I. ARTICLES

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THE EFFECTS OF GLOBALIZATION AND ECONOMIC GROWTH ON INCOME INEQUALITY: EVIDENCE FOR 24 OECD COUNTRIES

Using the World Income Inequality Database and static and dynamic panel data analyses, this paper analyses the correlation between income inequality in the OECD countries and economic globalization, measured by trade openness and foreign direct investment, for the period 1995-2007. The static analysis, conducted by means of the fixed-effects estimator, suggests that trade openness reduces inequality, whereas FDI is positively linked to inequality. Some control variables, such as unemployment and inflation, also have a positive effect on inequality. When we control for endogeneity, using the system GMM estimator with the Windmeijer correction for small samples, the results also show that trade openness decreases income inequality and that the FDI effect on inequality is not significant. The country's economic growth causes inequality to increase, according to the findings of both our static and dynamic analyses. The Washington Consensus seems to be inconsistent.

Keywords: globalization, income inequality, panel data

JEL classification: C23; D30; D63; F02

1. INTRODUCTION

Over the past two decades, possibly no topic has been more discussed, or indeed few terms more frequently used (sometimes *ad nauseam*) than "globalization". Omnipresent in the media and in political debates ("the challenges posed by globalization demand it" is a widely-used argument employed by governments as a defence for unpopular measures), the phenomenon of globalization, and more precisely its costs and benefits, has also been a major object of study for social sciences researchers.

From an economic perspective, globalization essentially encompasses two aspects: i) liberalization and the consequent increase in trade and

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financial flows between nations and ii) the increased flows of foreign direct investment (FDI) (Mah, 2003). The rapidity of this global economic integration during recent decades would not have been possible without the accompaniment of technological progress, the new information and communication technologies and the decrease of transportation costs.

According to some authors, contemporary globalization has also been characterized by growing inequality in income distribution, both in developed and developing countries. As stated by Cornia (1999:1), "*The data on growth and income inequality seem to contradict the optimism of the proponents of globalisation. The empirical evidence suggests in fact that, for most countries, the last two decades have brought about slow growth and rising inequality*".

Obviously, we may be dealing with a *post hoc ergo propter hoc* argument, so the questions that arise are the following: is there a statistical correlation between the phenomenon of increasing inequality in income distribution and globalization? If so, is this correlation evidence of a causal relationship between the two? In other more prosaic words, is globalization to be blamed for the increase in inequality in wealth distribution worldwide?

Various researchers have attempted to answer these questions. There is a vast literature on this issue, particularly relating globalization to production fragmentation/outsourcing and inequality in income distribution. Fenstra and Hanson (1999) have shown that there is a positive correlation between the increase in inequality in the U.S. and production outsourcing processes. Due to the process of fragmentation/outsourcing of production carried out by multinational firms, it is expected that globalization leads to greater inequality between highly-skilled workers (human capital) and the least-qualified workers. The increase in labour factor income disparity will affect the level of inequality of society as a whole, with a consequent increase of the Gini index, the most commonly-used measure of inequality in income distribution.

More recently, some authors have examined the relationship between economic freedom, globalization and income inequality (cf. Carter, 2007, Dreher and Gaston, 2008, Bergh and Nilsson, 2010), the relationship between education policy, enrolment and inequality (Bergh and Fink, 2008) and that between openness, endowments and inequality (Gourdon et al., 2008).

Variables such as unemployment, the level of economic development – measured by per-capita income – inflation, the education level and the urbanization level of a country may also influence the distribution of income. Thus, in our econometric study, in addition to the explanatory variables summarising the effects of globalization (openness and FDI), all these variables will have to be considered for a correct model specification.

What is surprising is the conclusion of most empirical studies that trade liberalization has no significant impact, or that it increases inequality in low-income countries. This is not predicted by the Heckscher-Ohlin (HO) model, specifically, the Stolper-Samuelson theorem: trade liberalization will be good for the relatively abundant factor that increases its price in real and nominal terms.Since in developing countries unskilled labour is the relatively abundant factor, the theory predicts a decrease in inequality, whereas in developed countries, which are relatively abundant in physical capital or skilled labour, it is expected that trade liberalization increases inequality.

