Crisis and Inequality in the European Union

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ABSTRACT

The objective of this work is to analyze the factors which influence a greater or lesser inequality in income distribution, paying particular attention to the effect which the economic crisis has had. For this we have used a panel data covering a period of 16 years, and we have introduced additional variables over and above those normally used, such as the ideology of the governing party, the economic freedom index, as well as the "crisis" variable. The results obtained show that during the current economic crisis spending on social protection has not proved effective in the fight against inequality.

KEY WORDS: Inequality, institutionalism, social benefits, economic crisis, indirect tax pressure.

JEL CODES: H5, H11, H20, B15, F5, I3

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1. INTRODUCTION

If governments pursue a more equitable distribution of income, will it help the economic crisis? Has democracy achieved improvements in the equitable distribution of income? Has the economic liberalization which now prevails in the world brought about a reduction in the gulf between rich and poor? Are Social Democratic governments more concerned than others with inequality? To these and other questions we will try to respond in this work. In fact, we hope to contribute to the understanding of behavior and the determining factors which influence a greater or lesser inequality in income distribution, focusing our attention on the effect which the economic crisis is having on inequality, and on the policies employed in combating the said inequality.

To this end, a model of panel data for the 27 nations of the European Union has been applied, covering a period of 16 years (from 1996 to 2011, both included). The use of such a heterogeneous model – made up of nations of differing levels of economic development and which have undergone different historical processes of integration – the inclusion of the institutional variables and the deployment of the "crisis" dummy variable with spending on social benefits are, to our understanding, aspects both relevant and original in the analysis of income distribution, given that empirical studies which use these types of variables are rare in this field.

The objective of this study is to analyze the determining factors in income distribution, so that we may discern the influence of different types of variable, this being the study's fundamental aim. To this end, we have introduced a series of variables in addition to the ones generally used, such as the ideology of the governing

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party, the index of economic freedom, the typicality of Scandinavian countries or the indirect tax pressure. The results obtained show that the model used is robust, and that equality in income distribution has diminished with the decrease in the importance of the remuneration of salaried workers within the GDP and with global economic freedom, at the same time improving in countries who apply the Nordic model and where democratic development has occurred. As for the effect which the crisis has had, the results suggest that this alone per se, but also the social policy put in train by European countries during this period has increased the lack of equality in income distribution.

The study is structured as follows: after the introduction, in Section 2 we give an overview of the various explanatory theories on income distribution and carry out an analysis of the determining factors, distinguishing and evaluating those which are economic, and those which are institutional. Then, in Section 3, we apply the panel data previously mentioned to the 27 nations of the European Union in order to determine the relative influence of the different variables. Finally, in Section 4, we demonstrate our conclusions.

2. THEORETICAL BACKGROUND

Since the classical era, economic theory has concerned itself with the question of distribution and performance in economic activity. This interest starts with Quesnay and his "Tableau", which represents as a double-entry chart the various contributions to production of the various branches and, of course, their distribution. Adam Smith and Karl Marx, authors as paradigmatic as they are different, were preoccupied with the

subject of distribution. Some of the marginal thinkers such as Leontief and Sraffa(Pasinetti, 1984) were also interested in the distribution issue. On top of this, there exist various models of distribution and growth arising out of Ricardian, Marxist, Neoclassical and Keynesian theory (Kaldor, 1956). Keynes and the Post-Keynesians made important contributions to this subject. As Paukert maintains (1973, p.109), Keynes transformed the most convincing idea against equality of income into the most important argument in its favour – namely that the frugality of the most opulent classes, far from encouraging economic growth (as the classical school argued), holds it back, and consumption is the most effective method of expanding production in an economy. Dutt (1990) and Taylor (2004) posit a theory of distribution implicit in the General Theory and in the Treatise on Money (1930), which claims to identify a relationship between distribution theory and effective demand theory. However, Kaldor (1956) had already proposed a Keynesian theory of distribution. Basing his argument on long-term considerations, Kaldor used the theoretic tool of the multiplicator in order to explain aspects of distribution. In the same way, other Post-Keynesian authors tried to explain the relationship between production growth and its distributive consequences (Kalecki, 1977; Robinson, 1965; Pasinetti, 1978). Despite this initial interest no special attention appears to be paid, in conventional macroeconomic texts, to the theme of distribution as a key element in understanding the functioning and development of economies and, in particular, of the less-developed ones. In this sense, distribution analysis has also taken a secondary place in empirical studies.

