

HOW DOES FISCAL POLICY IMPACT POVERTY? THE ROLE OF INSTITUTIONS

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Abstract

Poverty is one of the most pressing challenges of the global economy, with its eradication recognized as a priority by the United Nations. Many anti-poverty policies are implemented through fiscal policy, but the relationship between fiscal policy and poverty is mixed, which might stem from institutional factors. This study aims to answer three main questions: How does fiscal policy affect poverty? How does institutional quality impacts poverty, controlling for fiscal policy? Do institutions influence the relationship between fiscal policy and poverty? Using panel least squares with fixed effects, this dissertation evaluates the impact of fiscal policy (total, health and education expenditures as share of GDP), alongside institutional quality (corruption and democracy), as well as controls on poverty (AROPE) across EU-27 countries from 2008-2023. Results consistently show that higher total government expenditure is associated with lower poverty rates, with education spending showing larger marginal impact on poverty than health expenditures. We also find evidence of an inverted U-shaped relationship between democracy and poverty, which suggests that poverty alleviation benefits from further democratization primarily in mature democracies. Additionally, the results from the two-stages least squares regression suggest that reducing the level of perceived corruption may coincide with higher poverty rates, meaning that in the EU anti-corruption measures may not alleviate poverty. Finally, we do not find evidence on the mediating effect of institutions on the fiscal policy-poverty nexus, since interaction terms between fiscal policy and institutional quality indicators are always insignificant. The study contributes to the literature by highlighting the underexplored role of fiscal policy and institutional quality in poverty reduction within the context of developed economies.

JEL-codes: H30, H51, H52, P16, D73, I32, I38, C23, C26

Key-words: Fiscal Policy, Institutions, Poverty, Panel data, 2SLS

Resumo

A pobreza é um dos desafios mais urgentes da economia mundial, sendo a sua erradicação reconhecida como uma prioridade pela Organização das Nações Unidas. Muitas políticas de combate à pobreza são implementadas através de política orçamental, mas a relação entre política orçamental e pobreza é ambígua, o que pode decorrer de fatores institucionais. Este estudo visa responder às seguintes questões de investigação: Como é que a política orçamental afeta a pobreza? Como é que a qualidade institucional impacta a pobreza, controlando pela política orçamental? Como é que as instituições influenciam a relação entre política orçamental e pobreza? Utilizando o método de mínimos quadrados para dados em painel com efeitos fixos, esta dissertação avalia o impacto da política orçamental (despesas públicas totais, em educação e em saúde como percentagem do PIB), juntamente com indicadores de qualidade institucional (corrupção e democracia), bem como variáveis de controlo, sobre a pobreza (AROPE), nos países da UE-27 entre 2008 e 2023. Os resultados mostram consistentemente que quanto mais elevadas forem as despesas totais, menores tenderão a ser as taxas de pobreza, sendo que os gastos em educação apresentam um impacto marginal maior na redução da pobreza do que os gastos em saúde. Também encontramos evidências de uma relação em formato de U invertido entre democracia e pobreza, o que sugere que os benefícios da democratização em termos de redução de pobreza surgem primariamente em democracias maduras. Adicionalmente, os resultados da regressão em dois estágios com variável instrumental sugerem que a redução do nível de corrupção percebida está associada a taxas de pobreza mais elevadas, o que implica que, na UE, medidas de combate à corrupção podem não reduzir a pobreza. Não encontramos evidências do efeito mediador das instituições na relação entre política orçamental e pobreza, já que os termos de interação entre política orçamental e qualidade institucional são sempre estatisticamente não significativos. O estudo contribui para a literatura ao analisar o papel da política orçamental e da qualidade institucional na redução da pobreza em economias desenvolvidas.

Códigos-JEL: H30, H51, H52, P16, D73, I32, I38, C23, C26

Palavras-chave: Instituições, Política Orçamental, Pobreza, Dados em painel, MQ2E

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List of acronyms

AROPE	At risk of poverty or social exclusion
CC	Control of Corruption
COVID-19	Coronavirus Disease 2019
CPI	Corruption Perceptions Index
EU	European Union
EU-27	European Union with 27 member states (since 2020)
EIU	The Economist Intelligence Unit
FH	Freedom House
GDP	Gross Domestic Product
HDI	Human Development Index
HPI	Human Poverty Index
MPI	Multidimensional Poverty Index
MPM	Multidimensional Poverty Measure
OECD	Organisation for Economic Co-operation and Development
PPP	Purchasing Power Parity
SDG	Sustainable Development Goals
UN	United Nations
UNDP	United Nation Development Programme
WB	World Bank
WGI	Worldwide Governance Indicators

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Chapter 1. Introduction

The reduction of poverty has been one of the most pressing challenges of the global economy. Poverty eradication was established as the foremost priority of the United Nations (UN) Millennium Development Goals, which guided global development efforts between 2000 and 2015. This focus remains unchanged under the UN's 2030 Sustainable Development Goals (SDG), where the elimination of poverty continues to be the first goal (United Nations, n.d.). According to the latest *Poverty, Prosperity, and Planet* report launched by the World Bank (WB), 8.5% of the global population currently lives in extreme poverty - defined as subsisting on less than $2.15 per day (2017 Purchasing Power Parities (PPP)) - representing a significant improvement from 1990 levels (World Bank, 2024). When poverty is measured at the higher threshold of $6.85 per day, a staggering 44% of the world's population falls into this category, also an improvement compared to approximately 70% in 1990. Despite this reduction in the poverty rate, in absolute terms, the number of people living on less than $6.85 per day (2017 PPP) has barely changed since 1990, largely due to population growth (World Bank, 2024). Thus, with only six years remaining until the target year of 2030, the full achievement of the first SDG still appears distant.

In 2023, to celebrate the International Day for the Eradication of Poverty, the UN Secretary-General stated that "Ending poverty is the challenge of our time. But it is a challenge we can win.". If so, real action shall be taken. According to Ghatak (2015), there are three categories of anti-poverty policies: those whose goal is to allow the poor to get access to markets, those that seek to improve the access of the poor to public services and infrastructures and those which are inherently redistributive. While increasing the public spendings on certain public services like health and education represent examples of the second category, examples of the latter include direct transfers to the poor. Either way, such measures are implemented through fiscal policy. Thus, analysing to which extent fiscal policy mitigate poverty is not only pertinent but also essential.

Concerning poverty reduction, the role played by institutions is not to be disregarded. The negative relation between institutional quality (on a broad sense) and poverty has been widely addressed in the literature (e.g.: Acemoglu & Robinson, 2012; Chong & Calderón, 2000; Tebaldi & Mohan, 2010). This year, the prestigious Sveriges Riksbank Prize in Economic Sciences in memory of Alfred Nobel was awarded to Daron Acemoglu, Simon Johnson and James A. Robinson for their work on how institutions affect countries'

economic prosperity. This recent recognition further underlined the importance that the type of institutions plays on the economic development of a nation. Although there is no unique definition of institutions and despite its quite challenging measurement, corruption is often perceived as a result of weak institutions.[1] Several studies indicate that corruption biases public investment, lowering its average productivity and prioritising more visible expenditures (Tanzi & Davoodi, 1997) and distorting its composition, namely reducing the proportion of funds allocated to important targets such as social protection (Hessami, 2010) and education (Mauro, 1996, 1998). Moreover, Gupta et al. (2002) showed that corruption reduces tax progressivity and the effectiveness of social expenditures, thus impacting both budgetary revenues and expenditures. Hence, exploring the impact of institutions on poverty as well as on the fiscal policy-poverty nexus shall further enrich this work.

Poverty is often associated with less developed economies, where monetary poverty tends to be very severe. However, considering broader poverty indicators, like Eurostat's At-risk-of-poverty, even more advanced economies exhibit a significant proportion of their population living in poverty. According to Eurostat (n.d.a), in 2024, 42.7% of the population of the European Union (EU) had an equalised disposable income before social transfers below the risk-of-poverty threshold, which is set at 60% of the national median equalised disposable income. This means that, in the EU in 2024, approximately 4 out of 10 people lived at risk of poverty before social transfers. This number decreases steeply when social transfers are considered: in the same year, 16.2% of EU's population lived at-risk-poverty after social transfers (Eurostat, n.d.f). Although this is still a considerable share of the EU population, the role of governments in alleviating poverty through social benefits for the poor in the EU context is remarkable. In fact, the levels of total government expenditure in the EU are notably high, with the 2023 EU average reaching 49% of GDP (Eurostat, n.d.c). According to Eurostat (n.d.c), more than 60% of the total government expenditure is targeted to pro-poor sectors – social protection, health and education – which further exacerbates the social role of public spending in this context. All in all, the data highlight the relevance of studying the fiscal policy-poverty nexus in the EU context, particularly since there are significant differences between member states not only in poverty rates but also in expenditure levels.

[1] Control of corruption (CC) is one of the dimensions included in the Worldwide Governance Indicators (WGI), which is used to analyse institutional quality (Handoyo, 2023).

This study has three main research questions: Does the way fiscal policy is conducted have impact on poverty levels? Does the quality of institutions affect poverty rates when controlling for fiscal policy? Do institutions have a mediating effect on the way fiscal policy impacts poverty? First, it is our goal to assess the mechanisms through which fiscal policy and institutional quality can stress poverty reduction; second, we aim to describe the role that institutions can play on the effectiveness of fiscal policy on poverty mitigation; thirdly, this study seeks to empirically assess the interactions between fiscal policy, institutions and poverty across the EU member states through a longitudinal study; finally, it is our ambition to contribute to the design of more effective policies oriented towards poverty alleviation.

Given the significant attention devoted to poverty, its conceptualisation, measurement, and interactions with various factors – namely institutions – have been extensively examined. However, as Lustig (2016) notes, the impact of fiscal policy on poverty remains ambiguous: in eight countries, out of the twenty-five analysed, cash-based fiscal policy measures increase poverty. The author also highlights that the impact of fiscal policy on poverty is not only often overlooked in academic analysis, but also in policy debate. Similarly, Damuri and Perdana (2003) argue that while fiscal expansion can serve as a tool to reduce poverty incidence, its effectiveness depends on the source of its financing and may not always result in poverty reduction. The mixed results regarding the relationship between fiscal policy and poverty may stem from other factors such as institutional quality. However, existing research has paid limited attention to the critical role institutions might play in the effectiveness of anti-poverty fiscal policies. Hence, exploring the impact of institutions on the relationship between fiscal policy and poverty reduction, while also examining their individual effect on poverty, is expected to enrich the literature and help in the definition of better anti-poverty measures. Particularly, this research aims to investigate whether policies focused on improving institutional quality can provide an efficient alternative to poverty mitigation strategies. The EU context provides an intriguing opportunity for this investigation. While poverty studies typically focus less on developed countries, EU member states present a variety of poverty rates and institutional quality measures, with reliable data available.

The remainder of this study proceeds as follows. Chapter 2 presents a brief definition of the key concepts – poverty, fiscal policy and institutions – as well as the theoretical foundations that explain the linkages between them, along with some relevant empirical

evidence. Chapter 3 describes our data and the methodology used. In Chapter 4, we show and discuss the empirical results. Last chapter concludes.

Chapter 2. Research background

This chapter introduces main concepts, theories and evidence that support the relationship between fiscal policy, institutions and poverty.

2.1 Poverty

Poverty is a deeply multidimensional phenomenon, and its definition and measurement have sparked enduring debates within the literature. In this line, Mabughi and Selim (2006) highlight the multidimensional nature of poverty and emphasize the interconnection among its various dimensions by exploring the evolution of the concept and measures of poverty both qualitatively and quantitatively over time. They conclude that there is no perfect methodology to measure poverty or specific indicators that totally capture this concept. Instead, they advocate for a clear establishment of the definitions and concepts used to define poverty – qualitative analysis – before measuring it – quantitative analysis. Later, a similar analysis was made by Misturelli and Heffernan (2010), who applied a synchronic approach to examine changes in the meanings and perceptions of key terms associated with 159 poverty definitions proposed from the 1970s to the 2000s. They state that the concept of poverty is unstable. It has initially focused on individual lacks, such as income or other material goods, and then started including collective dimensions like lack of services and human rights. Despite the collective perspective having gained relevance, the individual perspective remained dominant (Misturelli & Heffernan, 2010). Overall, both studies outline how the concept of poverty evolved from basic physical subsistence towards broader definitions closely tied to development and shaped by broader societal and political context, due to the emergence of new topics, perspectives and approaches, which will be further analysed below.

Poverty can be defined and assessed in both absolute and relative terms. In 1901 Benjamin Seebohm Rowntree published a seminal work titled *Poverty: A Study of Town Life* in which he provided a pioneer framework to define and measure poverty. In his view, poverty was perceived in absolute terms, meaning that it was defined by living below a minimum standard necessary for survival, regarding adequate nutrition and other essential goods (Mabughi & Selim, 2006). To measure this type of poverty, it was necessary to "arrive at the minimum sum necessary to maintain families of various sizes in a state of physical efficiency" (Rowntree, 1901, p. viii). Hence, this approach involves a subjective evaluation of what are

basic human needs and what resources are necessary to satisfy those needs (Mabughi & Selim, 2006). In the same study, in order to explore the nature of the poor, Rowntree also distinguished two different classes of poverty: primary and secondary poverty. While the first include only families who lack the ability to get indispensable goods to survive – such as food, house or clothing – the latter include those who have sufficient income to ensure their physical health if they do not have any additional expenditures (Rowntree, 1901 p. viii). All in all, Rowntree's initial approach limited poverty to concept of mere physical health.

In contrast, the concept of relative poverty offers a different perspective. In this matter, the contribution of Townsend (1979) stands out as particularly significant. According to him, "Individuals, families and groups in the population can be said to be in poverty when they lack the resources to obtain the types of diet, participate in the activities and have the living conditions and amenities which are customary, or are at least widely encouraged or approved, in the societies to which they belong." (Townsend, 1979, p. 31). In other words, one is relatively poor if one lacks the ability to live a life in line with the average standard of living in their community. In this context, the concept of poverty is not static, since it changes across different geographies and over time, as social living standards evolve. Contrarily, Townsend (1979, p. 38) argue that absolute poverty, as it is based on an absolute minimum level of basic human needs which remains unchanged over time, is believed to be "inappropriate and misleading". Concerning measurement, Townsend (1979) highlights two measures of poverty that seem appropriate: the relative income standard and the deprivation standard. The first consists of selecting a fixed percentage of the population with the lowest incomes or one set of population at a low level relative to the mean income (which he believes is more proper than the median income). The latter refers to individuals who fall below an income threshold and experience a disproportional level of deprivation relative to their income. Deprivation is the state of lacking "the types of diet, clothing, housing, environmental, educational, working and social conditions, activities and facilities which are customary, or at least widely encouraged or approved, in the societies to which they belong" (Townsend, 1979, p. 413).

Nowadays, both of these definitions of poverty continue to be used. Aligned with the notion of absolute poverty is the international poverty line established by the WB aiming to address the problem of global poverty, thus treating two individuals with the same purchasing power over goods equally, regardless of the country in which they live. Although

this poverty line is fixed in terms of living of standards – that is why it is an absolute poverty line – it is not unchangeable, as it adjusts for inflation (Fields, 1994). In fact, the last change made in this regard was in September 2022, as the WB set the international poverty line at $2.15 per day (2017 PPP) (World Bank, 2022). Besides this line that tracks global extreme poverty, WB has other two international absolute poverty lines set at $3.65, to monitor poverty in lower middle income countries, and at $6.85, which measures poverty in upper middle income countries. The approach to absolute poverty focuses on basic needs and it is mostly employed in the analysis of poverty in low and middle income countries. Contrarily, in what respects developed countries such as EU countries, most poverty indicators address poverty in relative terms. For example, Eurostat's at-risk-of-poverty thresholds are set at some percentage of the national median or mean equivalised disposable income[2] (Eurostat, n.d.b). The most popular one, used in the calculation of the at-risk-of-poverty rate, is the threshold set at 60 % of the national median equivalised disposable income after social transfers (Eurostat, n.d.d).

After establishing the income threshold that defines poverty, whether absolute or relative, quantitative metrics are used to measure the extent of poverty (Mabughi & Selim, 2006). The simplest poverty measure is the Headcount (H), which identifies the number of individuals living with an income that falls below the established poverty line. Similarly, but taking into account the whole population, is the Headcount ratio[3] (HCR), which gives the fraction of poor in a certain geography. These measures, however, have some limitations, as they only account for the number of people living in poverty, without considering its severity (Fields, 1994). The Poverty Gap Ratio (PGR) is an example of a measure that was introduced to make up for this flaw by considering not only the incidence but also the intensity of poverty. It represents the proportion of total income that needs to be transferred from the non-poor to the poor to elevate all individuals in poverty to the poverty line (Mabughi & Selim, 2006).

In *Poor, relatively speaking* Amartya Sen (1983) the 1998 winner of the Nobel Prize in Economics, recognizes the relevant contributions made by advocates of the relative concept of poverty, namely Townsend, while also acknowledging two flaws of his view. First, despite

[2] The equivalised disposable income is total income of a household, after tax and other deductions, that is available for spending or saving, divided by the number of household members converted into equalised adults using the so-called modified OECD equivalence scale. (Eurostat, n.d.e)
[3] Headcount ratio = Headcount /total population

the belief of some relativist scholars, their view does not offer an innovative perspective on the variation of poverty over time when compared to the absolutist view, as neither perspective implies fixity over time. Second, Sen argues that poverty ultimately involves an absolute difference between individuals, which can shape their relative success. In other words, there is an irreducible absolutist aspect in the concept of poverty. "If there is starvation and hunger, then – no matter what the relative picture looks like – there clearly is poverty." (Sen, 1983, p. 159). To move forward the debate between the absolutist and relativist conceptualizations of poverty, Sen (1983) introduces the capability approach to the poverty analysis. According to him, the proper focus for assessing standard of living should not be on commodities, their characteristics or the utility derived from their use. Instead, the core part of the standard of living lies in one's capability to use a good and its characteristics in various ways. Furthermore, he concludes that, in defining poverty, capabilities should be regarded as an absolute component, while the commodities or their characteristics should be considered a relative one: as societies evolve, the commodity required for the same absolute capability may vary. One's capability consists of a set of alternative combinations of functionings that are reachable to that person (Sen, 1985). Functionings, the core concept of Sen's approach, are "various doings and beings" (Sen, 1985, p. 197). These activities or states of being can be either elementary, such as being properly nurtured, or more complex, for instance, feeling socially included. In Sen's approach of well-being evaluation, the set of functionings one achieves is a key aspect but considering their capability's array allow the acknowledgement of each individual freedom to achieve well-being (Sen, 1985). Overall, as noted by Mabughi and Selim (2006, p. 9), the capability approach "defines and interprets the poverty phenomena as the absence of basic human capabilities to function at a minimally acceptable level within a society", or, in other words, it pictures poverty as capability deprivation.

In the first *Human Development Report* launched by United Nation Development Programme (UNDP), in 1990, human development was defined as "a process of enlarging people's choices." (UNDP, 1997, p. 15). Building on this perspective, in the 1997 *Human Development Report*, human development was pictured as an approach to defining poverty: poverty refers to the absence of basic opportunities and choices that are crucial for human development, including the ability to live a long and healthy life, attain a decent standard of living, enjoy freedom, dignity, self-respect and the respect of others. In other words, "Human poverty is more than income poverty – it is the denial of choices and opportunities for living

a tolerable life" (UNDP, 1997, p. 2). As stated by Mabughi and Selim (2006), the work of Amartya Sen underpins the development of this multidimensional conceptualisation of poverty. Such a complex definition entails challenges in its measurement. In this context, the Human Poverty Index (HPI) was established as an attempt to build a composite measure that captures multiple dimensions of deprivation – longevity, knowledge and a decent standard of living – in order to assess the overall extent of poverty in a community (UNDP, 1997). In 2010, this indicator was replaced by the Multidimensional Poverty Index (MPI), a more comprehensive measure of poverty (UNDP, 2014). Developed by the Oxford Poverty & Human Development Initiative (OPHI) in collaboration with the UNDP, the MPI is grounded in three key dimensions: health, education and standard of living, each of which is assessed through a set of indicators and deprivation criteria (Alkire & Santos, 2014). Unlike the HPI, which lacked the ability to identify specific individuals, households or groups as jointly deprived, the MPI overcomes this limitation by capturing both the prevalence of overlapping deprivations – indicating how many people face multiple deprivations – and its intensity – reflecting the average number of deprivations experienced by those affected. According to the MPI, a person is multidimensionally poor if their household is deprived in one third or more of the weighted indicators, emphasizing that a single deprivation alone might not represent poverty (UNDP, 2014). Other multidimensional poverty indicators include Eurostat's At risk of poverty or social exclusion (AROPE)[4] and the WB's Multidimensional Poverty Measure (MPM)[5], both of which include a monetary dimension, unlike UN's HPI or MPI.

Summing up, poverty can be defined in absolute or relative terms, through a monetary lens or a multidimensional framework, like Sen's capability approach. No single methodology or set of indicators can fully capture the complexity of poverty. Nevertheless, poverty has been increasingly understood as a consequence of broader social and political factors, leading to a shift in the focus of poverty discourse toward a broader emphasis on human development (Misturelli & Hefferman, 2010).

2.2 Fiscal policy

[4] For a more detailed information on AROPE, please see https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:At_risk_of_poverty_or_social_exclusion_(AROPE) (accessed on 4/12/2024).

[5] For a more detailed information on MPM, please see https://www.worldbank.org/en/topic/poverty/brief/multidimensional-poverty-measure (accessed on 4/12/2024).