We inhabit a world of imperfect competition, where the globalization of production has brought about a trade in intermediate products, mainly vertical intra-industry trade, that is not fully explained by the HO theory. This trade in intermediate products is affecting the relationship between trade liberalization and income distribution and can explain some of these unexpected results (see, for example, Feenstra and Hanson, 2001).

Since factor endowment differences matter, the focus of the empirical study is important: to consider all the countries as a single, undifferentiated class does not seem to be adequate. We should separate the sample of the countries into homogeneous groups: high-income countries, middle-income countries and low-income countries. Bergh and Nilsson (2010) presented a division between 43 high- and middle-income countries and 36 low- and lower-middle-income countries, as well as a second division between 28 high-income countries and 37 middle-income countries, excluding the 14 poorest economies.

Another important issue is that different authors reach different and contradictory results due to the use of different econometric specifications (in levels or in the first differences, static model or dynamic model), different estimators, different definitions of variables (different proxies for the same variable) and sample (cross-section or panel data analysis, small sample or large sample).

Thus, the purpose of this paper is to test the relationship between globalization, trade liberalization, measured by trade openness and foreign direct investment inflows, and income inequality in the most developed countries. The study was carried out using a sample of 24 OECD countries covering the period from 1995 to 2007 (the exclusion of the following 10 OECD countries is due to the lack of data for some variables: Australia, Chile, Czech Republic, Estonia, Hungary, Israel, Mexico, Poland, Slovak Republic and Turkey).

As globalization is a dynamic phenomenon, we preferred a dynamic specification and estimates using the system GMM estimator. However, in order to compare results with other empirical studies, we also conducted a static analysis, using the fixed-effects estimator.

There are historical hypotheses, such as that of Kuznets (inequality increases with economic growth), that the present paper seeks to test, using a new specification and different estimators. There is controversy over the discrepancy between theoretical predictions and empirical results. Is this accurate, or is it only a matter of wrong assumptions, taking into consideration only the trade in finished goods and overlooking the trade in intermediate products (Feenstra and Hanson, 2001)? Or if the theory is correct, does the problem reside in the model specification and data?

There is a fear that globalization increases income inequality. Feenstra and Hanson (2001) consider that trade in intermediate products, linked to the globalization of production and the role of multinational corporations, explains the increasing gap in the United States between the wages of less skilled workers and those of more skilled workers. In this paper, we consider that FDI reflects both globalization and the fragmentation of production and that the Gini index increases when wage differences increase. Thus, it is expected that FDI may have a positive effect (increasing) on income inequality, measured by the Gini index.

In order to provide us with guidance as to the best model specification for this paper, the next section presents a review of the literature, considering two aspects: the relationship between trade and income inequality and between FDI and income inequality. In Section 3, we explain how the data was collected and discuss the methodological issues. In Section 4, the econometric model is specified and the explanatory hypotheses are formulated and justified. In Section 5, we present and discuss the results, while in Section 6, we make our concluding remarks.

2. LITERATURE REVIEW

2.1. The relationship between trade and income inequality

According to the neoclassical theory of international trade (Heckscher-Ohlin model and one of its theorems, the Stolper-Samuelson theorem, 1941), openness to trade will lead to a rise in the real and nominal return on the abundant factor in a country and, conversely, to a fall in the real and nominal

return on the country's scarce factor. Thus, in countries with an abundant supply of cheap and low-skilled labour (usually the case of developing countries), openness to trade will have the effect of increasing the real and nominal wages of those workers, thus leading to a decrease in inequality. On the other hand, in countries with an abundant supply of physical and human capital (usually the case of developed countries), openness to trade will lead to an increase in the real and nominal income of the owners of those factors (for instance, highly skilled workers). Consequently, inequality will increase in developed countries (not only between capital and labour, but particularly between different levels of qualification of labour, considering the labour factor as not homogeneous). In short, according to the Stolper-Samuelson theorem, globalization will lead to a reduction in inequality in developing countries and an increase in inequality in developed countries. However, this conclusion contradicts the commonly accepted "popular view" on globalization and its impacts, as noted by Barro (2000:27): "*the standard theory seems to conflict with the concerns expressed in the ongoing popular debate about globalization. The general notion is that an expansion of international openness (...) will benefit most the domestic residents who are already relatively well off*".