If in actual fact there exists no consensus with regard to an economic theory which includes all the relevant aspects of personal income distribution¹, as opposed to the analysis of functional distribution which was abundantly developed from the starting-point of the works of David Ricardo (1817), the empirical studies which have recently been addressed to inequality of income distribution have aligned themselves in two directions: a) analyzing the relationship with and/or effect on economic growth, and b) analyzing the determinant factors in this.

Among studies of income distribution which have been carried out, the majority of them using simple countries, economic growth has been the factor most examined, most of all since Kuznets (1955) proposed his famous "U Hypothesis". His conjecture – that inequality increases in the early stages of development, only to diminish later as part of the development process – has been the object of innumerable subsequent empirical studies. The literature has labelled this approach the "Inverted U Hypothesis". This hypothesis has been contrasted empirically with various results. Some studies have supported Kuznets' Hypothesis, whereas others have dismissed it.

What is certain is that around this same area an abundant economic literature has grown up, concerned with proving or refuting its propositions. Since the 1990's, the relationship between economic growth and income distribution has awoken enormous interest among economists. Though there are many opinions concerning the nexus of the two variables, they do not always follow the same line of thought, and emerge as a subject of considerable controversy, in which a variety of approaches can be found:

¹ The studies on personal income distribution took on a growth of their own when, at the end of the 19th century, the publication of Pareto's first researches marked the start of what Dagum (1980) called the "quantitative era" of personal income distribution analysis. This line of investigation, which has received numerous contributions from a great number of economists, mathematicians and statisticians, in the view of authors such as Sahota (1976), Baró (1982) or Dagum (1996), has still to find its place in the bosom of economic theory.

- One the one hand, those which point to a negative effect of inequality on growth, as is the case with Alesina & Rodrik (1994), Bertola (1993), Galor & Zeira (1993), Piketty (1997) and Perotti (1996), among others.
- On the other hand, those which maintain that growth has a sparse or even negative impact on inequality, both supported by different sets of data. Thus, for example, Psacharopoulos, Morley, Fiszbein, Lee & Wood (1995) observe that inequality diminishes in Latin American countries when *per capita* income rises, while Ravallion & Chen (1997) can find no reason whatsoever to support this conclusion in their study which covers 42 countries.
- In third place, there is yet another line of studies which argues for a two-way influence of inequality over economic growth, of such a form that, beside the influence of growth on inequality, it is accepted that a certain level of inequality can stimulate growth along particular paths of investment.

Another variable which has been used is inflation, to which controversial effects on inequality have been attributed. In some studies, inflation is associated with an expansion of the poverty bubble, most of all in periods of hyperinflation (Lustig & Deutsch, 1998). Al-Marhubi (2000), by means of regressors applied to data drawn from 53 countries in the 1975-95 period, reaches the conclusion that high inequality in income is linked to a high rate of inflation.

In the same way, the unemployment rate is analyzed in numerous studies and there are those which assess the negative impact of this variable on inequality (Bakker & Creedy, 2000). In the Spanish case, the work of Ayala, Martínez y Ruiz-Huerta (1996) points out certain effects of unemployment on inequality which have little significance.

On the other hand Sahn, Dorosh & Younger (1996) see in exchange rate depreciation one of the factors which could trigger an increase in equality if the incomes of the leastfavoured (informal sector), tied to the sectors which are most isolated from the outside world, are seen as less affected than the workers in open, dynamic modern technology sectors.

Another variable used is the participation of agriculture in national output. The relative importance of the agricultural sector has been analyzed by many authors since the pioneering studies of Oshima (1962) or Kuznets (1955). This indicator marks the transition to more advanced states of economic development and is related to other interesting variables such as the percentage of the population which is urban or rural, which combine certain characteristics influential in determining a greater or lesser inequality of incomes (Cameron, 2000).

