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ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

CONVERGENCE IN INCOME INEQUALITY ACROSS THE EU-15

AB-15 ÜLKELERİ ARASINDA GELİR EŞİTSİZLİĞİ YAKINSAMASI

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Abstract

The purpose of this study is to examine whether there is convergence in income inequality across the European Union-15 (EU-15) member countries over the 1988-2017 period. The system-GMM estimations suggest a significant convergence process in income inequality between EU-15 countries, but at higher values of the Gini coefficient. This 'unpleasant' result may indicate the inefficiency of extensive EU social and developmental projects and programs aimed at reducing national and regional disparities. The estimates also show more rapid convergence between the EU-15 countries when the country-specific economic and political control variables are included. On the other hand, our results indicate that an increase in FDI inflows leads to higher income inequality within individual countries while in countries where political rights and civil liberties are well established, income inequality tends to be lower.

Keywords: Income inequality, Inequality convergence, EU-15, System GMM

Öz

Bu çalışmanın amacı, 1988-2017 döneminde Avrupa Birliği-15 (AB-15) üyesi ülkeler arasında gelir eşitsizliğinde yakınsama olup olmadığını incelemektir. Sistem-GMM tahminleri, AB-15 ülkeleri arasındaki gelir eşitsizliğinde, Gini katsayısının daha yüksek değerlerinde, önemli bir yakınsama sürecine işaret etmektedir.

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Bu 'hoş olmayan' sonuç, AB'nin ulusal ve bölgesel eşitsizlikleri azaltmaya yönelik kapsamlı sosyal ve kalkınma proje ve programlarının verimsizliğine işaret etmektedir. Tahminler, ülkeye özgü ekonomik ve siyasi kontrol değişkenleri de dahil edildiğinde AB-15 ülkeleri arasında daha hızlı yakınsama olduğunu da göstermektedir. Öte yandan, model sonuçları doğrudan yabancı sermaye girişlerindeki artışın ülkelerde daha yüksek gelir eşitsizliğine yol açtığını, siyasi haklar ve sivil özgürlüklerin iyi olduğu ülkelerde ise gelir eşitsizliğinin daha düşük olma eğiliminde olduğunu göstermektedir.

Anahtar Kelimeler: Gelir eşitsizliği, Gelir eşitsizliği yakınsaması, AB-15, Sistem GMM

1. Introduction

Inequality in income distribution has significantly increased within many advanced countries since the 1980s (Piketty, 2014; Morelli, Smeeding & Thompson, 2015, OECD, 2015), contrary to Kuznets' (1955) hypothesis relating an inverted U-shaped relationship between income inequality and GNP per capita, i.e., inequality first increases then decreases during the process of economic development. This rise in inequality has often been linked to increasing trade and financial globalization (IMF, 2007; Dreher & Gason, 2008). The relationship between inequality and trade openness is partly explained by the Heckscher-Ohlin model. When a country endowed with skilled-workers opens to trade, it produces more skill-intensive goods for export, which will increase wages for the skilled at the expense of the unskilled. Moreover, increased trade with developing countries leads to deindustrialization in developed countries, bringing a sharp decline in manufacturing production and thereby increasing unemployment among the less-skilled (Feenstra & Hanson, 1996). For the US and developed European countries, respectively, Katz & Autor (1999) and Aghion, Caroli & Garcia-Penalosa (1999) underline openness to trade as one of the causes of higher unemployment among the unskilled. Edwards (1997) and Bergh & Nilsson (2010) empirically show that trade openness leads to increasing income inequality in high-income countries, but not necessarily in low-income ones.

Financial openness leads to improvements in the quality and variety of financial services and mainly benefits high-income individuals and well-established firms (Demirguc-Kunt & Levine, 2009). As suggested by Banerjee & Newman (1993) and Galor & Zeira (1993), asymmetric information and transaction costs in financial markets generally penalize the poor who lack collaterals, credit histories, and network relationships. Furthermore, the rising delocalization of large domestic firms to developing countries causes job losses, lower wages, and less job security for unskilled workers. Empirical work shows financial liberalization has been an important determinant of inequality in the EU-27 (Asteriou, Dimelis & Moudatsou, 2014) and in many developed countries (Jaumotte, Lall & Papageorgiou, 2013).

