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**Public welfare spending and cross-country
economic disparities in the European Union:
Panel evidence for the period 2000-2021**

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PUBLIC WELFARE SPENDING AND CROSS-COUNTRY ECONOMIC DISPARITIES IN THE EUROPEAN UNION: PANEL EVIDENCE FOR THE PERIOD 2000-2021¹

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Abstract

The aim of this paper is to investigate the role of public welfare spending in supporting economic well-being in the European Union (EU-27). To this end, we construct an aggregate of public spending that considers three key areas: health, education, and social protection. We assume that public spending in these areas can be instrumental in promoting citizen empowerment, which ultimately translates into improved economic well-being of countries. To empirically test this assumption, we design a panel analysis of the EU-27 countries for the period 2000-2021, using a variety of methods that are useful for obtaining evidence that is robust to multiple issues and scenarios. The results of the empirical analysis confirm the existence of a positive relationship between welfare spending and the socio-economic well-being of EU countries. This evidence reinforces the assumption that allocating more resources to health, education, and social protection could be a crucial choice for public policies aiming to steer economic development towards more equitable and sustainable paths.

Keywords: human development, welfare spending, economic well-being, panel data, European Union.

JEL codes: O15; H51; H52; H53; I31.

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1. Introduction

The ability of governments to promote economic and social progress is a critical challenge for contemporary societies. Public spending in domains such as health and education is one of the cornerstones of modern welfare states and represents a fundamental policy option for improving the quality of life of citizens (Lescano et al., 2023).

At a time when external shocks – such as financial crises, pandemics, natural disasters, and armed conflicts – are becoming more frequent, European welfare states are finding it difficult to reconcile social inclusion and economic sustainability (Cantillon & Vandenbroucke, 2014). Such events have a profound impact on the well-being of citizens and exacerbate the levels of social inequality that threaten the social cohesion of countries and regions (Rodriguez-Pose, 2018). Crises, such as the recent pandemic, have heterogeneous social impacts, imposing different costs on different groups of people based on factors such as gender, sex, age, ethnicity, disability, level of education, and place of residence (Arciprete et al., 2022).

The micro-level impact of external shocks clearly determines macroeconomic effects, as it influences, for example, the accumulation of human capital, which is a key element of countries' macroeconomic performance. The result is a possible geographical polarisation that risks undermining the EU's efforts, mainly through cohesion policies, to reduce disparities between countries and between regions.

A fundamental policy objective in promoting economic well-being is undoubtedly the enhancement of human development, i.e. increasing the opportunities available to people to become active participants in the economy and society (Anand & Ravallion, 1993). Preserving and enhancing human potential requires governments to define social investment strategies that go beyond mere assistance and foster the empowerment of people by accompanying them on a path of developing their capabilities (Ronchi, 2023). This paradigm assumes that investment in human development is crucial for sustainable economic growth and reduced inequality. In fact, this would overcome the trade-off between equity and efficiency, as the social investment approach relies heavily on the belief that social and economic policies are mutually reinforcing and that the former, when approached from a social investment perspective, is a prerequisite for future economic and employment growth (Garrizman et al., 2022). Moreover, protecting people's human capital can help build more resilient human development systems and minimize the long-term impact of recurrent crises (Rigolini et al., 2023).

In the EU, the social investment paradigm has inspired recent policy strategies to promote growth and cohesion, as evidenced by the adoption of the Social Investment Strategy. However, disparities between countries in the EU are still quite high in terms of both the quantity and quality of welfare spending, which is reflected in different social and employment outcomes (Ronchi, 2023).

Based on these premises, we consider it worthwhile to carry out an empirical investigation of EU countries to test whether the different levels of welfare spending explain cross-country economic disparities. To analyse this relationship, we first construct a measure of the quality of public spending that promotes human development using Eurostat data on general government expenditure (COFOG). Inspired by some works (e.g. Abrigo et al., 2018; Andrews et al., 2019; Kim & Ahn, 2020; Leitner & Stehrer, 2016; Paliova et al., 2019), we then aggregate spending items related to three domains: health, education, and social protection. By conducting a panel analysis of EU countries for the period 2000-2021, we empirically investigate the relationship between welfare spending and countries' economic well-being. The hypothesis we empirically test is that welfare spending promotes human empowerment by providing opportunities that enable people to reach their full potential (Sen, 1985; 1999), thus stimulating an increase in the productivity of human capital and making citizens active contributors to the economy and society. Therefore, we expect welfare spending to be one of the factors promoting economic well-being.

The results of the empirical analysis confirm the hypothesis of our paper, as welfare spending is positively associated with the measure used to proxy economic well-being, namely Gross National Income (GNI). These results are robust to different issues and scenarios, providing some evidence of a possible causal relationship. This evidence gives us elements to suggest how human development-oriented spending policies can be instrumental in promoting widespread well-being and ensuring social and economic cohesion both within and between countries.

To the best of our knowledge, this work should be the first to investigate whether the different levels of welfare spending explain cross-country economic disparities in the EU during a particular relevant period in which the succession of external shocks has posed new challenges to EU cohesion policy. Thus, the contribution of the work is twofold: i) to provide tools for evaluating spending policies in terms of human development; and b) to show how investment in human development is a key determinant of improving economic well-being and, consequently, reducing cross-country disparities that have widened as a result of recent shocks.

The remainder of the paper is organised as follows. Section 2 provides a brief literature review of the relationship between welfare spending and socio-economic well-being. Section 3 discusses the key indicators used in the analysis. Section 4 presents the empirical strategy and the estimation results. Finally, Section 5 provides some concluding remarks.

2. Welfare spending and economic well-being: theory and evidence

In this Section we first provide a broad conceptual framework of the potential mechanisms through which welfare spending might affect economic well-being, and then we review the relevant empirical literature.

The role of human capital in fostering economic development has been well recognised in the literature (consider, for example, the seminal contributions of Schultz (1961), Becker (1964), Romer (1986), and Lucas (1988)), not only as a key contributor to growth and poverty reduction, but also as an overarching development goal to expand human freedom (Baldacci et al., 2008). A related strand of literature focuses on human development, emphasising how a healthier and better educated population can contribute more actively to the social and economic progress of the communities in which they live (Beraldo et al., 2009).

Drawing on both strands of literature, we argue that welfare spending plays a central role in expanding human capabilities, enabling people to enjoy long, healthy, and creative lives (Veenhoven, 2009; Welzel & Inglehart, 2010). In the face of this challenge, the capability approach – central to the human development paradigm – developed by A. Sen and M. Nussbaum provides appropriate conceptual tools, as it emphasises and proposes people's choices (see, for example, Nussbaum & Sen, 1993).

This approach claims that well-being should be understood in terms of capabilities and functioning. These concepts are closely linked because capabilities represent a combination of functionings – i.e., desirable outcomes that can be achieved – and reflect the ability to choose between different life choices. Capabilities, therefore, represent the freedom to pursue the life one wishes to have and to access opportunities that would otherwise be excluded. The capability approach clearly has important policy implications in terms of how public interventions should be directed towards increasing the range of opportunities available to citizens. For capabilities to be realised, citizens must be provided with the essential services that enable them to transform resources into final outcomes.