With regard to demographic factors, such as birth rate or migration, these can have distributive effects, and at the same time inequality can stimulate or discourage certain behavior linked to these variables of the demographic kind. Ngwane, Ydavalli & Steffens (2001) carried out a study based on a regression model, in which the Gini Index is the dependent variable which is explained by demographic variables relating to weightings of certain population groups, gender of the head of the family, etc.; by means of this procedure, it was possible to note the cross-effects between demographic variables and personal income distribution. Initial levels of *per capita* income, inequality and poverty are also considered.

Concerning this last, some studies (Psacharopoulos, Morley, Fiszbein, Lee & Wood, 1995; Alonso, 2001) have concentrated on the role of education, and these have noted

empirically that improving the levels of education is an effective tool in enabling the reduction of inequality and poverty in income distribution.

The inclusion of institutional variables in empirical works which study income distribution is relatively recent and still rare, and this presents two problems: the poor timespan coverage of many indicators, which impedes the proper use of panel data, and the differences which exist with regard to the coverage of countries, a state of affairs which inclines the contemporary investigator to select a group of countries which he proposes to analyze. Even so, the interest which this type of variable has aroused among scholars is bringing about a situation where the data are each time more complete, both in terms of the period of time to be considered and in the number of countries analyzed.

In whatever case, we encounter studies with aspects of the political type such as the independence of the central banks, the stability and democratic nature of the system, the economic reforms undertaken, the level of uncertainty and confidence in governments and the degree of openness in the economy. As an example of analysis of these types of factors, Al-Marhubi (2000) introduces variables which register the frequency of coups d'etat and revolutions, the number of political transitions and the repercussions these have on the changes of governors of the central issuing bank. By means of disturbances and socio-political instability, Alesina & Perotti (1996) and Benhabib & Rustichini (1996), have developed studies in which they show the negative effect of widespread inequality on economic growth owing to a rise in crime, social unease and political instability which a high level of inequality provokes. Afonso, Schuknecht & Tanzi (2008) demonstrate that to the extent that the quality of the institutions is better,

measured through the judicial system, the bureaucracy and regulation, the more efficient social spending is, and in line with this, the fairer is the distribution of income.

Finally, there is a small group of investigators who have tried to analyze the relationship between the economic crisis and inequality of income distribution. Thus, Wisman & Baker (2010) conclude that the lack of equality in income distribution is one of the dislocators causing the financial and economic crisis. However, Atkinson & Morelli (2011) do not manage to arrive at any firm conclusion that the rise in inequality is one of the causes of the economic crisis. On the contrary, empirical evidence shows that the financial crisis carries with an increase in inequality.

3. THE MODEL

The Tobit model and a linear model are used, in the hope of explaining the distribution of income by means of economic, institutional and geopolitical variables, as has already been indicated.

The time period which we have considered has been restricted by the availability of data, fundamentally data on institutional variables. We have been able to generate a panel data model for a 16-year period, taking in 1996 to 2011. In this sense, the use of panel data in order to study the economic and institutional determinants of income distribution is ground-breaking in that the majority of empirical studies employ cross-sectional data, for the reason that the institutional indices have been created relatively recently and it has not been possible before now to deploy them in a series of more than ten years for some of these indicators. In this way, we have been able to analyze 432

observations for each one of the variables used, since we have employed a sample of 27 countries over a sixteen-year period.

A) Data

The variables which we have used are summarized in the following table:

(Table 1)

B) The Model

The Tobit model used here has been estimated to maximum likelihood, and the linear model has been estimated through the estimators of *Feasible Generalized Least Squares* (FGLS), *Panel Corrected Standard Errors* (PCSE) and *Robust Generalized Method of Moments* (RGMM) for dynamic panel data. IN the case of this second model, At the time of choosing these estimators a series of tests was carried out in order to determine the most efficient, in accordance with the variables used.

In first place, we applied the *Lagrange Multiplier Test* for random effects. The value obtained for chi squared (χ^2) led to rejection of the null hypothesis, making the use of Ordinary Least Squares (OLS) for random effects model preferable to the pooled model (pooled OLS) – that is to say, the usual OLS estimator.

Secondly, we carried out a similar test in order to determine whether the estimator for fixed effects was also better than the pooled model. The F test for the significance of fixed effects showed that, effectively, it is preferable to use the fixed effects estimator.

