GLOBALIZATION, INCOME INEQUALITY AND INCOME DISTRIBUTION: NEW EVIDENCES FROM DEVELOPED COUNTRIES

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Abstract

The main purpose of this paper is investigating the dynamics of income inequality and globalization with emphasis on laber market inequality in data covering 13 developed countries over the period of 1995-2016. The paper uses Panel cointegration test and Fully Modified Ordinary Least Squares method to determine the long run relationship between Globalization, Inequality in income, FDI and income inequality indices. The results suggest that globalization did increase the inequality of gross wages. In addition, both trade openness and outward foreign direct investments had a positive effect on gross income inequality, but inward FDI did not have an effect. On the other hand, when looking at the effects of globalization on the net income inequality, results differed. An increase in outward and inward FDI will decrease the net income inequality. Technological progress, on the other hand, had only a significant positive effect on the net income inequality. Moreover, results showed that an increase in globalization increases the income redistribution by government.

JEL classification: D30, F10, C23

Keywords: Globalization; Income inequalities; Trade; FDI

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1. Introuduction

Since the early 1980s, income inequality has risen in many advanced economies, as evidenced by the sustained increase in these countries' Gini coefficients and top earners' income shares (Atkinson and Piketty, 2007; OECD, 2012; Alvaredo and others, 2013). Traditional explanations for the rise of inequality in advanced economies are skill-biased technological change (SBTC) and globalization, which have increased the relative demand for skilled workers, benefitting top earners relative to average wage earners.

The theoretical foundation of the effect of globalization, especially trade integration, on domestic income inequality is based on the Hechscher-Ohlin[1] model and the Stopler-Samuelson theorem[2]. Where the Stolper-Samuelson and the Heckscher-Ohlin theory focus on trade, Borjan, et al., (2002) conclude that due to international trade, developed countries' supply of low skilled labour has increased relative to high skilled labour supply. This will make unskilled labour relatively less scarce and relative wages of unskilled workers will drop. Krugman (1994) stated that globalization should have grown the higher-skill abundant industries and shrunk the lower-skilled abundant industries. Next to that, Lawrence et al. (1993) researched the causes of the increase of the relative wage of non-manufacturing workers over manufacturing workers during the 1980's. They concluded that international trade did not cause this increase. Krugman and Lawrence

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[1] Heckscher-Ohlin theory focuses on the effects of free trade on the demand for production factors. It states that, countries export products that use their abundant and cheap factors of production and import products that use the countries' scarce factors. Low-income countries specialize in the production of less skill-intensive products, while their wealthy trading partners specialize in high skill (or capital)-intensive products. As a result, trade reduces the income gap between low-skill and high-skill workers within developing countries; but trade widens the inequality within developed countries.

[2] The Stolper - Samuelson theorem describes how firms react to openness in trade and how prices and wages will change subsequently. This theorem argues that a rise in the relative price of a good will lead to a rise in the return to that factor which is used most intensively in the production of the good, and conversely, to a decrease in the return to the other factor.

(1993) state that, according the Stolper-Samuelson theory, international trade increases the production in skill intensive industries, thus raising the demand for skilled labor and increasing its relative price. Nevertheless, other researchers came to different conclusions. For example, Wood (1998) states that the increase in relative demand for skilled labor since the 1940s is caused mainly by technological change. However, during the 1980s the increase in relative demand accelerates, which is caused by international trade.

This paper aims to investigate this question: are increases in economic freedom and globalization, associated with labor markets inequality in developed countries? In other words, whether everybody profit from globalization, or are there winners and losers. Investigating such a question is important; as Lower skilled workers in developed countries do not seem to profit from globalization and fear that their jobs will be outsourced to low-wage countries. Higher wages, on the other hand, thrive due to continued globalization. Knowledge is limited as to whether globalization would polarize incomes, meaning that whether it would have a negative effect on middle-income groups relative to higher and lower income groups. Using Pretax and Post-tax Gini coefficients of household net income from Solt's (2016) recently developed Standardized World Income Inequality Database (SWIID) as our preferred inequality measure, we can construct a panel from 1990 through 2010 with more observations on within-country income inequality than do other studies. This paper pioneers the use of Panel cointegration test and Fully Modified Ordinary Least Squares method, filling the existing gap in the methodological literature on to study the globalization inequality nexus.