The public sector can therefore contribute to the development of capabilities by providing services – in areas such as health, education, and social care – that are associated with basic functionings, such as being well educated and healthy. Thus, public spending on health, education, and social protection can promote the human development of citizens by enhancing their capabilities. This can generate positive effects at a macro level since it can reinforce social cohesion and facilitate the accumulation of human capital, helping to steer development paths towards greater sustainability and stability. This argument has important implications for economic policy because, as noted above, we believe that welfare spending can overcome the trade-off between equity and efficiency. Indeed, the nature of public and merit goods of many services provided by the public sector can lead to spillover effects that can have a positive impact on factors such as labour productivity and the propensity to innovate (Anand & Sen, 2000), fuelling a virtuous circle that leads to better macroeconomic performance.

Turning now to the empirical literature, we find a large body of work highlighting how welfare spending can have positive economic and social outcomes.

Furceri and Zdzienicka (2012) claimed that “there are several channels through which social spending is likely to affect output in the short term. First, an increase in social spending will increase demand by rising public consumption. Second, since a number of social policies target low-income individuals and credit constrained agents, an increase in social spending is likely to affect positively private consumption. Third, some measures of social spending, such as active labour market policies, may affect output by increasing employment. Fourth, social spending in health may affect investment by rising human capital and, to the extent that private and public investments in the health sector are complementary, by providing medical capital goods. Fifth, an increase in social spending may be also associated with distortionary policy actions (such as early retirement incentives and invalidity benefits) which may have negative effects on output (via reduced labour force participation) both in the short and in the medium term.” (p.130). Performing a panel analysis of OECD countries from 1980 to 2005, they empirically show that social protection spending has expansionary effects on GDP, even in recessionary periods. The role of social spending in stabilising the economy has already been highlighted, for instance, in Darby and Melitz (2008) and Furceri (2010). Darby and Melitz (2008) find, through an empirical analysis of 21 OECD countries from 1982 to 2003, that age- and health-related social spending, as well as incapacity and sick benefits, all react to the cycle in a stabilising manner. Furceri (2010) shows, through an empirical analysis of OECD countries over the period from 1980 to 2015, that total social spending can smooth about 15 per cent of a shock to GDP. Among its subcategories, spending on old age, health, and

unemployment are the ones that contribute more to the smoothing. Moreover, the stabilising effect of social spending is significantly greater in countries where its level is higher and less volatile.

Several other works have been carried out on both advanced and developing countries. Beraldo et al. (2009) test whether public spending on health and education affected the economic growth of 19 OECD countries between 1971 and 1998. They find that health and education spending positively impacts economic growth, and the estimated impact is stronger for health than for education. They also show that public spending has a stronger impact on GDP growth than private spending. Paliova et al. (2019) analyse the impact of public social spending on human development for a sample of 68 countries over the period 1995-2016. They estimate the impact of government spending on social protection, health, and education on Gross National Income (GNI) per capita, expected years of schooling, and life expectancy, finding a significant positive effect of education spending on educational outcomes and GNI dimensions, and of health spending on life expectancy. Lescano et al. (2023) empirically analyse the impact of central and subnational government spending on education and health on human development in a sample of 57 developed and developing countries over the period 2000-18. Using a panel data analysis, they find that health spending has a positive impact on the Human Development Index (HDI) and its components, while in the case of education spending, this positive effect is only observed for the education dimension of the HDI. In an empirical analysis of 15 advanced welfare states for the period 1990-2015, Kim and Ahn (2020) show that public spending on education, health, and social services has a positive impact on economic performance in the medium and long term, while cash welfare spending has no significant effect.

Several empirical studies have been conducted on the impact of social spending in developing and emerging countries. For example, Gupta et al. (2002) show that increased public spending on education and health has positive social outcomes, such as improved school access and performance, and reduced infant and child mortality. Baldacci et al. (2003), estimate the linkage between government spending on health care and education and selected social indicators. Their findings suggest that public spending is an important determinant of social outcomes, particularly in the education sector. Abrigo et al. (2018) show, through an empirical analysis on a sample of middle-income Asian countries, that investment in human capital has a positive effect on labour productivity and hence output. The positive effect is stronger for poorer households, which is beneficial for equity. They also find that human capital investment can generate sufficient tax revenues to improve fiscal balances.

Focusing on Europe, Hessami (2010) shows that governments in the EU could have achieved higher levels of well-being by spending more on education and less on social protection. Ronchi (2023), using a multi-level analysis, finds that most social investment-oriented welfare states have higher individual-level employment opportunities, which were indeed maintained during the Great Recession. Clearly, rising employment could have a positive impact on aggregate demand, thereby boosting macroeconomic performance.

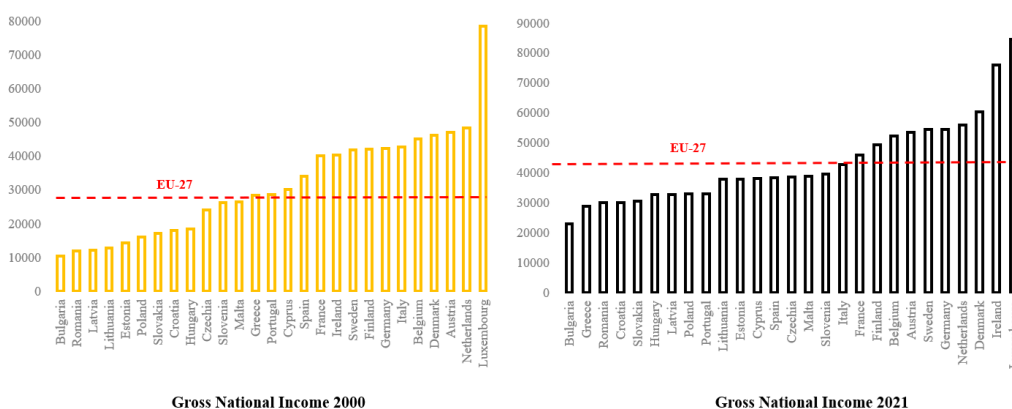
To the best of our knowledge, this extensive literature has not yet considered how public welfare spending has affected economic disparities across EU countries in recent years, when various external shocks could have undermined social and economic cohesion. Therefore, the existing evidence needs further in-depth empirical work. Our paper aims to fill this gap by analysing this issue using updated data for the EU-27 countries.

3. Key variables

In this section, we provide information on our main variables of interest, Gross National Income (GNI) per capita and welfare spending. Our sample consists of a panel of EU-27 countries for the period 2000-2021.

The GNI per capita represents our dependent variable, employed to proxy the economic well-being of countries.² Figure 1 first shows the spatial distribution of the indicator in 2000 and 2021 – i.e., the beginning and the end of the period under consideration. It can be seen that there is a clear divide, particularly between the Central European and Nordic countries on the one hand and the Eastern and Southern countries on the other.

Figure 1. Spatial distribution of GNI per capita in 2000 and 2021



² The GNI is expressed in international \$ at 2017 prices. As a real measure, it is therefore more suitable for cross-country comparisons.