Fiscal policy can be defined as the use of expenditure and taxation by a government to influence the economic activity. This impact can be direct, when a government sets the extent and composition of public spending (G), or indirect, when the remaining sources of aggregate demand – private consumption (C), private investment (I) and net exports (NX) – are affected through changes in taxes or transfers. When fiscal policy contributes to a reduction in aggregate demand, it is considered contractionary, whereas when it increases aggregate demand, it is called expansionary (Horton & El-Gananiny, 2009). Such policies, which involve variations in government's expenditure or revenue, hence entail variations in the budget balance, defined, in simple terms, as the difference between a government's revenues and expenditures. It can be either a balanced budget – when expenditures equal revenues –, a budget deficit – if the government spends more than it earns in revenues – or a surplus deficit – if the government earns more than it spends. If the second scenario occurs, then the government needs to borrow money, often issuing public debt, the interest on which further adds to government's expenditure. Thus, a key challenge with fiscal policy is that budget deficits directly contribute to the accumulation of public debt (Allsopp & Vines, 2005). Traditionally, one of fiscal policy's roles, in the short-run, is macroeconomic stabilization (Horton & El-Gananiny, 2009), both through the provision of automatic stabilizers and through discretionary policy. In the long run, the allocation function, including public spending and investment to foster sustainable growth, gains relevance (Horton & El-Gananiny, 2009). Moreover, it is generally accepted that fiscal policy needs to be sustainable (Allsopp & Vines, 2005), for example regarding the debt-to-GDP ratio. It can be noted that, over time, the importance of fiscal policy as a macroeconomic tool has fluctuated (Horton & El-Gananiny, 2009). In the 50's, when the Keynesian full-employment policies prevailed, the main instrument of macroeconomic policy was fiscal policy. Then, sometime between the end of the XX century and the beginning of the XXI century, monetary policy began to play a central role in achieving the stabilization function of macroeconomic policy, leading to a monetary-policy-oriented regime. In this context, the control and sustainability of public finances, as well as the resource allocation and distributional functions, were left to the domain of fiscal policy (Allsopp & Vines, 2005). With the Global Financial Crisis and following Great Recession, a renewed emphasis on a more active fiscal policy emerged (Horton & El-Gananiny, 2009), which was further highlighted during the recent Covid-19 pandemic. Overall, albeit the current consensus that there are certain roles played exclusively by monetary policy, as controlling inflation, fiscal policy still matters, namely in its social role.

Arestis (2012) concludes that the often-overlooked goal of income distribution should be prioritized as a key objective of the coordination between fiscal, monetary and financial stability policies and Horton and El-Gananiny (2009) state poverty reduction as one fiscal policy's long-run aims.

2.3 Institutions

Institutions have been defined in various ways by different authors (Raudla, 2014). Perhaps the most remarkable definition is the one given by North (1992, p. 477), who describes them as "the rules of the game in a society". In a more formal way, "institutions are the humanly devised constraints that structure political, economic and social interaction." (North, 1991, p. 97). They can be both informal, such as set of customs, codes of conduct and tradition in a society, or formal, of which constitutions, laws and property rights are examples (North, 1991). Another important distinction to be made is between political and economic institutions, which are both integral components of an effective institutional matrix (North, 1991). While the first act within the political sphere determining the distribution of political power in a society, including the form of government or the amount of constraints placed on politicians, the latter are, for instance, the structure of property rights and the existence and perfection of markets, which shape the structure of economic incentives and contribute to an efficient allocation of resources within a society (Acemoglu et al., 2005). Political institutions directly and indirectly determine economic institutions (Acemoglu et al., 2005), as the latter are defined and enforced by the first (North, 1991). Together, North (1991, p. 97) argues, they matter for the economy because they "define the choice set" available to economic agents, guide the behaviour of individuals by "providing the incentive structure of an economy" and provide order and reduce uncertainty in exchange through changes in transaction costs. Hence, institutions shape economic growth. Based on this relationship, Acemoglu and Robinson (2012) distinguish between inclusive and extractive institutions. Inclusive economic institutions, by enabling and encouraging individuals to willingly engage in whatever economic activities maximize their talents and skills, promote economic growth and prosperity. Contrarily, extractive economic institutions, those with opposite properties to inclusive ones, are structured to extract income and wealth from one segment of society to benefit another segment, blocking others' opportunities and incentives. Whether the economic institutions are inclusive or extractive greatly depends on whether the political institutions are also inclusive – pluralistic and with a sufficient strong

state – or extractive – when one of those conditions fail. All in all, political institutions determine economic institutions, which in turn shape economic growth and prosperity (Acemoglu & Robinson, 2012). It is worth mentioning that the interaction between institutions and the economy is not a one-way relationship, as Raudla (2014) highlights that economic changes can also lead to transformations in institutions.

As happens with poverty, measuring institutions also entails several complications. Institutions have different dimensions, each of which can be measured using specific indicators. For example, the Corruption Perception Index (CPI)[6] measures corruption and the Polity5 Project[7] evaluates the quality of democracy, by ranking countries on a spectrum ranging from full autocracy to full democracy. However, it is difficult to identify a single proxy that effectively represents the quality of the institutional environment. Thus, the use of a composite indicator that combines information from multiple empirical measures appears more effective (Kunčič, 2014). In this context, Kunčič (2014) presents a large set of institutional proxies that align with North's previously stated definition of institutions, considering only the indicators with the longest time coverage – specifically those starting from at least the 1990s – and the ones that encompass the majority of countries globally. The proxies are divided in three homogenous categories of formal institutions: legal, political and economic. The first include measures on the legal environment category of freedom of the press (from the Freedom House (FH)), the protection of property rights (by the Fraser Institute) or the rule of law (from WB's WGI); the second encompass, among others, control of corruption (CC) (WB's WGI), bureaucratic quality (International Country Risk Guide) and a measure for institutionalized democracy (by Polity IV); the last group consists of, for example, measures on both financial and business freedom (from the Heritage Foundation), on regulatory quality (from WB's WGI) and on the economic environment category of freedom of the press (from the FH)[8]. Kunčič (2014) acknowledges, however, that this list is not exhaustive, that is, there may be other relevant indicators to measure institutional quality in the proposed terms.

2.4 The impact of fiscal policy and institutions on poverty: the mechanisms

[6] See more about the CPI at https://www.transparency.org/en/cpi
[7] See more about the Polity5 Project at https://www.systemicpeace.org/polityproject.html
[8] For more examples of institutional proxies that fit the above-mentioned conditions, see Kunčič (2014).

To understand how fiscal policy and institutional quality affect poverty, as well as the mediating role of institutions, we begin by examining the theoretical framework linking fiscal policy and poverty. We then explore the conceptual foundations of the institutions-poverty nexus, and finally, we analyse the mechanisms underlying the interactions among fiscal policy, institutions and poverty. Along with the theory, we present some empirical evidence that illustrates and supports the relationships between the variables.

Fiscal policy and poverty

According to Bhagwati (1988), public policies – including fiscal ones – aimed at alleviating poverty fall into two different categories. One is composed by direct policies, which provide consumption, both in kind and through grants. The provision of public goods and services like education, health or housing and of in-cash social transfers to the poor are examples of public expenditures that constitute direct fiscal policies. Ames et al. (2002) also allocate to this category the government's overall fiscal stance and the distributional effects of taxation. The second category comprises indirect policies that create income and thus foster consumption. This approach focuses on seeking growth, which in turn impacts the incomes and living standards of the poor. It is worth noting that the two different routes – direct and indirect – are interconnected. Fiestas and Wilhelm (2005) state that the allocation and composition of government spending affect economic growth, which, in turn, influences government's spending. Thus, public spending may increase the welfare of the poor directly and also indirectly, through its impact on growth (Bhagwati, 1988). Distortionary and inefficient tax systems also impact growth, for high taxes might change the incentives to work and invest, therefore hindering economic growth (Damuri & Perdana, 2003; Granger et. al, 2022; Fiestas & Wilhelm, 2005). Moreover, public borrowing might crowd out the private access to credit and hence private investment, potentially sabotaging economic growth (Ames et al., 2002; Fiestas & Wilhelm, 2005).

Regarding the expenditure side of direct policies, Damuri and Perdana (2003) highlight three main instruments used by governments to aid poverty reduction: personal subsidies (directed to low-income households), price subsidies (allocated specifically to basic commodities, primarily consumed by poor households) and direct government expenditure on public services and infrastructure, particularly on sectors that primarily benefit the poor, such as education and health. Concerning this type of policies, governments ought to analyse both the distributional and growth effects, focusing on programs that are pro-poor and

assuring their effective delivery to the targeted population (Ames et al., 2002). With respect to the revenue side of direct polices, it is worth mentioning that the tax system, primarily intended to finance public expenditure, can be broadly divided into direct and indirect taxes. The first category is twofold: taxes imposed on the individual, such as personal income tax, levied both on employment and capital, and taxes imposed on organisations. Granger et. al (2022) provide a literature review on personal income taxes that suggests that, typically, they are progressive, that is, individuals are taxed according to their ability to pay, at least for employment income, promoting income equality. However, their actual impact on poverty depends on specific factors like the tax base and the level of marginal rates. The second category – indirect taxes – include a wide range of taxes, such as general consumption taxes, excise taxes and trade taxes, all of which are usually considered to be poverty-increasing. According to Granger et. al (2022), general consumption taxes have been found to be regressive and to exacerbate inequality, as richer households pay proportionally less than poorer ones. In that context, sometimes exemptions on basic goods – those that constitute a larger proportion of poor households' budget – are introduced. Albeit potentially being regressive, what really matters is examining the net distributional impact of taxes, as they finance public spending that may be pro-poor, compensating for any negative impact of taxation on poverty (Granger et. al, 2022). In sum, the design and implementation of the tax system greatly matter for the poor.

Public policies might also indirectly impact the poor through economic growth. At this purpose, Dollar and Kraay (2002) find that, on average, the incomes of the poorest of a country rise in the same proportion as the average incomes, implying that economic growth generally benefits the poor to the same extent as it benefits other groups in society. Thus, policies aimed, for instance, at macroeconomic stability and openness to trade, which are positively linked to economic growth, help poor households to rise their production and income. The authors, however, highlight that growth in itself is not enough to improve the living standards of the poor, for the distributional effect of policies shall not be overlooked. In this context, the concept of pro-poor growth becomes important. According to Kakwani and Pernia (2000), pro-poor growth is inclusive in that it enables the poor to take part of and reap the benefits of economic activity. In this sense, promoting pro-poor growth requires a strategy intentionally designed to favour the poor, ensuring they benefit proportionally more than the wealthy. It comprises "the removal of institutional and policy-induced biases against the poor, as well as the adoption of direct pro-poor policies" (Kakwani & Pernia, 2000, p.

4). One of the flaws pointed out to this definition of pro-poor growth is that, under an economic recession, pro-poor measures can entail no absolute gain to the poor (Ravallion, 2004). Ravallion (2004) underscores two factors that affect the impact of growth on poverty: the initial level of inequality and the changing income distribution. When the level of initial inequality is high and inequality increases during periods of growth, economic growth may disproportionately benefit the wealthier members of society, limiting the extent of poverty reduction.

The optimal fiscal policy design aimed at reducing poverty should, thus, involve a combination of both direct and indirect approaches, as far as the indirect one – growth – is not totally in favour of the non-poor (Bhagwati, 1988), that is, it is pro-poor.

Institutions and poverty

Following a literature review, Tebaldi and Mohan (2010) highlight market inefficiencies and misallocation of resources as the main channels through which institutions (on a broad sense) affect poverty. While the first refer to the fact that institutions influence average income, which in turn impacts poverty, the latter focus primarily on institutions' impact on poverty via income distribution. Olson (1996) concludes that the quality of institutions and economic policies lies at the core of the wealth differences between countries, whose boundaries usually represent different institutional frameworks. The argument made by Olson (1996) is that differences in the three factors of production – capital, land and labour – cannot explain much of the great difference in per capita incomes worldwide, with the major problem being that poor countries do not have the adequate structure of incentives – provided by institutions, as for North (1991) – to foster economic performance. Furthermore, individual behaviour cannot itself explain the differences in economic performances between countries: people in poor countries are just as rational and hardworking as those in wealthy ones. But individual rationality alone, as important as it is, does not lead to social efficiency. Economic growth, attained through gains in specialization and trade, demands efficient cooperation between workers and firms, which depends both on the quality of institutions and of economic policies. For instance, when institutions do not enforce contracts impartially and fail to secure property rights over the long run, the largest gains from production and specialization might be lost (Olson, 1996). The perspective put forth by Olson (1996) for explaining wealth disparities between countries can also be used to understand income differences within a country. In this context, within a country,

the increase of absolute poverty may be promoted, among others, by enforcement contracts that favour specific groups, special-interest lobbies that significantly influence property rights and corrupt bureaucracies that marginalise the poor (Chong & Calderón, 2000).

Due to their broadness, institutions as a whole are difficult to measure, leading to the use of various metrics that capture different nuances of the concept. Thus, empirical studies may use distinct measures to address institutions. For instance, a study by Chong and Calderón (2000, p.133) using an overall measure of institutional quality, the risk of expropriation, the repudiation of contracts by the government, the law and order tradition, the corruption in government and the quality of bureaucracy, showed that "the degree, severity, and incidence of poverty appears to be robustly and negatively linked with the development of better institutions", at least "a lower risk of property expropriation, a better quality of the bureaucracy, and an improved overall quality of the institutions". Following this study, Tebaldi and Mohan (2010) demonstrate that several measures of institutions – control of corruption, regulatory quality, rule of law, government effectiveness, voice and accountability, political stability and absence of violence – show a negative relation with poverty rates. Thus, controlling corruption, having an effective government and a stable political system are effective ways to promote poverty reduction both through economic growth and income distribution.

Fiscal policy, institutions and poverty

After separately going through the existing literature on the links between fiscal policy and poverty and institutions and poverty, we shall now dive into the explanation on how institutions can affect the link between fiscal policy and poverty. Once again, since institutions encompass a broad range of aspects, our analysis will focus on how the relation between fiscal policy and poverty can be mediated by specific dimensions, such as corruption and democratization.

Regarding corruption, which is often perceived as symptom of weak institutions, Chetwynd et al. (2003) identify two different models that explain its impact on poverty: the economic model and the governance model. The governance model postulates that corruption affects poverty by influencing governance factors, such as public trust in government and its institutions and the institutional capacity of government to deliver quality public services. Therefore, the government is less able to help its citizens, particularly the poor ones (Chetwynd et al., 2003). In turn, the economic model asserts that corruption

affects poverty through its impacts on economic growth and income inequality, which in turn affect poverty. Channels through which corruption hamper economic growth include the decrease of tax revenue, removing resources from potentially effective pro-poor expenditures, the increase of public expenditure on non-productive sectors and the distortion of public expenditure composition towards sectors in which rent seeking is easier (Chetwynd et al., 2003). Mauro (1996, 1998) finds strong evidence that there is a significant negative relationship between corruption and education expenditures, as well as some evidence that corruption might lower health expenditures. However, an empirical study by Hessami (2010) carried on 26 countries between 1996 and 2008 showed that an increase in corruption, albeit being associated with lower expenditures on social protection, leads to higher shares of spending on health. The rationale behind this result might be that while education is a sector where it is not easy to levy bribes – as it usually does not require high technology typically supplied by oligopolistic firms – in the health sector there may be more opportunities for bribery, particularly in the acquisition of "state-of-the-art medical equipment or advanced hospital facilities" (Mauro, 1998, p. 264). Furthermore, Gupta et al. (2002) highlight that, through greater tax evasion, corruption can worsen poverty by biasing the tax system – reducing both the tax base and the progressivity of the tax system. While a lower tax revenue decreases the financial resources targeted at public services such as education – crucial to the formation of human capital – the reduction of the progressivity of the tax system promotes income inequality. Thus, "Corruption can affect the targeting of social programs to the truly needy" (Gupta et al., 2002, p.25).

The impact of the type of government, from democracy to autocracy, on the welfare of the poor has long been studied in the literature. Theoretically, democracy is believed to help the poor. Dörffel and Freytag (2023) suggest that democracy may influence poverty through GDP growth and inequality. As for the first, despite previous studies in contrary, Acemoglu et al. (2019) conclude that democracy does significantly cause economic growth, especially in countries where a greater fraction of the population has secondary schooling. Their estimates suggest that a country shifting from nondemocracy to democracy can achieve approximately 20% higher GDP per capita over the next 25 years compared to a country that remains nondemocratic. Concerning inequality, the study by Meltzer and Richard (1981) is perhaps the most influential on democracy's impact on redistribution. They argue that, with majority rule, the preferences of the median-income voter amongst the voting population determine the tax and redistribution policies. Therefore, democratization, by

extending voting rights to poorer citizens who demand more redistribution, shifts the median voter downward, ultimately leading to greater government size, more taxation and redistribution and reduced inequality, that is, to more pro-poor policies. A similar argument is the one made by Sen (1999) in *Development as Freedom* regarding the prevention of famines or, more broadly, of poverty. According to him, the causal relationship between democracy and the nonoccurrence of famines is twofold. First, through free elections and open government criticism, the political leaders feel the political consequences of social catastrophes that they might not personally experience, such as famines. Hence, democracy provides incentives for politicians to take action so as to avoid famines. Second, in a democracy, free press and active political opposition expose relevant information that put pressure on the government to act, serving as a good early-warning system against famines. Another potential impact of democracy on income distribution is noted by Acemoglu et al. (2015): democracy aids the removal of economic and institutional barriers that restrict opportunities for the middle class and the poor. A consequence of this might be structural transformation, which occurs when an economy transitions from agriculture to industry and urbanization, and, eventually, a more equal income distribution. However, democracy's effect on inequality might be more nuanced. For instance, the capture of the political system by the rich elite and the rise of inequality among the poor due to increasing market opportunities and the middle-class bias – meaning that the greater redistribution associated with democratization can benefit more the middle class than the poor – illustrate that greater democratization may not always reduce inequality (Acemoglu et al., 2015). Nevertheless, following the seminal work by Meltzer and Richard (1981), the prevailing belief is that democracy positively affects both expenditure and revenue sides of government fiscal policy. Several authors highlight that democracies tend to provide more public goods and services than autocratic systems (McGuire and Olson, 1996; Niskanen, 1997), a theory supported by empirical studies from Lake and Baum (2001) and Deacon (2009). While Lake and Baum (2001) conclude that democracies do produce a higher level of public services than other types of regimes, based on several public health and education indicators, Deacon (2009) shows that democracies invest significantly more in public education, roads, safe water, sanitation and environmental protection than dictatorships. As for the revenue side, Acemoglu et al. (2015, p. 1954) find that "democratization does indeed increase government taxation and revenue as fractions of GDP". Similarly, the findings of Balamatsias (2018) indicate that democracy seems to increase both direct and indirect taxes. Empirical studies

on democracy's effects on poverty yield mixed results compared to theoretical predictions. For instance, Dörffel and Freytag (2023) conclude that electoral democracy has no significant effect on poverty rates, while Ross (2006) finds little evidence that the rise of democracy led to a decrease in infant and child mortality, a common sign of well-being improvement of the poor.

Overall, institutions – particularly corruption levels and the government type – play a crucial role in shaping the relationship between fiscal policy and poverty by altering the fiscal instruments, both taxes and public spending. The effective implementation of pro-poor fiscal policies might thus benefit from the improvement of the quality of the institutional framework, namely reducing corruption and greater democratization.

2.5 The impact of fiscal policy and institutions on poverty: the evidence

The literature on the effect of fiscal policy on poverty alleviation with the mediating impact of institutions remains scarce. However, several studies, despite not addressing exactly our research topic, share a common feature which is relevant for our study: they examine the relationship between fiscal policy instruments, institutions and various socioeconomic outcomes – if not poverty itself, at least related to it. A summary of these articles, including their sample, methodologies, variables and main conclusions, is presented in Annex A.

Komarudin (2020) and Dankumo et al. (2021) investigate the effect of government expenditures (the first just on health and the latter broadly) and institutional quality on poverty alleviation, using the poverty headcount ratio and the HDI, respectively, as measures of poverty reduction. Malla and Pathranarakul (2022) explore the effect of fiscal policy, including public debt, public spending and taxes, on income inequality – rather than poverty – moderated by the quality of the institutions, using the Gini Index as measure of income inequality. Other authors (Rajkumar & Swaroop, 2008; Suryadarma, 2012; Makuta & O'Hare, 2015) examine the impact of public spending, an important fiscal policy instrument, on key development outcomes in areas such as health and education. Their studies use as indicators under-five mortality rate and life expectancy at birth for health, and school enrolment, failure rates and performance in school national exams for education – factors that, ultimately, can be associated to the well-being of the poor. Regarding the measures used for institutions, they are diverse and vary across studies. Several rely on one or more of WB's WGI, which include CC, government effectiveness, regulatory quality, rule of law, voice and

accountability and political stability. Makuta and O'Hare (2015) use five of these six indicators, only excluding political stability; Dankumo et al. (2021) consider both CC and political stability, while Komarudin (2020) uses solely government effectiveness, also used by Malla and Pathranarakul (2022) alongside a corruption measure by Transparency International. Similarly, Suryadarma (2012) relies only on Transparency International Indonesia's corruption perception index. Lastly, Rajkumar and Swaroop (2008) use two components of the political risk index provided by the Political Risk Services Group: corruption and bureaucracy quality, which assesses the strength of institutions and the expertise of bureaucrats. A measure of democracy – democracy index by Polity V Project – is used only as a control variable in Malla and Pathranarakul (2022).

Among all studies, the most employed methodology, including for robustness tests, is the two-stage least squares (2SLS) (Rajkumar & Swaroop, 2008; Makuta & O'Hare, 2015; Komarudin, 2020), followed by the generalized method of moments (GMM) (Komarudin, 2020; Malla & Pathranarakul, 2022). Other methodological approaches include ordinary least squares (Rajkumar & Swaroop, 2008), pooled ordinary least squares (Suryadarma, 2012), pooled mean group (Dankumo et al., 2021) and random effects model (Komarudin, 2020).

Overall, the findings of the studies seem to be in line with the theory, though with some nuances. Firstly, Dankumo et al. (2021) find that, in Sub-Saharan African countries, corruption control, political stability and government expenditures have a positive relationship with poverty reduction. Particularly, the authors emphasize the critical role of governance, as reducing corruption and improving political stability were found to have a greater influence on poverty reduction than increasing government spending. These findings suggest that public spending alone can be insufficient to reduce poverty and that the priority should be to improve institutions through higher corruption control and political stability. Moreover, public spending on health was found to improve health outcomes in the developed and developing countries studied by Rajkumar and Swaroop (2008) and Makuta and O'Hare (2015), with the impact being greater in countries with good governance. Rajkumar and Swaroop (2008) even conclude that, in countries with bad governance, government expenditures on health will, at the margin, be ineffective. Komarudin's (2020) lower-upper and middle-upper income countries study show that public spending on health reduces poverty, though the effect is small. In turn, governance quality plays a bigger role in poverty reduction. However, contrarily to Rajkumar and Swaroop (2008) and Makuta and

O'Hare (2015), the impact of public health spending is stronger in countries with poor governance. This difference might stem from the fact that the studies use different dependent variables. While better governance seems to enhance the efficiency of health spending in improving health outcomes, it does not necessarily translate into poverty reduction, as measured by the poverty headcount ratio, which is a monetary measure of poverty. Concerning education, public spending on the sector improves school enrolment rates in Indonesia (Suryadarma, 2012) and reduces education failure rates in a set of developed and developing countries (Rajkumar and Swaroop, 2008), but only in less corrupt regions and in countries with better governance. Lastly, Malla and Pathranarakul (2022) conclude that institutions play a minor role in moderating the effect of fiscal policy on income inequality in a set of developed and developing countries. Their findings indicate that, even though the signal of the interaction terms generally align with expected patterns, suggesting that institutions could help reduce income inequality, they are not statistically significant. Nevertheless, in general, the literature suggests that the soundness of institutions might influence the effectiveness of fiscal policy – particularly public spending targeted to pro-poor sectors such as health and education – on poverty alleviation.

