data; European Union

*JEL Classification Codes:* C23, E02, I10, O52

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### **1. Introduction**

The quality of economic institutions is closely linked to the long-run economic growth and living standards. A large body of literature has documented the linkages between the quality of institutions and economic growth across countries (e.g., North, 1989; De Haan and Sturm, 2000; Brkić et al., 2020). However, the relationship between institutional quality and living standards is not well-established in the literature. As better health outcomes translate to a higher standard of living, the focus of this paper is to understand the connection between the quality of economic institutions and health outcomes for the EU countries. The scholars frequently use economic freedom to assess the quality of a country's economic institutions (e.g., Nyström, 2008; Dutta and Williamson, 2016; Sharma, 2020). Economic freedom encompasses secure property rights, fair enforcement of contracts, a stable monetary environment, and freedom of choice for individuals (Gwartney et al., 2021; Stroup, 2007).

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There are various channels through which economic freedom can affect health outcomes (Hall et al., 2018; Sharma, 2020). Increased economic freedom in the form of small government size and low taxes is likely to lead to lower government spending on health. On the other hand, lower public spending on health may worsen health outcomes (Rubin et al., 2016; Sharma, 2020). Hall et al. (2018) argue that reduced spending may instead improve health outcomes as people might switch to a healthy lifestyle and make behavioural changes to reduce their out-of-pocket expenditure. Greater economic freedom is also associated with free trade and the removal of trade barriers. Scholars argue that trade in health products generates benefits for society by increasing choice and affordability (Helble and Shepherd, 2017). These gains from trade may enhance health outcomes. A better quality of economic institutions also creates incentives for innovation and entrepreneurship. This, in turn, may lead to the advancement of medical science and technology and thus, have a positive impact on health (Baumol, 2002; Roberts and Olson, 2013). Economic freedom is linked to income inequality (Apergis and Cooray, 2017; Lawson and Dean, 2021; Karakotsios et al., 2020) and thus, it may have an indirect effect on health through income inequality. Existing evidence indicates that economic freedom reduces income inequality (e.g., Clark and Lawson, 2008; Bennett and Vedder, 2013). In turn, the reduction in income inequality is likely to improve health outcomes in a country (Pickett and Wilkinson, 2015).

Only a few scholars have studied the effect of institutional quality on health outcomes (e.g., Esposto and Zaleski, 1999; Stroup, 2007; Sharma 2020; Geloso et al., 2021). Roberts and Olson (2013) observed that economically freest countries witness significantly higher life expectancy and lower infant mortality rates as compared to the most economically repressed countries. Using ordinary least squares regression, Esposto and Zaleski (1999) found a favourable effect of economic freedom on life expectancy for a sample of 40 countries. Stroup (2007) employed fixed effects regression to analyse the effect of economic freedom and democracy on the quality of life. He found that an improvement in economic freedom has a positive effect on health irrespective of a country's democratic environment. Sharma (2020) examined the effect of economic freedom on health outcomes for sub-Saharan Africa using fixed effects and instrumental variables regression. He found that economic freedom has a positive and significant effect on health. Several studies have also examined the relationship between institutions and health outcomes at the regional level (e.g., De Luca et al., 2021; Hall et al., 2018; Razvi and Chakraborty, 2016). De Luca et al. (2021) examined the effect of institutional quality on the adequacy of health care provision in Italy for the period 2007 to 2012. They made a significant effort to deal with the endogeneity of institutional quality by employing historical instruments. They found that institutional quality has a favourable effect on health care provision. Most of the studies analyse the relationship between institutions and health by grouping the countries based on data availability. Kacprzyk (2016) argues that it is useful to examine a set of homogenous countries with some common features. Further, most of the studies in the literature do not analyse the relationship between different areas of economic freedom and health outcomes and thus, do not provide detailed insights about the elements of economic freedom that may affect health.

The main goal of this paper is to understand the linkages between the quality of economic institutions and health outcomes for the EU countries from 2000 to 2018. This paper significantly adds to the economic freedom-health literature in various ways. First, this paper makes one of the first efforts in examining the relationship between institutional quality and health outcomes for the EU countries. Second, this research tries to unentangle the various elements of institutional quality by examining the relationship between the five areas of economic freedom and health indicators.

The rest of this paper is organised as follows. Section 2 describes the methodology and variables. Section 3 lists the data sources and section 4 presents the results. Section 5 sums up the key findings of the paper.