Over time there seems to have been a convergence. In fact, many countries, especially in the East, have seen their GNI increase significantly. However, the divide with the Nordic and Mitteleuropean countries remains significant, as can be seen from the scatterplot shown in Figure 2. It shows that all countries increased their GNI between 2000 and 2021. The largest increases occurred especially in Eastern European countries. Thus, this evidence shows traces of a convergence, confirmed by the graph illustrated in Figure 3, which represents the time series of the coefficient of variation of the GNI. There is a downward trend, although the gaps widen again in times of crisis. These data highlight how the recurrence of external shocks could jeopardise this convergence between countries in terms of economic and social development, which is one of the pillars of EU policy.

Figure 2. GNI per capita in 2000 and 2021 (scatterplot)

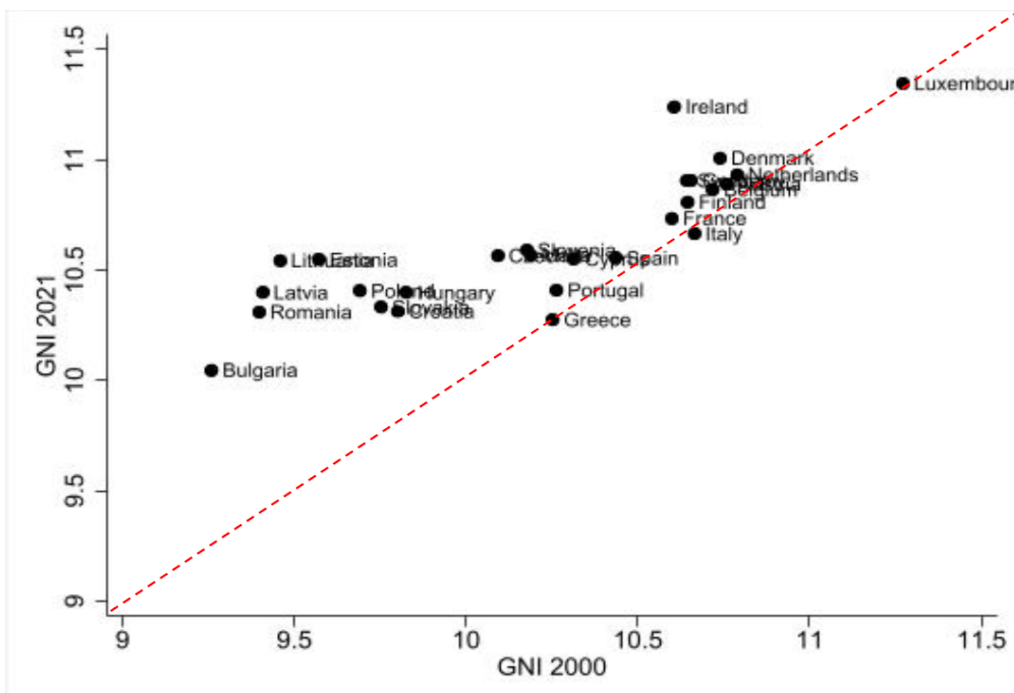
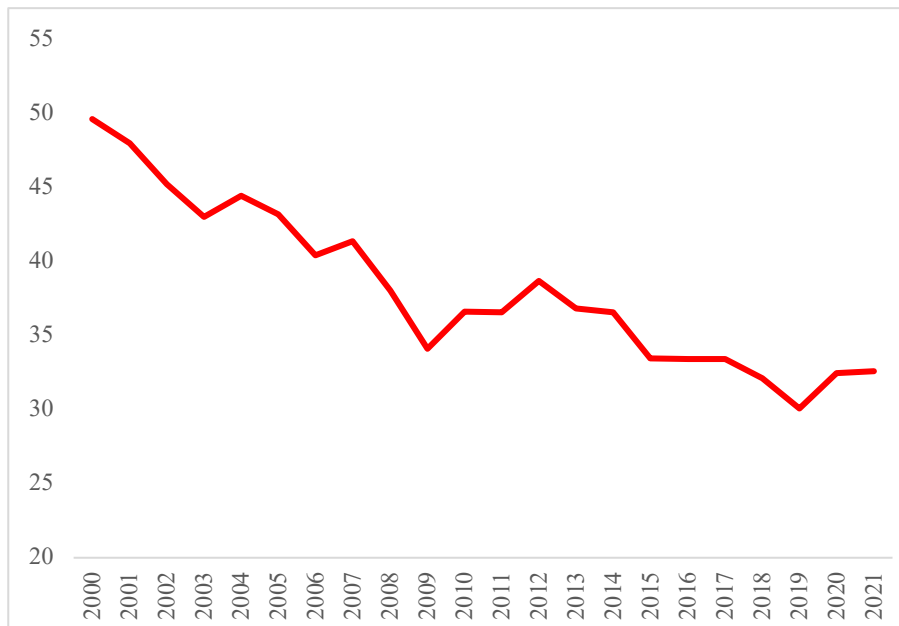


Figure 3. Coefficient of variation (CV) of GNI per capita in EU-27

The other variable of interest, public welfare spending, is used as the main independent variable. Following the existing literature, this expenditure aggregate is constructed by considering three domains: health, education, and social protection. Table 1 shows in detail the different spending items that we take into account for the construction of the measure that aims to examine the financial commitment of governments to the promotion of human development, using Eurostat's database of government finance statistics, classified by economic function (COFOG).³

³ The individual spending items (education, health, and social protection) are obtained by aggregating the following indicators: gross fixed capital formation, capital transfers, and current primary expenditure. The latter indicator is obtained by taking into account: compensation of employees, intermediate consumption, subsidies, other current transfers, social benefits other than social transfers in kind and social transfers in kind.

Table 1. Composition of welfare spending

COFOG (I level)	COFOG (II level)
Health (GF07)	Medical products, appliances, and equipment (GF0701)
	Outpatient services (GF0702)
	Hospital services (GF0703)
	Public health services (GF0704)
	R&D health (GF0705)
	Health n.e.c. (GF0706)
Social protection (GF10)	Sickness and disability (GF1001)
	Old age (GF1002)
	Survivors (GF1003)
	Family and children (GF1004)
	Unemployment (GF1005)
	Housing (GF1006)
	Social protection n.e.c. (GF1007)
Education (GF09)	Pre-primary and primary education (GF0901)
	Secondary education (GF0902)
	Post-secondary non-tertiary education (GF0903)
	Tertiary education (GF0904)
	Education not definable by level (GF0905)
	Subsidiary services to education (GF0906)
	R&S education (GF0907)
	Education n.e.c. (GF0908)

Figure 4 shows the spatial distribution of welfare spending per capita in 2000 and 2021. We consider the per capita value to assess how this expenditure is distributed across the population of the countries.⁴ A significant gap in expenditure is clearly visible between the Central and Nordic countries on the one hand and the Mediterranean and Eastern countries on the other. Again, between 2000 and 2021, expenditure increases in all countries, especially in the Eastern countries, as can be seen from the scatter plot in Figure 5. Convergence is therefore also observed for welfare spending, although the differences remain particularly large. Indeed, Figure 6 shows how the coefficient of variation of this indicator in the EU has decreased over time, although it remains at a relatively high level.

⁴ We deflate the measure appropriately using the GDP deflator (2015=100) to obtain a real measure suitable for cross-country comparisons.