Chapter 3. Methodology

This chapter exposes the methodology used for measuring the impact of fiscal policy and institutional quality on poverty, while acknowledging the moderating effect of institutions on the fiscal policy-poverty relationship. After presenting our model, we describe the sample as well as the variables and proxies included in the model. Finally, we provide relevant descriptive statistics for the database.

3.1 The model

Our sample consists of the EU-27 member states[9] over a sixteen-year period, from 2008 to 2023. The selection of the EU countries for this investigation was based on two main considerations. First, there are few empirical studies that assess the relationship between fiscal policy, institutions and poverty in developed countries, as low and middle income countries are the usual choice. Second, the existence of a statistical office of the EU – Eurostat – guarantees the collection of reliable and harmonized data on both poverty and fiscal policy measures. The time horizon was primarily determined by data availability, while also ensuring a sufficiently long period to capture the effects of the Global Financial Crisis and the Covid-19 pandemic.

Our dataset is both a panel and unbalanced dataset. It qualifies as panel because it includes observations of variables both over a period of time and across various sample units – the EU countries (Gujarati & Porter, 2009, p. 591). It is also unbalanced, since not all countries have the same number of observations due to missing values, and short, as the number of entities is higher than the number of years analysed (Gujarati & Porter, 2009, p. 593).

Due to the presence of both time-series and cross-sectional dimensions, panel data is prone to suffer from problems such as heteroscedasticity, autocorrelation and cross-correlation dependence, all of which must be addressed. Therefore, the use of panel data estimation is required to deal with these issues (Gujarati & Porter, 2009, p. 612). There are three main models for panel data estimation: pooled OLS, fixed effects model and random effects model.

[9] EU-27 includes Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

The pooled OLS model corresponds to a "grand" ordinary least square regression, in which the cross-section and time-series nature of the data is neglected (Gujarati & Porter, 2009, p. 593). Consequently, the heterogeneity among entities is ignored, which may lead to a situation in which the error term is correlated with some of the explanatory variables used in the model, thereby violating a classical OLS assumption. When this occurs, the coefficients estimated by pooled OLS may be biased and inconsistent (Gujarati & Porter, 2009, p. 594).

In contrast, both the fixed and random effects models account for individual heterogeneity across subjects. However, they do it in different ways. In the fixed effects model, each cross-section unit is allowed to have its own intercept representing the unique characteristics of each entity, which is often implemented using dummy variables for each unit (Gujarati & Porter, 2009, p. 613). In this model, the unique traits of each unit might be correlated with other variables in the model (Greene, 2012, p.410). According to Gujarati & Porter (2009, p. 606), the fixed effects model is more appropriate when the individual error component is correlated with one or more regressors of the model, as the estimators obtained are not biased. The random effects model assumes that the unobserved individual effects are uncorrelated with the explanatory variables in the model. Thus, rather than assigning each unit its own fixed intercept, it assumes that these individual effects are randomly drawn from a common distribution (Greene, 2012, p.411). As for Greene (2012, p.411), this approach is appropriate when the sample is considered a random selection from a larger population. In such model, the individual effects, expressed as a deviation from this constant mean value, are incorporated into the error term, which consists of two components: the cross-sectional specific error component and the combined time-series and cross-section error component, also called the idiosyncratic term (Gujarati & Porter, 2009, p. 603). Hence the model's alternative name: the error components model (Gujarati & Porter, 2009, p. 602). The Hausman test can be applied to choose between the fixed and random effects models (Greene, 2012, p. 420).

We begin by presenting the linear model to be estimated using ordinary least squares:

$$AROPE_{it} = \beta_1 + \beta_2 \text{ FISCAL POLICY}_{it} + \beta_3 X_{it} + \alpha_{i(t)} + \varepsilon_{it} \quad (1.1)$$

$$AROPE_{it} = \beta_1 + \beta_2 \text{ FISCAL POLICY}_{it} + \beta_3 \text{ INSTITUTIONS}_{it} + \beta_4 X_{it} + \alpha_{i(t)} + \varepsilon_{it} \quad (1.2)$$

where i represents the country (i = 1, …, 27) and t represents the year (t = 2008,…, 2023); $AROPE_{it}$ is the dependent variable, representing a measure of poverty in country i in year t; β_1 denotes the constant term in both equations; $FISCAL\ POLICY_{it}$ stands for fiscal policy indicators (either total, health or education expenditures) for country i in year t; in both equations, β_2 corresponds to the vector of coefficients linked to the fiscal policy variable; in equation (1.2), $INSTITUTIONS_{it}$ corresponds to the institutional quality indicators, encompassing either corruption or democracy indicators and β_3 is the vector of coefficients associated with the institutional quality variable; in both equations, X_{it} represents the vector of control variables for country i at year t; in equation (1.1), the vector of coefficients associated with these variables is β_3, whereas in equation (1.2) is β_4; $\alpha_{i(t)}$ represents the heterogeneity, or individual effect, in the panel data model (in case of country fixed effects α_i is a country-specific constant term, for time fixed effects α_t corresponds to a time-specific term common to all units, while under random effects α_i is treated as part of the error term) (Greene, 2012, pp. 385-386); finally, ε_{it} is the error term for country i in year t.

In order to capture potential non-linear relationships, we incorporate a quadratic term for the institutional quality variable:

$$AROPE_{it} = \beta_1 + \beta_2\ FISCAL\ POLICY_{it} + \beta_3\ INSTITUTIONS_{it} + \beta_4\ INSTITUTIONS^2_{it} + \beta_5\ X_{it} + \alpha_{i(t)} + \varepsilon_{it} \quad (2)$$

where, everything remaining the same as in the baseline model, each institutional quality indicator represented by $INSTITUTIONS_{it}$ enters the equation both in its linear and quadratic form; β_4 corresponds to the effect of the quadratic term of the institutional quality variable. Equation (2) is estimated, again, via ordinary least squares.

Moreover, we employ the two-stages least squares method (2SLS) using instrumental variables (IV). This method consists of two successive applications of OLS. In the first stage, the IV is used as an independent variable, along with the other explanatory variables, while the endogenous variable serves as the dependent variable. It is important to note that finding valid instruments is particularly challenging, since they must be strongly correlated to the endogenous variable but only correlated to the dependent variable through their effect on the endogenous variable; otherwise, the results might be biased. In the second stage, the

original dependent variable is regressed on the predicted values of the endogenous variable – obtained in the first stage – and on the remaining explanatory variables (Zaefarian et al., 2017). This method is very appropriate to address endogeneity, which arises when one or more regressors are correlated with the error term, thereby rendering the OLS estimates inconsistent and biased (Greene, 2012, p. 259). Such endogeneity issues may stem from several sources, namely: omission of relevant variables, that will appear in the error term leading to omitted variable bias; measurement error, which occur when a variable is inherently unmeasurable, causing it to be correlated with the disturbance term; and simultaneous causality, when dependent and independent variables simultaneously cause each other. The model to estimate is the following:

$$\begin{aligned} &INSTITUTIONS_{it} = \beta_1 + \beta_2\, IV_{it} + \beta_3\, X_{it} && (1^{st}\ \text{stage}) \\ &AROPE_{it} = \beta_1 + \beta_2\, INSTITÛTIONS_{it} + \beta_3\, X_{it} + \varepsilon_{it} && (2^{nd}\ \text{stage}) \end{aligned} \tag{3}$$

where $INSTITÛTIONS_{it}$ denotes the predicted value of the institutional indicator of country i in year t; IV_{it} represents the instrumental variables for country i at year t; X_{it} represents the vector of control variables as well as explanatory variables that characterize fiscal policy for country i at year t; while β_1 represents the constant term, β_2 and β_3 correspond to the coefficients of the respective variables; ε_{it} is the error term for country i in year t.

We test both democracy and corruption as potentially endogenous variables to assess the robustness of our results, but the results of preliminary diagnostic tests were not satisfactory, except for corruption. For that reason, we instrument only corruption.

Finally, to understand the mediating effect of institutions in the relationship fiscal policy-poverty, the baseline linear model is extended to include an interaction term between fiscal policy and institutional quality indicators in an ordinary least squares regression:

$$\begin{aligned} AROPE_{it} = {} & \beta_1 + \beta_2\, FISCAL\ POLICY_{it} + \beta_3\, INSTITUTIONS_{it} + \beta_4\, (FISCAL \\ & POLICY_{it} * INSTITUTIONS_{it}) + \beta_5\, X_{it} + \alpha_{i(t)} + \varepsilon_{it} \end{aligned} \tag{4}$$

where, all else meaning the same, the interaction term $FISCAL\ POLICY_{it} * INSTITUTIONS_{it}$ combines the fiscal policy and institutional quality indicators included

linearly in each specification of the model; β_4 represents the coefficient of the interaction term.

3.2 Data

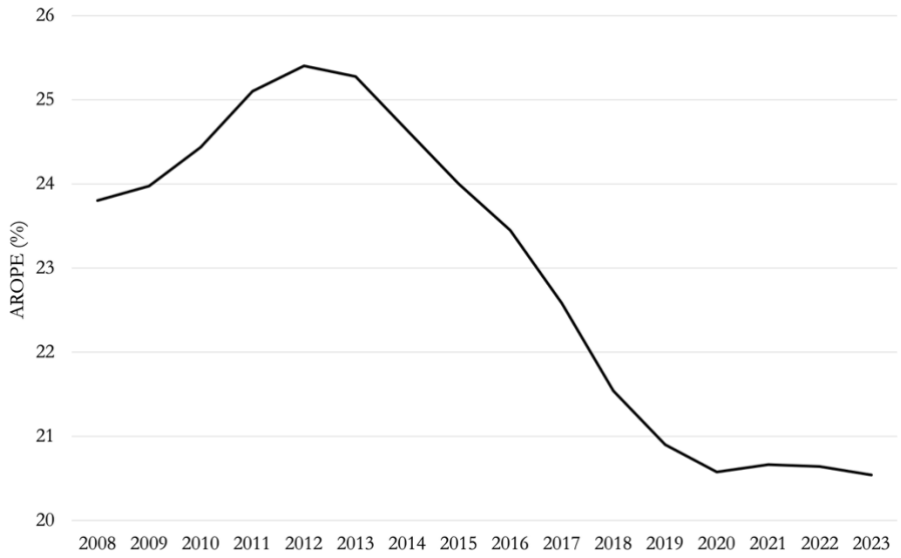
As already mentioned, we study the impact of fiscal policy and institutional quality on poverty in the twenty-seven EU member states between 2008 and 2023. Secondary data from Eurostat and other sources were utilized for this analysis. In this section, we describe the data sources and present the relevant preliminary statistics.

3.2.1 Dependent variable

Our dependent variable is poverty, measured using the AROPE. Since the launch of the Europe 2020 Strategy in 2010, AROPE has been the main tool for tracking poverty trends in the EU. Collected annually by Eurostat, AROPE includes three dimensions – monetary poverty in relative terms, deprivation and household's work intensity – which outline the multidimensional nature of poverty, as addressed by the UN. A person is considered to be at risk of poverty or social exclusion if he/she falls into at least one of the aforementioned domains (Robayo & Echeverria, 2025). Although AROPE remains the primary poverty indicator under the Europe 2030 Strategy, the methodology behind it was revised in 2021 to meet the new EU 2030 target. The updated framework introduced a redefined deprivation rate and a new measure of work intensity. A detailed description of the AROPE indicator as well as its methodological evolution over time is presented in Annex B.

Due to this modification, a single AROPE dataset covering the full 2008–2023 period is not available in Eurostat. Instead, there is one dataset with information for 2008-2020 (aligned with the Europe 2020 strategy) and another with data for 2015-2023 (aligned with the Europe 2030 strategy). In order to make a harmonized dataset for our analysis period (2008-2023), we had to make some adjustments. Starting with the dataset 2015-2023 (from the Europe 2030 strategy dataset), we estimated the AROPE aligned with the Europe 2030 strategy for the period 2008 and 2014 by introducing the annual effective growth rates from the Europe 2020 strategy dataset we calculated the values that the indicator would take in the period between 2008 and 2014 for the Europe 2030 strategy dataset. For Croatia, which lacks data for 2008 and 2009 in the Europe 2020 strategy dataset, the average annual growth rate from 2011 to 2020 was used to complete the dataset.

Figure 1 - AROPE (%), EU-27 AVERAGE, 2008-2023



Source: Own elaboration. Data obtained at Eurostat. Available at https://doi.org/10.2908/ILC_PEPS01 and https://doi.org/10.2908/ILC_PEPS01N. Accessed on March 24, 2025.

Figure 1 shows the evolution of the simple average of the AROPE indicator across the EU-27 member states over the period under analysis. In general, the picture reveals a downward trend, particularly from 2012 onwards, which was only interrupted in 2021. It is worth noting that the average AROPE level in the EU-27 tends to increase in times of crisis: first, during the 2008 financial crisis and then – albeit to a lesser extent – in the course of the covid-19 pandemics. Despite this overall trend, several disparities exist between member states (see Annex C). Bulgaria, Hungary, Poland and Romania contributed most significantly to the decline in the indicator, with Bulgaria and Hungary having previously recorded AROPE values exceeding 50%. Contrarily, Czechia consistently exhibits the lowest levels of AROPE throughout the period, around 10%.

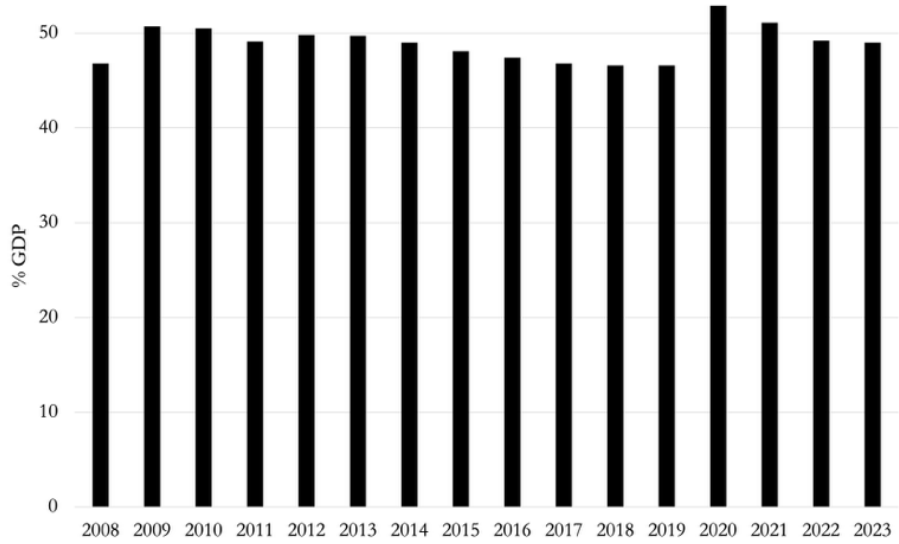
3.2.2 Explanatory variables

Our explanatory variables of interest can be divided between those which measure fiscal policy and those which represent institutional quality.

Regarding fiscal policy, as outlined in section 2.5, the expenditure side is the most common in the literature to capture fiscal policy's effect on poverty or other related outcomes (Rajkumar & Swaroop, 2008; Suryadarma, 2012; Makuta & O'Hare, 2015; Komarudin, 2020; Dankumo et al., 2021). Particularly, public spending on health and education, which are often oriented to provide the minimum living standards for the poor

(Bhagwati, 1988). Therefore, in our study, we consider the total government expenditure, as well as expenditure on health and education, in percentage of GDP, all retrieved from Eurostat. As health and education spending is typically targeted to benefit poorer households (Damuri & Perdana, 2003), we expect their coefficients to be negative.

Figure 2 – Total Government expenditure (% GDP), EU-27 average, 2008-2023

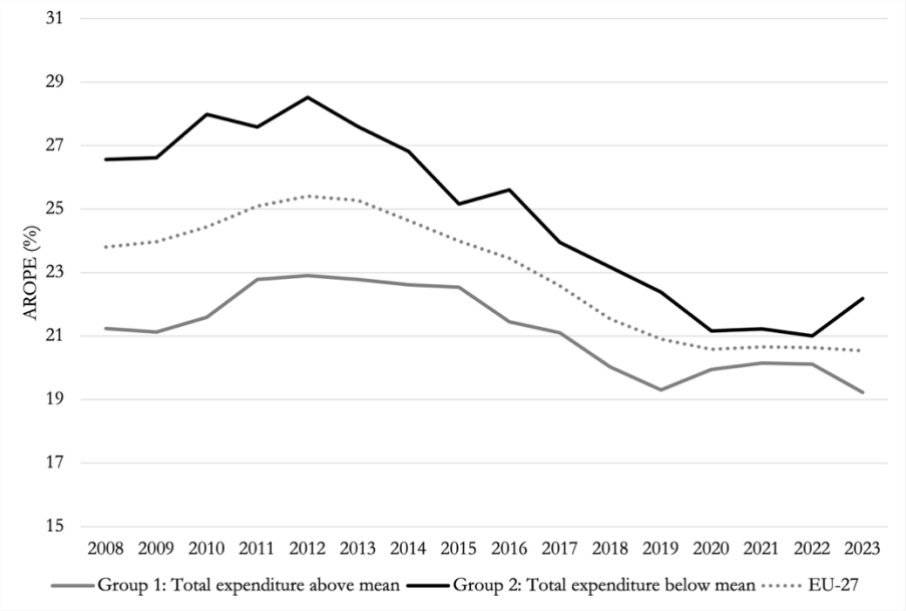


Source: Own elaboration. Data obtained at Eurostat. Available at https://doi.org/10.2908/GOV_10A_EXP. Accessed on March 24, 2025.

Figure 2 shows the trend in average total government expenditure as percentage of GDP in the EU-27 from 2008 to 2023. While the levels of expenditure remain relatively stable throughout the period, there are visible increases in 2008-2009 and even more in 2019-2020 – both coinciding with global crisis (the 2008 financial crisis and the covid-19 pandemics), when AROPE also increased.

By dividing the EU-27 countries into two groups according to whether their total government expenditure lies above or below the overall annual, the evolution of AROPE reveals more nuanced patterns. Figure 3 shows that AROPE is higher when the government expenditures are smaller. Moreover, globally, the AROPE trend is declining, mainly in the countries with government expenditure below mean. Thus, there seems to be a convergence in the AROPE values between countries with higher and lower levels of expenditure.

Figure 3 – AROPE in the EU-27, average by expenditure group, 2008-2023



Source: Own elaboration. Data obtained at Eurostat. Data for AROPE available at https://doi.org/10.2908/ILC_PEPS01 and https://doi.org/10.2908/ILC_PEPS01N. Data for total expenditure available at https://doi.org/10.2908/GOV_10A_EXP. Accessed on March 24, 2025.

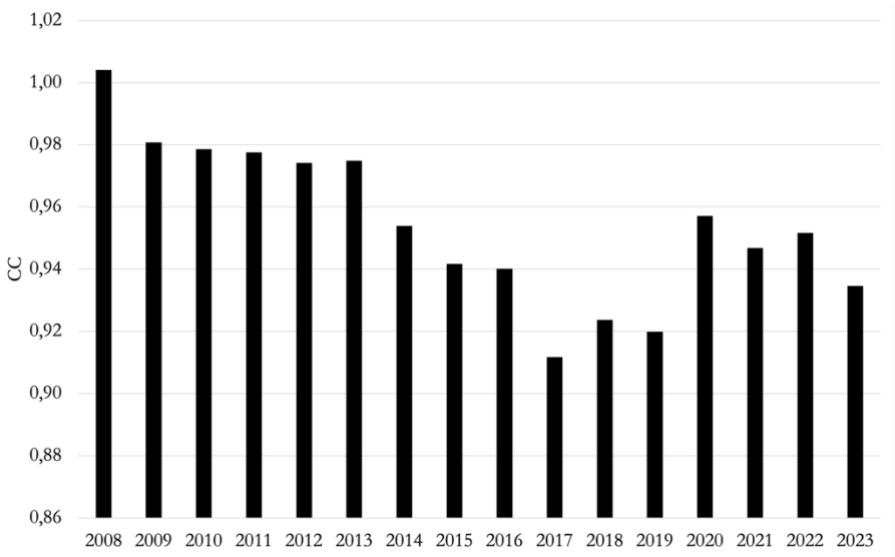
Concerning institutions, we consider corruption – widely used by the literature – as well as democracy. Unlike other studies, we did not use measures of governance such as government effectiveness and rule of law, from the Worldwide Governance Indicators (WGI), since preliminary tests showed that they often displayed inconsistent signs across different specifications and were often not significant. Following Malla and Pathranarakul (2022) and Suryadarma (2012), we measured corruption using the indicator from Transparency International – the Corruption Perceptions Index (CPI). For a more robust analysis, we chose another corruption measure from the WGI – the Control of Corruption (CC) indicator, also used by Makuta and O'Hare (2015) and Dankumo et al. (2021). To capture democracy, we chose Freedom House (FH)'s political rights and civil liberties, which captures democracy in a broader way, as well as The Economist Intelligence Unit's (EIU) democracy index, a more recent measure. The Polity V index, used by Malla and Pathranarakul (2022), was not included in our analysis because its scores show very little variation across countries in our sample.

The CPI, developed by Transparency International, assesses the perceived public sector corruption in a given country. Based on data from various experts and business surveys, it assigns scores ranging from 0 (perceived to be highly corrupt) to 100 (perceived

to be very clean). However, this scoring scale has only been in place since 2011, as in previous years the scale was from 0 to 10. To harmonise the data across our observed period, we multiplied the values prior to 2011 by 10.