In the third place, the Hausman test was used to decide between random and fixed effects. The value of " χ^2 " obtained allows us to reject the null hypothesis, which is to say, the difference between the coefficients of random and fixed effects is clearly systemic, making it convenient to use fixed effects.

In the fourth place, the Wooldridge test was carried out. This test demonstrated that the model did not have any autocorrelation problems. Finally, the modified Wald test proved that the model is heterocedastic. In order to solve this, the two best estimators are *Feasible Generalized Least Squares* (FGLS) and *Panel Corrected Standard Errors* (PCSE). Although, Beck & Katz (1995) demonstrated that the standard errors of PCSE are more precise than those of FGLS, as the authors showed that when N>T (as is the case where N = 27 and T = 16), and that FGLS should not be used, we decided however to use both models, in order to check the robustness of the model.

Also, regarding the possible existence of an endogeneity problem in the fiscal variables and the variables which measure the education quality, we decided to use the GMM estimator (Arellano & Bond, 1991) for dynamic panel data in its robust version due to the presence of heterocedasticity. We used the lagged fiscal and education quality variables as instruments, and the exogenous variables. The Arellano-Bond test to check for autocorrelation gives a result that cannot reject the null hypothesis and, therefore, once again we find that the model does not have an autocorrelation problem. The comparison of the results obtained through this estimator with those obtained with FGLS and PCSE once again allows the analysis of the model's robustness.

. The different tests applied show that the model is globally significant and there is no heteroscedasticity.

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We have used a panel data to jointly evaluate all the economic, institutional and geopolitical variables used. Using panel data instead of cross-section analysis – which is the most often-used by those investigators who employ institutional variables for previously-mentioned problems of data availability – allows us to check individual heterogeneity, produce data with a higher degree of variability and a lower level of collinearity among the regressors, study dynamic adjustment processes, identify and measure effects which are not detectable with pure cross-section or time series data, and build and contrast models of more complex behavior than would be possible simpler data.

We have undertaken eight separate estimations with depending on the estimator used and the measure of inequality employed, which is to say, the Gini Index and the income ratio between 20% richest and 20% poorest of the population.

In this way, we have estimated using the following models:

• <u>Tobit model</u>

$$ID_{it} = \begin{cases} ID_{it}^{*} & \text{si } 0 < ID_{it}^{*} < 100 \\ 0 & \text{si } ID_{it}^{*} \le 0 \\ 0 & \text{si } ID_{it}^{*} \ge 100 \end{cases}$$
(1)

 $ID^{*}_{it} = \alpha + \beta_{1}SOCIAL_{it} + \beta_{2}WAGE_{it} + \beta_{3}ITAX_{it} + \beta_{4}Y_{it} + \beta_{5}AGR_{it} + \gamma_{1}ICL_{it} + \gamma_{2}IPR_{it} + \gamma_{3}IEF_{it} + \gamma_{4}IPC_{it} + \lambda_{1}NORDIC_{it} + \lambda_{2}MEDITERRANEAN_{it} + \lambda_{4}PARTY_{it} + \theta_{1}CRISIS_{it} + \theta_{2}SOCIAL_CRISIS_{it} + \theta_{3}SOCIAL_PARTY_{it} + \eta_{i} + \delta_{t} + \mu_{it}$ (2)

• Linear model

 $ID_{it} = \alpha + \beta_1 SOCIAL_{it} + \beta_2 WAGE_{it} + \beta_3 ITAX_{it} + \beta_4 Y_{it} + \beta_5 AGR_{it} + \gamma_1 ICL_{it} + \gamma_2 IPR_{it} + \gamma_3 IEF_{it} + \gamma_4 IPC_{it} + \lambda_1 NORDIC_{it} + \lambda_2 MEDITERRANEAN_{it} + \lambda_4 PARTY_{it} + \theta_1 CRISIS_{it} + \theta_2 SOCIAL_CRISIS_{it} + \theta_3 SOCIAL_PARTY_{it} + \eta_i + \delta_t + \mu_{it}$ (3)