Figure 4. Spatial distribution of welfare spending in 2000 and 2021

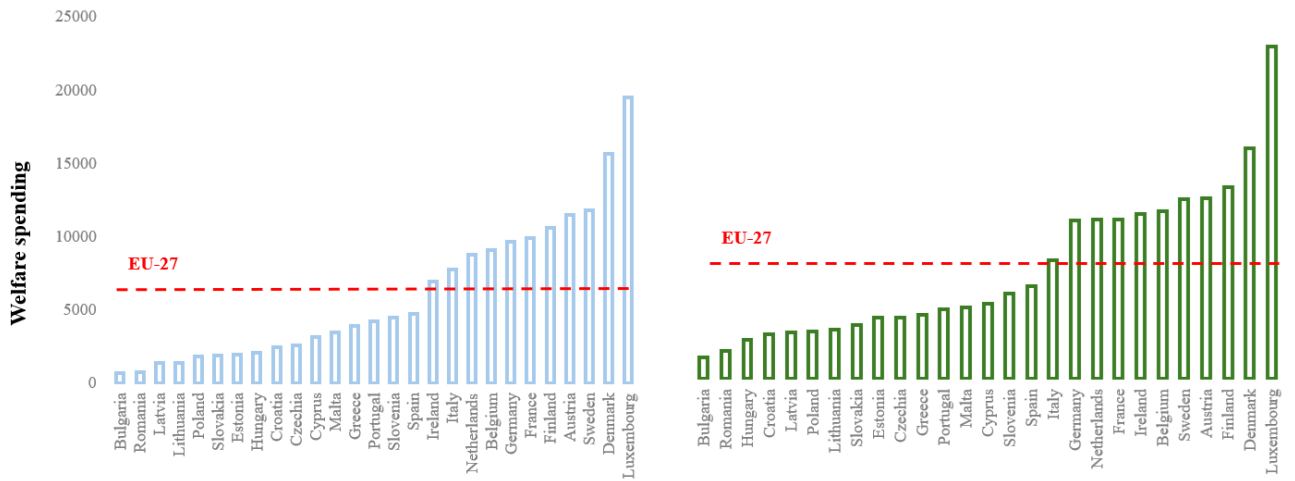


Figure 5. Welfare spending in 2000 and 2021 (scatterplot)

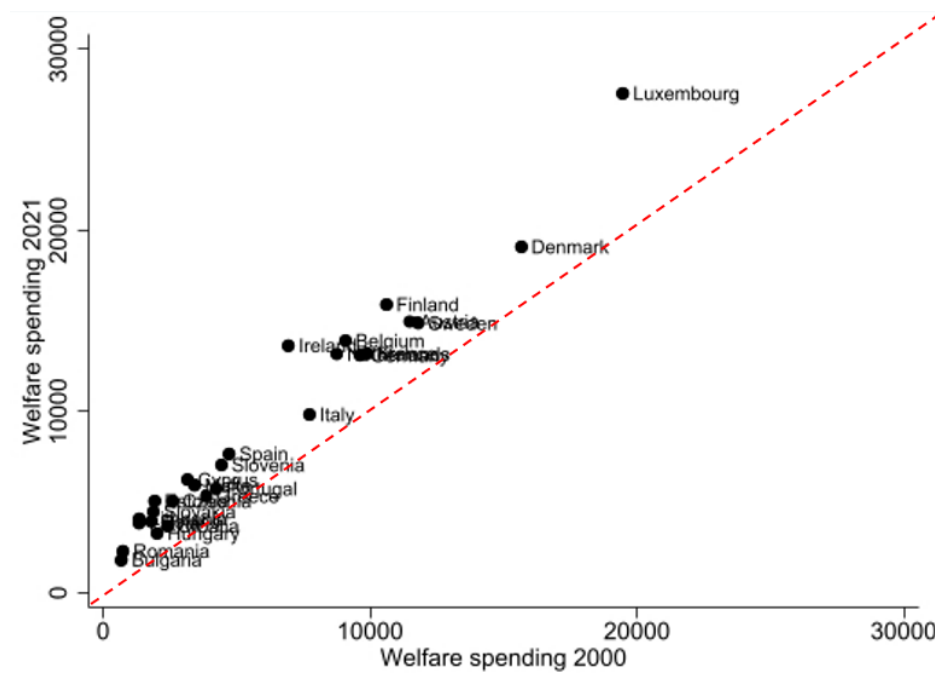
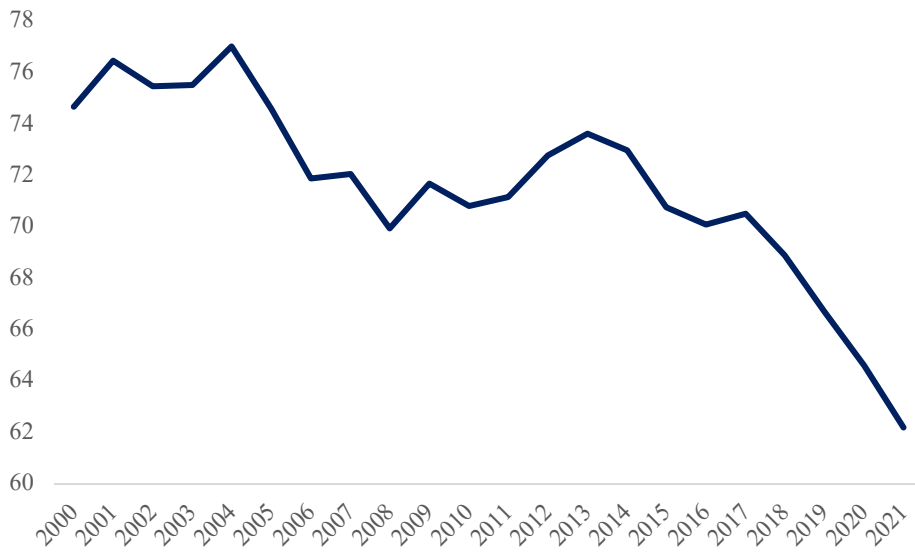
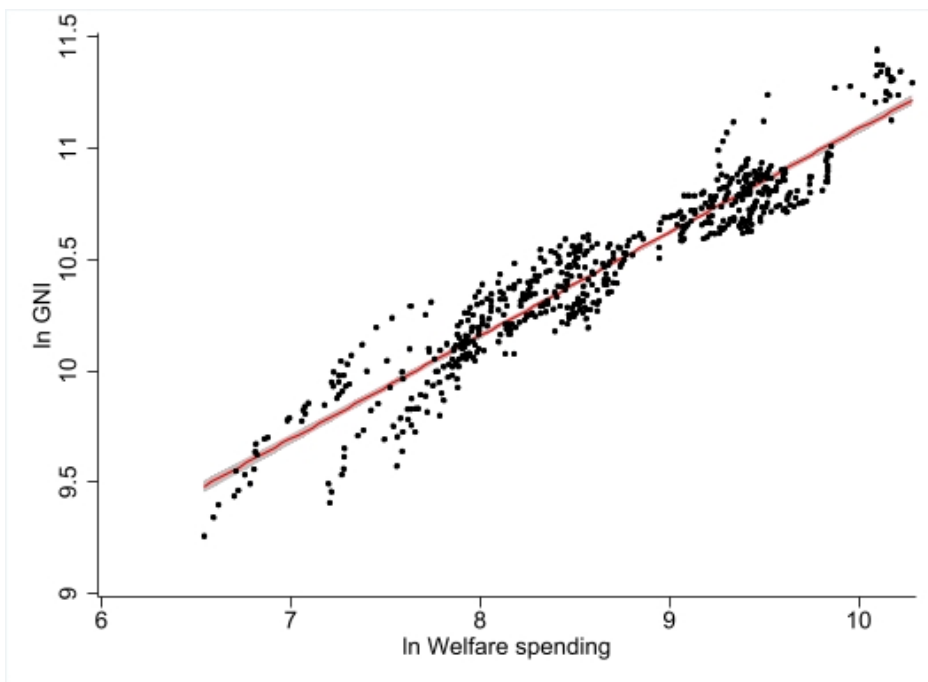


Figure 6. Coefficient of variation (CV) of welfare spending in EU-27



The above analysis seems to suggest that there is a strong correlation between welfare spending and GNI. The scatterplot shown in Figure 7, whose slope is estimated with a pooled OLS, confirms that there is a positive relationship between the two measures over the period 2000 to 2021. This result should be treated with caution, since it could be the result of a spurious correlation. In fact, there are several methodological issues that need to be addressed in order to examine the relationship between the two variables.