Several empirical studies have been undertaken in order to test the impact of trade liberalization on income distribution, both in developed and developing countries. However, the plethora of studies has not resulted in consensus. Some authors have found evidence supporting the results of the Heckscher-Ohlin model (such as Wood, 1994; Bourguignon and Morrisson, 1990; Calderón and Chong, 2001; Dollar and Kraay, 2004; Hanson and Harrison, 1999). Other authors have found no correlation whatsoever between trade liberalization and income distribution disparity (such as Edwards, 1997; Li et al., 1998). Finally, several authors have highlighted the existence of empirical evidence that contradicts the Stolper-Samuelson theorem (Barro, 2000; Lundberg and Squire, 2003; Milanovic and Squire, 2005).

Bergh and Nilsson (2010) used the KOF index of globalization and the Fraser index of economic freedom and concluded that reforms in favour of economic freedom tend to rise inequality in wealthier countries, confirming the results of the Stolper-Samuelson theorem. As for middle- and low-income countries, it was shown that the main driver of the rise of income inequality is social globalization, one of the KOF index components comprising the number of telephone calls and the number of Internet users, among other indicators.

2.2. The relationship between FDI and income inequality

According to Mah (2003), in order to account for the distributive consequences of globalization, it is also pertinent to study, together with trade, the impact of the increase of foreign direct investment (FDI) flows on income distribution. Again, consensus is lacking.

Mundell (1957) theorized that the increase of FDI flows in developing countries leads to the reduction of inequality in income distribution. The author argues that the rise of FDI flows from developed economies to developing countries, by increasing the existing amount of capital in the host countries, will lead to a rise in the marginal physical product of labour (firstly, since there is a greater quantity of capital per worker and secondly, because there is a positive correlation between the use of more capital-intensive techniques and relative returns to labour) and this will lead in turn to a rise in both nominal and real wages. Therefore, income inequality will decline.

Contrary to the view of neoclassical economic theory, we find the dependency theory. This body of theories argues that the dependency of developing countries' economies on advanced economies has harmful economic and social consequences for the former, particularly in the long term (Firebaugh and Beck, 1994). This dependency is created and exerted mainly via foreign trade dependency and dependency on FDI flows (Firebaugh and Beck, 1994). Proponents of this theory argue that the penetration of FDI in developing countries hinders economic growth and promotes income inequality by creating disparities and dualism in economies and productive structures. For example, the multinationals, forming a highly capital-intensive export sector, are remote and operate apart from the rest of the economy, consuming most of the resources and the existing credit and capital, only to repatriate the profits and wealth created. A similar divisive effect is found in the local communities, where the penetration of FDI tends to produce and maintain local elites whose function is to ensure the best interests of multinationals, which invariably imply the perpetuation of cheap labour, *ergo* poor and marginalized workers.

This pessimistic position with regard to the role of multinational firms (MNF) and FDI is, however, contradicted by the latest World Investment Reports (WIR). According to the WIR (2009), the five most attractive countries for MNFs are the BRIC countries (Brazil, Russia, India and China) and the United States. Despite their not being considered developed countries, the BRICs are characterized by having emerging, rapid-growth

economies, i.e., they are countries with per-capita GDP that is higher than less developed countries, but lower than advanced economies (a minimum of $12,000). Among the fifteen major FDI destination countries, Vietnam currently occupies the sixth position, followed by Germany and Indonesia. This group of fifteen countries also includes Poland, South Africa and Turkey, as well as France, the United Kingdom and Canada. In addition, regarding the factors that explain the attractiveness of FDI, the report stresses the growth and size of the internal market, access to international and regional markets, the supply of skilled labour, the quality of infrastructures, the economic and business environment and the legal environment. The supply of cheap labour is also a factor mentioned, but mainly as a requisite of labour-intensive industries (often low-skilled labour).