Technical change is another factor in explaining the recent increase in income inequality, since it creates proportionately more high-skill, better-paid jobs, benefiting those with the required skills (Aghion, Caroli & Garcia-Penalosa, 1999; OECD, 2015). Acemoglu (2002) empirically shows that

technical change favors the higher skilled, hence, aggravates inequality in the US and other advanced economies. However, the extent to which the technological progress provokes an increase in inequality rests on the institutional characteristics of a country, particularly labor market institutions such as unions. As shown by Dabla-Norris et al. (2015), deunionization is associated with rising inequality in advanced countries.

Because of the increasing trend of inequality in income distribution within most of the advanced countries, a question arises: is there an inequality convergence within and across countries? In the literature, a small number of papers examined this issue. For instance, Benabou (1996), using Deininger & Squire (1996) statistics on income inequality and Gini coefficients for different country groups, empirically shows that there is evidence of inequality convergence from 1970 to 1980 and, to a lesser extent, from 1980 to 1990. Ravallion (2003), using different datasets including the data used in Benabou (1996), also finds evidence that within-country income inequalities converged over 1980s and 1990s. Furthermore, Bleaney & Nishiyama (2003), using World Income Inequality Database (WIID), confirms the results of previous studies about inequality convergence. However, they point out that the convergence is significantly faster in advanced countries compared to developing ones from 1965 to 1990. The faster convergence in advanced countries is also found by Dhongde & Miao (2013), using relatively recent data (from 1980 to 2005) retrieved from the World Bank and WIID. In their analysis covering developing and developed countries, both cross-section and panel data results indicate a significant convergence process in income inequality. Chambers & Dhongde (2016), using a panel of Gini coefficient between 1990 and 2010 gathered from All the Ginis (ATG) database, find strong evidence of inequality convergence in both developed and developing countries, but the process is faster in the former. Chambers & Dhongde (2017), using World Bank data on decile income shares across countries over the period of 1985-2011, indicate that within-country inequality has converged since the mid-1980s as income shares of the poorest deciles decline, while those of the top decile increase significantly.

The aforementioned papers indicate that, over time, inequality in income distribution increases, and that the inequality converges. These two findings are intriguing, particularly for the core EU member countries, because the EU project aims to reduce regional disparities through funding for wide-ranging projects in areas such as regional, rural, and urban development, and employment and social inclusion. Three early papers empirically examined inequality convergence in the EU: Alvarez-Garcia, Prieto-Rodriguez & Salas (2004), Ezcurra & Pascual (2005) and Tselios (2009). All these three papers use data from the European Community Household Panel (ECHP) for very short periods. Using data over the period 1993-1997, Alvarez-Garcia, Prieto-Rodriguez & Salas (2004) first classify EU member countries in terms of degree of inequality, then test for inequality convergence within and between countries. Their results indicate a decrease of income inequality within countries and between-countries, implying inequality convergence in the EU. For the periods 1993-1998 and 1995-2000, respectively, Ezcurra & Pascual (2005) and Tselios (2009) investigate the possible existence of convergence in income inequality at regional level, and both find an unconditional convergence in regional inequality levels in the European context. In a more recent study, Savoia (2019)

investigates inequality convergence across the EU in a regional basis, using data from Luxembourg Income Study (LIS) over the 1989-2013 period. The findings obtained both from cross-sectional and panel data analyses reveal that income inequality among NUTS2 regions have been converging, but to a higher level.

However, except for Savoia (2019), these papers use very short sample periods, that make difficult to observe the long-term trend of inequality. Moreover, all except for Alvarez-Garcia, Prieto-Rodriguez & Salas (2004) focus on the regional level. Indeed, it is important to consider the issue at the national level since differences in inequality level may result from aggregate economic and social policies. Hence, we aim to fulfill these shortcomings in the literature. To do so, we use country-based data to investigate the convergence in income inequality between EU-15 countries in the period of 1988-2017, using data retrieved from World Bank and Standardized World Income Inequality Database (SWIID). Compared to earlier work, we use a relatively long sample period, allowing us to observe long-run trends in income inequality. Moreover, the data used in the empirical analysis is highly consistent and of good quality.