where,

ID is the income distribution, measured by means of two variables, these being the Gini Index and the ratio between the income of the 20% richest and 20% poorest in the population; SOCIAL is the total spending on social benefits in relation to GDP; WAGE measures the importance of the pay of salaried staff for the GDP; ITAX measures indirect tax pressure; Y is per capita income, measured through GDP; AGR is the importance of agriculture within the GDP; ICL is the Index of Civil Liberties; IPR is the Index of Political Rights; *IEF* is the Index of Economic Freedom; *IPC* is the Index of Perceived Corruption; NORDIC is a dummy variable which takes a value of 1 if the country is Scandinavian; MEDITERRANEAN is a dummy variable which takes a value of 1 if the country is Mediterranean; PARTY is a dummy variable which take the value 1 if the governing party is left-wing; CRISIS is a dummy variable which takes a value 1 if the year falls between 2008 and 2011; SOCIAL CRISIS is the interaction between social welfare spending and the dummy variable "CRISIS", which is to say, social spending for the EU countries is taken into account only during the years of the economic crisis; SOCIAL PARTY is the interaction between social welfare spending and the dummy variable "PARTY", which is to say, social spending for the EU countries is taken into account only when the government is left-wing; η_i collects individual, specific,

unobserved (but constant in time) effects for each country, and δ_t measures temporary unobserved effects which are variable with time but identical for all countries.

C) Results

After estimating the Tobit model with maximum likelihood and the linear model with FGLS, PCSE and RGMM, verifying the model globally significant and, in the case of the GMM estimator, checking that the instruments are valid through Hansen Test, we obtained the following results:

(Table 2)

The first conclusion that one finds on observing the mentioned table is that the results do not vary substantially, whichever estimator is used, nor do they vary with the inequality variables employed. This enables us to affirm that the model used is robust. In addition, the R^2 is close 0.77, so the quality of adjustment is good, and Hansen Test gives a value greater than 0.05, so that the instruments used in the dynamic model are valid.

As for the values we have obtained, most cases coincide with what is expected a priori. In this way, the social policies put in place by governments and measured in terms of public spending on social benefits do reduce inequalities in income distribution, although the significant level is vey low. This result accords with that obtained by Afonso, Schuknecht & Tanzi (2008), in that greater public spending leads to greater equality in the distribution of incomes. Similarly, Keizer & Spithoven (2009) conclude that in the Dutch case, inequality of income diminishes as the welfare state expands and, on the other hand, Ovaska y Takashima (2010) maintain that welfare

inequality can be explained in terms of inequality of income, quality of health care and quality of institutions. Furthermore, as Atkinson (2008) points out, redistributive intervention in public spending is justified in terms of aversion towards inequality.

The introduction of the variable which measures the importance for the GDP of remuneration of salaried workers did not either produce any definitive result, given that the estimated regressor is not significant for all the estimations, but those estimations in which the regressor is significant, the negative sign shows that the decrease in the importance the remuneration of salaried workers has been experienced in relation to the gross operating surplus, has made the inequality in income distribution to increase. To the extent that the effect of the indirect tax pressure on income distribution is not significant, it is not possible to affirm that the regressivity of indirect levying generates any major inequality in income distribution. In this sense, the majority of EU countries have established a VAT of varying rates, and these have had the effect of softening the regressive nature of taxation². Furthermore, the importance which special taxes have acquired in certain countries could explain the result obtained. In the same way, this result does not differ substantially from the study of Afonso, Schuknecht & Tanzi (2008), who obtained an insignificant regressor for the direct taxation variable, and whose sign fluctuated with the dependent function used.

We measured the effect of economic development by means of two variables, GDP per capita and the importance of agriculture in the economy, and the results obtained are contradictory. Thus, in the first case, the estimated regressor is negative and significant in some of the estimations, and so, the greater the GDP per capita the more equitable the

² Denmark is the only country to have a unique rate of VAT.

income distribution is. However, the estimated value is very close to zero. On the other hand, the regressor obtained to measure the effect of the importance of agriculture in income distribution is only significant in the Tobit model. In this case, the negative sign enables us to conclude that economic development, in so far as it exists, worsens the equality of income distribution. This result is in agreement with those obtained by Ravallion & Chen (1997), for whom economic growth does not reduce income inequalities. Also, Cameron (2000) maintains that inequality is greater in urban areas, along with which economic development, measured in terms of the diminished importance of agriculture in the overall economy, has a negative effect on income distribution.