As measures for globalization, this paper, according to Bergh and Nilsson (2010), and Lee (2006), uses the trade openness indicator, which is the sum of total imports and exports divided by GDP. The empirical evidence is based on a fixed effect panel data

model, using data from 14 EU countries and covering the period between 1992 and 2015. By estimating a fixed-effect model of country-level income inequality as a function of the trade, FDI and some complementary variables, our analysis again confirm that trade liberalization and economic globalization increase income inequality and income distribution.

The remainder of the paper is organized as follows. Section 2 review the litreture. Section 3 presents data used to implement the model. Section 4 summarizes and analyzes the empirical results. Section 5 concludes the article and draws the main economic policy implications.

2. Literature review

As with a rapid expansion of the global economy for the last several decades, the impact of globalization has been extensively debated from various perspectives (Baek and shi, 2016). Most countries around the world have experienced substantial increases in economic freedom and globalization. There is a prevalent belief that such changes may benefit economic growth (Barro and Sala-i-Martin, 1995; Chang et al., 2009; Kim 2011; and Jouini 2015), but at the expense of increased income inequality within countries (Deininger and Squire, 1998; Aghion et al., 1999; Panizza, 2002; and Stiglitz, 2012).

There is an ongoing literature examining the relationship between globalization and inequality. Different studies consider various parameters (human capital, income, or wages) to examine the interactions with FDI flows and openness (Francois and Nelson, 2003; Taylor and Driffield, 2005; and Bjørnstad and Skjerpen, 2006).

Globalization is often measured by trade and foreign direct investment (FDI), and the empirical results of its impact on inequality are mixed in the previous literature. Carneiro and Arbache (2003), Mah (2003), Mahler etal., (1999), and Ghosh, et al., (2000), found

no clear evidence between globalization and inequality. Some empirical findings showed that globalization had a significant impact on reducing income inequality (Williamson, 1997; Dollar, 2005; Zhou et al., 2011). However, there are several empirical studies that pointed out the increases in income differences caused by economic globalizationon for example, Beyer, et al., (1999), Feenstra and Hanson (1997);Yao, (2006) and Choi (2006). Bergh and Nilsson (2010) conclude that freedom to trade internationally increases the within-country inequality; Lee (2006), investigated the effects of globalization on inequality in Europe. He found that FDI has a positive significant effect on inequality, but the effect of trade is insignificant. Herzer and Nunnenkamp (2013), conclude that both inward- and outward-FDI have a negative relation with inequality in the long run; but have a positive relation in the short run. Savvides (1998) found that inequality by trade is raised in the developing countries, but not in the developed countries. Feenstra and Hanson (1996) found a positive relation between globalization and inequality; Hijzen (2007) found that Skill Biased Technological Change and outsourcing are the main drivers of increasing inequality.

In general, the FDI inflows decrease the GINI coefficient in developed countries but increase in developing countries before 1990s. Trade openness has a negative effect on the GINI coefficient in developed countries and a positive effect in developing countries.

3. The empirical model

In this paper, following Bergh and Nilsson (2010), and Lee (2006), the model looks as follows:

$$Gini_{it} = \alpha_i + \beta\left(\frac{I+X}{GDP}\right)_{it} + \phi\left(\frac{Inward\ FDI}{GDP}\right)_{it} + \varphi\left(\frac{Outward\ FDI}{GDP}\right)_{it} + \gamma Z_{it} + \varepsilon_{it}$$

Where, I and X stand for total import and export and *Z* is other control variables. Globalization effect is characterized by two variables, *trade* and *FDI*; which are the major channels of introducing skill-biased technology and thus have an implication on income distribution by altering the relative demand for skilled and unskilled labors. The Stolper–Samuelson theorem expects β to depend on factor abundance relative to her major trading partners; β <0 if the country is a labor abundant country and β >0; if the country is a capital abundant country within the context of Heckscher–Ohlin model (Lee, 2006). Outward Foreign Direct Investments usually shift lower skilled production abroad, increasing inequality, so we expect that ϕ is bigger than zero as well. There are competing views on the sign of ϕ. The Mundell (1957) hypothesis corresponds to the negative sign. In contrast, the Feenstra and Hanson (1997) hypothesis is equivalent to a positive one. They argue that FDI into developing countries raises the demand for skilled labor and the relative wage of skilled labor to increase.