Feenstra and Hanson (1997) developed the argument that capital flows from developed countries to developing countries correspond to the outsourcing of activities that, from the developed countries' perspective, use mainly low-skilled labour, but, from the host countries' perspective (developing countries), are intensive in skilled labour. Thus, the penetration of FDI in developing countries leads to an increased demand for skilled workers (from the perspective of those countries), in turn leading to an increase in the relative wages of those workers. Therefore, there is an improvement in the situation of workers considered qualified and a degradation of the situation of unskilled workers. Hence, the main consequence of the expansion of FDI flows to developing countries is the increase in inequality in income distribution.

The authors tested this hypothesis for Mexico over the period 1975-1988 and concluded that "*... FDI is positively correlated with the relative demand for skilled labour and that it can account for a large portion of the increase in the skilled labour share of total wages.*" (Feenstra and Hanson, 1997: 391).

Figini and Gorg (1999) proposed a slightly different hypothesis. They argued that multinational companies not only outsource activities that use relatively large numbers of low-qualified and cheap labour, but also introduce new technologies that were not previously available in developing countries. The role of these new technologies is crucial. Initially, the introduction of new technologies leads to a shift towards a higher demand for skilled workers and therefore, to a rise in their relative wages, increasing income inequality and market segmentation, since in this early stage, low-skilled workers, now earning low relative wages, remain uneducated and

marginalized. However, previously low-qualified workers eventually become more educated and skilled due to the experience gained with the use of the new technologies (learning by doing). Thus, in this second phase, previously unskilled or low-skilled workers become skilled themselves, which results in a decrease of the previous wage inequalities. So, Figini and Gorg argue for the existence of an inverted-U shape relationship between wage inequality and inward flows of FDI. The authors tested their hypothesis for Ireland in the period 1979-1995. They found evidence supporting the inverted-U shape relationship between wage inequality and inward flows of FDI.

Meschi and Vivarelli (2007) concluded that the diffusion of new technologies originating from the advanced economies only widens the income disparities in middle-income developing countries (MICs), since these countries are characterized by a higher absorption capacity of new technologies than low-income developing countries (LICs). Mescher and Vivarelli (2007:19) argued that "*Therefore – as far as LICs are concerned – trade with more advanced countries may not have the same adverse consequences in terms of income distribution.*"

Other authors have found empirical evidence which supports the traditional neoclassical economic theory and thus, the predicted negative relationship between the expansion of FDI flows and inequality income in developing countries (see, e.g., Firebaugh and Beck, 1994).

Finally, some authors such as Mahler et al. (1999) and Mah (2003) do not find any statistically significant relationship between the expansion of FDI flows and income distribution disparities in developing countries.

3. DATA AND METHODOLOGICAL ISSUES

Our main objective is to study the relationship between the widening in income inequality and globalization for 24 OECD countries. Economic globalization will be expressed by the evolution of the proportion of trade in world production and by the share of foreign direct investment flows and stocks. But trade and foreign direct investment are not the only variables that affect income distribution.

With regard to the countries, there are many variables which may affect the income distribution and some may be considered in the empirical model. Among the examples are the following: primary school completion rate, secondary education enrolment, the literacy rate among adults, public spending on education as a percentage of GDP, public expenditure on health

as a percentage of GDP, corruption (percentage of questioned managers that indicated corruption as a major constraint to business), number of listed domestic companies, annual inflation, taxes on income, profits and capital as a percentage of total public revenues, tax revenue as a percentage of GDP, urban population as a percentage of the total, the unemployment rate and long-term unemployment as a percentage of total unemployment.