## 2. Methods

In accordance with the extant literature, we investigate the effect of institutional quality on health outcomes by using the following empirical model (e.g., Stroup, 2007; Lio and Lee, 2016; Sharma, 2020)

$$Health_{it} = \beta_0 + \beta_1 Economic\ Freedom_{it} + \beta_2 Z_{it} + \gamma_i + \varepsilon_{it} \quad (1)$$

Where  $Health_{it}$  shows the two dependent variables viz. infant mortality rate and life expectancy at birth.  $Economic\ Freedom_{it}$  measures the quality of economic institutions in country  $i$  at year  $t$ . The economic freedom index lies between 0 and 10 and it has five sub-areas. These are a) size of government, b) legal system and property rights c) sound money, d) free trade, and e) regulation. Low values of the index show low economic freedom and high values denote high freedom.  $Z_{it}$  represents the control variables and includes per capita GDP, public health expenditure, improved water facilities, education, CO2 emissions, income inequality and urbanization. These control variables are widely used in the empirical literature (e.g., Lio and Lee, 2016; Li et al., 2018; Sharma, 2020).  $\gamma_i$  is the country-specific effect and  $\varepsilon_{it}$  is the error term.

We can estimate the model outlined above using the pooled OLS regression. However, it produces biased and inconsistent estimates due to the omission of time-invariant variables (Wooldridge, 2009). Instead, we use fixed effects and random effects regression and apply the Hausman test to choose the suitable model. These panel data methods have been widely used in the literature for analyzing the effect of economic freedom on health (e.g., Stroup, 2007; Razvi and Chakraborty, 2016; Sharma, 2020). Panel data helps to control for unobserved heterogeneity and allows better inference of model parameters (Wooldridge, 2009; Hsiao, 2007).

## 3. Data

In this paper, we analyse the annual data for the 27 EU countries for the period 2000 to 2018. We obtain the data on dependent variables (infant mortality rate and life expectancy) and the control variables from the World Development Indicators, World Bank. We use the economic freedom index published by the Fraser Institute to measure the quality of economic institutions. The economic freedom index is available for all the EU countries on an annual basis from the year 2000. Table 1 presents the variable definition and descriptive statistics. The mean values of two outcome variables viz. infant mortality rate and life expectancy are 4.66 and 78.06 respectively. The average value of the economic freedom index for the EU countries is 7.58 with a standard deviation of 0.39.

## 4. Results and discussion

We estimate the empirical model outlined in Eq. 1 using the fixed effects and random effects approaches. These results are presented in Table 2 which shows the standardized regression coefficients. Column (1) shows the FE results when the outcome variable is the infant mortality rate. We find that an increase in economic freedom is associated with a decline in the infant mortality rate. Specifically, one standard deviation increase in economic freedom is associated with a 0.271 standard deviation decrease in infant mortality. We obtain similar results for the RE model, as shown in column (2). This implies that an increase in economic freedom is associated with better health outcomes. Most of the coefficients on control variables have the expected sign. Per capita GDP and expected years of schooling are negatively linked to the infant mortality rate. Both FE and RE results highlight that public spending on health, CO2 emissions, and income inequality are insignificant.

Table 1. Variable definition and descriptive statistics.

Variable	Definition	Mean	S.D.	Minimum	Maximum
<i>Infant mortality</i>	Infant mortality rate (per 1000 live births)	4.66	2.48	1.7	18
<i>Life expectancy</i>	Life expectancy at birth (years)	78.06	3.27	70.25	83.43
<i>Economic freedom</i>	Economic freedom index (ranging from 1 to 10)	7.58	0.39	5.55	8.32
<i>EF1</i>	Size of the government	6.00	0.89	4.08	7.79
<i>EF2</i>	Legal System	6.86	0.82	5.06	8.47
<i>EF3</i>	Sound Money	9.24	0.74	2.71	9.87
<i>EF4</i>	Free Trade	8.31	0.47	6.47	9.24
<i>EF5</i>	Regulation	7.48	0.61	5.57	8.71
<i>Per capita GDP</i>	GDP per capita, PPP (constant 2011 international \$)	38376.20	18055.51	10233.85	115000
<i>Health expenditure</i>	Public health expenditure (% of GDP)	5.72	1.54	2.18	9.27
<i>Improved water</i>	Improved water source (% of people with access)	99.33	1.41	89.67	100
<i>Education</i>	Expected years of schooling	11.22	1.33	6.8	14.1
<i>Carbon emissions</i>	CO2 emissions (metric tons per capita)	7.69	3.58	2.92	25.67
<i>Income inequality</i>	Estimate of Gini index of inequality	29.24	3.47	22.6	37.9
<i>Urbanization</i>	Urban population as % of the total population	71.81	12.55	50.75	98.00

Source: World Bank (2021), Fraser Institute (2021), Solt (2019). Note: Observations: 513.