In our model, as a proxy for technological progress, the General Expenses of Research and Development (GERD) as a percentage of GDP will be included. Next, the percentage of people between ages 15 and 64 who attained a tertiary education used as a measurement of the supply of skilled labor. An increase in the skilled-labor supply should decrease the skill premium and thus decrease income inequality. Lastly, the union density has added to model.

As the dependent variable, two different kinds of Gini coefficients as pretax and post-tax Gini coefficient will be added to model. The Gini coefficient of pretax does not show the effect of the redistribution of income, so this variable is more helpful to show the direct effects of globalization on the labor market. Where the post-tax Gini coefficient shows the effect globalization has on the people's income. Furthermore, in this paper the ratio of the ninth and fifth income decile's cutoff-income have included to see if globalization increased higher incomes relative to the middle income groups, and including the ratio of

the ninth and first decile's cutoff-incomes of the to see if globalization increased higher incomes relative to the lower income group. In addition, the paper adds the income shares of the first, the third and the fifth quintile, to see which effect globalization has on the relative income of this three groups.

The paper used a fixed effect model to capture country-specific unobserved effects in country-specific constants and thus prevent correlation between disturbance and explanatory variables that would be present otherwise (Lee, 2006). The data over the period of 1995–2016 contain 13 countries in the European Union: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, The Netherlands, Portugal, Spain, and the United Kingdom. The data used for estimation come from four sources; The Gini coefficients are collected from the Standardized World Income Inequality Database (SWIID), the docile income data is retrieved from Eurostat, The globalization variables, (trade-openness and FDI stocks) are from the United Nations Conference on Trade and Development (UNCTAD) database, and other control variables are all obtained from the Organization for Economic Co-operation and Development (OECD) database.

4. Empirical evidence

Valid tests of above model require that the data be stationary (integrated of order zero). Our econometric methodology proceeds in four stages. First, we implement the Fisher ADF panel unit root test proposed by Maddala and Wu (1999) to ascertain the order of integration of the variables. Second, conditional on finding that all variables are integrated of order one; we test for panel cointegration using the approach suggested by Pedroni (1999). Finally, conditional on finding cointegration we calculate panel fully modified ordinary least squares (FMOLS) estimate of the coefficients on dependent

variable. The results from the ADF Fisher panel unit root test in Table 1(see appendix). Given that each variable is integrated of order one, we test for panel co-integration using Pedroni's (1999) test. The results of Pedroni's (1999) panel co-integration test based on the seven test statistics are reported in Table 2(see appendix).

Because both models are co-integrated, we calculate FMOLS panel estimates for Gini coefficients. The results for the panel FMOLS estimates are reported in Table 3. The results with Pretax Gini show that outward FDI stock has a positive effect on income inequality. In addition, trade openness is positive and significant at a 10% significant level. Therefore, an increase in these two measures of globalization will increase the income inequality of gross wages earned. Nevertheless, regression results on the post-tax Gini, inward and outward FDI stock have a negative effect on net income inequality. Outward and Inward FDI are significant at a 5% and 1% level, respectively. Trade openness is also negative, but has no significant effect. It seems that although globalization has a positive effect on inequality of gross wages, it does not increase the net wages. The increase in inequality could lead to the government using income redistribution by progressive taxes and income transfers.