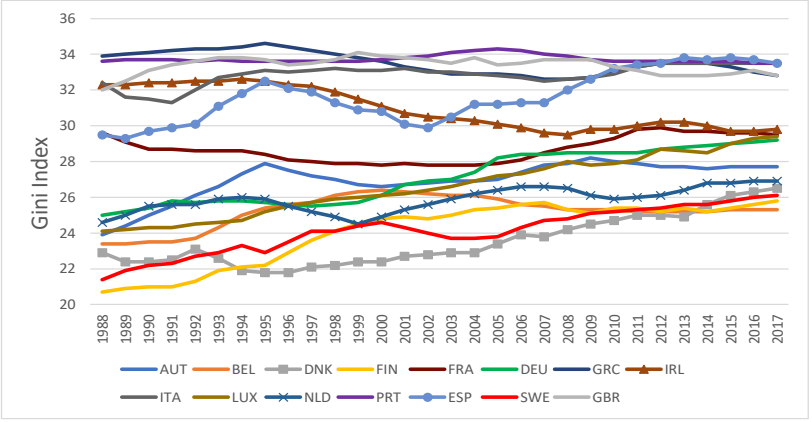

Figure 1. Income Inequality Trends in EU-15 Countries (1988-2017)

Source: Standardized World Income Inequality Database (SWIID).

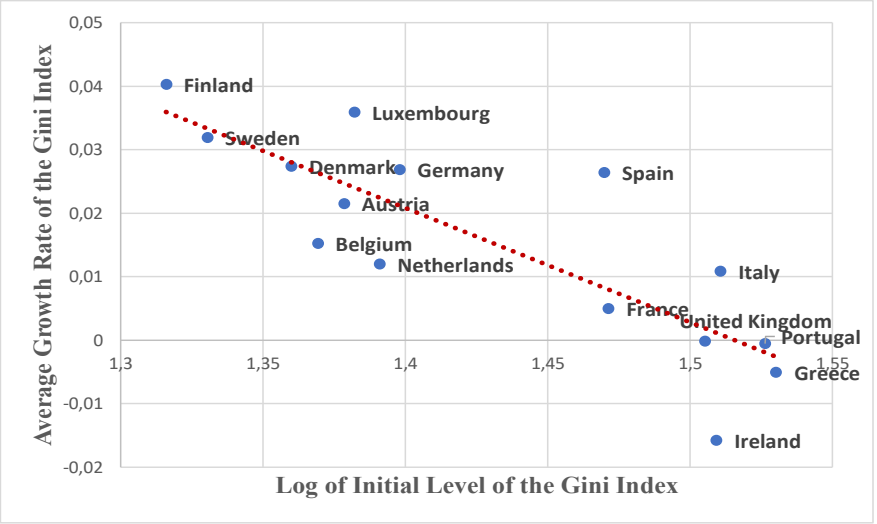

Figure 2. Convergence in Income Inequality (1988-2017)
Source: Standardized World Income Inequality Database (SWIID)

Figures 1 and 2 pinpoint that there is a convergence in income inequality among EU-15 countries. Figures also imply that the inequality has risen across EU-15, as those countries with lower income inequality (i.e., Finland, Sweden, Denmark) approach the level of those with higher levels (i.e., Spain, France, Italy, Portugal). The only notable exceptions are Ireland, and, to a lesser extent, Greece. For these countries, we see that income inequality decreases over the analysis period. We also note that the high inequality in income distribution in the United Kingdom and Portugal remain unchanged over the 30-year period.

Although Figures 1 and 2 give a sense of how income inequality has changed in the last 30 years across EU-15, more precise evidence is needed. For this purpose, the convergence in inequality in income distribution is analyzed by using the system-GMM estimator. To estimate unconditional and conditional convergence in income inequality, we use dynamic panel methodology in the tradition of Islam (1995) and Caselli, Esquivel & Lefort (1996). To be more specific, we use System GMM estimator, proposed by Arellano & Bover (1995) and Blundell & Bond (1998), as a two-step panel econometric analysis. As far as we know, Chambers & Dhongde (2016) is the only study that used this methodology for testing inequality convergence, although not specifically for the EU case. The previous studies mainly employ OLS approach (Benabou, 1996; Ravaillon, 2003) and panel unit root tests (Lin & Huang, 2012a, 2012b). The estimation technique therefore constitutes another contribution of our study.