Table 2. Economic freedom and health (fixed and random effects).

	(1) FE	(2) RE	(3) FE	(4) RE
	Infant mortality	Infant mortality	Life expectancy	Life expectancy
<i>Economic freedom</i>	-0.271** (0.111)	-0.274** (0.115)	0.065** (0.029)	0.055** (0.026)
<i>Per capita GDP</i>	-0.652** (0.259)	-0.548*** (0.213)	0.504*** (0.177)	0.515*** (0.144)
<i>Pub health expenditure</i>	-0.182 (0.116)	-0.179* (0.097)	0.207** (0.079)	0.202*** (0.075)
<i>Improved water facilities</i>	-0.108 (0.090)	-0.118 (0.086)	0.109** (0.047)	0.114** (0.048)
<i>Education</i>	-0.188* (0.110)	-0.221** (0.101)	0.257*** (0.064)	0.258*** (0.058)
<i>CO2 emissions</i>	-0.115 (0.111)	-0.036 (0.094)	-0.314*** (0.084)	-0.361*** (0.068)
<i>Income inequality</i>	-0.273 (0.238)	-0.275 (0.193)	-0.098 (0.130)	-0.036 (0.116)
<i>Urbanization</i>	-0.536* (0.294)	-0.210 (0.181)	0.878*** (0.209)	0.579*** (0.113)
<i>Observations</i>	513	513	513	513
<i>Adjusted R<sup>2</sup></i>	0.64		0.79	

Notes: Robust standard errors are in parenthesis. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Column (3) shows the FE results for life expectancy. These results indicate a positive association between economic freedom and life expectancy. We find that one standard deviation increment in economic freedom is associated with a 0.065 standard deviation (or about 0.21 years) rise in life expectancy. RE model results in column (4) corroborate this finding. All the control variables show the expected results. Urbanization and per capita GDP are positively linked to life expectancy. An increase in public expenditure on health, improvement in water facilities and rise in expected years of schooling are associated with an increase in life expectancy. On the other hand, CO2 emissions are negatively related to life expectancy. Income inequality turns out to be insignificant. We use the Hausman test to choose between the FE and RE models. Hausman test p-value is less than 0.05 which indicates that FE is the appropriate model in this case.

Next, we examine the relationship between the five areas of economic freedom with infant mortality and life expectancy. Hausman test supports the use of the FE model in this case. However, we summarize and present the results of both FE and RE models in Table 3. We only report the coefficients on areas of economic freedom for these models. Column (1) shows that an efficient legal system and well-designed property rights (EF2) has the highest negative association with infant mortality rate. A stable macroeconomic environment (EF3), free trade (EF4), and regulations (EF5) are also negatively associated with the infant mortality rate. Size of government (EF1) is positively associated with infant mortality. RE results in column (2) broadly support these findings. However, EF2 turns out to be insignificant in affecting infant mortality. Column (3) presents the FE results for life expectancy. We find that an efficient legal system (EF2), stable macroeconomic environment (EF3), and fewer regulatory constraints (EF5) are associated with a higher life expectancy. The other two areas of EF viz. size of government (EF1) and free trade (EF4) turn out to be insignificant.

Table 3. Areas of economic freedom and health (fixed and random effects).

	(1) FE Infant mortality	(2) RE Infant mortality	(3) FE Life expectancy	(4) RE Life expectancy
<i>EF1 (Size of government)</i>	0.223* (0.118)	0.186* (0.106)	-0.117 (0.076)	-0.119* (0.066)
<i>EF2 (Legal system &amp; property rights)</i>	-0.454* (0.257)	-0.387 (0.239)	0.205* (0.112)	0.150 (0.102)
<i>EF3 (Sound money)</i>	-0.188** (0.071)	-0.205*** (0.075)	0.041* (0.022)	0.039* (0.020)
<i>EF4 (Freedom to trade internationally)</i>	-0.223** (0.085)	-0.220** (0.090)	0.037 (0.022)	0.030 (0.021)
<i>EF5 (Regulation)</i>	-0.158* (0.092)	-0.162* (0.094)	0.091** (0.039)	0.085** (0.038)
Observations	513	513	513	513

Note: Robust standard errors are in parenthesis. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ .

Table 4. Effect of economic freedom on health, by gender, fixed effects.