Moreover, CC, one of the six WGI developed by the WB, captures to which degree public power is exercised for private gain and whether the state is "captured" by elites and private interests. Estimates of this variable range from -2.5 (weak) to 2.5 (strong governance performance), that is, the higher the score, the less corrupt is the country. The evolution of the CC, as displayed in Figure 4, shows a clear declining trajectory, particularly until 2017. In 2020, there is a partial recovery, followed by a decline, though with some fluctuations, in the subsequent years. Overall, we can conclude that the governance performance regarding corruption control has, on average, been worsening in the EU-27.

Figure 4 - CC, EU-27 average, 2008-2023

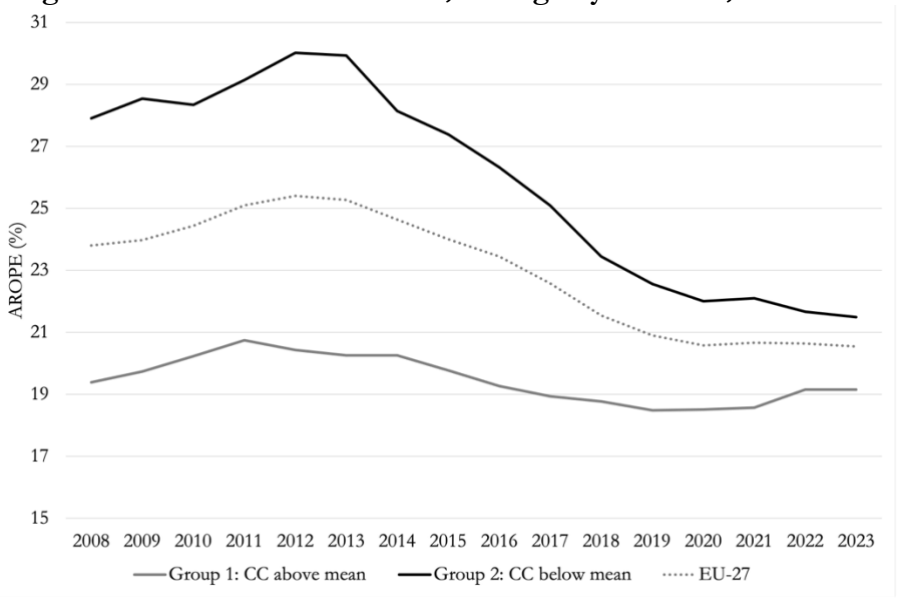


Source: Own elaboration. Data obtained at World Bank. Available at https://www.worldbank.org/en/publication/worldwide-governance-indicators. Accessed on April 1, 2025.

Following literature, and as discussed in section 2.4, lower levels of corruption are associated with lower poverty levels. This relationship is empirically verified by Chong and Calderón (2000) and Tebaldi and Mohan (2010). Thus, we predict negative coefficients for these variables. This relationship is also supported by Figure 5, which shows the evolution of AROPE for two groups based on whether the values of CC are above or below its mean. According to Figure 5, the group in which the corruption indicator is above mean consistently display lower AROPE rates. It is worth noting that, from 2012 onwards, the

AROPE rates for the group in which the corruption indicator is below mean show a steady decline. Again, there is a convergence in the AROPE values between countries with higher and lower corruption measures. Overall, the graph suggests that higher CC are associated with lower risks of poverty.

Figure 5 - AROPE in the EU-27, average by CC level, 2008-2023



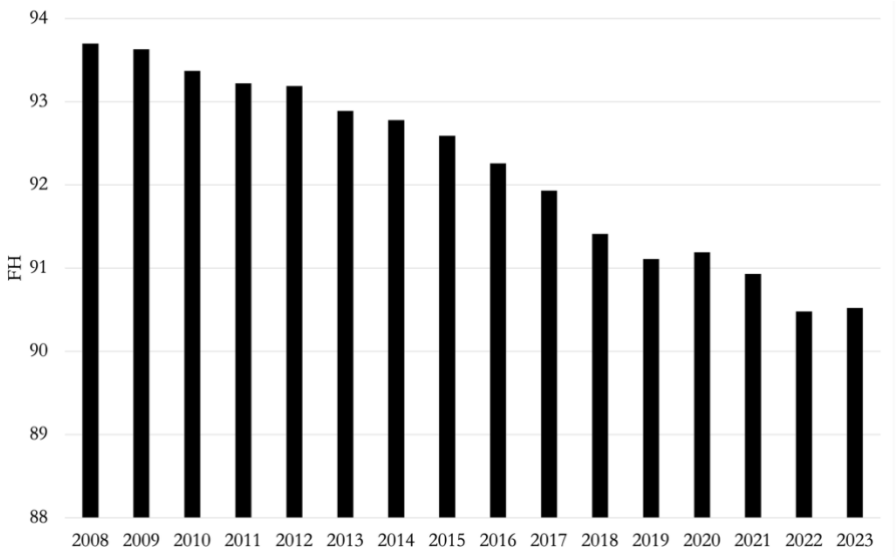
Source: Own elaboration. Data for AROPE was obtained at Eurostat. Available at https://doi.org/10.2908/ILC_PEPS01 and https://doi.org/10.2908/ILC_PEPS01N. Accessed on March 24, 2025. Data for CC was obtained at World Bank. Available at https://www.worldbank.org/en/publication/worldwide-governance-indicators. Accessed on March 24, 2025.

The democracy index from EIU is based on 60 indicators grouped into five categories: electoral process and pluralism, civil liberties, functioning of government, political participation and political culture. Hence, it evaluates the degree to which citizens can choose their political leaders through free and fair elections, enjoy civil liberties, prefer democracy over alternative political systems, can and actually do participate in politics and are served by a government that functions on their behalf. The score assigned to countries range from 0 to 10, given that the highest the score the more democratic is the country. Although the first year for which data were reported dates back to 2006, consistently annual data are only available from 2010 onwards. This matters for our study since there are no data for 2009.

Additionally, Freedom House (FH) annually publishes a report containing countries' scores on political rights (0-40 points), including electoral process, political pluralism and participation and functioning of government, and on civil liberties (0-60 points), covering freedom of expression and belief, associational and organizational rights, rule of law and

personal autonomy and individual rights. When combined into a 0-100 scale, the scores are widely considered a measure of democracy, with higher scores indicating a more democratic country. Figure 6 illustrates the evolution of FH's political rights and civil liberties scores together. The graph reveals a downward trend over the observed period. In 2008, the value was approximately 94, but it declined continuously, reaching a value between 90 and 91 in 2023. Thus, this figure indicates a deterioration in democratic conditions over time.

Figure 6 - FH, EU-27 average, 2008-2023

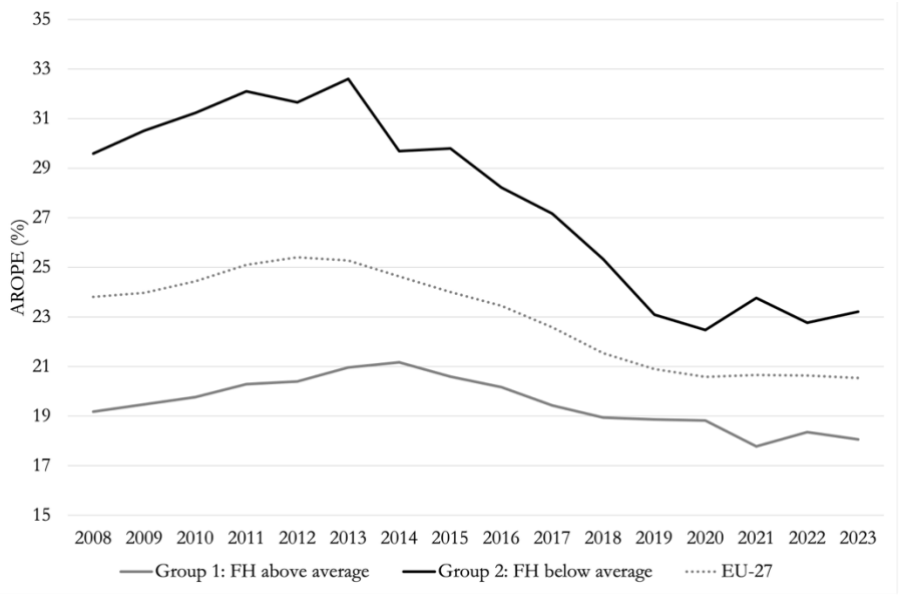


Source: Own elaboration. Data obtained at Freedom House. Available at https://freedomhouse.org/report/freedom-world#Data. Accessed on March 31, 2025.

As stated in section 2.4, literature suggests that a greater level of democracy shall help the reduction of poverty, so we predict the coefficient of this variable to exhibit a negative sign. However, it is worth mentioning that the empirical evidence on the effect of democracy on poverty is not that clear (Dörffel and Freytag, 2023; Ross, 2006).

Figure 7 shows that countries with above-average FH democracy scores consistently maintain lower AROPE rates than those with below-average scores. While countries with above-average democracy scores saw a more stable and lower AROPE trend, the group with below-average scores had the highest AROPE scores, but these gradually declined over time. In general, this graph suggests a positive correlation between greater democratisation and less poverty.

Figure 7 - AROPE in the EU-27, average by FH score, 2008-2023



Source: Own elaboration. Data for AROPE was obtained at Eurostat. Available at https://doi.org/10.2908/ILC_PEPS01 and https://doi.org/10.2908/ILC_PEPS01N. Accessed on March 24, 2025. Data for FH was obtained at Freedom House. Available at https://freedomhouse.org/report/freedom-world#Data. Accessed on March 31, 2025.

3.2.3 Control variables

In this section, we describe the control variables and their expected effect on the dependent variable, AROPE, summarized in Table 1.

Table 1 - Description of control variables

Variable	Description	Expected sign of coefficient	References
GDP	Gross Domestic Product at current prices measured in purchasing power standard (PPS) per capita, using the EU-27 (from 2020) as the reference base (in logarithms).	-	Dollar and Kraay (2002)
UNEM	Unemployment rate corresponds to the share of unemployed population as percentage of the labour force.	+	Lecerf (2016); Tudorache (2019)
HICP	The harmonized index of consumer prices (HICP) is the standard measure of inflation used in the EU since it is comparable across countries.	+	Easterly & Fischer (2001); Romer and Romer (1998)

S80S20	The S80/S20 ratio, is the ratio of total income received by the 20% of the population with the highest income (top quintile) to that received by the 20% of the population with the lowest income (lowest quintile).	+	Bergstrom (2020); Lakner et al (2022); Karagiannaki (2017);
PSE	Primary sector employment corresponds to the share of the active population employed in agriculture, forestry and fishing.	+	Christiaensen and Todo (2014); Tudorache (2019)
DEBT	Debt-to-GDP ratio corresponds to general government gross debt in percentage of GDP, and it is used to measure a country's public debt.	+/-	Akram (2016); Mencinger et al. (2014); Ribeiro et al. (2012); Siddique et al. (2016)
TRADE	Trade openness corresponds to the sum of exports and imports of goods and services as a percentage of GDP.	-	Dollar and Kraay (2004); Komarudin (2020)

Source: Own elaboration

The per capita gross domestic product (GDP) is used to measure economic well-being or living standards, which, according to Dollar and Kraay (2002), is of great importance to the reduction of poverty – hence, we predict a negative coefficient for this variable. We use the GDP per capita in chain-linked volumes (2020), expressed in euros, as provided by Eurostat, and in logarithms. This measure accounts for inflation by using 2020 as the reference year, enabling comparisons of over time.

Unemployment (UNEM) corresponds to the share of unemployed population as percentage of the labour force. Again, as Eurostat does not provide a single dataset covering the period between 2008 and 2023, we had to make some calculations to construct a harmonized dataset for this period combining data from two sources: one covering 1992-2020 and another with data for the 2009-2024 period for the majority of countries. We start with 2009-2024 dataset and estimate the missing data for 2008 by using the 2009 annual growth rate from the 1992-2020 dataset. According to Lecerf (2016), unemployment has been one of the main determinants of poverty in the EU since 2008, intensified by the economic crisis. Moreover, Tudorache (2019) concludes that the unemployment rate positively impacts poverty (in this case measured by the at risk of poverty rate after social

transfers) in some central and eastern EU member states. Therefore, we expect UNEM to have a positive effect on AROPE.

The harmonized index of consumer prices (HICP) is the standard measure of inflation used in the EU since it is comparable across countries. The literature emphasizes that inflation contributes to increase poverty, not only since it is a key concern of the poor, but also because empirical evidence shows a negative relationship between inflation and direct measures of poverty (Easterly & Fischer, 2001). Similarly, Romer and Romer (1998) conclude that, particularly in industrialized countries, high inflation disproportionately harms the poor, since it is associated with lower incomes among the poorest groups. Based on this evidence, we expect the coefficient of the inflation variable to be positive.

The S80/S20 ratio (S80S20) is the ratio of total income received by the 20% of the population with the highest income (top quintile) to that received by the 20% of the population with the lowest income (lowest quintile). Although the Gini index is more commonly used to measure income inequality, the S80/S20 ratio was chosen due to its availability in Eurostat. The inclusion of this variable is supported by existing literature such as Karagiannaki (2017), who finds a robust and statistically significant positive correlation between income inequality and poverty rates in her cross-country analysis of rich and middle income countries. Similarly, the studies by Bergstrom (2020) and Lakner et al (2022) support the idea that declining income inequality is a key factor to decrease poverty. Consequently, we predict a positive sign for the income inequality variable coefficient.

Structural change, as measured by a reduction on primary sector employment or in rural population, is expected to decrease poverty. On one hand, Tudorache (2019) concludes that the share of rural population – which is highly correlated with employment in the primary sector – has a positive effect on poverty in some central and eastern European countries. On the other hand, according to Christiaensen and Todo (2014), a shift away from agriculture is associated with faster poverty reduction, particularly if it is towards rural nonfarm activities, which provides more inclusive growth. Thus, we use the share of primary sector employment (PSE), which corresponds to the share of the active population employed in agriculture, forestry and fishing (section A of NACE Rev.2), according to Eurostat. We select this measure to account for the effect of structural change on poverty, after testing the urbanisation rate, but with less relevant results. The coefficient of this variable is predicted to have a positive sign.

Debt-to-GDP (DEBT) ratio corresponds to general government gross debt in percentage of GDP, and it is used to measure a country's public debt. The literature on the relationship between public debt and poverty is not extensive. However, this relationship can be implicitly explored by studies that focus on the relationship between public debt and economic growth. Overall, the literature suggests that this relationship is complex. Mencinger et al. (2014) find evidence that this relationship is not linear, but concave, as the impact of public debt on growth shifts from being good to being bad beyond a public debt threshold. Siddique et al. (2016) conclude that, although debt has a negative influence on GDP in highly indebted poor countries, it can lead to pro-poor growth up to a certain point, if used efficiently. These ideas – that debt only becomes a serious problem when it grows too large and that its impact depends on a country's ability to effectively use it – are also supported by Akram (2016). Ribeiro et al. (2012) do not find a significant relationship between public debt and GDP, as it varies from country to country. Therefore, we do not have any prior conviction regarding the coefficient of public debt variable.

Trade openness (TRADE) corresponds to the sum of exports and imports of goods and services as a percentage of GDP, with data retrieved from Eurostat. In a study on developing countries, Dollar and Kraay (2004) conclude that as trade increases, the incomes of the poor rise via higher growth rates. Thus, following Komarudin (2020), we include trade openness as a control variable. Although we would expect the coefficient to be negative, the effect might not be so significant as above studies predict, since our sample includes only developed countries that belong to an economic union.

3.3 Descriptive statistics

This section provides a statistical characterization of the variables included in our study. We present descriptive statistics in Table 2 and the correlation matrix in Table 3.

Table 2 – Summary descriptive statistics

Variable	Description	Obs.	Mean	Median	Std. Dev.	Min.	Max.	Source
AROPE	At-risk-of-poverty and social exclusion rate (%)	432	22,9703	20,5000	7,7548	10,7000	52,5909	Eurostat
TOT_EXP	Total general government expenditure (% GDP)	432	45,7949	45,8000	6,9721	20,6000	64,9000	Eurostat
HLT_EXP	Total general government expenditure on Health (% GDP)	432	6,3556	6,5000	1,4993	2,5000	10,1000	Eurostat
EDU_EXP	Total general government expenditure on Education (% GDP)	432	5,0641	5,0000	1,0065	2,5000	7,8000	Eurostat
CC	Control of corruption	432	0,9545	0,7848	0,7852	-0,3814	2,4355	World Bank
CPI	Corruption Perceptions Index	432	63,3449	61,0000	15,4739	33,0000	94,0000	Trasparency International
FH	Political rights and civil liberties	432	92,1991	94,0000	6,1238	66,0000	100,0000	Freedom House
EIU	Democracy index	405	7,9111	7,8400	0,8325	6,3800	9,8800	The Economist Intelligence Unit
GDP	Gross Domestic Product per capita	432	10,12595	10,05707	0,615678	8,839276	11,5859	Eurostat
UNEM	Unemployment rate (%)	432	8,4547	7,3000	4,4036	2,0000	27,8000	Eurostat
HICP	Harmonized index of consumer prices	432	2,6819	1,9000	3,2615	-1,7000	19,4000	Eurostat
S80S20	S80/S20 ratio (%)	430	4,8223	4,4750	1,1357	3,0300	8,3200	Eurostat
PSE	Primary sector employment (% active population)	432	4,7698	3,4469	4,4470	0,5888	28,8537	Eurostat
DEBT	Public Debt (% GDP)	432	66,3910	58,5500	37,5441	4,7000	209,4000	Eurostat
TRADE	Trade openess (% GDP)	432	127,5144	114,8000	62,54162	45,2000	412,2000	Eurostat

Source: Own elaboration

Table 3 – Correlation matrix

	AROPE	TOTEXP	HLTEXP	EDUEXP	CC	CPI	FH	EIU	GDP	UNEM	HICP	S80S20	PSE	DEBT	TRADE
AROPE	1.0000														

TOTEXP	-0.2880	1.0000													
	(0.0000)	----													
HLTEXP	-0.5246	0.6239	1.0000												
	(0.0000)	(0.0000)	----												
EDUEXP	-0.3649	0.4989	0.2625	1.0000											
	(0.0000)	(0.0000)	(0.0000)	----											
CC	-0.5771	0.2959	0.4656	0.5041	1.0000										
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	----										
CPI	-0.5604	0.2891	0.4599	0.4967	0.9788	1.0000									
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	----									
FH	-0.5516	0.1725	0.4075	0.3949	0.8161	0.7842	1.0000								
	(0.0000)	(0.0003)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	----								
EIU	-0.5176	0.2148	0.4643	0.3349	0.8770	0.8502	0.8148	1.0000							
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	----							
GDP	-0.6073	0.2336	0.4599	0.2101	0.8489	0.8231	0.7220	0.8524	1.0000						
	(0.0000)	(0.1570)	(0.0000)	(0.0510)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	----						
UNEM	0.4139	0.1726	-0.1598	-0.0573	-0.2877	-0.3071	-0.1089	-0.1677	-0.2901	1.0000					
	(0.0000)	(0.0003)	(0.0009)	(0.2344)	(0.0000)	(0.0000)	(0.0236)	(0.0007)	(0.0000)	----					
HICP	0.0107	-0.1228	-0.0528	-0.0342	-0.1186	-0.1265	-0.2266	-0.1500	-0.1089	-0.2966	1.0000				
	(0.8246)	(0.0106)	(0.2734)	(0.4779)	(0.0136)	(0.0085)	(0.0000)	(0.0025)	(0.0636)	(0.0000)	----				
S80S20	0.7766	-0.2886	-0.4568	-0.3202	-0.4988	-0.4751	-0.4703	-0.4338	-0.4911	0.4256	0.0055	1.0000			
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.9100)	----			
PSE	0.6747	-0.2150	-0.3955	-0.3000	-0.5323	-0.5020	-0.5112	-0.5315	-0.5997	0.2042	0.0584	0.5175	1.0000		
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.2262)	(0.0000)	----		
DEBT	-0.0077	0.5086	0.2222	-0.1379	-0.1543	-0.1549	-0.0432	-0.0536	0.0492	0.4723	-0.2008	0.0363	-0.0291	1.0000	
	(0.8737)	(0.0000)	(0.0000)	(0.0041)	(0.0013)	(0.0012)	(0.3702)	(0.2822)	(0.0221)	(0.0000)	(0.0000)	(0.4524)	(0.5461)	----	
TRADE	-0.2060	-0.4191	-0.2517	-0.0816	0.1685	0.1441	0.1561	0.1297	0.3534	-0.3250	0.0918	-0.2734	-0.3147	-0.3811	1.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0905)	(0.0004)	(0.0027)	(0.0011)	(0.0090)	(0.0000)	(0.0000)	(0.0566)	(0.0000)	(0.0000)	(0.0000)	----

Source: Own elaboration

Chapter 4. How do fiscal policy and institutions impact poverty?

This chapter explores the impact of fiscal policy and institutions on poverty by showing and discussing the key results of the models. After presenting some relevant diagnostic tests, we show the results of the simple linear model estimation. Next, we extend the model including a quadratic term. Then, we instrumentalize corruption and consequently estimate the model by 2SLS. Finally, we include to the baseline linear model an interaction term between fiscal policy variables and institutional quality indicators. We end with a short discussion on main results.

4.1 Preliminary diagnostic tests

Our aim is to analyse the effect of fiscal policy and institutional quality on poverty across the 27 EU countries between 2008 and 2023, while also considering the mediating effect of institutions on the fiscal policy-poverty relationship. We estimated the model following several different specifications. First, we include three alternative fiscal policy measures – (1) government total expenditure, (2) health expenditure and (3) education expenditure; then, we extend the model by incorporating, alongside the fiscal ones, four institutional quality indicators that measure corruption – (1) CPI and (2) CC – and democracy – (3) FH and (4) EIU. We also include control variables, starting with a simple specification that uses only the logarithm of GDP as a control (simple model, reported in Annex D), followed by a complete specification that incorporates all control variables (complete model, reported in sections 4.1-4.4).

We start with preliminary diagnostic tests. First, we run the cross-sectional Hausman test[10] for all models to verify whether we should use (country) fixed or random effects. The null hypothesis states that the estimators from both models are not statistically different. If this hypothesis is rejected, the random effects are likely correlated with one or more explanatory variables, making the random effects model not appropriate. Thus, in such case the fixed effects model is preferred (Gujarati & Porter, 2009, p. 605). Contrarily, if the null hypothesis is not rejected, random effects are more appropriate.