The variables used to represent the concept of globalization are *OPENNESS* (the ratio exports of goods and services + imports of goods and services/GDP), and *FDI* (Foreign Direct Investment as a percentage of GDP). Since Kearney (2002, 2003), we have a composite globalization index for many countries or areas. Dreher (2006) used a new index that measures the three main dimensions of economics: political, economic and social dimensions. The KOF index of globalization is a composite index made up of three minor indexes: the economic globalization index, the social globalization index and the political globalization index (in this paper, we do not use the KOF globalization index because our purpose is to compare the results with those of other empirical studies that use the traditional proxies for measuring globalization).

The variable used to measure the concept of inequality in income distribution is the Gini index.

In a first stage, data was extracted from the World Development Indicators (WDI) 2008, a database updated annually by the World Bank.

The observations for the Gini index in the WDI 2008 database were insufficient for the period under analysis (1995-2007). Therefore, it was necessary to search in other databases in order to obtain a greater number of observations for the Gini index. The search resulted in the use of the World Income Inequality Database, Version 2 (WIID2) May 2008 database, compiled by the World Institute for Development Economics Research of the United Nations University (UNU-WIDER). This database consists of a compilation of 5,313 observations of the Gini index obtained from various sources for 159 countries, for several years. In addition, it contains more detailed information regarding economic inequality, including income distribution broken down into quintiles and percentiles.

From the WIID2 database, it was possible to obtain several values for the Gini index, which we designated as *GINIW*. Additionally, given the fact that the observations for the Gini index over the period 1995-2007 were still meager for some countries, an alternative solution was undertaken for these cases; the missing Gini index observations were obtained through the calculation of average rates of growth.

Despite the consensus about the Gini index as a best synthetic measure of income inequality, there are authors that consider its decomposition by income sources and by subpopulations (see, for example, Bukietynska and Czekala, 2002; Monti, 2008, and Jedrzejczak, 2010). Following this methodology and taking into account the Polish income data, Jedrzejczak (2010) identified the main sources of inequality and their contributions to the overall inequality. Monti (2008) compare the decomposition of Gini index proposed by different authors and studied the effects of Polish income tax on income inequality within and between groups. The results obtained by Calzoni et al. (2009) also emphasize the inequality-accounting welfare measures and the selection of sub-periods when we evaluate the effects of income growth on inequality over time.

4. EMPIRICAL MODEL

4.1. Dependent variable

The dependent variable used is the Gini index obtained from the UNU-WIDER database. The Gini index includes income other than wage income and its value ranges from 0 to 1, 0 representing perfect equality or equal distribution of total income among households, and 1 representing perfect inequality.The dependent variable is called *GINIW*.

As the Gini index ranges between 0 and 1, we also considered the logistic transformation of the Gini index (variable *LOGISTIC GINIW*, where LOGISTIC GINIW = GINIW / (1-GINIW)).

4.2. Independent variables: hypotheses

Variables used to compute the effects of globalization on income distribution are *OPENNESS* (exports of goods and services + imports of goods and services/GDP) and *FDI* (net inflows as % of GDP). As there are other explanatory causes of inequality in income distribution, we decided to introduce control variables, namely, the variable *PCGDP* (GDP per capita, PPP, current international dollars), *U* (unemployment as % of total labour force), *LTU* (long-term unemployment, as % of total unemployment, i.e., those who are jobless for 27 weeks or more), *INFLATION* (annual variation of the consumer price index) and *COMPANIES* (number of domestic companies).

Taking into consideration the explanatory variables selected, the following hypotheses were formulated:

H1: Greater trade openness between OECD countries leads to decreased income inequality in all OECD countries.

The OECD comprises developed countries with similar factor endowments and a trade pattern based on the intra-industry trade. According to Krugman's (1979, 1980) models of intra-industry trade, it is expected that trade between similar countries increases real wages and decreases income inequality.

Mah (2003), according to the Stolper-Samuelson theorem, expects a negative (positive) coefficient for this variable if the country is a labour (capital)-abundant country. This theorem applies when we are considering the Heckscher-Ohlin (HO) framework, in which countries have different levels of development. From this model, we can predict that trade openness (free trade) will benefit the relatively abundant factors (unskilled labour in developing countries and capital in developed countries).