	(1)	(2)	(3)	(4)
	Male infant mortality	Female infant mortality	Male life expectancy	Female life expectancy
<i>Economic freedom</i>	-0.269** (0.112)	-0.273** (0.112)	0.036 (0.027)	0.110*** (0.034)
<i>Per capita GDP</i>	-0.653** (0.263)	-0.626** (0.257)	0.506*** (0.159)	0.476** (0.205)
<i>Pub health expenditure</i>	-0.184 (0.116)	-0.179 (0.114)	0.198** (0.072)	0.212** (0.089)
<i>Improved water facilities</i>	-0.108 (0.091)	-0.112 (0.089)	0.104** (0.041)	0.111* (0.056)
<i>Education</i>	-0.189* (0.109)	-0.197* (0.111)	0.222*** (0.060)	0.303*** (0.070)
<i>CO2 emissions</i>	-0.124 (0.113)	-0.104 (0.110)	-0.281*** (0.074)	-0.352*** (0.097)
<i>Income inequality</i>	-0.277 (0.240)	-0.270 (0.236)	-0.083 (0.120)	-0.118 (0.144)
<i>Urbanization</i>	-0.536* (0.290)	-0.533* (0.302)	0.821*** (0.174)	0.931*** (0.267)
<i>Observations</i>	513	513	513	513
<i>Adjusted R<sup>2</sup></i>	0.64	0.64	0.79	0.78

Note: Robust standard errors are in parenthesis. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Further, we examine the impact of institutional quality on health by gender. We present the FE results for infant mortality and life expectancy for males and females in Table 4. Columns (1) and (2) show that economic freedom is negatively associated with both male and female infant mortality rate. Urbanization, per capita GDP and education, are also negatively related to male and female infant mortality. Columns (3) and (4) highlight that an improvement in the quality of economic institutions is linked to an increased life expectancy for both males and females. However, the effect appears to be weak in the case of males. Except for income inequality, all the control variables turn out to be significant.

It is important to note that the FE model may not fully resolve the endogeneity issues. Economic freedom may be endogenous due to several reasons. First, the FE model is unable to control for the time-variant unobserved variables. Thus, there may be an omitted variable bias when these variables affect health outcomes and are correlated with economic freedom. Second, there may be measurement errors as it is difficult to obtain a perfect measure of institutional quality (Faria and Montesinos, 2009; Li et al, 2018; Sharma, 2020). Therefore, our results do not establish a causal relationship between economic freedom and health outcomes.

We check the robustness of the above results by using an alternative index of economic freedom provided by the Heritage Foundation. The Heritage Foundation's index of economic freedom focuses on the rule of law, government size, regulatory efficiency, and market openness (Heritage Foundation, 2021). We obtain broadly similar results using this index and find that an improvement in the quality of economic institutions is associated with better health outcomes. In addition, we attempt to use two-stage least squares (2SLS) to check the robustness of our findings. We use lagged values of the economic freedom index as an instrument for economic freedom. However, we find that it is not a valid instrument and therefore, do not report these results. The difficulty in finding a suitable instrument that satisfies both the properties of relevance and validity restricts us from presenting the results of IV regression. This challenge is well-documented in the empirical literature (e.g., Sharma, 2020; Elheddad et al., 2021; Kelly et al., 2021).

We find that an improvement in the quality of economic institutions is linked to favourable health outcomes. This implies that economic freedom is associated with not only economic gains but also substantial non-economic gains. These findings are in accordance with the extant literature (Stroup, 2007; Razvi and Chakraborty, 2016; Sharma 2020). The results suggest that an efficient legal system, a stable macroeconomic environment, and fewer regulations are associated with better health outcomes. We also find that an increase in per capita income, a rise in education, and faster urbanization are linked to better health outcomes. Mere reliance on increasing public spending on health without focusing on the institutional environment may not have a desirable effect on health.

## 5. Concluding remarks

In this paper, we examine the relationship between institutional quality and health outcomes for the EU countries for the period 2000 to 2018. We also probe the relationship between the areas of the economic freedom index and health. Using the panel data regression models, we find a positive association between the quality of economic institutions and health outcomes. The results also highlight that an efficient legal system, a stable macroeconomic environment, and fewer regulations are associated with better health outcomes. Thus, policies that reduce regulatory constraints, protect property rights and create a conducive macroeconomic environment need to be emphasized due to their close linkages with improved health outcomes in the EU countries.

In this paper, we use panel data regression which does not fully address the endogeneity problems. Future studies may attempt to use the Generalised Methods of Moments technique to deal with the endogeneity concerns. Additionally, we measure health outcomes by infant mortality and life expectancy. Future research in this area may use a composite index capturing other useful aspects of health.

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