In so far as the effect of the index of civil liberties on income distribution merits attention, the regression coefficient obtained is negative. Since this indicator (as with the index of political rights) is defined in such a manner that those nations with a lower index enjoy greater civil liberties, it implies that those European countries in which greater freedom of speech, belief and association exist, and which enjoy secure juridical systems, suffer a greater inequality in income distribution – at least when we apply the income ratio between the 20% richest and 20% poorest of the population. According to the Gini Index, the estimated value of this variable is not significant. However, in the case of the estimated parameter for the index of political rights, the positive and significant sign allows us to affirm that the greater the degree of democracy reached by the nations of the EU, the greater the equality of income distribution. With regard to the impact of economic freedom on income distribution, the result is positive and significant. In this regard, the liberalization of commercial regimes, the reduced intervention of governments in the economy, the free circulation of capital and the

freeing-up of the labour market have led to a major inequality in income distribution. Previously, we pointed out that intervention in the public sector improves income distribution, and so a major liberalization of the economy, logically, increases inequality in the distribution of incomes. Further, this result supports the thesis of Hall & Ludwig (2010), for whom the more liberal societies do not propose to fight inequality of income distribution. In the case of corruption, there is only a significant and negative effect on income distribution in three of the estimations. Thus, when the degree of corruption in a country is greater, the inequality in income distribution is also greater. In this sense, Molina, Amate & Guarnido (2013) conclude that those countries which present a higher incidence of corruption spend less on social benefits, which means that inequality of income distribution is greater.

Concerning the analysis of the efficiency of the Scandinavian and Mediterranean models in the struggle against inequality in income distribution, we observe that the significance of the estimated parameter for Scandinavia, and the non-significance of the Mediterranean model, enables us to conclude that the Scandinavian example, which concentrates its efforts on the young population, is more effective in the achievement of a fairer distribution of income than is the case with the Mediterranean model, which is founded on social benefits and which is focused on the older population.

In so far as the effect of the ideology of the governing party of each country on income distribution is concerned, the result is not very significant and positive, so we cannot state that governments of left-wing are who make improvements in distribution of income. However, when we combine the social spending and governing ideology variables, that is to say, when we analyze the effect of social policy when it is operated by left-wing governments, we observe that the sign change and it is negative, but it's not very significaant, and so we cannot conclude empahatically spending on social benefits is far more effective in the struggle against inequality of income distribution when it is carried out by left-wing governments.

Finally, we estimated the effect which the economic crisis has had on inequality. The negative sign, although only significant for the Gini Index, allows us to conclude that, in principle, the economic crisis through which the European countries have lived since 2008 has not caused serious income inequality. This result supports the thesis of Wisman & Baker (2010), who argue that the lack of equality in income distribution is one of the dislocators in the economic and banking crisis, and not one of its consequences, as Atkinson & Morelli (2011) maintain. However, when we analyze the efficacy of social policies during the present crisis, the positive sign suggests that governments are redesigning social spending in such a way that the reduction of inequalities of income distribution is no longer a prime objective. In this sense, it must be borne in mind that the policy of adjustment being undertaken by the majority of EU countries is altering the weighting of each benefit within the social spending budget. Thus, unemployment benefits are taking on major importance because of the expanding numbers of unemployed Europeans, and the main purpose of this benefit is to restore, not to redistribute, income.

4. CONCLUSIONS

The results obtained in our study permit us to conclude that both the sample used and the variables employed greatly enrich the analysis. Despite forming part of the same economic bloc, the 27 countries analyzed offer differences in both their levels of economic development and the historical, cultural, political and economic experiences which they boast. Added to this, the inclusion of institutional variables and the effect of the crisis on the analysis of determinants of income distribution in the case of the EU countries make for very interesting results, as we understand them.

How has the crisis affected the struggle against inequality of income distribution? To answer this question has been the fundamental aim of this study. The results obtained enable us to conclude that while the crisis has not necessarily engendered a worsening in inequality, the response of European governments by means of social policy has not so far, however, proved effective in achieving a major equalization in income distribution, probably because inequality has dropped to the status of a secondary objective, as is reflected in the policies of cuts which the most of European governments have applied.