In our study, we cannot apply the HO model, because all of the OECD countries are developed.

H2: The impact of FDI inflows on income inequality differs depending on the stages of the presence of multinationals.

This hypothesis is considered by various authors (cf. Figini and Gorg, 1999; Feenstra and Hanson, 1997; Mah, 2003).

There are spillover effects at both the intra- and inter-industry levels, due to the presence of multinationals. The acquisition of skills is regarded as a process of learning-by-doing. The blue-collar workers become more skilled in order to work with new technology. So, according to these authors, wage inequality initially widens between qualified and non-qualified workers, but with the process of learning-by-doing (external economies), the gap is gradually reduced.

Thus, the coefficient of this variable can be positive in the first stage and negative in the last stage. In the transition from the first stage to the second stage, it is possible that the coefficient of this variable is not different from zero.

We consider that the Gini index increases when wage differences increase.

H3: Greater per-capita GDP leads to increased income inequality.

This is the Kuznets hypothesis, if we consider the first part of the inverted U relationship between the Gini index and per-capita GDP. The central question of Kuznets' (1955) paper was: "Does inequality in the distribution

of income increase or decrease in the course of a country's economic growth?". Kuznets considered that "the narrowing of income inequality in the developed countries is relatively recent and probably did not characterize the earlier stages of their growth" (p.18).

Barro (2000) considers that "A Kuznets curve would show up as an inverted-U relationship between the Gini value and log(GDP)". Therefore, if the Kuznets hypothesis is valid, it is expected that the coefficient of *PCGDP* is positive. If we wish to consider the quadratic function, we should introduce into the equation the variable ($PCGDP^2$), the coefficient of which is expected to be negative. We included this variable, but it was insignificant. Thus, we did not present the quadratic specification and estimation. It is possible that with more observations, we can reach the Barro (2000) conclusion of "a clear empirical regularity" (the Kuznets curve).

H4: An increasing share of unemployed workers will widen the income inequality.

We consider two variables: total unemployment (*U*) and long-term unemployment (*LTU*). The workers who are unemployed receive a lower wage (subsidy). So, income inequality eventually increases.

H5: A higher inflation rate will increase the inequality.

There are some arguments that relate higher inflation with opportunities to increase profits and earn higher wages if the companies are non-risk-adverse. So, it is expected that income inequality eventually increases.

H6: Income inequality and the number of domestic companies are robustly related.

In this case, we do not know the type of effect, i.e., whether it is positive or negative. More companies mean more industry and more capital and labour. There are also labour mobility and country-specific external economies, due to the agglomeration of industrial activity. Everything depends on the firm's priority: either to greater equality between wages and profits (negative effect on the Gini index and hence the reduction of inequality), or favouring the increase in profits, leading to greater inequality.

4.3. Model specification

To analyse the effects of globalization on income inequality, we formulate the following empirical model, in which countries are represented by *i* and time by *t*:

$$Logisticginiw_{it} = \alpha + X'_{it}\beta + \eta_i + \delta_t + \varepsilon_{it} \quad i = 1, \dots, n \; t = 1, \dots, T \quad (1)$$

Here, X_{it} is a (k x 1) vector of explanatory variables as defined above, β is a (k x 1) vector of unknown coefficients, α the intercept, η_i corresponds to a country's fixed effect, δ_t is a period effect that affects all countries at the same time and ε_{it} is a normally distributed error term.

As changes in income inequality may influence some explanatory variables, we have a potential endogeneity problem. For panel data studies, this problem was resolved by Arellano and Bover (1995) and by Blundell and Bond (1998, 2000) by using a system GMM estimator. The system equation uses first-difference equations instrumented by lagged levels and level equations instrumented by the first differences. The system GMM works for unbalanced panels and for small samples (few periods and many countries), using the Windmeijer (2005) correction (two-step estimation). The estimator is consistent if the instruments are valid and there is no second-order autocorrelation.