Figure 7. Welfare spending and GNI per capita (2000-2021)



4. Econometric analysis

In this section, we propose an empirical analysis aimed at analysing the robustness of the evidence from the previous exploratory analysis regarding the positive relationship between welfare spending and economic well-being in EU countries. To this end, we develop an empirical model using a strongly balanced panel dataset of the 27 EU countries over the period 2000-2021, drawing on data collected from a variety of sources, namely Eurostat, the World Bank, the International Monetary Fund (IMF), and the United Nations Development Programme (UNDP). Below we present the details of our empirical strategy and the results obtained from the econometric estimations, as well as a series of robustness tests and comments on the results obtained.

4.1 Empirical strategy and estimation results

We first estimate the following pooled OLS:

$$\ln GNI_{it} = \beta_0 + \beta_1 \ln Welfare_spending_{it} + \beta_2 X_{it} + \mu_t + u_{it} \quad (1)$$

Where GNI is real gross national income per capita, $Welfare_spending$ is real public welfare spending per capita, X is a vector of control variables, μ_t indicates time dummies (useful to control for external shocks), and u_{it} is the disturbance term.

Regarding the control variables, following the relevant literature on the determinants of socio-economic well-being, we consider different variables to control for the main social and economic features of the countries. Specifically, the following variables are selected.

- i) Unemployment rate (*Unemployment*). Unemployment status can lead to a reduction in income with a consequent negative impact on material well-being (e.g., Ayala et al., 2023). Furthermore, it can negatively affect the mental and physical health of people (e.g., Mousteri et al., 2018; Voßemer et al., 2018), undermining their productivity. Taking these considerations into account, we expect a negative sign for this variable.
- ii) Consumer prices growth (*Inflation*). This variable captures the idea that an economy with a high level of inflation erodes the purchasing power of households, which has a negative impact on socio-economic well-being (Lescano et al., 2023; Paliova et al., 2019). Hence, we expect a negative sign for this variable.
- iii) Percentage of Gross Value Added in the industry sector out of total gross value added (*GVA_ind*). We use this variable as a proxy for the level of industrialisation of countries, considering how the industrial sector can

stimulate productivity and, consequently, promote economic growth, leading to an improvement in material living conditions through increased income, food security, and access to education and health care (Greenstein, 2019).

iv) Population growth (*Pop_growth*). A growing population can lead to an increase in the labour force and productivity. This can translate into higher economic growth and improved living standards. A growing population can also lead to an increase in diversity and creativity.⁵ The linkage between population growth and economic well-being could be mediated by welfare spending (Heady & Hodge, 2009). We therefore expect a positive sign for this variable, since public spending on education, health, and social protection can translate population growth into growth in productivity and human potential.⁶

Table 2 shows the results of different model specifications. We first include only the key variable of interest (column I), then the control variables (column II), and finally the time dummies (column III). To account for possible autocorrelation, the standard errors are clustered by country. The main variable of interest has a positive and statistically significant sign in all specifications. This allows us to provide the first evidence confirming the hypothesis that welfare spending promotes the economic well-being of European countries. As for the control variables, they have the expected signs, although the *Industry* variable never reaches statistical significance, and the *Inflation* variable loses significance in the last specification (column III).

⁵ A detailed description and the summary statistics of the variables included in the model are reported in the appendix, table A1.

⁶ In the appendix, we report the correlation matrix of the explanatory variables (table A2) and a list of empirical works that use these variables in their models to explain the economic performance of countries and regions (table A3). In table A2 we also report the variance inflation factor (VIF) associated with each explanatory variable. This is useful to check that our estimates are not biased by the issue of multicollinearity. Since the VIFs all have values below 5, we are quite confident that there are no variables that are linked by linear dependence.

Table 2. Estimation results I (Pooled-OLS model)

Dependent variable: ln GNI			
	I	II	III
<i>ln Welfare spending</i>	0.464*** (0.021)	0.404*** (0.021)	0.399*** (0.022)
<i>Inflation</i>		-0.007*** (0.002)	-0.003 (0.002)
<i>Unemployment</i>		-0.015*** (0.004)	-0.013*** (0.004)
<i>Population growth</i>		0.035* (0.017)	0.049** (0.020)
<i>Industry</i>		-0.002 (0.002)	-0.000 (0.002)
Time FE	No	No	Yes
Adjusted R ²	0.910	0.939	0.950
Countries	27	27	27
Observations	594	594	594

Note: Clustered standard errors in parentheses. Level of significance: 10% (*), 5% (**), and 1% (***).

The main limitation of previous pooled OLS estimates is that they do not fully address the possible omitted variable bias. Therefore, the literature suggests estimating panel models with fixed-effects (FE) and random-effects (RE) (Wooldridge, 2011). Generally, the choice of the most appropriate model to estimate is made by estimating the Hausman test, which in our case rejects the null hypothesis that the random coefficients model is the most appropriate choice. From a theoretical point of view, the fixed-effects procedure is preferable, since we are dealing with the whole of the EU-27 countries and not a sample of them.⁷ We then estimate the following model including the country fixed-effects (μ_i):

$$\ln GNI_{it} = \beta_1 \text{Welfare spending}_{it} + \beta_2 X_{it} + \mu_i + \mu_t + u_{it} \quad (2)$$

The results of different specifications of this model, shown in Table 3, confirm the positive and statistically significant sign of our key variable of interest. These results are the first indication of the robustness of the evidence regarding the positive relationship between welfare expenditure and GNI. The control variables also retain coefficients with the expected sign. The only variable that shows statistically non-significant coefficients is *Inflation*.

⁷ The estimates of random-effects model are not reported. They are available upon request.

Table 3. Estimation results II (Fixed-effects model)

Dependent variable: ln GNI			
	I	II	III
<i>ln Welfare spending</i>	0.762*** (0.046)	0.761*** (0.041)	0.701*** (0.077)
<i>Inflation</i>		-0.002 (0.002)	-0.001 (0.002)
<i>Unemployment</i>		-0.011*** (0.002)	-0.011*** (0.002)
<i>Population growth</i>		0.058*** (0.012)	0.056*** (0.014)
<i>Industry</i>		0.013** (0.005)	0.014*** (0.005)
Country FE	Yes	Yes	Yes
Time FE	No	No	Yes
R ² (within)	0.760	0.874	0.899
Countries	27	27	27
Observations	594	594	594

Note: Clustered standard errors in parentheses. Level of significance: 10% (*), 5% (**), and 1% (***).