[10] We run the Hausman test in Stata with the sigmamore option, which is recommended when comparing fixed-effects and random-effects linear regression because they are much less likely to produce a non-positive-definite-differenced covariance matrix (which happened when we run the test without this option).

Table 4 - Results of cross-sectional Hausman test

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
74.32***	69.89***	75.16***	70.35***	68.93***	79.68***	65.48***	66.66***
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
66.03***	77.05***	57.54***	67.60***	65.19***	77.14***	58.36***	
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

The results of the cross-sectional Hausman tests are displayed in Table 4. According to these results, for all models, we reject the null hypothesis at 1% level of significance. Thus, for all specifications, the appropriate model is the country fixed effects model. To make sure this type of effects is really necessary, we also performed F-tests to the fixed effects regressions in order to decide between pooled OLS and fixed effects. If the null hypothesis – that the fixed effects are jointly not significant – is rejected, then we should apply the fixed effects model. For all specifications, we reject the null hypothesis (see Table E.1 in Annex E). Thus, the cross-sectional (country-specific) effects are significant and the fixed effects model is appropriate.

In addition, we also test the joint significance of time fixed effects (in this case, year fixed effects) using a F-test test. The results, displayed in Table 5, show that in all specifications time fixed effects are not significant and, thus, not appropriate according to this test.

Table 5 - Results of time fixed effects tests

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
1.00	1.07	1.00	0.98	0.99	1.35	1.19	1.06
(0.4583)	(0.3823)	(0.4497)	(0.4759)	(0.4664)	(0.1676)	(0.2788)	(0.3905)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
1.07	1.47	1.28	0.98	1.00	1.36	1.14	
(0.3859)	(0.1114)	(0.2163)	(0.4743)	(0.4577)	(0.1631)	(0.3213)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Furthermore, we test for heteroskedasticity, autocorrelation and cross-sectional dependence (Annex E). First, we performed the modified Wald test for groupwise

heteroscedasticity, in which the null hypothesis corresponds to homoscedasticity, that is, the variance of the error term is constant. According to Table E.2 (Annex E), in all specifications the null hypothesis is rejected at 1% level of significance, hence, there is evidence of groupwise heteroscedasticity. Moreover, we performed the Wooldridge test for autocorrelation in panel data. In all specifications we reject the null hypothesis of no first-order autocorrelation even at 1% level of significance (see Table E.3 in Annex E). Thus, there is evidence of the presence of first-order autocorrelation in all specifications of the models.

Following De Hoyos and Sarafidis (2006), we test for cross-sectional dependence in the errors, which often arise due to shocks affecting all countries simultaneously, an increasingly common situation as the financial and economic integration of countries increases, particularly within an economic union as the EU. Since N > T in our panel data, that consists of 27 countries across 16 years, we performed Pesaran's cross-sectional dependence test (also used by Yameogo et al. (2021), whose panel data corresponds to 20 countries and 16 years) and use Friedman's statistic to corroborate our results. In these two tests the null hypothesis is cross-sectional independence, thus, if we reject it, there is evidence of the presence of cross-sectional dependence. Overall, the results do not show evidence of cross-sectional dependence (see Table E.4 in Annex E). While with the Friedman's statistic we fail to reject the null hypothesis in all specifications, with Pesaran's test the null hypothesis is only rejected, i.e. there is evidence of cross-sectional dependence, in few specifications.

To address heteroskedasticity and autocorrelation, we estimate the abovementioned specifications of the regression using robust standard errors clustered at the panel level.

4.2 Baseline model

We estimate 15 different specifications of the baseline model to investigate the effect of fiscal policy and institutional quality on poverty (plus 15 specifications with only one control, reported in Annex D). Each specification corresponds to one of the three fiscal policy indicators (TOTEXP, HLTEXP and EDUEXP), estimated both individually and in conjunction with one of the four institutional quality indicators (CPI, CC, FH and EIU).

The results of the baseline model are displayed in Tables 8 and 9. In general, the models seem to have a good fit, as indicated by the R-squared within values, which range from 0.64 to 0.67. Furthermore, the joint F-test is statistically significance at 1% level of significance

across all models, indicating that the explanatory variables globally have a meaningful impact on the dependent variable.

Table 6 displays the results of the regressions that include only the three fiscal policy indicators as explanatory variables. Regarding total government expenditure, when we increase its share in GDP by 1 percentage point, the AROPE rate decreases by approximately 0.12 percentage points, everything else remaining constant. This suggests that increased public spending as a share of GDP tends to contribute to lower poverty levels, as predicted by the literature (Mehmood & Sadiq, 2010; Wahiba & Ahlem, 2022). As expected, the relationship between health and education spending goes in the same direction: at 10% level of significance, a 1 percentage point increase in the share of health and education expenditure in GDP is associated, respectively, with a decrease of 0.40 and 1.13 percentage points in AROPE rate, holding all else constant. These results suggest that, in our sample, public spending on education seems to contribute more to explaining variations in poverty than health expenditure, as indicated by the greater magnitude of the coefficient.

Table 6 - The impact of fiscal policy on poverty (AROPE): linear model

	Model 1	**Model 2**	**Model 3**
Constant	198.306*** (0.001)	186.072*** (0.001)	201.203*** (0.001)
TOTEXP	-0.1227** (0.019)		
HLTEXP		-0.3978* (0.098)	
EDUEXP			-1.1281* (0.098)
GDP	-17.579*** (0.001)	-16.670*** (0.002)	-17.746*** (0.001)
UNEM	0.2777** (0.014)	0.2569** (0.019)	0.2780** (0.015)
HICP	0.0589 (0.201)	0.0422 (0.398)	0.0605 (0.158)
S80S20	-0.1259 (0.900)	-0.1848 (0.857)	-0.1817 (0.854)
PSE	0.4590*** (0.008)	0.4614** (0.010)	0.4961*** (0.003)
DEBT	-0.0097 (0.670)	-0.0166 (0.494)	-0.0200 (0.417)
TRADE	0.0383** (0.014)	0.0453*** (0.008)	0.0357** (0.018)
R-squared within	0.6496	0.6421	0.6488
F-statistic	35.14	30.82	33.23
Prob (F-statistic)	0.0000	0.0000	0.0000
Obs.	430	430	430
Method	Cross-section fixed effects; Robust standard errors		

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table 7 displays the results of the specifications that include both fiscal policy and institutional quality indicators. These findings support the idea that total government expenditure generally has a negative impact on poverty, although the evidence is weaker in models that include democracy indicators. The effect is statistically significant at 5% level of significance in models with corruption indicators (models 4 and 5) and at 10% level of significance in the model with EIU (model 7). Regarding health expenditure, the coefficients lose significance across all specifications. In contrast, in the specifications with corruption indicators (models 12 and 13), the impact of education spending on poverty is negative and significant at 10% level of significance. For example, in model 13, a percentage point increase in education expenditure as a share of GDP is associated with a 1.15 percentage point decrease in the AROPE rate, holding all else constant. These results further support the previously stated idea that, in our sample, public spending on education contributes more to explaining variations in poverty than health expenditure, as its estimated coefficients show greater significance. Nevertheless, it is important to note that the statistical significance of the coefficients is not consistent across all specifications. Poor effects of health and education expenditures on poverty have been observed in previous empirical studies: Asghar et al (2012) find that government spending in health sector does not have significant impact on poverty reduction in Pakistan between 1972 and 2008; Omari and Muturi (2016) conclude that, in Kenya for the period of 1964-2010, the effect of education sector expenditure on poverty level is insignificant. Furthermore, in a research using a sample of developing countries, Devarajan et al. (1996) conclude that public spending on education and health – "standard candidates for productive expenditure" – do not have a significant effect on growth, which is, as mentioned before, one of the main channels through which fiscal policy – or, more particularly, public spending – impacts poverty. Therefore, this perspective helps explain why, in our study, spending on health and education do not show a statistically significant effect on poverty.

Regarding the institutional quality indicators – CPI, CC, FH and EIU – they consistently display insignificant coefficients, which means that, with the linear model, our results do not provide strong evidence to confirm our hypothesis.

Overall, the coefficients of the control variables are in accordance with our expectations. GDP, UNEM and PSE are significant across all specifications and display the expected sign. Thus, our data finds evidence that economic growth helps poverty reduction while unemployment and primary sector employment contribute to increase our dependent variable, AROPE. Regarding inflation and public debt, there is insufficient evidence to claim a meaningful effect: the coefficient associated with HICP is always positive but barely significant and the one associated with DEBT is negative but never significant. Contrary to expectations are the results concerning income inequality and trade openness. S20S80 is never significant. As for TRADE, the effect on poverty is always positive and significant. Despite the overall increase in the economy resulting from free trade, some studies point out that, beyond winners, there are also losers resulting from free trade. Particularly, in high-income economies, low-skilled workers – who are relatively scarce – may suffer from job displacement and downward pressure on wages due to increased competition with labour-abundant countries (O'Rourke et al., 2017). Therefore, our finding that greater trade openness is associated with an increase in poverty is plausible, as our sample is composed of developed high-income economies.

Table 7 – The impact of fiscal policy and institutional quality on poverty (AROPE): linear model

	Dependent variable: AROPE											
	Model 4	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**
Constant	198.798***	199.068***	153.802**	196.491***	185.954***	186.084***	140.91**	184.093***	201.291***	201.731***	155.882**	200.016***
	(0.001)	(0.001)	(0.021)	(0.001)	(0.001)	(0.001)	(0.017)	(0.001)	(0.001)	(0.001)	(0.018)	(0.001)
TOTEXP	-0.1262**	-0.1267**	-0.0977	-0.1015*								
	(0.015)	(0.016)	(0.117)	(0.059)								
HLTEXP					-0.3908	-0.3965	-0.3590	-0.2472				
					(0.163)	(0.110)	(0.165)	(0.298)				
EDUEXP									-1.1339*	-1.1490*	-0.9609	-0.9081
									(0.096)	(0.098)	(0.167)	(0.182)
CPI	0.0293				0.0083				0.0208			
	(0.720)				(0.925)				(0.802)			
CC		0.5721				0.1101				0.4495		
		(0.782)				(0.958)				(0.829)		
FH			0.1896				0.2074				0.1962	
			(0.212)				(0.147)				(0.177)	
EIU				0.6493				0.8072				0.5623
				(0.625)				(0.541)				(0.668)
GDP	-17.816***	-17.727***	-15.153***	-17.971***	-16.720***	-16.689***	-14.267***	-17.161***	-17.896***	-17.857***	-15.292***	-18.156***
	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)	(0.001)	(0.004)	(0.001)
UNEM	0.2853**	0.2778**	0.2878**	0.2896**	0.2595**	0.2570**	0.2696**	0.2772**	0.2834**	0.2781**	0.2882**	0.2866**
	(0.011)	(0.016)	(0.021)	(0.012)	(0.015)	(0.019)	(0.027)	(0.014)	(0.011)	(0.016)	(0.022)	(0.012)
HICP	0.0643	0.0579	0.0693*	0.0503	0.0434	0.0418	0.0586	0.0326	0.0639*	0.0596	0.0727**	0.0505
	(0.105)	(0.222)	(0.072)	(0.282)	(0.330)	(0.429)	(0.144)	(0.499)	(0.090)	(0.178)	(0.040)	(0.250)
S80S20	-0.1122	-0.1070	-0.0213	-0.1301	-0.1823	-0.1819	-0.0530	-0.1938	-0.1736	-0.1685	-0.0593	-0.1771
	(0.911)	(0.916)	(0.984)	(0.893)	(0.860)	(0.860)	(0.961)	(0.846)	(0.862)	(0.866)	(0.955)	(0.853)
PSE	0.4615***	0.4635***	0.5204***	0.4062**	0.4629***	0.4626**	0.5241***	0.4121**	0.4985***	0.5005***	0.5520***	0.4350**
	(0.008)	(0.008)	(0.003)	(0.023)	(0.009)	(0.010)	(0.003)	(0.024)	(0.002)	(0.002)	(0.001)	(0.010)
DEBT	-0.0109	-0.0093	-0.0054	-0.0134	-0.0171	-0.0166	-0.0098	-0.0205	-0.0211	-0.0199	-0.0133	-0.0224
	(0.640)	(0.691)	(0.821)	(0.570)	(0.494)	(0.496)	(0.700)	(0.426)	(0.403)	(0.424)	(0.613)	(0.388)
TRADE	0.0394**	0.0402**	0.0392***	0.0393**	0.0456**	0.0457**	0.0446***	0.0453**	0.0365**	0.03711**	0.0365***	0.0370**
	(0.015)	(0.015)	(0.007)	(0.021)	(0.012)	(0.014)	(0.004)	(0.010)	(0.022)	(0.019)	(0.008)	(0.026)
R-squared within	0.6506	0.6503	0.6669	0.6601	0.6422	0.6421	0.6633	0.6535	0.6493	0.6492	0.6676	0.6587

F-statistic	31.90	30.64	30.29	33.66	27.33	27.73	26.58	30.55	29.82	30.16	28.53	28.31
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Obs.	430	430	430	404	430	430	430	404	430	430	430	404
Method	Cross-section fixed effects; Robust standard errors											

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

4.3 Nonlinear model

In the last section we found that, contrary to theoretical predictions, the coefficients of the institutional variables are not statistically significant. These results may result from misspecification, that is, a relationship that the linear model fails to capture. This section extends the baseline model by incorporating a quadratic term of the institutional variable to investigate potential nonlinear effects. Thus, we test the possibility that the impact of the institutional variable on poverty varies with institutional quality.

Table 8 shows the results of the inclusion of a squared term of the institutional indicators (while also maintaining the linear term) across different complete model specifications. The coefficients of total government expenditure are negative and significant at 5% level of significance in models 4, 5 and 6 and at 10% level of significance in model 7. Again, these results show that an increase in the share of total government expenditure is associated with a slightly lower percentage of people at risk of poverty and social exclusion. Regarding health and education expenditures, the results are similar to the linear model: coefficients display the expected direction but are non-significant in almost all specifications, except HLTEXP in model 10, and EDUEXP in models 12 and 13 (at 5% level of significance). Thus, the impact of increasing the government's share of GDP allocated to health and education on poverty remains mostly inconclusive. Concerning the control variables, the coefficients remain largely consistent across both the linear and the nonlinear models: GDP exhibits a negative relationship with AROPE, while UNEM, PSE and TRADE consistently display positive associations with the dependent variable, being all statistically significant at 5% level of significance.

The most interesting result of this model stems from the democracy variables (both FH and EIU) and their squared terms, which offer significant insights into the non-linear relationship between democracy and poverty. Across all specifications of the model, both FH and EIU exhibit positive and statistically significant (at 5% level of significance) linear coefficients, while their squared terms bear negative sign and are also statistically significant at 5% level of significance. This pattern suggests a U-inverted relationship between democracy and poverty: at low levels of democracy, greater democratization is associated with higher poverty rates but, up to a certain threshold, this relationship inverts and democratization become negatively associated with AROPE rates. Despite vast and mixed empirical literature on the effect of democracy on poverty, we found no study that directly

examines this non-linear relationship between democracy and poverty. However, taking into account broader outcomes that might be related to poverty, such as infant mortality, Wullert and Williamson's (2016) findings are interesting. They find an inverted U-shaped relationship between infant mortality and political regime in Sub-Saharan Africa. Mainly due to political instability, that undermines governance and distorts public expenditures, infant mortality is higher in hybrid regimes when compared with democracies and autocracies. Moreover, given that the democracy-poverty nexus can operate through channels such as GDP growth and income inequality, this type of relationship does have precedents in the literature. Recently, Campos et al. (2024) conclude that the relationship between political regime and economic performance is U-shaped, that is, income-wise, intermediate regimes – those which are neither fully democratic nor fully autocratic – perform worse than the other two regime types. According to this study, political stability – typical of intermediate regimes – and, consequently, social unrest, is the key explanation for the "Political U". Given that economic growth is a strong determinant of poverty reduction (as shown by our results on the coefficient of the control variable GDP), a hypothetical U-shaped pattern between growth and democracy supports our findings that the benefits of democratization for poverty reduction emerge only once democratic institutions reach high levels of institutional consolidation. Furthermore, Chong (2004) finds a political Kuznets curve: in countries above a certain democratic threshold, the link between democracy and income inequality is positive, but in countries below it, the link is negative. Considering the theoretical considerations on the close relationship between poverty and income inequality (though our results do not support it), our findings on the democracy-poverty linkage follow a similar pattern as Chong's (2004). It is worth mentioning, though, that the results involving quadratic terms of democracy shall be interpreted with caution, as they may reflect statistical artifacts such as collinearity (Colagrossi et al., 2020). However, the corruption variables do not exhibit the same pattern, as their coefficients are consistently insignificant across all non-linear model specifications. One possible explanation for the lack of statistical significance for the corruption variables, both in the linear and in the nonlinear models, might be endogeneity, a possibility that will be further explored in a following section. Furthermore, as noted by Chetwynd et al. (2003), the effect of corruption on poverty tends to operate indirectly rather than through a direct causal link. This may also help to explain the absence of statistical significance of the coefficients associated with the corruption indicators in this analysis.

Table 8 – The impact of fiscal policy and institutional quality on poverty (AROPE): non-linear model

	Dependent variable: AROPE											
	Model 4	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**
Constant	200.315***	195.732***	-45.619	88.9650	186.022***	182.518***	-60.256	73.976	199.992***	197.855***	-39.893	91.925
	(0.001)	(0.001)	(0.414)	(0.224)	(0.001)	(0.001)	(0.244)	(0.284)	(0.001)	(0.001)	(0.484)	(0.207)
TOTEXP	-0.1272**	-0.1244**	-0.1279**	-0.1017*								
	(0.015)	(0.016)	(0.023)	(0.056)								
HLTEXP					-0.3647	-0.3583	-0.5113**	-0.3113				
					(0.218)	(0.153)	(0.019)	(0.191)				
EDUEXP									-1.1135*	-1.1352*	-1.0904	-0.9631
									(0.092)	(0.092)	(0.105)	(0.161)
CPI	-0.1349				-0.1246				-0.0754			
	(0.725)				(0.755)				(0.841)			
CPI²	0.0015				0.0012				0.0009			
	(0.641)				(0.710)				(0.776)			
CC		-0.0671				-0.3995				0.2096		
		(0.985)				(0.912)				(0.952)		
CC²		0.4798				0.4058				0.2442		
		(0.790)				(0.825)				(0.891)		
FH			4.7263***				4.7179***				4.5723***	
			(0.000)				(0.000)				(0.000)	
FH²			-0.0269***				-0.0267***				-0.0259***	
			(0.000)				(0.000)				(0.000)	
EIU				24.7958**				25.8022**				25.0693**
				(0.018)				(0.014)				(0.022)
EIU²				-1.5375**				-1.5936**				-1.5614**
				(0.013)				(0.010)				(0.017)
GDP	-17.511***	-17.289***	-13.774***	-16.326***	-16.365***	-16.253***	-12.701***	-15.536***	-17.475***	-17.375***	-13.720***	-16.562***
	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)
UNEM	0.2769**	0.2688**	0.3228***	0.2783**	0.2541**	0.2514**	0.2970***	0.2618**	0.2775**	0.2718**	0.3231***	0.2754**
	(0.011)	(0.018)	(0.002)	(0.020)	(0.017)	(0.022)	(0.003)	(0.022)	(0.012)	(0.019)	(0.002)	(0.021)
HICP	0.0689	0.0635	0.1120***	0.0535	0.0479	0.0470	0.0995**	0.0378	0.0714*	0.0679	0.1141***	0.0567
	(0.115)	(0.209)	(0.003)	(0.290)	(0.326)	(0.397)	(0.019)	(0.478)	(0.083)	(0.150)	(0.002)	(0.246)
S80S20	-0.0501	-0.0917	0.0694	-0.2868	-0.1319	-0.1688	0.0269	-0.3544	-0.1305	-0.1494	0.0128	-0.3349
	(0.959)	(0.926)	(0.946)	(0.773)	(0.894)	(0.869)	(0.979)	(0.731)	(0.892)	(0.879)	(0.990)	(0.734)

PSE	0.4506***	0.4526***	0.5467***	0.3905**	0.4569***	0.4566***	0.5495***	0.3924**	0.4940***	0.4973***	0.5897***	0.4206***
	(0.008)	(0.006)	(0.001)	(0.021)	(0.009)	(0.008)	(0.001)	(0.022)	(0.002)	(0.001)	(0.000)	(0.008)
DEBT	-0.0066	-0.0052	-0.0013	-0.0099	-0.0134	-0.0130	-0.0069	-0.0162	-0.0170	-0.0158	-0.0114	-0.0187
	(0.774)	(0.820)	(0.945)	(0.647)	(0.586)	(0.590)	(0.741)	(0.498)	(0.492)	(0.524)	(0.605)	(0.438)
TRADE	0.0415***	0.0402***	0.0166*	0.0349**	0.0473***	0.0457***	0.0240**	0.0408***	0.0377***	0.0371***	0.0154	0.0321**
	(0.004)	(0.009)	(0.078)	(0.017)	(0.004)	(0.009)	(0.038)	(0.008)	(0.004)	(0.008)	(0.125)	(0.026)
R-squared within	0.6510	0.6497	0.7281	0.6755	0.6416	0.6409	0.7233	0.6700	0.6492	0.6488	0.7259	0.6749
F-statistic	34.53	34.74	147.23	27.47	31.96	32.91	113.20	22.93	32.71	34.88	117.33	20.53
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Obs.	428	428	428	402	428	428	428	402	428	428	428	402
Method	Cross-section fixed effects; Robust standard errors											

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

4.4 Model with Instrumental Variable: two-stages least squares

Another possibility, rather than misspecification, is the fact that institutions might be endogenous. Thus, there's a possibility that the linear panel least squares results are biased due to the presence of endogeneity, an issue that can stem from simultaneous causality between poverty and institutional quality variables. After testing for both democracy and corruption as potentially endogenous variables, we instrument only corruption since the results of preliminary diagnostic tests proved to be unsatisfactory for democracy.