Thus we can observe differences among the countries. In concrete terms, the Scandinavian countries have succeeded in distributing income in a more equal way. Also, in those countries in where the remuneration of salaried workers has lost importance in relation to capital gains. When social policy is designed and implemented by governments of the Left, more substantial improvements in fair income distribution are achieved.

Finally, in those countries where a greater degree of democracy has been attained, and where corruption is combated with greater firmness, and which boast less liberalized economies, lower levels of inequality have also been achieved.

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Table 1TAXONOMY OF THE MODELLED VARIABLES

Name	Description				
	We have used two measures of income distribution: 1) The Gini Index.				
Income Distribution	2) Ratio of incomes between two extreme quintiles, which is to say, the relationship between the total income of the richest 20% and the 20% poorest of the population Source: <i>Eurostat</i> .				
Spending on Social Protection (Welfare)	Defined as the spending undertaken by the public sector on social benefits, whether they Money transfers or cash payments, in relation to the GDP. Source: <i>Eurostat</i> .				
Importance of the Pay of Salaried Workers within the GDP	Defined as total pay received by the worker, whether in cash or transfer, including social contributions. This variable is measured in relation to the GDP. Source: <i>Eurostat</i> .				
Indirect Tax pressure	Defined as indirect tax income (production and imports) in relation to the GDP. Source: <i>Eurostat</i> .				
GDP per capita	Measured in US dollars. It is a <i>proxy</i> variable of a country's level of development. Source: <i>Governments Finance Statistics</i> , IMF.				

Importance of the Agricultural Sector in the GDP	We also use this as a <i>proxy</i> variable of a country's level of economic development, to test the relationship which exists between economic development and equality of income distribution. As Cameron (2000) indicates, inequality of income increases as the importance of the agricultural sector in the economy diminishes. Source: <i>World Bank</i>
Civil Liberties	<i>Index of Civil Liberties</i> : This is an index prepared by the NGO <i>Freedom House</i> and which includes evaluations of religious and press freedom, the Rule of Law, economic, human and association rights.
Polítical Rights	<i>Index of Political Rights:</i> This is an index prepared by the NGO <i>Freedom House</i> and which includes evaluations of free and impartial elections, multiple political parties, a significant opposition, military dominance and self-determination of minority groups.
Economic Freedom	Index of Economic Freedom: It is an index prepared by the Heritage Foundation/Wall Street Journal Institute of Investigation and includes assessments on commercial policy, Government tax load, Government intervention on economy, monetary policy, foreign investment and capital flow, foreign activity, financial activity, salary and price control, property rights, and black market regulation and activity.
Corruption	<i>Index of Perception of Corruption:</i> This is an index prepared by the NGO <i>Transparency International</i> and includes the perceptions of businessmen, academics and analysts about the level of corruption in civil servants and politicians.
Economic Crisis	Its value is one if the year falls between 2008 and 2011 (the years of economic crisis in the European Union) and zero in any other case. Further, we have interacted the social spending variable with this one in order to test whether the policy of social spending during the crisis is designed to combat inequality of income, or not.
Governing Political Party	Its value is one if the government is left wing or left-centre, otherwise it is zero. With this

	variable we intend to test if the left-wing governments adopt efficient measures to alleviate inequalities in income distribution. For this, we have interacted the social spending variable with this one, to test whether social spending policy is more efficient when designed by left-wing governments.
Mediterranean Countries	Its value is one if the country is Mediterranean, and zero in the contrary case. Once more, we want to study whether the Mediterranean social welfare model is more efficient than the others, or not.
Scandinavian Countries	Its value is one if the country is Scandinavian, and zero in the contrary case. Once more, we want to study whether the Scandinavian social welfare model is more efficient than the others, or not.