Another methodological problem could be reverse causality and simultaneity. We assume that welfare spending affects GNI. However, the opposite may be true as the volume of national income affects government budgets and hence public spending choices. For this motivation, in order to deal with endogeneity we estimate a fixed-effects IV-GMM model. In this context, the choice of instrumental variables that comply with fundamental requirements such as relevance and exogeneity is of paramount importance. Let us consider two different instrumental variables: the share of the population aged between 15 and 24 in the total population (*Young population*) and an index of institutional trust (*Institutional trust*). The latter variable captures perceptions of the extent to which agents trust and abide by the rules of society, in particular the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence. Institutional trust is seen as a potential determinant of welfare spending, as perceptions of government quality affect attitudes towards taxes and social spending, as shown for example by Svallfors (2013). Thus, people who perceive institutions as efficient and fair want higher taxes and spending. As claimed by Bergh and Bjørnskov

(2011), confident populations were more likely to create and sustain large, universal welfare states. With regard to the population, the age structure inevitably has an impact on welfare spending, as it affects the demand for public services (Furceri & Mouragane, 2010). We believe that both variables can meet the exogeneity requirement because their impact on GNI is indirect – i.e., mediated by factors such as welfare spending. Moreover, concerning the level of institutional trust has remained fairly stable over the period we have considered. This is because it is determined by social and cultural factors with deep historical roots. Finally, estimating a model with fixed-effects severely limits the possibility of the presence of unobserved factors other than welfare spending that may mediate the relationship between the instrumental variables and the dependent variable. Therefore, they should be uncorrelated with the disturbance term.

Table 4 shows the results of the IV-GMM estimation. Our variable of interest retains a positive and statistically significant coefficient. As for the instrumental variables, both are significantly correlated with the endogenous variable, as shown in the first stage estimates. These results suggest that these variables are not weak and therefore relevant. To confirm this, we present the results of the weak identification test (Kleibergen-Paap Wald rk F statistic), which rejects in all cases the null hypothesis that the equations are weakly identified. Furthermore, the relative value of the F-statistic is above 10, which is considered the threshold for an instrument not to be weak. We also show the results of the underidentification test (Kleibergen-Paap rk LM statistic), which indicates that the matrices have rank=K1 and are therefore identified. Finally, the over-identification test (Hansen J statistic) shows a not statistically significant result. Therefore, there is insufficient evidence to reject the null hypothesis that the instruments are exogenous. Thus, these results allow us to argue with some confidence that the emerging evidence on the positive relationship between welfare spending and GNI should not be affected by endogeneity. The control variables show no variation in the sign and significance of the coefficients than the previous model.

Table 4. Estimation results III (IV-GMM model)

II stage	
Dependent variable: ln GNI	
<i>ln Welfare spending</i>	0.691*** (0.106)
<i>Inflation</i>	-0.001 (0.002)
<i>Unemployment</i>	-0.011*** (0.002)
<i>Population growth</i>	0.056*** (0.013)
<i>Industry</i>	0.014*** (0.004)
R ² (within)	0.899
I stage	
Dependent variable: ln Welfare spending	
<i>Institutional trust</i>	0.275*** (0.064)
<i>Young population</i>	-0.046*** (0.005)
Country FE	Yes
Time FE	Yes
Countries	27
Observations	594
Diagnostic	
Weak identification test (Kleibergen-Paap rk Wald F statistic)	44.96***
Underidentification test (Kleibergen-Paap rk LM statistic)	15.565***
Overidentification test (Hansen J statistic)	2.130

Note: Clustered standard errors in parentheses. Level of significance: 10% (*), 5% (**), and 1% (***).

A final methodological issue that needs to be addressed, as it could be a source of bias in the estimates, is spatial dependence. Both GNI and welfare spending, as well as the control variables, show a non-random spatial distribution, with the presence of clusters of countries with similar values. For this reason, we estimate a Spatial Autoregressive Model (SAR), which takes into account the effect of spatial lag on the dependent variable. The model is formalised as follows:

$$\ln GNI_{it} = \beta_1 \ln Welfare\ spending_{it} + \beta_2 X_{it} + \rho W \ln GNI_{it} + \mu_i + \mu_t + u_{it} \quad (3)$$

Thus, we include the spatial lag of the dependent variables in the list of regressor ($\rho W GNI$), where W is a row-standardised matrix of spatial weights, in our case the inverse of the great circle distance calculated on the

basis of the latitude and longitude of the countries.⁸ The results of the estimation using the quasi-maximum likelihood estimator (QMLE) are presented in Table 5.

Table 5. Estimation results IV (SAR model)

Dependent variable: ln GNI			
	I	II	III
<i>ln Welfare spending</i>	0.619*** (0.028)	0.624*** (0.022)	0.667*** (0.025)
<i>Inflation</i>		-0.002** (0.001)	-0.001 (0.001)
<i>Unemployment</i>		-0.010*** (0.001)	-0.010*** (0.001)
<i>Population growth</i>		0.061*** (0.007)	0.056*** (0.007)
<i>Industry</i>		0.014*** (0.001)	0.014*** (0.001)
ρ	0.239*** (0.036)	0.248*** (0.027)	0.153*** (0.035)
Country FE	Yes	Yes	Yes
Time FE	No	No	Yes
Pseudo R ²	0.914	0.907	0.916
Countries	27	27	27
Observations	594	594	594

Note: Standard errors in parentheses. Level of significance: 10% (*), 5% (**), and 1% (***).

Once again, the coefficient of our variable of interest is positive and statistically significant. For the control variables, the results obtained in the previous estimates are also confirmed. With regard to the lag of the dependent variable, the coefficient is positive, indicating the presence of positive spillover effects. We also report direct, indirect, and total effects (Table 6). The direct effect reflects the average change in the GNI in a particular region caused by a one unit change in that country's explanatory variable. In turn, the indirect effect can be defined as the aggregate impact on GNI in a specific countries caused by the change in an explanatory variable in all other countries or, alternatively, as the impact of changing an explanatory variable in a particular country on GNI in the remaining countries. Finally, the total effect is the sum of the direct and indirect effects (LeSage & Pace, 2009). Concerning our key variable of interest, it shows significant positive direct and indirect effects. This confirms the existence of spatial spillovers. The results for control variables are also confirmed in this case.⁹

⁸ We set the minimum useful distance to avoid isolated units.

⁹ We acknowledge that these results may be sensitive to the choice of matrix and model. Therefore, we estimated the SAR model using the inverse distance matrix with different cut-offs. In addition, we also estimated a spatial error model (SEM), which consists of spatially lagging the disturbance term. In all cases, the results (available upon request) of the variable of interest are confirmed.