Ünver and Koyuncu (2016) find evidence that poverty contributes to corruption, as higher levels of poverty are associated with higher levels of corruption. These results align with those of Justesen and Bjørnskov (2014), who found that poor people are more likely to face demands to pay bribes across all types of public services, given that they tend to use public services more frequently as they have fewer available alternatives (e.g. shifting to the private sector or moving to different geography). Thus, fighting corruption might include enlarging exit mechanisms out of corrupt public services. However, the authors highlight that, for such measures to be successful, policymakers shall not disregard anti-poverty measures, since access to exit options typically requires substantial financial resources. Furthermore, some authors shed light to the correlation between economic development – typically measured by per capita GDP – and corruption: corruption tends to be lower in wealthier countries, where the incidence of poor is generally lower (Husted, 1999; Paldam, 2002). To sum up, in addition to the widespread idea that corruption is a driver of poverty (e.g.: Dincer & Gunalp, 2008; Gupta et al., 2002), there is also evidence suggesting that poverty can, in turn, foster corruption. Additionally, there are several authors that highlight a potential bidirectional causality between corruption and growth (Mauro, 1995) and also between corruption and income inequality (Chong & Gradstein, 2007; You & Khagram, 2005), both regarded as channels through which corruption affects poverty. In fact, in a study on developing countries between 1997 and 2006, Negin et al. (2010) argue that such bidirectional relationship between corruption and poverty does exist.

To correct for such potential sources of endogeneity, this section explores the results obtained by two-stages least squares using instrumental variables (IV). Selecting an appropriate instrument is perhaps the most important, but also the most challenging step in this analysis. For a variable to be considered a valid instrument, it must exhibit two properties: (1) exogeneity, that is, it is uncorrelated with the error term and (2) relevance,

meaning that the instrument must be highly correlated to the endogenous explanatory variable (Greene, 2012, p. 263-264). Following the literature, we tested several instruments for corruption, including measures of political regime, cultural diversity, legal origin and geographical factors. Annex F provides a detailed description of the tested variables[11], along with their sources and year coverage.

Gupta et al. (2002) use democracy as an instrument of corruption in a regression whose dependent variable is the Gini Index. Though we do not share the same dependent variable, we use a measure of relative poverty that is conceptually related to the income inequality indicator. This instrument is relevant in so far as democracy appears to have a substantial impact in reducing corruption, as found by Kolstad & Wiig (2015). Not only because electoral freedom enables the people to expose and punish corrupt officials, but also due to the existence of effective checks and balances that monitor the public sector, we expect that democratic regimes are associated with lower levels of corruption. Furthermore, we assume democracy to be exogenous, following studies in the literature that find no consistent evidence of a direct impact of democracy on poverty (e.g.: Dörffel and Freytag, 2023; Ross, 2006). Thus, we test as instrument several proxies of democracy: Freedom house's democracy index (FH), The economist intelligence unit's democracy index (EIU), Direct democracy index (DIR_DEM), Representation index (REPR_DEM), Rights index (RIGHTS_DEM), Rule of law index (RL_DEM), Participation index (PART_DEM), WGI's Voice and accountability (VA) and Rule of law (RL).

Dincer & Gunalp (2008) use as instrument of corruption the religious fractionalization index. Indeed, La Porta et al. (1999) argue that religion is one of the determinants of institutional quality, including corruption, which is specifically emphasized by Treisman (2000). La Porta et al. (1999) conclude that countries in which the majority of population is either Catholic or Muslim have worse governments than those where most of the population is Protestant. Similarly, Treisman (2000) argue that countries with Protestant traditions tend to have lower levels of perceived corruption, not only through its positive impact on economic development and on democracy, but also because its focus is on the individual – rather than on the family – which is perceived to be personally accountable for avoiding errors. Additionally, because Protestant churches are usually more independent from the

[11] For most variables, we employed the Stata command that allows for IV estimation in panel data – xtivreg2. However, some of the variables are time-invariant, which hinder its use; instead, we applied the ivreg2 command and adjusted standard errors at the country level to account for intra-cluster correlation.

state, the civil society is more autonomous and monitors the state more efficiently. Therefore, assuming that religious affiliation has no impact on poverty except from its impact through corruption, we test religion as an instrument of corruption. Specifically, we transformed a categorical variable indicating the dominant religion in each country – Protestant, Catholic or Orthodox – into two binary variables, that were then employed as instruments for corruption in our regressions.

Another commonly used instrument for corruption in the literature is ethnolinguistic fractionalization. La Porta et al. (1999) also identify it as a determinant of government performance and conclude that ethnolinguistically heterogenous countries exhibit inferior government performance, that is, more corruption. Furthermore, in a study on how corruption affects investment and economic growth, Mauro (1995) uses an index of ethnolinguistic fractionalization – "which measures the probability that two persons drawn at random from a country's population will not belong to the same ethnolinguistic group" – as instrument of corruption. Assuming that ethnolinguistic fractionalization is exogenous to poverty, as Mauro (1995) assumes it to be exogenous to economic variables such as growth, we build on his work and test as instrumental variable the historical index of ethnologic fractionalisation (HIEF). Since this data were only available until 2013, to estimate values for the period 2014-2023 we applied a linear trend projection based on the available data. Additionally, we also tested a variable that represents the number of living indigenous languages per country, assuming that countries with a greater number of coexisting languages are more likely to experience higher levels of corruption.

Moreover, both the origin of the legal systems and latitude can serve as strong instrumental variables for corruption, given their strong correlation with government performance, as stated by La Porta et al. (1999), and can be considered exogenous to our dependent variable, poverty. They find that "countries that are close to the equator and use French or Socialist laws exhibit inferior government performance" (La Porta et al., 1999, p. 222). In the European context, it is also meaningful to distinguish between west and east, as the latter were significantly influenced by the Soviet Union, where institutions were weaker and accountability limited.

We conduct several tests to assess the presence of endogeneity, to evaluate the relevance of the instruments and to determine if each instrument is strong enough to serve as an instrumental variable. The endogeneity test reports a Chi-squared statistic and the

associated p-value under the null hypothesis that the specified variable is exogenous. Thus, for the regressor to be endogenous, the p-value must be low so that we reject the null hypothesis. The null hypothesis of the underidentification test is that the instruments are not correlated with the endogenous variable, hence for the instruments to be relevant, we must reject the null hypothesis. Finally, the weak identification test corresponds to the F-statistic of the first stage, which – according to the widespread rule of thumb – must not be smaller than 10 for the instrument to be considered sufficiently strong and to avoid estimation bias (Staiger & Stock, 1997). Only one indicator, Voice and Accountability (VA), was validated by all the tests, as shown by Table 9 below. All the other potential instruments failed at least one of the tests (see Annex G).

Table 9 – Endogeneity, underidentification and weak identification tests

	Model 4	**Model 5**	**Model 8**	**Model 9**	**Model 12**	**Model 13**
			Instrument: VA			
Endogeneity	3.053*	3.449*	2.975*	3.457*	2.914*	3.289*
	(0.0806)	(0.0633)	(0.0846)	(0.0630)	(0.0878)	(0.0697)
Underidentification	4.325**	7.992***	3.950**	7.600***	4.357**	8.107***
	(0.0376)	(0.0047)	(0.0469)	(0.0058)	(0.0369)	(0.0044)
Weak identification	12.220***	20.230***	9.989***	16.217***	11.575***	17.097***
	(0.0017)	(0.0001)	(0.0040)	(0.0004)	(0.0022)	(0.0003)

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

The endogeneity test results indicate that the null hypothesis of exogeneity was rejected at 10% significance level across all models – for total, health and education expenditure, using both CC and CPI. Hence, the corruption variable is considered endogenous and IV estimation is preferred to OLS in order to obtain unbiased estimations. Regarding the relevance of the instrument, Voice and Accountability, the results of the underidentification test reveal that the instruments are correlated with the endogenous variable as the null hypothesis is rejected at 5% level of significance across all models. Furthermore, the results of the weak instrument test show that the F-statistic exceeds 10 in all models, except in model 8, in which it is approximately 10. This indicates that the instrument is sufficiently strong to mitigate weak instrument bias. Therefore, the 2SLS estimation with Voice and Accountability as the IV for the corruption variable, with coefficients reported in Table 10, is considered reliable.

Table 10 - The impact of fiscal policy and institutional quality on poverty (AROPE): 2SLS with IV model (2nd stage)

Dependent variable: AROPE						
	Model 4	**Model 5**	**Model 8**	**Model 9**	**Model 12**	**Model 13**
CPI	0.4088** (0.037)		0.4481** (0.044)		0.4163** (0.043)	
CC		6.4327** (0.047)		6.9085* (0.055)		6.4620* (0.057)
TOTEXP	-0.1712** (0.016)	-0.1672*** (0.005)				
HLTEXP			-0.0254 (0.941)	-0.3180 (0.271)		
EDUEXP					-1.2457* (0.079)	-1.4288** (0.030)
GDP	-20.8812*** (0.000)	-19.2416*** (0.000)	-19.3813*** (0.000)	-17.8802*** (0.001)	-20.7442*** (0.000)	-19.3362*** (0.000)
UNEM	0.3836*** (0.005)	0.2788** (0.044)	0.3972*** (0.007)	0.2643* (0.070)	0.3869*** (0.005)	0.2796** (0.045)
HICP	0.1333*** (0.005)	0.0475 (0.350)	0.1026** (0.039)	0.0174 (0.758)	0.1284** (0.012)	0.0468 (0.337)
S80S20	0.0654 (0.950)	0.0867 (0.932)	-0.0475 (0.966)	0.0004 (1.000)	-0.0204 (0.984)	0.0080 (0.994)
PSE	0.4933*** (0.003)	0.5097*** (0.004)	0.5428*** (0.004)	0.5352*** (0.006)	0.5448*** (0.001)	0.5601*** (0.000)
DEBT	-0.0270 (0.386)	-0.0053 (0.857)	-0.0445 (0.181)	-0.0171 (0.578)	-0.0421 (0.175)	-0.0194 (0.515)
TRADE	0.0529*** (0.001)	0.0587*** (0.004)	0.0647*** (0.001)	0.0700*** (0.005)	0.0524*** (0.001)	0.0561*** (0.005)
R-squared Centered	0.4878	0.5841	0.4257	0.5514	0.4706	0.5788
F-statistic	33.62	22.04	36.98	19.78	39.11	24.35
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Obs.	430	430	430	430	430	430
Method	Fixed-effects two-stage least squares; Clustered standard errors at the country level					

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Similar to both the linear and non-linear models, the coefficients of the total government expenditure variable are negative and statistically significant at 5% significance level. While health spending does not impact poverty in these models since the coefficients are not significant, education spending's coefficients are negative and statistically significant at 10% (Model 12) and 5% (Model 13) level of significance. With respect to the control variables, the results remain consistent with those observed in previous models: per capita GDP, unemployment rate, primary sector employment and trade openness all exhibit statistically significant coefficients in all specifications, maintaining the same direction of the previously identified effect. This consistency highlights the reliability of the IV findings.

The main conclusion from the IV regression is the fact that the coefficients of the corruption variables gain significance throughout all specifications: at 5% significance level for CPI and at 10% significance level for CC. In the models with total government expenditure, an increase of one unit in Control of Corruption is associated with a 6.43 percentage point increase in AROPE, while a one-unit rise in the Corruption Perceptions Index corresponds to an average increase of just 0.41 percentage points, ceteris paribus. In all cases, the signal is positive, meaning that less corruption is linked to higher poverty rates in our sample. Such result is counterintuitive, given that corruption is widely understood to hinder economic growth, promote income inequality and reduce governance capacity (Chetwynd et al., 2003) – hence, according to the literature, higher corruption is expected to worsen poverty. However, as highlighted by Aidt (2003), there is a strand in the literature that argues that, under certain circumstances, corruption can be efficient. Such circumstances include "a set of unavoidable distortions created by various government procedures or policies" (Aidt, 2003, p. 634). Therefore, the potential benefits of corruption arise in a second-best scenario, while the first-best one would always be the removal of all distortions. According to Aidt (2003), there are two distinct pathways by which corruption can contribute to a greater allocative efficiency: first, the idea that corruption fosters competition for scarce government resources, which enables services to be delivered more efficiently than they otherwise would have been; second, the so-called "grease the wheels" theory that asserts that corruption accelerates bureaucratic procedures (see e.g., Leff, 1964; Leys, 1965; Lui, 1985); Despite several theoretical models, the empirical evidence on this stream is weak, being more in line with the opposite hypothesis that corruption "sand the wheels" (Méon & Sekkat, 2005; Hoinaru et al., 2020; Nur-tegin & Jakee, 2020). However, some studies provide support for the "grease the wheels" hypothesis as corruption is found to be positively associated with efficiency in countries where institutions are extremely ineffective (Méon & Weill, 2010) and to facilitate firm entry in highly regulated economies (Dreher & Gassebner, 2013). For the specific case of Europe, Bardhan (1997) provides some historical examples in which corruption may actually support development by enabling entrepreneurs to arise. More specifically, on an EU-15 study, Chapsa & Katrakilidis (2022) find evidence that, in countries with poor governance, particularly in Southern Europe, corruption promotes economic growth. As far as our findings are concerned, the positive effect of corruption on poverty can steam from the excessive bureaucracy within the EU framework, which can both hinder the creation of new businesses, particularly from new or small entrepreneurs, and make it

difficult for poor people to take up welfare benefits that they need and are entitled to. Indeed, the complexity and the resource intensity of the procedures are reported to contribute to non-take-up of benefits (Eurofound, 2015). That said, we are not suggesting that corruption should be encouraged; rather, we note that the beneficial side of corruption in regard to growth and, consequently, poverty alleviation does exist under some circumstances. Furthermore, in contexts where the informal sector plays a major role, anti-corruption reforms may limit informal income opportunities and obstruct the access to otherwise unaffordable goods for the poor (Ruzek, 2015).

4.5 Model with interaction term

Finally, to investigate the role of institutions in how public spending impacts poverty reduction, and following Komarudin (2020), Makuta and O'Hare (2015), Rajkumar and Swaroop (2008) and Suryadarma (2012), we reestimate the linear regression applying an interaction term between public expenditure indicators and institutional quality indicators. In theory, we would expect that better institutions would increase the effectiveness of fiscal policy on poverty alleviation. Thus, we predicted the coefficient of the interaction term to be negative. However, our results are not in line with the theoretical predictions. The coefficients of the interaction terms are not statistically significant across all specifications (see Annex H). Thus, we do not find evidence that stronger institutions enhance the relationship between fiscal policy and poverty alleviation. While the coefficients of the control variables are similar to the results of the baseline linear model, the fiscal policy indicators, particularly total government expenditure, lose significance.

Chapter 5. Conclusion

Ending poverty remains one of the main objectives of our time. Apart from the developing world, about which several poverty studies have been made, many people in the most advanced economies still experience poverty.

Taking as sample the EU-27 countries in the 2008-2023 period, the present paper primarily aims to test three hypothesis: (1) the way fiscal policy – more specifically, public spending – is conducted by national governments affects their countries' poverty rates; (2) controlling for fiscal policy measures, the level of institutional quality – particularly in terms of corruption levels and adherence to democratic principles – influences each country's poverty outcomes; (3) each country's institutional framework, namely regarding the level of corruption and democratic principles, may have a mediating effect on the fiscal policy-poverty nexus. As a starting point for this purpose, we carried out extensive background research on our key concepts and on the mechanisms that underline the link institutions-fiscal policy-poverty, as well as their empirics. Next, we described the dataset and proceeded to the estimation of the model. The model considered poverty (AROPE) as dependent variable and fiscal policy (total, health and education expenditures as share of GDP), institutional quality (corruption (CC, CPI), democracy (FH, EIU)) and controls as independent variables. First, we conducted the baseline model only with fiscal policy regressors and then, we complemented it with institutional quality indicators. This model, estimated using panel least squares with fixed effects, tests the separate impact of fiscal policy and institutional indicators on poverty. Second, we tested a nonlinear model that includes a squared term of the institutional variables. Third, we implemented a two-stage least squares model with instrumental variable to address potential endogeneity of the corruption variables. Finally, our fourth model includes an interaction term between public spending and institutional quality variables to assess the mediating role of institutions on the relationship between fiscal policy and poverty. Each model is estimated under various specifications, since we use more than one proxy for each independent variable.

The results from the linear, nonlinear and 2SLS regressions support the first hypothesis. Particularly, total government expenditure exhibits significant negative effects on poverty rates throughout all specifications and all models. This result is similar to that of Mehmood & Sadiq (2010) and Wahiba & Ahlem (2022), who suggest that as the share of

total public spending on GDP increases, poverty rates tend to decrease. The impact of health and education public spending on poverty follow the same direction: more expenditure is associated with less poverty. However, this effect is not as robust, since in some specifications the coefficients for these variables lose statistical significance. Nevertheless, it is worth noting that, in terms of magnitude, the coefficient of spending on these areas, particularly education, is more negative than that of total government spending in almost all model specifications. This means that increases in education spendings are associated with a larger decrease in AROPE than increases in health or total government spending. All in all, our findings imply that policymakers should refrain from reducing overall public spending and should even try to increase it, as it can be an effective tool for poverty alleviation. Furthermore, the differential impact of various areas of spending highlights the importance of allocating public expenditure strategically. In this case, decision-makers should prioritize education spending over other areas of government spending, as it yields higher returns in terms of poverty reduction.

The second hypothesis is not supported by the linear model, since the coefficients of all the institutional variables are not statistically significant. However, our study provides interesting evidence regarding the relationship between institutional quality and poverty. On one hand, according to the nonlinear model, democracy appears to exhibit an inverted U-shaped relationship with poverty, meaning that as democratization increases, poverty tends to rise until it reaches a certain point, after which further democratization is associated with lower AROPE values. This finding aligns with those of Campos et al. (2024), regarding the relationship between political regime and economic performance, and Chong (2004), who finds a political Kuznets curve. On the other hand, the 2SLS regression suggests that reductions in corruption indicators are linked to increases in poverty rates, a result in line with the "grease the wheels" theory developed by Leff (1964) and Leys (1965). Nonetheless, the interpretation of these results should be approached with caution. We do not intend to convey the idea that better institutions, particularly measured by corruption and democracy, are detrimental for the people; contrarily, we have shown many mechanisms through which institutional quality can help the economy and its agents, while delivering broader societal benefits. Rather, these results suggest that, in the EU context, pro-democratic and anti-corruption measures alone may not constitute the best polices for reducing poverty rates, particularly in settings where the institutional framework is weak.

Finally, unlike previous studies (Komarudin, 2020; Makuta and O'Hare, 2015; Rajkumar and Swaroop, 2008; Suryadarma, 2012), ours do not support the third hypothesis, as in the model with interaction terms, the coefficients of the fiscal policy and institutional variables, including the interaction terms, are statistically insignificant.

This study contributes to the literature by addressing the often overlooked and still ambiguous role of fiscal policy in poverty reduction, offering evidence from the relatively underexplored context of developed countries, specifically the EU, about which few studies on the matter have been made. Furthermore, the analysis adds value to the discussion on the relationship between institutional quality and poverty, with nuanced implications for policy design.

Despite the interest of our results, we shall note that this study has some limitations, mainly concerning data availability. For several variables – including our dependent variable, AROPE – we had to make some adjustments in order to reach a harmonized dataset for the whole period of analysis (2008-2023). Moreover, there are missing values for the EIU's democracy index in 2009, for the S80/S20 ratio in Croatia in 2008 and 2009, for the direct democracy index in Cyprus and for the HIEF in France, Luxembourg and Malta. In addition, although it adds to the literature, using the EU as sample can be seen as a limitation since it limits the variability of some proxies, mainly the institutional ones, which can hinder the detection of statistically significant relationships. Therefore, expanding the sample to include all OECD countries could be an interesting future research, as it would maintain the focus on more developed economies while increasing cross-section variation and heterogeneity. Future research could also enrich the literature by making an analysis on the fiscal policy-poverty relationship with regard to the revenue side of fiscal policy, assessing the role of taxation in shaping poverty rates. Finally, although our study did not find evidence on the mediating effect of institutions on the fiscal policy-poverty nexus, we consider this topic highly important for decision-making. Thus, it should be further studied in future investigations using alternative methodological approaches, rather than relying on the introduction of interaction terms as in the present dissertation.

Regardless of the chosen path, future researchers and policymakers in this area should always keep in mind the words of António Guterres: "Ending poverty is the challenge of our time. But it is a challenge we can win."

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Annexes

Annex A - Summary of relevant articles

Author	Title	Sample	Methodology	Dependent Variable(s)	Main Explanatory Variables	Control Variables	Conclusions
Malla & Pathranarakul (2022)	Fiscal Policy and Income Inequality: The Critical Role of Institutional Capacity	2000 – 2019 35 developed countries and 33 developing countries	Generalized Method of Moments (GMM)	Gini index of households' disposable income after taxes, liabilities, and receiving benefits	Total Government Expenditure; Income Tax; Taxes on goods and services; Public Debt; Health Expenditure; Education Expenditure; Government Effectiveness; Corruption.	Democracy; GDP per capita; Foreign direct investment; Inflation; Trade openness; Population growth rate.	Government size, education expenditure and health expenditure are negatively associated with income inequality in developed countries only. Taxes on goods and services and public debt were found not to influence income distribution across the world. Institutions play a minor role in influencing the effect of fiscal policy on income inequality.
Rajkumar & Swaroop (2008)	Public spending and outcomes: Does governance matter?	1990, 1997 and 2003 91 countries developed and developing countries	Ordinary Least Squares (OLS) Two-Stage Least Squares (2SLS)	Under-5 (child) mortality rate (natural logarithm) Primary education failure rate (natural logarithm)	Public health spending (% of GDP) (natural logarithm); Index of corruption and quality of bureaucracy. Public education spending (% of GDP) (natural logarithm); Index of corruption and quality of bureaucracy.	Per capita GDP; Female education; Income inequality; Religion; Ethnolinguistic fractionalization; Access to safe water; Urbanization; Percentage of population under 5; Latitude. Per capita GDP; Adult illiteracy rate; Income inequality; Religion; Ethnolinguistic fractionalization; Urbanization; Percentage of population aged 6-12; East Asia dummy; Latitude.	Public health spending has a stronger negative impact on child mortality in countries that have good governance. However, in countries with bad governance, public health spending at the margin will be ineffective. In countries with good governance, education spending is effective in lowering education failure rates, but there is no evidence of this in a country with bad governance.