In order to compare the results, we will estimate the following dynamic model, using the system GMM estimator:

$$Logisticginiw_{it} = \alpha + \gamma Logisticginiw_{it-1} + X'_{it}\beta + \eta_i + \delta_t + \varepsilon_{it} \ .(2)$$

5. EMPIRICAL ANALYSIS

The static panel data models were estimated with Pooled OLS, fixed-effects (FE) and random-effects (RE) estimators. The *F*-statistics tests the null hypothesis of the same specific effects for all countries. As this hypothesis was rejected, we could not use the OLS estimator. The Hausman test can be used to test the null hypothesis that random effects and fixed effects are both consistent, but only RE is efficient under the alternative hypothesis that only the FE estimator is consistent. As the Hausman test concluded that both estimators were consistent, we used the FE estimates for purposes of comparison with the dynamic model (on the Hausman test and FE estimator, see, for example, Leitão, 2011).

Table 1

Static estimations (Dependent variable: *LOGISTICGINIW)*

	Fixed-Effects Model	Random-Effects Model
FDI	0.31E-03 (2.07) **	0.12E-03 (0.65)
OPENNESS1	-0.28 (-2.31) **	-0.18 (-4.84) ***
PCGDP	0.13E-04 (2.60) **	0.90E-05 (7.15) ***
U	0.01 (2.62) ***	0.80E-02 (2.88) ***
LTU	0.29E-02 (1.43)	0.20E-02 (2.48) **
INFLATION	0.012 (2.49) **	0.95E-02 (2.39) **
COMPANIES	0.32E-04 (1.13)	0.33E-04 (4.97) ***
CONSTANT		0.18 (3.44)
N	230	230
Adjusted R^2	0.84	0.23
Hausman Test (H_0: RE vs FE)		CHISQ(3) = 1.02 P-value = [0.79]

t-statistics (heteroskedasticity corrected) are in round brackets.

***/**/* denote statistical significance respectively at the 1%, 5% and 10% levels. Source: authors' calculations

The fixed-effects estimation shows that globalization (trade liberalization), measured by trade openness (*OPENNESS*), is associated with a decreasing inequality in rich countries (OECD countries). The Gini index decreases when *OPENNESS* increases. However, if the globalization is due to foreign direct investment (*FDI*), the results suggest that globalization increases income inequality in OECD countries. This is in accordance with the hypothesis that the effect of FDI inflows increases income inequality in the first stage. The Kuznets hypothesis that inequality increases with economic growth is confirmed. The variable per-capita GDP has a positive and significant coefficient. The explanatory variable unemployment (*U*) has the expected positive and significant coefficient, showing the positive correlation between unemployment and inequality. The variable long-term unemployment is not statistically significant. The variable inflation is positively related with income inequality, as was expected.

Table 2
Dynamic estimations (Dependent variable: LOGISTICGINIW)

Variables	1-STEP ESTIMATION	2-STEP ESTIMATION
LOGISTICGINIW (-1)	0.89 (14.8)***	0.43 (1.21)
FDI	0.0001 (1.30)	0.0005 (0.676)
OPENNESS1	-0.02 (-2.42)**	-0.49 (-1.85)*
PCGDP	3.6e-007 (0.376)	1.4E-005 (2.23)**
U	0.002 (1.25)	0.016 (0.45)
LTU	-0.0002 (-0.464)	0.002 (0.17)
INFLATION	0.004 (0.967)	0.005 (0.19)
COMPANIES	1.2E-005 (3.64)***	1.24E-005
Constant	0.02 (0.399)	0.06 (0.0947)
Sargan	365.6 [0.98] df=424	3.04 [1.000] df=424
AR(1) test	-3.623 [0.000]	-1.26 [0.21]
AR(2) test	0.01004 [0.99]	-0.1021 [0.92]
Observations	208	208
Parameters	18	18

The null hypothesis that each coefficient is equal to zero is tested using one-step and two-step robust standard error; t-statistics (heteroskedasticity corrected) are in round brackets.