GERD has a positive effect in both regressions, but is only significant with the Gini coefficient of net wages as a dependent variable. Therefore, globalization has a positive effect on gross wage inequality, but does not seem to have a positive effect on net income inequality. It looks like that the redistribution of income offsets the effect of globalization. However, does globalization increase the income redistribution by the government? I want to test that question with a new regression with the same independent variables as above, but using a redistribution variable as a dependent variable. The redistribution variable is also retrieved from the SWIID dataset. The variable is calculated by (market Gini coefficient - net Gini coefficient)/ market Gini coefficient × 100.

Table 3: FMOLS results with inequality Gini coefficients

variable	Post tax Gini coefficient	Pre-tax Gini coefficient
Trade openness	-0,024	0,06**
Inward FDI	-0.051*	-0,028
Outward FDI	-0,123**	0,139**
GERD	0,894*	0,585
Population between 15 and 64	–0.596***	-0,197
Union density	0.135	-0,113

*, ** and *** *** denotes statistical significance at 10%, 5% and 1% respectively

The regression's results in table 4 show that, both trade openness and outward foreign direct investments have a positive effect on the redistribution variable, so globalization increases the income distribution by the government. An explanation could be that a decrease in demand for non-skilled labour does not decrease the wages due to rigidities in the labour market. Therefore, the drop in demand will lead to a decrease in employment. This will lead to an increase in unemployment benefits. This effect on the income redistribution will be bigger in countries where the labour market rigidities are stricter and the unemployment benefits are higher.

Table 4: FMOLS results with redistribution as dependent variable

variable	coefficient
Trade openness	0.234***
Inward FDI	-0.123
Outward FDI	0.587**
GERD	-0.98
Population between 15 and 64	0.198
Union density	-0,654**

*, ** and *** *** denotes statistical significance at 10%, 5% and 1% respectively

The section above shows the effects of globalization on inequality, but it does not show how it effects the income distribution exactly. Thus, by using different dependent variables, we aim to show which income groups win and which will lose when a country is affected by globalization. First, the ratio of the ninth and fifth, and ninth and first income docile's cutoff income will be used. Next, the relative income share of the first, third and fifth quintile will be used.

Table 5: FMOLS results with 9/1 and 9/5 docile ratio

variable	coefficient 9/1 ratio	Coefficient 9/5 ratio
Trade openness	0,097	-0,087
Inward FDI	-0,123	-0,158
Outward FDI	-0,124*	0,456
GERD	-0,345	-0,19***
Population between 15 and 64	-0,678*	0,248
Union density	-0.876	-0,123**

*, ** and *** *** denotes statistical significance at 10%, 5% and 1% respectively

The regression results from Table 5 show that, only the outward FDI stock has a significant effect on the 9/1 ratio and the effect are negative. Therefore, outward foreign direct investments increase the wage of middle incomes relative to higher income. Union density has a negative effect on the 9/5 ratio. So, if unions have more members, they have more power and it increases the incomes of the middle income groups relative to the higher incomes, but it does not have an effect on the 9/1 ratio, so they do not have a positive effect on the lower incomes. Thus, outward Foreign Direct Investments decreases income inequality. Besides that, it only has a positive effect on the Gini coefficient of gross income. An explanation could be that FDI has a negative effect on

inequality where the variables use the net incomes. So the effect of the FDI on wage inequality could have been offset by income redistribution through the government. Another explanation could be that a large part of the investments is not directed at developing countries but at other developed countries. If a firm invests in a developing country, the firm would likely outsource a relatively unskilled intensive part of their production, because unskilled labor is abundant over there. However, this is not the case when you invest in a developed country. FDI could have a negative effect if a firm will outsource a relatively skilled activity to a country which is even more skill intensive.

The table 6 below shows the regression results of the effects of globalization on the income shares of the first, third and fifth income share.