Komarudin (2020)	Public Health Spending, Governance Quality and Poverty Alleviation	2003 – 2016 24 lower–upper and middle–upper income developing countries	Random Effects (RE) model Instrumental Variables (IV) (Two-Stage Least Squares [2SLS]) First-Difference Generalized Method of Moments (GMM)	Poverty Headcount ratio	Public health spending (% of GDP); Government effectiveness index.	GDP per capita; Trade (% of GDP).	Public health spending reduces poverty, with this effect being stronger in poorly governed countries. Countries with good governance tend to reduce poverty more effectively than those with poor governance. Governance quality itself has a stronger effect on poverty reduction than public health spending alone.
Suryadarma (2012)	How corruption diminishes the effectiveness of public spending on education in Indonesia	2002-2008 32 regions in Indonesia	Pooled Ordinary Least Squares (OLS)	Net junior and senior secondary school enrolment rates Performance in junior secondary school national exams	Public education spending per student; Corruption Perception Index.	Private education spending per student; Poverty headcount rate;	Public spending improves enrolment only in less corrupt regions. No significant effect on school performance regardless of corruption levels.
Makuta & O'Hare (2015)	Quality of governance, public spending on health and health status in Sub Saharan Africa: a panel data regression analysis	1996-2011 43 countries in Sub Saharan Africa	Two-Stage Least Squares (2SLS)	Under-five mortality Life expectancy at birth	Public spending on health (% of GDP) (natural logarithm); Quality of governance (5 governance indicators);	GDP per capita (natural logarithm); Socio-economic status vector (female literacy, sanitation, immunization, urbanization and number of physicians).	Public spending on health improves health outcomes, but its effectiveness is significantly enhanced in countries with better governance.
Dankumo et al. (2021)	Governance, Public Expenditure, Trade and Poverty Reduction in Sub-Saharan African Countries	1996 – 2019 27 countries of Sub-Saharan Africa	Pooled Mean Group (PMG)	Human Development Index (HDI)	Government expenditures (% of GDP); Governance (control of corruption, political stability); Trade.	Lagged HDI.	Control of corruption, political stability, government expenditure and trade are positively related to poverty reduction specially in the long run, being control of corruption the most effective one. The quality of governance plays a more significant role in reducing poverty than public expenditure alone.

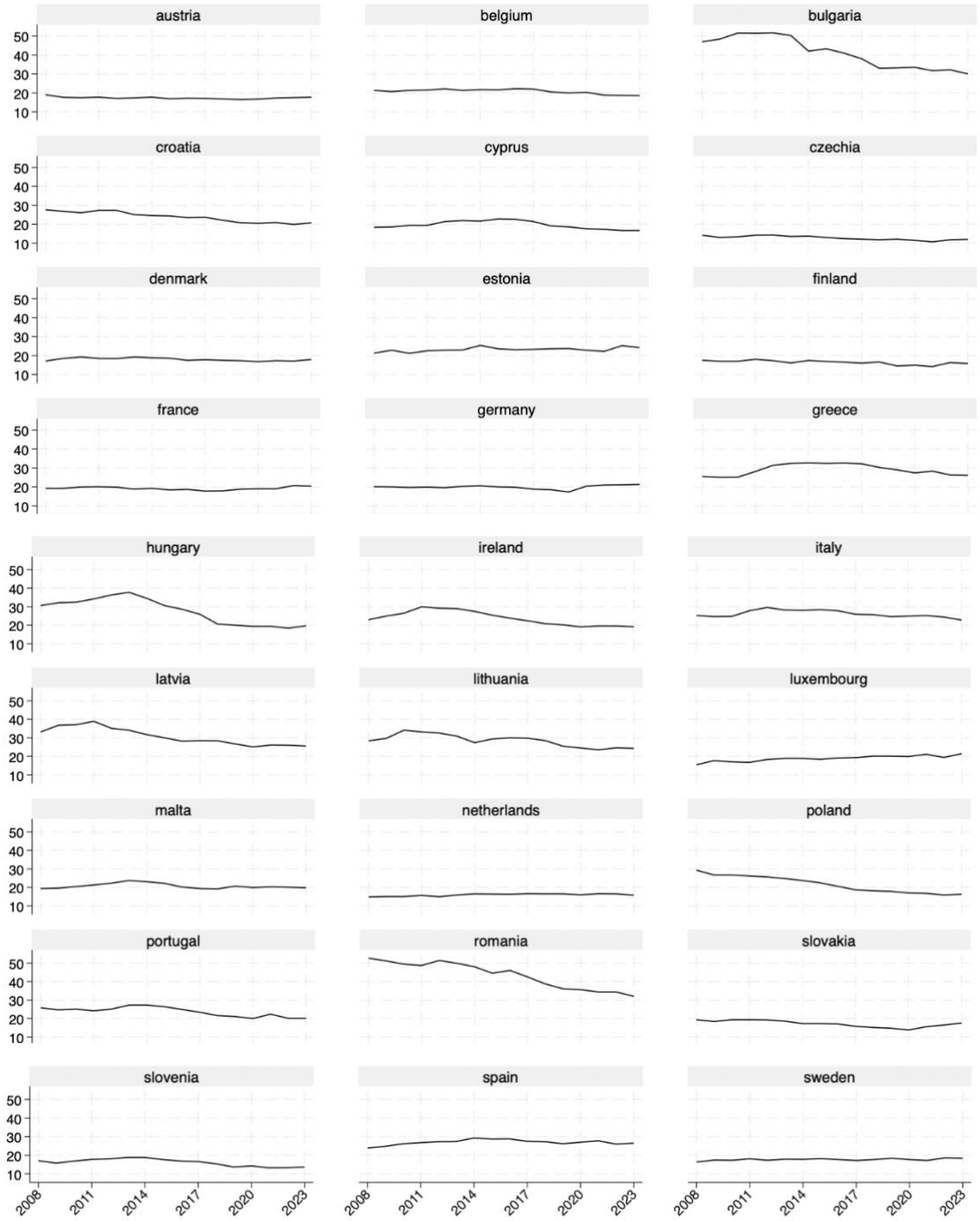
Source: Own elaboration

Annex B - AROPE components: Europe 2020 vs Europe 2030 strategy

Component	Europe 2020 strategy	Europe 2030 strategy
At risk of poverty rate	Percentage of people in the total population with an equivalised disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income after social transfers.	Percentage of people in the total population with an equivalised disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income after social transfers.
Deprivation	Severe material deprivation rate (SMD): Proportion of the population that cannot afford (rather than the choice not to do so) at least 4 out of 9 predefined material items considered by most people to be desirable or even necessary to lead an adequate life.	Severe material and social deprivation rate (SMSD): Proportion of the population experiencing an enforced lack of at least 7 out of 13 deprivation items (6 related to the individual and 7 related to the household).
Work intensity	Low work intensity indicator (LWI): People from 0-59 years living in households where the adults (those aged 18-59 excluding students aged 18-24) worked a working time equal or less than 20 % of their total combined work-time potential during the previous year.	Very low work intensity indicator (VLWI): People from 0-64 years living in households where the adults (those aged 18-64, but excluding students aged 18-24 and people who are retired according to their self-defined current economic status or who receive any pension (except survivors pension), as well as people in the age bracket 60-64 who are inactive and living in a household where the main income is pensions) worked a working time equal or less than 20% of their total combined work-time potential during the previous year.

Source: Own elaboration. Metadata obtained at Eurostat. Available at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:At_risk_of_poverty_or_social_exclusion_(AROPE). Accessed on March 24, 2025.

Annex C – AROPE (%) in the EU-27 member states, 2008-2023



Source: Own elaboration. Data obtained at Eurostat. Available at https://doi.org/10.2908/ILC_PEPS01 and https://doi.org/10.2908/ILC_PEPS01N. Accessed on March 24, 2025.

Annex D – Simple model: diagnostic tests and results

Table D.1 – Results of cross-sectional Hausman test

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
51.04***	43.91***	56.35***	52.25***	53.62***	55.29***	45.76***	46.94***
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
49.41***	42.96***	28.77***	49.50***	46.47***	49.39***	36.35***	
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table D.2 – Results of F-test for pooled OLS vs fixed effects

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
114.93***	99.85***	105.66***	113.61***	113.53***	110.65***	110.37***	100.19***
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
100.18***	98.76***	95.71***	105.80***	105.49***	106.30***	100.27***	
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table D.3 – Results of time fixed effects tests

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
2.47***	2.28***	1.93**	2.43***	2.41***	2.67***	2.19***	2.27***
(0.0017)	(0.0043)	(0.0194)	(0.0021)	(0.0023)	(0.0007)	(0.0079)	(0.0044)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
2.21***	2.62***	2.01**	1.94**	1.96**	2.06**	1.70*	
(0.0057)	(0.0009)	(0.0164)	(0.0185)	(0.0169)	(0.0111)	(0.0527)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table D.4 – Results of test for heteroskedasticity

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
3948.37***	4868.35***	2902.80***	3729.17***	4267.73***	2654.03***	4239.95***	3188.52***
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
4427.46***	2828.42***	3237.80***	2415.17***	2903.54***	2452.63***	2509.10***	
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table D.5 – Results of test for autocorrelation

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
78.200***	76.905***	82.619***	84.534***	77.692***	95.874***	53.673***	79.927***
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
75.210***	97.715***	57.250***	84.206***	80.776***	101.664***	66.267***	
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table D.6 – Results of cross-sectional dependence tests

Pesaran's cross-sectional dependence test							
Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
-1.637	-0.412	-1.500	-1.664*	-1.715*	-1.802*	-1.409	-0.501
(0.1017)	(0.6802)	(0.1336)	(0.0962)	(0.0864)	(0.0715)	(0.1587)	(0.6161)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
-0.468	-0.989	-0.292	-1.597	-1.622	-1.609	5.027***	
(0.6397)	(0.3228)	(0.7700)	(0.1102)	(0.1047)	(0.1077)	(0.0000)	
Friedman's statistic							
Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
10.725	14.605	9.092	11.036	10.324	10.712	10.707	14.618
(0.9964)	(0.9641)	(0.9991)	(0.9954)	(0.9974)	(0.9964)	(0.9964)	(0.9639)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
14.065	13.101	15.300	5.914	8.605	8.899	34.204	
(0.9721)	(0.9830)	(0.9516)	(0.2116)	(0.9995)	(0.9993)	(0.1300)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table D.7 – The impact of fiscal policy on poverty (AROPE): linear model

	Model 1	**Model 2**	**Model 3**
Constant	279.309*** (0.001)	247.752*** (0.000)	260.054*** (0.000)
TOTEXP	-0.2031** (0.047)		
HLTEXP		-0.7714 (0.131)	
EDUEXP			-1.3219 (0.190)
GDP	-24.476*** (0.000)	-21.776*** (0.000)	-22.78013*** (0.000)
R-squared within	0.6014	0.5862	0.5886
F-statistic	12.11	15.95	11.73
Prob (F-statistic)	0.0000	0.0000	0.0000
Obs.	432	432	432
Method	Cross-section and period fixed effects; Robust standard errors		

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table D.8 – The impact of fiscal policy and institutional quality on poverty (AROPE): linear model

	Dependent variable: AROPE											
	Model 4	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**
Constant	277.222*** (0.000)	275.349*** (0.000)	259.277*** (0.000)	282.865*** (0.000)	247.042*** (0.000)	243.777*** (0.000)	226.619*** (0.000)	251.503*** (0.000)	258.183*** (0.000)	255.499*** (0.000)	239.425*** (0.000)	264.895*** (0.000)
TOTEXP	-0.1951* (0.063)	-0.1937* (0.057)	-0.1853* (0.087)	-0.1887* (0.066)								
HLTEXP					-0.7808 (0.106)	-0.7722 (0.113)	-0.8044* (0.090)	-0.6943 (0.155)				
EDUEXP									-1.2582 (0.215)	-1.2286 (0.235)	-1.1726 (0.240)	-1.2435 (0.230)
CPI	-0.0247 (0.777)				-0.0651 (0.473)				-0.0501 (0.563)			
CC		-0.7542 (0.750)				-1.5727 (0.500)				-1.1000 (0.634)		
FH			0.1294 (0.469)				0.1736 (0.305)				0.1426 (0.402)	
EIU				0.7193 (0.667)				1.0368 (0.532)				0.6474 (0.702)
GDP	-24.148*** (0.000)	-24.049*** (0.000)	-23.769*** (0.000)	-25.474*** (0.000)	-21.289*** (0.000)	-21.224*** (0.000)	-21.274*** (0.000)	-23.034*** (0.000)	-22.311*** (0.000)	-22.266*** (0.000)	-22.135*** (0.000)	-23.825*** (0.000)
R-squared within	0.6021	0.6025	0.6094	0.6152	0.5912	0.5914	0.6010	0.6007	0.5915	0.5911	0.5984	0.6034
F-statistic	28.21	19.64	18.21	16.29	23.50	24.28	18.03	17.56	17.41	15.30	15.83	13.96
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Obs.	432	432	432	405	432	432	432	405	432	432	432	405
Method	Cross-section and period fixed effects; Robust standard errors											

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table D.9 – The impact of fiscal policy and institutional quality on poverty (AROPE): non-linear model

	Dependent variable: AROPE											
	Model 4	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**
Constant	297.191*** (0.000)	280.017*** (0.000)	40.654 (0.526)	151.598* (0.063)	261.704*** (0.000)	246.924*** (0.000)	3.1209 (0.956)	112.656 (0.112)	268.787 (0.000)	197.855*** (0.001)	23.2390 (0.709)	130.533* (0.088)
TOTEXP	-0.2083** (0.047)	-0.1968* (0.051)	-0.1962 (0.052)	-0.1898* (0.066)								
HLTEXP					-0.8081 (0.100)	-0.7547 (0.122)	-0.9360** (0.033)	-0.8047 (0.114)				
EDUEXP									-1.2233 (0.234)	-1.1962 (0.259)	-1.1192 (0.230)	-1.3343 (0.209)
CPI	-0.3952 (0.417)				-0.3759 (0.469)				-0.2968 (0.546)			
CPI²	0.0032 (0.415)				0.0027 (0.710)				0.0021 (0.591)			
CC		-3.1860 (0.456)				-3.6915 (0.401)				-3.2091 (0.457)		
CC²		1.6265 (0.465)				1.4097 (0.548)				1.3950 (0.537)		
FH			5.0015*** (0.000)				5.1431*** (0.000)				4.8811*** (0.000)	
FH²			-0.0291*** (0.000)				-0.0296*** (0.000)				-0.0283*** (0.000)	
EIU				29.215*** (0.009)				31.5457*** (0.004)				30.1382*** (0.009)
EIU²				-1.8262*** (0.008)				-1.9563*** (0.004)				-1.8922*** (0.007)
GDP	-25.123*** (0.000)	-24.525*** (0.000)	-21.930*** (0.000)	-23.330*** (0.000)	-21.924*** (0.000)	-21.569*** (0.000)	-19.336*** (0.000)	-20.839*** (0.00)	-22.741*** (0.000)	-22.576*** (0.000)	-20.083*** (0.000)	-21.698*** (0.000)
R-squared within	0.6091	0.6083	0.6820	0.6394	0.5962	0.5957	0.6761	0.6283	0.5946	0.5953	0.6670	0.6294
F-statistic	42.76	28.89	79.91	14.21	19.89	24.90	70.00	18.66	24.10	25.67	126.78	10.38
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Obs.	432	432	432	405	432	432	432	405	432	432	432	405

Method	Cross-section and period fixed effects; Robust standard errors

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table D.10 – The impact of fiscal policy and institutional quality impact on poverty (AROPE): model with interaction term

	Dependent variable: AROPE											
	Model 4	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**
Constant	280.843***	276.731***	304.052***	281.868***	234.421***	225.868***	236.822***	256.328***	264.955***	257.694***	224.251***	243.281***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)
TOTEXP	-0.3816	-0.2516	-1.1275	-0.1621								
	(0.284)	(0.126)	(0.299)	(0.776)								
HLTEXP					-3.7133	-1.5999*	-3.2694	-2.5147				
					(0.143)	(0.071)	(0.567)	(0.577)				
EDUEXP									-2.3590	-1.6097	1.8929	4.1480
									(0.482)	(0.265)	(0.825)	(0.394)
CPI	-0.1589				-0.3699				-0.1427			
	(0.561)				(0.225)				(0.606)			
CC		-2.7996				-7.3973				-2.9983		
		(0.565)				(0.149)				(0.502)		
FH			-0.3392				0.0358				0.3043	
			(0.550)				(0.934)				(0.540)	
EIU				0.8585				-0.3467				3.8162
				(0.815)				(0.937)				(0.248)
TOTEXP * CPI	0.0028											
	(0.542)											
TOTEXP * CC		0.0470										
		(0.560)										
TOTEXP * FH			0.0100									
			(0.374)									
TOTEXP * EIU				-0.0032								
				(0.959)								
HLTEXP * CPI					0.0494							
					(0.198)							

HLTEXP * CC						1.0138 (0.154)						
HLTEXP * FH							0.0270 (0.654)					
HLTEXP * EIU								0.2348 (0.676)				
EDUEXP * CPI									0.0172 (0.706)			
EDUEXP * CC										0.3724 (0.647)		
EDUEXP * FH											-0.0326 (0.725)	
EDUEXP * EIU												-0.6681 (0.249)
GDP	-23.630*** (0.000)	-23.942*** (0.000)	-23.834*** (0.000)	-25.491*** (0.000)	-18.290*** (0.002)	-19.028*** (0.000)	-21.053*** (0.000)	-22.462*** (0.000)	-22.406*** (0.000)	-22.300*** (0.000)	-22.135*** (0.000)	-24.207*** (0.000)
R-squared within	0.6039	0.6038	0.6131	0.6152	0.6080	0.6084	0.6022	0.6018	0.5926	0.5922	0.5988	0.6085
F-statistic	27.83	15.83	16.90	17.80	32.40	54.89	16.78	14.76	16.47	13.20	15.66	16.90
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Obs.	432	432	432	405	432	432	432	405	432	432	432	405
Method	Cross-section and period fixed effects; Robust standard errors											

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Annex E – Diagnostic tests: complete model

Table E.1 – Results of F-test for pooled OLS vs fixed effects

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
52.23***	50.45***	51.05***	52.29***	52.20***	54.77***	46.99***	50.33***
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
50.30***	53.57***	45.71***	50.62***	50.20***	54.12***	45.89***	
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table E.2 – Results of test for heteroskedasticity

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
4005.51***	3531.26***	4028.86***	3762.82***	3534.60***	5501.80***	3250.97***	3473.62***
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
3448.92***	3965.05***	2672.58***	3901.43***	3921.36***	5296.51***	3499.47***	
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table E.3 – Results of test for autocorrelation

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
56.072***	54.042***	59.485***	60.671***	55.367***	70.965***	35.718***	56.870***
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
52.602***	66.671***	38.589***	61.813***	57.297***	75.647***	42.580***	
(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table E.4 – Results of cross-sectional dependence tests

Pesaran's cross-sectional dependence test							
Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
1.054	1.706*	1.112	1.136	1.070	1.241	1.495	1.717*
(0.2919)	(0.0881)	(0.2662)	(0.2557)	(0.2848)	(0.2147)	(0.1349)	(0.0859)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
1.725*	1.832*	2.169**	1.087	1.152	1.428	1.494	
(0.0845)	(0.0670)	(0.0301)	(0.2769)	(0.2493)	(0.1534)	(0.1352)	
Friedman's statistic							
Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
10.147	22.115	18.344	19.004	19.356	17.447	22.424	21.734
(0.7845)	(0.6824)	(0.8629)	(0.8363)	(0.8211)	(0.8950)	(0.6653)	(0.7031)
Model 9	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**	
22.551	21.768	27.178	18.509	18.162	14.831	21.650	
(0.6582)	(0.7013)	(0.4001)	(0.8565)	(0.8698)	(0.9604)	(0.7077)	

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Annex F - Description of the potential instrumental variables

Variable	Description	Source	Sample (countries, years)	Expected relationship with corruption
FH	Measure of democracy that combines countries' scores on political rights (0-40 points), including electoral process, political pluralism and participation and functioning of government, and civil liberties (0-60 points), covering freedom of expression and belief, associational and organizational rights, rule of law and personal autonomy and individual rights. Overall, this proxy ranges from 0 to 100, with higher scores indicating a more democratic country.	Freedom House	27 EU countries, 2008-2023	The more democratic is the country, the less corruption it tends to be.
EIU	The EIU's Democracy Index is based on 60 indicators grouped into five categories: electoral process and pluralism, civil liberties, functioning of government, political participation and political culture. It measures the extent to which citizens can choose their political leaders in free and fair elections, enjoy civil liberties, prefer democracy over other political systems, can and do participate in politics, and have a functioning government that acts on their behalf. Countries are given a rating on 0 to 10 scale (the highest the score the more democratic is the country).	The Economist Intelligence Unit	27 EU countries, 2008, 2010-2023	The more democratic is the country, the less corruption it tends to be.
DIR_DEM	The direct democracy index includes expert estimates of the extent to which citizens themselves can easily vote on specific issues like popular initiatives, referendums and plebiscites. It is included in V-Dem's Participatory democracy index and ranges from 0 to 1, with higher values representing more direct democracies.	V-Dem	27 EU countries except Cyprus, 2008-2023	The more democratic is the country, the less corruption it tends to be.
REPR_DEM	One of the four attributes of democracy developed for International IDEA's Global State of Democracy Indices. By including 6 subattributes - Credible Elections, Inclusive Suffrage, Free Political Parties, Elected Government, Effective Parliament and Local Democracy – this index measures to which extent people can choose their leaders in open and inclusive elections. It ranges from 0 to 1, with higher scores representing greater democracies.	International IDEA	27 EU countries, 2008-2023	The more democratic is the country, the less corruption it tends to be.