Table 6. Direct, indirect, and total effects (SAR model)

	Dependent variable: ln GNI		
	Direct	Indirect	Total
<i>ln Welfare spending</i>	0.670*** (0.025)	0.118*** (0.030)	0.788*** (0.037)
<i>Inflation</i>	-0.001 (0.001)	-0.000 (0.000)	-0.002 (0.001)
<i>Unemployment</i>	-0.010*** (0.001)	-0.002*** (0.000)	-0.012*** (0.001)
<i>Population growth</i>	0.056*** (0.007)	0.010*** (0.003)	0.066*** (0.009)
<i>Industry</i>	0.014*** (0.001)	0.002*** (0.001)	0.016*** (0.001)

Note: Standard errors in parentheses. Level of significance: 10% (*), 5% (**), and 1% (***).

4.2 Robustness checks

To further test the robustness of the evidence obtained so far, we perform some robustness tests using the FE model. First, we consider how welfare spending may have lagged effects on countries' economic well-being. Therefore, in Table 7, we present results with the explanatory variables lagged by one year (column I), two years (column II) and three years (column III). This strategy is also useful to further check that the results obtained above are not biased by reverse causality.

Table 7. Estimation results V (Fixed-effects model)

Dependent variable: ln GNI			
	I	II	III
	1-year lagged explanatory variables	2-year lagged explanatory variables	3-year lagged explanatory variables
<i>ln Welfare spending</i>	0.599*** (0.079)	0.501*** (0.084)	0.425*** (0.088)
<i>Inflation</i>	-0.002 (0.002)	-0.004** (0.002)	-0.005*** (0.002)
<i>Unemployment</i>	-0.012*** (0.002)	-0.011*** (0.002)	-0.010*** (0.002)
<i>Population growth</i>	0.044*** (0.015)	0.032* (0.018)	0.020 (0.022)
<i>Industry</i>	0.014*** (0.005)	0.015*** (0.004)	0.015*** (0.004)
Country FE	Yes	Yes	Yes
Time FE	No	No	Yes
R ² (within)	0.875	0.833	0.790
Countries	27	27	27
Observations	567	540	513

Note: Clustered standard errors in parentheses. Level of significance: 10% (*), 5% (**), and 1% (***).

One aspect to consider is the effect of outliers. In the descriptive analysis we found that Luxembourg is an outlier, so we remove it from the sample. In addition, we also remove the Nordic countries (Denmark, Sweden, and Finland) in order to test whether the relationship between welfare spending and economic well-being is not influenced by the typically high levels of spending in these countries. The results of the estimates are presented in Table 8.

Table 8. Estimation results VI (Fixed-effects model)

	Dependent variable: <i>ln GNI</i>		
	(1)	(2)	(3)
<i>ln Welfare spending</i>	0.857*** (0.094)	0.727*** (0.080)	0.727*** (0.080)
<i>Inflation</i>		-0.001 (0.002)	-0.001 (0.002)
<i>Unemployment</i>		-0.011*** (0.001)	-0.011*** (0.001)
<i>Population growth</i>		0.052*** (0.012)	0.052*** (0.012)
<i>Industry</i>		0.013** (0.005)	0.013** (0.005)
Country FE	Yes	Yes	Yes
Time FE	No	No	Yes
R ² (within)	0.783	0.916	0.917
Countries	23	23	23
Observations	506	506	506

Note: Clustered standard errors in parentheses. Level of significance: 10% (*), 5% (**), and 1% (***).

Given that our dependent variable moves relatively slowly over time, we estimate a model considering five-year mean values for the periods 2000-2004, 2005-2009, 2010-2014, and seven-year mean values for the period 2015-2021 (Table 9). This allows us to capture long-term trends and structural relationships between the key variables of interest, neutralising the business cycle effect.

Table 9. Estimation results VII (Fixed-effects model)

	Dependent variable: <i>ln GNI</i>		
	(1)	(2)	(3)
<i>ln Welfare spending</i>	0.798*** (0.049)	0.847*** (0.048)	0.789*** (0.093)
<i>Inflation</i>		-0.001 (0.003)	0.002 (0.003)
<i>Unemployment</i>		-0.009*** (0.002)	-0.008*** (0.003)
<i>Population growth</i>		0.066*** (0.015)	0.074*** (0.016)
<i>Industry</i>		0.017*** (0.005)	0.018*** (0.004)
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
R ² (within)	0.818	0.931	0.936
Countries	27	27	27
Observations	108	108	108

Note: Clustered standard errors in parentheses. Level of significance: 10% (*), 5% (**), and 1% (***).

We also need to consider how the different components of our welfare spending aggregate may have different effects on economic well-being. For this reason, we estimate models, the results of which can be seen in Table 10, in which we separately include health spending, education spending, and social protection spending.

Table 10. Estimation results VIII (Fixed-effects model)

	Dependent variable: <i>ln GNI</i>		
	(1)	(2)	(3)
<i>ln Health spending</i>	0.454*** (0.100)		
<i>ln Education spending</i>		0.584*** (0.101)	
<i>ln Social protection spending</i>			0.537*** (0.069)
<i>Inflation</i>	-0.005 (0.003)	-0.003 (0.003)	-0.002 (0.003)
<i>Unemployment</i>	-0.009*** (0.002)	-0.010*** (0.002)	-0.016*** (0.002)
<i>Pop_growth</i>	0.045*** (0.014)	0.028* (0.016)	0.062*** (0.017)
<i>Industry</i>	0.013*** (0.004)	0.013*** (0.003)	0.012** (0.006)
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
R ² (within)	0.850	0.863	0.873
Countries	27	27	27
Observations	594	594	594

Note: Clustered standard errors in parentheses. Level of significance: 10% (*), 5% (**), and 1% (***).

As a final robustness test, we replace the dependent variable with an alternative measure of well-being. In our study, the focus has been on economic well-being, but it may be interesting to test whether welfare spending affects the overall well-being of countries by looking beyond the economic dimension and thus adopting a multidimensional measure. We therefore introduce the Human Development Index as a dependent variable in our model. The Human Development Index (HDI) is a comprehensive measure of a country's human development, covering three critical aspects: life expectancy, knowledge, and living standards. It has been published annually since 1990 by the United Nations Development Programme (UNDP) as an alternative to purely economic indicators. Life expectancy at birth represents the health dimension, while expected and average years of schooling reflect the knowledge dimension. GNI per capita (PPP USD) captures the living conditions dimension. The HDI is derived by taking the geometric mean of these three indices. In essence, the HDI provides a holistic assessment of a country's progress in promoting human well-being beyond mere economic growth. The results of the estimations are reported in Table 11.

Table 11. Estimation results IX (Fixed-effects model)

	Dependent variable: HDI		
	(1)	(2)	(3)
<i>ln Welfare spending</i>	0.128*** (0.008)	0.122*** (0.010)	0.047*** (0.007)
<i>Inflation</i>		-0.001* (0.000)	-0.001*** (0.000)
<i>Unemployment</i>		0.000 (0.000)	-0.000 (0.000)
<i>Population growth</i>		0.004 (0.005)	0.006 (0.004)
<i>Industry</i>		-0.000 (0.001)	0.001 (0.001)
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
R ² (within)	0.756	0.772	0.930
Countries	27	27	27
Observations	594	594	594

Note: Clustered standard errors in parentheses. Level of significance: 10% (*), 5% (**), and 1% (***).

In all the estimates presented in this section, our welfare spending variable and its components have positive and significant coefficients. Therefore, we consider the evidence of a positive relationship between welfare spending and economic well-being that has emerged in this analysis to be sufficiently robust to derive concluding considerations that are useful for formulating some policy recommendations. The only significant difference from the results observed in the baseline models concerns the inflation rate. Indeed, the *Inflation* variable has statistically significant coefficients when lagged by two and three years. This suggests that the negative effect of inflation on economic well-being may not be immediate.