Table 6: FMOLS results with income shares of first, third and fifth quintile

variable	Coefficient first quintile	Coefficient third quintile	Coefficient fifth quintile
Trade openness	-0,154	0,046	0,123
Inward FDI	0,005	0,006*	-0,167***
Outward FDI	0,379	-0,125	0,093
GERD	0,113	0,789**	-2,126**
Population between 15 and 64	0,567**	-0,189	-0,126
Union density	-0,489	0,085**	-0,324***

*, ** and *** denotes statistical significance at 10%, 5% and 1% respectively

The results show that inward FDI is significant for the third quintile at a 10% level and for the fifth quintile at a 5% level. It has a positive effect on the third quintile income share and a negative effect on the fifth quintile income share. Therefore, it seems that inward foreign direct investments increase the demand for middle class workers and lower the demands for higher-class workers. This coincides with the theory that firms outsource parts of their value chain, which is not the skill-intensive but use more medium skilled labor. The coefficients for trade and outward foreign direct investments are all insignificant. Then, it cannot be concluded that globalization led to income polarization.

Technological progress has a negative significant effect on the income share of the fifth quintile, a positive significant effect on the third quintile and no effect on the first quintile. This is contradictory with the theory that suggests that technology is replacing lower skilled and middle class jobs, thus lowering their income. Union density has a significant positive effect on the income share of the third quintile and a negative significant effect on the fifth quintile income share. Thus if unions have more members and have more bargaining powers, it can provide the middle-income groups with higher wages, but not the lower income groups. This comes of the expense of high-income groups. The effect of globalization on income polarization cannot be proven in both regressions. The variables trade-openness and outward foreign direct investments do not result in an increase in income of high-income groups relative to both lower and middle incomes. Neither does it have a negative effect on the relative income share of the middle class. Inward FDI even has the opposite effect; it increases the income of the middle class and decreases the income of the highest income group.

5. Conclusion

In this study, we econometrically analysed the effects of globalization on labor markets in developed countries. The paper aims to investigate the effect of globalization on the income inequality and if it would polarize incomes.

The results show that globalization did increase the inequality of gross wages. Both trade openness and outward foreign direct investments had a positive effect on gross income inequality, but inward FDI did not have an effect. On the other hand, when looking at the effects of globalization on the net income inequality, results differed. An increase in outward and inward FDI will decrease the net income inequality. Technological progress, on the other hand, had only a significant positive effect on the net income inequality.

Because of the different results on the net and gross income inequality, I had a closer look at the effect that globalization has on income redistribution by the government. It showed that an increase in globalization increases the redistribution by the government. Therefore, international trade and outward foreign direct investments do have a positive effect on gross wages, but because most developed countries have a welfare state, redistribution effects offset these effects.

The results did not show any results that correspond with the theory that globalization create income polarization. In addition, we did not show an increase in the relative incomes of high-income groups and a decrease in the relative income of middle-income groups. Just like the fact that globalization did not have any effect on net income inequality, it could be that lower incomes for some groups caused by globalization could be offset by income redistribution by way of taxes and transfers. Lastly, union density had a positive effect on the income share of the third quintile and a negative effect on the income share of the fifth quintile. Therefore, it could be so that wages for the largest part

are set by wage bargaining between unions and employers because of the bargaining power of trade unions and that market forces such as globalization have a smaller effect.

APPENDIX:

Table 1: ADF Fisher panel unit root test results

variable	No Trend	Trend
Trade openness	11.8562	58.8654
Δ Trade openness	185.643***	198.7843***
Inward FDI	0.8734	12.6545
Δ Inward FDI	87.0621***	136.456***
Outward FDI	0.3578	5.6734
Δ Outward FDI	137.069***	278.7894***
GERD	0.7654	8.7642
Δ GERD	113.6512***	115.154***
Population between 15 and 64	15.3253	21.6574
Δ Population between 15 and 64	96.6134***	113.9775***

Union density	11.2335	19.5987
Δ Union density	119.5998***	131.6542***

Table 2: Pedroni's panel co-integration test results

Test statistics	coefficient
Panel v-statistics	0.0420
Panel rho-statistics	5.1177
Panel pp-statistics	-7.2158***
Panel adf-statistics	-6.2116***
Group rho-statistics	7.7522
Group pp-statistics	-6.7865***
Group adf-statistics	-5.8734***

*** denotes statistical significance at 1%

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