	TOBIT		FGLS		PCSE		RGMM	
	GINI	80/20	GINI	80/20	GINI	80/20	GINI	80/20
Constant	28,40***	5,49***	32.64 ^{***}	5.26***	31.76 ^{***}	5.90 ^{***}	27.54**	4.17
	(7,92)	(5,48)	(8.30)	(6.21)	(8.30)	(5.17)	(2.53)	(1.38)
Social spending	-0,099*	-0,026*	-0.014	0.01	-0.040	-0.007	-0.08	-0.02
	(-1,74)	(-1,64)	(-0.26)	(0.91)	(-0.65)	(-0.40)	(-0.55)	(-0.41)
Inmportance of salary	0,011	-0,019	-0.101**	-0.04 ^{***}	-0.095*	-0.03**	-0.14	-0.04
	(0,22)	(-1,32)	(-2.24)	(-3.15)	(-1.83)	(-2.12)	(-0.99)	(-1.10)
Indirec tax pressure	0,029	-0,024	-0.12	-0.02	-0.09	-0.03	-0.16	-0.04
	(0,34)	(-0,99)	(-1.38)	(-0.84)	(-0.86)	(-0.85)	(-0.53)	(-0.50)
GDP per capita	0,000003	-0,000004	-0.00002	-0.000004	-0.00003*	-0.00001***	-0.00004***	-0.00001***
	(0,23)	(-1,36)	(-1.49)	(-1.41)	(-1.87)	(-2.85)	(-2.83)	(-2.76)
Importance of	-0,51***	-0,15***	-0.09	-0.02	-0.14	-0.05	-0.36*	-0.09
agriculture	(-7,42)	(-7,58)	(-1.00)	(-0.86	(-1.29)	(-1.52)	(-1.76)	(-1.31)
Index of Civil Liberties	-0,19	-0,16**	-0.26	-0.10	-0.33	-0.21**	0.12	-0.05
	(-0,86)	(-2,49)	(-0.93)	(-1.41)	(-1.00)	(-2.18)	(0.15)	(-0.19)
Index of Political Rights	1,60***	0,43***	0.43	0.16	0.44	0.24	3.25***	0.94***
	(3,26)	(3,12)	(0.73)	(0.77)	(0.71)	(1.08)	(2.86)	(2.80)

Table 2RESULTS OF THE ESTIMATIONS

			1				1	
Index of Economic	0,06**	0,028***	0.09 ^{***}	0.02 ^{***}	0.096 ^{***}	0.02**	0.17^{*}	0.05*
Freedom	(1,99)	(3,32)	(3.01)	(3.15)	(2.63)	(2.27)	(1.68)	(1.86)
Index of Perception of	-0,22	-0,12**	-0.41**	-0.11***	-0.21	-0.06	-0.21	-0.10
Corruption	(-1,25)	(-2,42)	(-2.47)	(-2.63)	(-1.09)	(-1.15)	(-0.44)	(-0.74)
Scandinavian countries	-4,89**	-0,54	-3.14***	-0.47***	-3.69***	-0.57***	-2.69	-0.24
	(-2,11)	(-0,86)	(-4.28)	(-2.94)	(-4.46)	(-2.69)	(-1.31)	(-0.41)
Mediterranean	-0,34	0,14	0.41	0.22	0.001	0.19	0.64	0.36
countries	(-0,21)	(0,33)	(0.75)	(1.57)	(0.02)	(1.09)	(0.39)	(0.77)
Left-wing government	2,69***	0,68***	0.83	0.32	0.58	0.21	2.48	0.68
	(3,64)	(3,28)	(1.00)	(1.35)	(0.61)	(0.70)	(1.20)	(1.16)
Economic crisis	-1,74**	-0,16	-1.91*	-0.43	-1.25	-0.32	-3.76*	-0.65
	(-1,98)	(-0,66)	(-1.84)	(-1.46)	(-1.05)	(-0.83)	(-1.80)	(-1.12)
Social spending during the economic crisis	0,075**	0,009	0.097 ^{**}	0.02*	0.07	0.02	0.19 ^{**}	0.03*
	(2,05)	(0,92)	(2.29)	(1.91)	(1.37)	(1.20)	(2.11)	(1.65)
Social spending among	-0,10 ^{***}	-0,026***	-0.04	-0.01	-0.03	-0.009	-0.08	-0.02
left-wing governments	(-3,16)	(-2,82)	(-1-15)	(-1.39)	(-0.75)	(-0.72)	(-0.94)	(-0.87)
Number of observations R ²	432	432	432	432	432 0.77	432 0.71	432	432
Test de Hansen							0.88	0.85
* Sig	nificant	to 10%.	**	Significant	t to	5%.***	Significant	to 1%.