Variable	Description	Source	Sample (countries, years)	Expected relationship with corruption
RIGHTS_DEM	One of the four attributes of democracy developed for International IDEA's Global State of Democracy Indices. This attribute assesses the protection of rights in form of liberal and social rights. It is composed of 4 subattributes: Access to Justice, Civil Liberties, Basic Welfare and Political Equality. It ranges from 0 to 1, with scores close to 1 representing better results.	International IDEA	27 EU countries, 2008-2023	The more democratic is the country, the less corruption it tends to be.
RL_DEM	One of the four attributes of democracy developed for International IDEA's Global State of Democracy Indices. This index measures whether political power is limited by clear rules and oversight as well as whether public administration and judiciary act independently, preventing the use of public power for private gain. It combines 4 subattributes: Judicial Independence, Absence of Corruption, Predictable Enforcement and Personal Integrity and Security. The scale goes from 0 to 1, where values near 1 indicate stronger democratic regimes.	International IDEA	27 EU countries, 2008-2023	The more democratic is the country, the less corruption it tends to be.
PART_DEM	The last of the four attributes of democracy developed for International IDEA's Global State of Democracy Indices. Participation index evaluates if citizens actively engage in politics at all levels It includes 3 subattributes: Civil Society, Civic Engagement and Electoral participation. The scale ranges from 0 to 1, with cores closer to 1 representing more robust democratic systems.	International IDEA	27 EU countries, 2008-2023	The more democratic is the country, the less corruption it tends to be.
VA	One of WB's WGI. Reflects how much citizens are believed to have the ability to choose their government, as well as enjoying freedom of speech, freedom of association and access to free media. It varies between -2.5 and +2.5, with higher scores representing better governance.	Worldwide Governance Indicators (World Bank)	27 EU countries, 2008-2023	The more democratic is the country, the less corruption it tends to be.
RL	Part of the WB's WGI. Captures how much people trust and follow the rules of society, especially in areas like contract enforcement, property rights protection and the performance of the police and courts. This indicator ranges from -2.5 and +2.5, where higher values indicate stronger governance performance.	Worldwide Governance Indicators (World Bank)	27 EU countries, 2008-2023	The more democratic is the country, the less corruption it tends to be.

Variable	Description	Source	Sample (countries, years)	Expected relationship with corruption
RELIGION	Categorical variable indicating the prominent religion in each country in 2020 – Catholicism, Protestantism or Orthodoxy.	Zurlo (2021)	Time-invariant	Protestant countries tend to be less corrupt.
HIEF	Corresponds to the probability that two randomly drawn individuals are not from the same ethnic group. It ranges from 0 to 1, where values closer to 1 indicate greater ethnic heterogeneity.	Drazanova (2019)	27 EU countries except France, Luxembourg and Malta, 2008-2013	Ethnically heterogenous countries tend to be more corrupt.
LANG	Number of living indigenous languages per country.	Ethnologue	Time-invariant	Linguistically heterogenous countries tend to be more corrupt.
GEO	Categorical variable that represents the European geographic area in which the country is located – north, south, east, west.	United Nations	Time-invariant	Southern and eastern countries are associated with weaker institutions.
LEGAL	Categorical variable that identifies the legal origin of the Company Law or Commercial Code of each country – French Law, German Law, English Law or Scandinavian Law.	La Porta (2008)	Time-invariant	Countries with French legal origin tend to show weaker performance.

Source: Own Elaboration

Annex G – Endogeneity, underidentification and weak identification tests

Table G.1 – Results of Endogeneity test

	Model 4	Model 5	Model 8	Model 9	Model 12	Model 13
Simple						
FH	0.521 (0.4703)	0.539 (0.4630)	0.808 (0.3688)	0.855 (0.3552)	0.658 (0.4173)	0.695 (0.4044)
EIU	0.271 (0.6029)	0.433 (0.5107)	0.543 (0.4610)	0.839 (0.3596)	0.239 (0.6252)	0.413 (0.5202)
DIR_DEM	2.172 (0.1405)	2.281 (0.1310)	1.969 (0.1605)	2.122 (0.1452)	1.884 (0.1698)	2.037 (0.1535)
REPR_DEM	0.463 (0.4960)	0.465 (0.4954)	0.801 (0.3708)	0.778 (0.3777)	0.514 (0.4735)	0.492 (0.4829)
RIGHTS_DEM	4.749** (0.0293)	5.210** (0.0225)	5.035** (0.0248)	5.637** (0.0176)	5.118** (0.0237)	5.562** (0.0184)
RL_DEM	0.016** (0.016)	0.044 (0.8331)	0.152 (0.6965)	0.243 (0.6221)	0.104 (0.7469)	0.146 (0.7027)
PART_DEM	6.252** (0.0124)	8.511*** (0.0035)	5.579** (0.0182)	7.325*** (0.0068)	6.789*** (0.0092)	8.956*** (0.0028)
VA	0.310 (0.5774)	0.428 (0.5129)	0.621 (0.4309)	0.817 (0.3660)	0.480 (0.4884)	0.634 (0.4259)
RL	1.380 (0.2401)	2.224 (0.1358)	1.561 (0.2116)	2.367 (0.1239)	1.674 (0.1957)	2.534 (0.1114)
RELIGION	0.964 (0.3261)	0.747 (0.3874)	1.029 (0.3104)	1.026 (0.3112)	1.271 (0.2597)	0.925 (0.3361)
HIEF	2.192 (0.1388)	2.192 (0.1388)	2.786* (0.0951)	2.443 (0.1181)	1.996 (0.1577)	1.801 (0.1796)
LANG	1.915 (0.1664)	1.902 (0.1679)	2.541 (0.1109)	2.548 (0.1104)	0.057 (0.8110)	0.061 (0.8054)
GEO	4.562** (0.0327)	4.516** (0.0336)	4.341** (0.0372)	4.351** (0.0370)	4.795** (0.0285)	4.615** (0.0317)
LEGAL	0.002 (0.9632)	0.040 (0.8423)	0.015 (0.9025)	0.092 (0.7619)	0.012 (0.9143)	0.019 (0.8895)
Complete						
FH	0.918 (0.3379)	0.895 (0.3441)	1.149 (0.2837)	1.158 (0.2819)	1.022 (0.3121)	1.005 (0.3160)
EIU	0.252 (0.6159)	0.314 (0.5755)	0.449 (0.5027)	0.569 (0.4505)	0.199 (0.6553)	0.245 (0.6204)
DIR_DEM	2.773* (0.0959)	2.674 (0.1020)	2.610 (0.1062)	2.540 (0.1110)	2.635 (0.1045)	2.559 (0.1097)
REPR_DEM	0.828 (0.3630)	0.824 (0.3639)	1.046 (0.3065)	1.035 (0.3089)	0.969 (0.3248)	0.959 (0.3275)
RIGHTS_DEM	2.666 (0.1025)	3.112* (0.0777)	2.871* (0.0902)	3.480* (0.0621)	3.446* (0.0634)	3.973** (0.0462)
RL_DEM	0.059 (0.8073)	0.055 (0.8138)	0.223 (0.6368)	0.281 (0.5960)	0.290 (0.5899)	0.313 (0.5757)
PART_DEM	3.411* (0.0647)	4.443** (0.0350)	3.485* (0.0619)	4.435** (0.0352)	3.749* (0.0528)	4.769** (0.0290)
RL	0.029 (0.8657)	0.103 (0.7479)	0.065 (0.7984)	0.121 (0.7284)	0.024 (0.8759)	0.089 (0.7649)
RELIGION	0.476 (0.4901)	0.374 (0.5408)	0.331 (0.5652)	0.242 (0.6224)	0.896 (0.3438)	0.754 (0.3854)
HIEF	0.983 (0.3215)	0.755 (0.3850)	1.359 (0.2436)	1.054 (0.3046)	1.498 (0.2210)	1.454 (0.2278)

LANG	2.496	2.710*	2.304	2.512	1.366	1.451
	(0.1141)	(0.0997)	(0.1290)	(0.1130)	(0.2424)	(0.2284)
GEO	1.070	0.620	1.611	1.014	2.774*	2.279
	(0.3010)	(0.4309)	(0.2043)	(0.3138)	(0.0958)	(0.1312)
LEGAL	1.205	1.543	1.128	1.137	0.173	0.000
	(0.2724)	(0.2142)	(0.2881)	(0.2863)	(0.6776)	(0.9844)

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table G.2 – Results of underidentification test

	Model 4	**Model 5**	**Model 8**	**Model 9**	**Model 12**	**Model 13**
Simple						
FH	2.672	4.805**	2.131	4.163**	2.381	4.523**
	(0.1021)	(0.0284)	(0.1443)	(0.0413)	(0.1228)	(0.0334)
EIU	1.156	1.860	0.351	1.074	0.988	2.084
	(0.2824)	(0.1726)	(0.5536)	(0.3000)	(0.3203)	(0.1488)
DIR_DEM	0.634	0.013	0.682	0.026	0.556	0.002
	(0.4261)	(0.9096)	(0.4090)	(0.8725)	(0.4560)	(0.9652)
REPR_DEM	3.463*	4.386**	4.184**	5.129**	3.704*	4.282**
	(0.0627)	(0.0362)	(0.0408)	(0.0235)	(0.0543)	(0.0385)
RIGHTS_DEM	1.430	4.202**	0.887	3.004*	0.931	3.328*
	(0.2318)	(0.0404)	(0.3462)	(0.0830)	(0.3346)	(0.0681)
RL_DEM	6.157**	8.086***	3.835*	6.095**	4.392**	6.593**
	(0.0131)	(0.0045)	(0.0502)	(0.0136)	(0.0361)	(0.0102)
PART_DEM	1.146	3.302*	0.597	2.554	0.798	2.827*
	(0.2844)	(0.0692)	(0.4397)	(0.1100)	(0.3718)	(0.0927)
VA	5.216**	9.071***	4.690**	8.409***	4.990**	8.844***
	(0.0224)	(0.0026)	(0.0303)	(0.0037)	(0.0255)	(0.0029)
RL	6.314**	6.846***	7.145***	6.921***	7.323***	7.554***
	(0.0120)	(0.0089)	(0.0075)	(0.0085)	(0.0068)	(0.0060)
RELIGION	8.475**	8.584**	8.929**	9.191**	5.017**	4.187
	(0.0144)	(0.0137)	(0.0115)	(0.0101)	(0.0814)	(0.1233)
HIEF	3.743*	6.117**	6.531**	9.244***	3.926**	6.053**
	(0.0530)	(0.0134)	(0.0106)	(0.0024)	(0.0475)	(0.0139)
LANG	0.908	1.086	0.764	0.876	0.072	0.088
	(0.3406)	(0.2973)	(0.3821)	(0.3494)	(0.7887)	(0.7662)
GEO	9.263**	8.978**	9.191**	8.888**	9.737**	8.644**
	(0.0260)	(0.0296)	(0.0269)	(0.0308)	(0.0209)	(0.0344)
LEGAL	6.815*	6.464*	6.366*	6.390*	5.865	5.026
	(0.0780)	(0.0911)	(0.0951)	(0.0941)	(0.1184)	(0.1699)
Complete						
FH	2.423	4.883**	1.942	4.205**	2.248	4.683**
	(0.1195)	(0.0271)	(0.1634)	(0.0403)	(0.1338)	(0.0305)
EIU	1.770	3.362*	0.718	2.169	1.574	3.560*
	(0.1834)	(0.0667)	(0.3969)	(0.1409)	(0.2096)	(0.0592)
DIR_DEM	1.228	0.073	1.059	0.035	1.088	0.006
	(0.2677)	(0.7864)	(0.3035)	(0.8526)	(0.2969)	(0.9390)
REPR_DEM	3.722*	4.660**	3.814*	4.771**	3.745*	4.557**
	(0.0537)	(0.0309)	(0.0508)	(0.0289)	(0.0530)	(0.0328)
RIGHTS_DEM	1.730	6.710***	1.072	5.412**	1.464	6.246**
	(0.1884)	(0.0096)	(0.3005)	(0.0200)	(0.2264)	(0.0124)
RL_DEM	5.315**	8.455***	2.963*	6.339**	4.568**	7.929***
	(0.0211)	(0.0036)	(0.0852)	(0.0118)	(0.0326)	(0.0049)
PART_DEM	1.310	3.754*	0.804	3.056*	1.137	3.512*
	(0.2524)	(0.0527)	(0.3699)	(0.0805)	(0.2862)	(0.0609)
RL	5.621**	9.084***	6.593**	10.013***	6.005**	9.251***

	(0.0177)	(0.0026)	(0.0102)	(0.0016)	(0.0143)	(0.0024)
RELIGION	9.788***	9.412***	11.014***	11.055***	3.840	2.664
	(0.0075)	(0.0090)	(0.0041)	(0.0040)	(0.1466)	(0.2640)
HIEF	4.185**	6.139**	5.789**	7.014***	4.336**	6.581**
	(0.0408)	(0.0132)	(0.0161)	(0.0081)	(0.0373)	(0.0103)
LANG	2.278	2.379	2.452	2.609	0.762	0.730
	(0.1312)	(0.1230)	(0.1174)	(0.1063)	(0.3827)	(0.3929)
GEO	12.151***	10.652**	11.936***	10.600**	10.123**	7.126*
	(0.0069)	(0.0138)	(0.0076)	(0.0141)	(0.0175)	(0.0680)
LEGAL	4.672	4.028	5.926	4.818	1.557	0.558
	(0.1975)	(0.2585)	(0.1153)	(0.1856)	(0.6692)	(0.9059)

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Table G.3 – Results of weak identification test

	Model 4	**Model 5**	**Model 8**	**Model 9**	**Model 12**	**Model 13**
Simple						
FH	26.042***	15.585***	11.212***	11.717***	16.480***	14.555***
	(0.0000)	(0.0005)	(0.0025)	(0.0021)	(0.0004)	(0.0008)
EIU	1.202	2.156	0.341	1.149	1.031	2.536
	(0.2829)	(0.1540)	(0.5644)	(0.2936)	(0.3193)	(0.1233)
DIR_DEM	0.679	0.012	0.753	0.024	0.580	0.002
	(0.4173)	(0.9137)	(0.3933)	(0.8780)	(0.4532)	(0.9669)
REPR_DEM	19.951***	17.488***	16.017***	12.758***	15.386***	11.933***
	(0.0001)	(0.0003)	(0.0005)	(0.0014)	(0.0006)	(0.0019)
RIGHTS_DEM	1.753	5.404**	0.924	3.007*	0.979	3.398*
	(0.1970)	(0.0282)	(0.3454)	(0.0948)	(0.3317)	(0.0767)
RL_DEM	7.552**	8.463***	3.500*	5.103**	4.021*	5.527**
	(0.0107)	(0.0073)	(0.0727)	(0.0325)	(0.0555)	(0.0266)
PART_DEM	1.191	3.649*	0.600	2.764	0.797	2.959*
	(0.2852)	(0.0672)	(0.4457)	(0.1084)	(0.3800)	(0.0973)
VA	18.029***	24.199***	11.818***	15.500***	13.299***	18.055***
	(0.0002)	(0.0000)	(0.0020)	(0.0006)	(0.0012)	(0.0002)
RL	17.388***	26.772***	23.317***	33.792***	17.647***	27.008***
	(0.0003)	(0.0000)	(0.0001)	(0.0000)	(0.0003)	(0.0000)
RELIGION	11.496***	11.756***	12.438***	12.470***	6.545***	5.286**
	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0050)	(0.0118)
HIEF	4.669**	8.147***	10.060***	14.189***	6.381**	7.337**
	(0.0414)	(0.0090)	(0.0043)	(0.0010)	(0.0189)	(0.0125)
LANG	1.540	1.933	1.394	1.676	0.076	0.095
	(0.2257)	(0.1762)	(0.2484)	(0.2069)	(0.7845)	(0.7603)
GEO	6.397***	6.313***	5.467***	5.136***	4.878***	4.245**
	(0.0022)	(0.0023)	(0.0048)	(0.0064)	(0.0080)	(0.0144)
LEGAL	23.449***	23.476***	28.244***	28.156***	6.371***	4.240**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0022)	(0.0145)
Complete						
FH	17.487***	26.459***	9.847***	22.878***	14.033***	24.986***
	(0.0003)	(0.0000)	(0.0042)	(0.0001)	(0.0009)	(0.0000)
EIU	1.889	4.200*	0.723	2.497	1.690	4.678**
	(0.1810)	(0.0506)	(0.4030)	(0.1261)	(0.2050)	(0.0399)
DIR_DEM	1.697	0.072	1.445	0.034	1.452	0.006
	(0.2042)	(0.7912)	(0.2402)	(0.8562)	(0.2391)	(0.9411)
REPR_DEM	17.784***	18.255***	14.952***	14.391***	15.848***	14.348***
	(0.0003)	(0.0002)	(0.0007)	(0.0008)	(0.0005)	(0.0008)
RIGHTS_DEM	2.182	9.423***	1.212	6.379**	1.745	7.758***
	(0.1516)	(0.0050)	(0.2810)	(0.0180)	(0.1980)	(0.0098)

RL_DEM	7.065**	10.668***	3.401*	7.084**	5.207**	8.342***
	(0.0133)	(0.0031)	(0.0766)	(0.0132)	(0.0309)	(0.0077)
PART_DEM	1.478	4.481**	0.867	3.532*	1.250	4.019*
	(0.2351)	(0.0440)	(0.3602)	(0.0715)	(0.2738)	(0.0555)
RL	8.546***	24.088***	9.807***	26.512***	9.029***	24.681***
	(0.0071)	(0.0000)	(0.0043)	(0.0000)	(0.0058)	(0.0000)
RELIGION	6.760***	6.595***	7.385***	7.213***	2.630*	1.750
	(0.0043)	(0.0048)	(0.0029)	(0.0032)	(0.0912)	(0.1936)
HIEF	7.090**	8.431***	11.953***	9.631***	8.431***	7.736**
	(0.0139)	(0.0080)	(0.0021)	(0.0050)	(0.0080)	(0.0106)
LANG	4.614**	4.754**	5.186**	5.492**	1.024	0.954
	(0.0412)	(0.0385)	(0.0312)	(0.0270)	(0.3209)	(0.3377)
GEO	7.840***	7.221***	7.363***	6.975***	5.671***	3.133**
	(0.0007)	(0.0011)	(0.0010)	(0.0014)	(0.0040)	(0.0426)
LEGAL	2.084	1.601	4.056**	2.952*	0.507	0.174
	(0.1267)	(0.2133)	(0.0172)	(0.0512)	(0.6808)	(0.9131)

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration

Annex H – The impact of fiscal policy and institutional quality impact on poverty (AROPE): complete model with interaction term

	Dependent variable: AROPE											
	Model 4	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**
Constant	194.981***	192.159***	180.505**	197.024***	185.094***	178.038***	133.479**	188.595***	205.244***	200.038***	162.549*	198.005***
	(0.001)	(0.001)	(0.011)	(0.002)	(0.001)	(0.001)	(0.043)	(0.001)	(0.001)	(0.001)	(0.065)	(0.002)
TOTEXP	-0.2794	-0.1742*	-0.9074	-0.2737								
	(0.325)	(0.093)	(0.145)	(0.558)								
HLTEXP					-2.3027	-0.9637	-0.2520	-2.5730				
					(0.320)	(0.172)	(0.957)	(0.505)				
EDUEXP									-3.0698	-1.9273	-3.7241	-1.3675
									(0.290)	(0.121)	(0.637)	(0.763)
CPI	-0.0824				-0.1870				-0.1372			
	(0.740)				(0.506)				(0.567)			
CC		-1.2456				-3.6933				-3.4087		
		(0.767)				(0.409)				(0.414)		
FH			-0.2090				0.2200				0.0589	
			(0.545)				(0.516)				(0.900)	
EIU				-0.2654				-0.9164				0.2982
				(0.931)				(0.781)				(0.916)
TOTEXP * CPI	0.0024											
	(0.551)											
TOTEXP * CC		0.0436										
		(0.514)										
TOTEXP * FH			0.0087									
			(0.182)									
TOTEXP * EIU				0.0212								
				(0.689)								
HLTEXP * CPI					0.0316							
					(0.359)							
HLTEXP * CC						0.6763						
						(0.264)						
HLTEXP * FH							-0.0007					
							(0.989)					

HLTEXP * EIU								0.3029 (0.527)				
EDUEXP * CPI									0.0304 (0.426)			
EDUEXP * CC										0.7841 (0.273)		
EDUEXP * FH											0.0296 (0.712)	
EDUEXP * EIU												0.0587 (0.908)
GDP	-16.582*** (0.003)	-16.699*** (0.002)	-13.974*** (0.007)	-17.171*** (0.002)	-15.337*** (0.005)	-15.425*** (0.003)	-13.574*** (0.004)	-16.183*** (0.002)	-17.213*** (0.002)	-17.167*** (0.001)	-14.571*** (0.004)	-17.649*** (0.001)
UNEM	0.2927** (0.015)	0.2837** (0.024)	0.2971** (0.023)	0.2930** (0.020)	0.2501** (0.016)	0.2462** (0.021)	0.2703** (0.022)	0.2738** (0.012)	0.2851** (0.012)	0.2812** (0.017)	0.2871** (0.022)	0.2844** (0.016)
HICP	0.0725* (0.095)	0.0685 (0.181)	0.0878** (0.033)	0.0566 (0.264)	0.0343 (0.495)	0.0393 (0.504)	0.0706 (0.130)	0.0307 (0.566)	0.0810* (0.055)	0.0807 (0.103)	0.0892** (0.019)	0.0587 (0.225)
S80S20	-0.0956 (0.923)	-0.1011 (0.920)	-0.0234 (0.982)	-0.1357 (0.889)	-0.1316 (0.891)	-0.1445 (0.882)	-0.0420 (0.969)	-0.2186 (0.827)	-0.1503 (0.876)	-0.1867 (0.850)	-0.0585 (0.956)	-0.1662 (0.862)
PSE	0.4647*** (0.007)	0.4652*** (0.008)	0.5257*** (0.002)	0.4114*** (0.023)	0.4306** (0.012)	0.4201** (0.018)	0.5367*** (0.003)	0.4058** (0.026)	0.5006*** (0.002)	0.4953*** (0.002)	0.5609*** (0.000)	0.4393*** (0.010)
DEBT	-0.0074 (0.739)	-0.0049 (0.825)	-0.0003 (0.990)	-0.0102 (0.653)	-0.0172 (0.484)	-0.0143 (0.548)	-0.0061 (0.801)	-0.0182 (0.465)	-0.0186 (0.440)	-0.0186 (0.437)	-0.0094 (0.716)	-0.0193 (0.460)
TRADE	0.0366** (0.025)	0.0381** (0.019)	0.0361*** (0.007)	0.0386** (0.021)	0.0428** (0.026)	0.0432** (0.022)	0.0436*** (0.003)	0.0456*** (0.008)	0.0362** (0.018)	0.0365** (0.018)	0.0356*** (0.007)	0.0369** (0.021)
R-squared within	0.6506	0.6503	0.6698	0.6588	0.6477	0.6480	0.6633	0.6537	0.6520	0.6538	0.6687	0.6574
F-statistic	40.75	44.31	36.02	53.17	28.73	26.71	22.84	25.37	52.64	46.42	24.08	43.05
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Obs.	428	428	428	402	428	428	428	402	428	428	428	402
Method	Cross-section fixed effects; Robust standard errors											

Note: P-value in parenthesis: 1% (***), 5% (**) and 10% (*).
Source: Own elaboration