***/**/* denote statistical significance respectively at the 1%, 5% and 10% levels. P-values are in square brackets. Year dummies are included in all specifications (this is equivalent to transforming the variables into deviations from time means).

Source: authors' calculations

In the FE model, all explanatory variables are potentially correlated with the effects and therefore, only estimators based on deviations of the observations can be consistent (Arellano and Bover, 1995; Blundell and Bond, 1998, 2000). In dynamic panel data models, the system GMM estimator eliminates the unobserved country-specific effects through the equations in first differences. This estimator also controls for the endogeneity of the explanatory variables. A standard assumption on the initial conditions allows the use of the endogenous lagged variables for two or more periods as valid instruments, if there is no serial correlation (see Blundel and Bond 1998, 2000). The validity of instruments is tested using a Sargan test of the over-identifying restrictions. First-order and second-order

serial correlation in the first-differenced residuals is tested using AR1 and AR2 statistics (Arellano and Bond, 1991). The system GMM estimator is consistent if there is no second-order serial correlation in the residuals (AR2 statistic). The dynamic panel data model is valid if the estimator is consistent and the instruments are valid. Therefore, we decided to use the system GMM estimator, but correcting the likely downward bias-estimated standard errors, using the Windmeijer correction (2-step estimation in Table 2). The GMM system estimates that we report were computed using DPD for OX (see, Doornik et al., 2006).

As shown in Table 2, the dynamic model, using 2-step estimation, presents consistent estimates, with no serial correlation (AR1, AR2 statistics) for the GMM-SYS estimator. The specification Sargan test shows that there are no problems with the validity of the instruments used. The model presents two significant variables, *OPENNESS* and *PCGDP*, confirming the static results that trade liberalization (globalization) decreases income inequality in rich OECD countries and that there is a positive relationship between income inequality and per-capita GDP. The effect of FDI inflows on income inequality is not significant in the dynamic model. The dynamic results also reveal that unemployment and inflation do not exert significant influence on inequality.

6. CONCLUSIONS AND IMPLICATIONS FOR POLICIES

The study was carried out for 24 OECD countries covering the period from 1995 to 2007, using static analysis (fixed-effects estimator) and dynamic analysis (system GMM estimator).

The static and dynamic estimations confirm that trade liberalization has a negative effect on the Gini index, suggesting that globalization by trade decreases income inequality in rich OECD countries. Bergh and Nilsson (2010), who used the KOF indices of globalisation in its three main dimensions, found a robust positive relationship between the Economic Freedom Index and country income inequality, suggesting that reforms aimed at increase economic freedom in fact increase inequality. The static and dynamic models also confirm the Kuznets hypothesis of a positive relationship between inequality and economic growth. The paper could not confirm an inverted U relationship between per-capita GDP and income inequality, measured by the Gini index, because the quadratic term ($PCGDP^2$) is not significant. The variable foreign direct investment (FDI) is

statistically significant, with a positive effect on inequality in the static model, as was expected. Globalization through FDI increases inequality. However, the effect of FDI on inequality is insignificant when we control for potential endogeneity, using the system GMM estimator with the Windmeijer correction for small samples. Unemployment and inflation increases income inequality in OECD countries if we use a static analysis. In dynamic estimations, both variables were found to be insignificant.

There is no consensus as to how trade liberalization and FDI affect income inequality. The Washington Consensus defends the liberalized trade and free movements of capital in order to increase economic growth at world level. However, our results suggest that the Washington Consensus is not consistent. Economic growth and FDI increase income inequality in developed OECD countries. However, globalization by trade reduces income inequality in these countries. The empirical evidence is not conclusive as to the effects of globalization on income inequality, but our results suggest that liberalization by trade is more beneficial than liberalization by FDI.

The paper leaves a number of issues to be considered in further research. For example, we need more observations on the Gini index for all OECD countries. We also need to introduce the KOF indices of globalization in order to compare the results. The introduction in the model of new explanatory variables reflecting the qualification of labour it is other field of research.

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