4.3 Comments

The results of the empirical analysis support our hypothesis that welfare spending is one of the factors explaining the cross-country economic disparities identified in the descriptive analysis. This result confirms what emerged from the large body of empirical studies examined in our literature review. The novel elements that arise from our analysis and that can enrich the already extensive empirical literature on the topic are varied. First and foremost, there is the introduction of a welfare spending indicator that aggregates the three domains considered vital for the promotion of human development, without considering them individually, as is done in the empirical literature we analysed. This has allowed us to conduct an overall assessment of the financial efforts made by governments to stimulate human development – which, as our analysis has amply demonstrated, can be considered a determinant of the level of economic well-being in European countries.

The second relevant element concerns the time interval considered, which has allowed us to show that the positive association between our welfare spending measure and economic well-being is not affected by the sequencing of external shocks – such as the 2008 financial crisis, the sovereign debt crisis that hit several countries in 2010, and the recent pandemic. This is particularly important as it highlights the ability of welfare spending to ensure the stability of socio-economic development processes, which will increasingly be a key policy objective in an era of proliferating external shocks.

Another potentially relevant aspect emerges from the spatial analysis. Indeed, it appears that welfare spending has spillover effects, affecting the economic well-being not only of the countries where it is spent but also of the neighbouring countries. This result could be explained by looking at the economic interdependence between countries. For example, it is possible that an increase in aggregate demand in countries with higher welfare spending could lead to an increase in imports from neighbouring countries, with a consequent increase in national income. In addition, countries with higher welfare spending might attract human resources that could contribute to the economic well-being of their home countries. Clearly, this preliminary evidence needs to be confirmed by more robust spatial econometric analysis.

5. Concluding remarks

In this paper we have explored how public spending on health, education, and social protection can be seen as key fiscal instruments to support economic development and, as a consequence, the quality of citizens' life. To this end, we have defined a simple measure of public spending that allows us to assess the level of public investment in human development. Indeed, we have theorised, in line with the capability theory proposed by A. Sen and M. Nussbaum, that public spending in the areas mentioned above can contribute to the development and enhancement of human potential. This clearly has positive economic implications, as a healthier and better educated population, less vulnerable to economic and social insecurity, can make a greater contribution to economic and social progress, while realising their potential and aspirations. To test this hypothesis, we conducted an empirical study on a panel of EU countries for the period 2000-2021, in order to assess the relationship between our measure of public welfare spending and Gross National Income per capita, which is used as a proxy for countries' economic well-being. The results of this analysis confirm our hypothesis that a greater public investment in human development, proxied by our measure of welfare spending, positively impacts the economic prosperity of countries, representing one of the factors explaining the cross-country economic disparities observed in the EU. Several empirical tests allow us to show that this evidence is

robust to multiple issues and scenarios, such as endogeneity and spatial dependence. We believe that these findings might have important policy implications. We live in an era where external shocks are increasingly widespread, putting the EU's economic, social, and territorial cohesion under strain. In our descriptive analysis we have shown how the process of economic convergence between countries has been interrupted by major shocks such as the Great Recession of 2008 and the recent pandemic. Therefore, it is necessary, in order to pursue the goal of cohesion, which is a necessary prerequisite for advancing the European integration process and making the EU more competitive in the global arena, that there is a strong commitment to social investment. This is, in fact, crucial to ensure the economic and social resilience of countries, putting them in a position to better cope with successive external shocks without jeopardising their own paths to economic development. The Next Generation EU plan is certainly an important signal. Public investment for the promotion and enhancement of human potential, represented by the paradigm of social investment, must increasingly become a cornerstone for addressing contemporary problems of social justice, without compromising the efficiency of the system – contributing, on the contrary, to its stability and sustainability. Although our work is not exempt from empirical limitations that require caution in interpreting the results (such as not taking into account the heterogeneity of economic and social conditions within countries, which would be possible if sub-national data on public spending were available), we provide further evidence to enrich an increasingly consolidated literature that allows us to support the thesis that allocating more public resources to welfare spending that promotes human potential is a promising policy option to address the cross-country economic disparities that undermine the EU's competitiveness.

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Appendix

Table A1. Description of variables and summary statistics

Variable	Description	Source	Mean	S.D.
GNI	Real Gross National Income per capita (International \$ at 2017 prices)	UNDP	37344.0	14505.0
HDI	Human Development Index	UNDP	0.867	0.048
Welfare spending	Aggregated government spending on health, education, and social protection per capita (in real terms)	Our elaboration on Eurostat data	7609.0	5789.0
Health spending	Government health spending per capita (in real terms)	Our elaboration on Eurostat data	1668.0	1213.0
Education spending	Government education spending per capita (in real terms)	Our elaboration on Eurostat data	1351.0	962.7
Social protection spending	Government social protection spending per capita (in real terms)	Our elaboration on Eurostat data	4590.0	3679.0
Inflation	Annual changes of Consumer Price Index	IMF	2.5	3.3
Unemployment	Unemployment rate	Eurostat	8.6	4.3
Population growth	Annual population growth rate	Eurostat	0.2	0.8
Industry	Percentage of Gross Value Added of industry (except construction) over total Gross Value Added	Eurostat	20.7	6.0
Institutional trust	Perceptions of the extent to which agents have confidence in and abide by the rules of society.	World Bank	1.1	0.6
Young population	Percentage of population aged 15-24 out of total population.	Eurostat	12.3	1.8

S.D.: standard deviation

Table A2. Description of variables and summary statistics

Variable	VIF	1	2	3	4	5	6	7	8
1 Welfare spending	2.0	1.0							
2 Health spending	2.0	1.0	1.0						
3 Education spending	2.3	0.9	0.9	1.0					
4 Social protection spending	1.9	1.0	1.0	1.0	1.0				
5 Inflation	1.6	-0.4	-0.3	-0.2	-0.3	1.0			
6 Unemployment	1.5	-0.3	-0.3	-0.4	-0.3	-0.1	1.0		
7 Population growth	1.9	0.6	0.6	0.6	0.6	-0.2	-0.4	1.0	
8 Industry	1.3	-0.2	-0.2	-0.4	-0.3	0.2	-0.1	-0.3	1.0

Table A3. Control variables: hypotheses and related literature

Variable	Expected sign	Literature
Inflation	Negative	Amate-Fortes et al., 2017 Baldacci et al., 2008 Bouis et al., 2011 Cammeraat. 2020 Im et al., 2011 Kim & Ahn, 2020 Lescano et al., 2023 Paliova et al., 2019 Vilela & Paredes, 2022 Wang, 2015
Unemployment	Negative	Amate-Fortes et al., 2017 Cammeraat. 2020 Forte & Abreu. 2023 Kasim et al., 2020 Vilela & Paredes, 2022
Population growth	Positive	Amate-Fortes et al., 2017 Baldacci et al., 2008 Bouis et al., 2011 Chen, 2013 Im et al., 2011 Forte & Abreu. 2023 Paliova et al., 2019
Industry	Positive	Ganau & Kilroy, 2023 Greenstein, 2019