The remainder of the paper is structured as follows. The second section presents the methodology, data, and findings. Section 3 concludes.

2. Data, Methodology, and Findings

Data

The study covers 1988-2017 period for EU-15 countries. The Gini index is a commonly used measure to represent income inequality across population groups. Theoretically, the Gini index ranges between 0 and 100, scores which imply complete equality and complete inequality, respectively. We compile the data from the following sources: the Gini index is obtained from the SWIID Database, human capital index is taken from the Penn World Tables, and civil liberties and political rights are gathered from Freedom House. The rest of the data are obtained from the World Development Indicators Database. Table 1 shows descriptive statistics of the data. According to the data, the Gini index values vary between 20.4 and 34 across EU-15 countries. Trends over the sample period indicate that income inequality has been increasing within EU-15, except for in Ireland, and to a lesser extent, Greece. The trends also imply that income inequality across countries seems to have converged. The average Gini index value in 1988 is observed as 27.28, rising to 29.48 in 2017. In the last year of our analysis period, 2017, the country with the greatest equality among the sample is Belgium (25.3) while the countries with the least are Italy, Spain, and Portugal (33.5).

Table 1. Descriptive Statistics

Variable	Number of Observations	Mean	Min.	Max.	St. Dev.	Source
Gini Index (0-100)	450	28.551	20.4	34.6	3.824	SWIID
GDP per capita (US$, constant 2010)	450	41376	15026	111968	17308	WDI
Trade Openness (% of GDP)	450	92.77	33.98	416.38	63.65	WDI
Foreign Direct Investment, net inflows (% of GDP)	435	5.58	-58.32	86.61	11.63	WDI
Population Growth (annual %)	450	0.52	-1.85	2.89	0.53	WDI
Index of Human Capital	450	3.03	1.88	3.75	0.36	PWT
Unemployment, (% of total labor force)	447	8.45	1.48	27.46	4.540	WDI
Government Spending (% of GDP)	450	20.30	11.98	27.93	3.12	WDI
Investment (Gross fixed capital formation as % of GDP)	450	21.65	11.54	35.63	3.19	WDI
Civil Liberties (1-7)	450	1.25	1	3	0.48	FH
Political Rights (1-7)	450	1.020	1	2	0.140	FH

Note: Min., Max., St. Dev denote minimum, maximum, and standard deviation, respectively. SWIID: The Standardized World Income Inequality Database, WDI: World Development Indicators – World Bank, PWT: Penn World Table version 9.1, FH: Freedom House

We use some social and economic factors which possibly affect the convergence process of income inequality. Let us give brief information about these factors. The GDP per capita levels differ

over the 30 years; the average level in 1988 was US$30699, increasing to US$49377 in 2017. To measure the openness of the countries, we use two different indicators. The first, trade openness, calculated as the share of the foreign trade volume to GDP, was, on average, 69.82% in 1988, increasing to 121.12% in 2017. As a second openness indicator, net foreign direct investment (FDI) inflows are considered. The average ratio of FDI to GDP rose from 1.16% in 1988 to 2.74% in 2017. Average population growth rate increased from 0.26% in 1988 to 0.54% in 2017. The highest population growth rate in 2017 is in Luxembourg (2.43%), and the lowest, in Portugal (-0.24%). Average human capital index based on the educational level of countries increased from 2.77 in 1988 to 3.28 in 2017. The highest human capital index in 2017 is in the United Kingdom (3.76) and the lowest, in Portugal (2.47). The average unemployment rate remains fairly constant over 30 years in EU-15, increasing slightly from 8.38% in 1988 to 8.47% in 2017. But at country level, the unemployment rate shows important discrepancies swinging from 21.48% in Greece to 3.75% in Germany in 2017. The average share of government spending to GDP increased from 19.29% in 1988 to 20.39% in 2017. The highest spending share is observed in Sweden (26.13%) and the lowest, in Ireland (11.98%). According to the data, the average share of investments to GDP fell from 23.54% in 1988 to 20.9% in 2017 among the EU-15. Lastly, we intend to control civil liberties and political rights in estimating the speed of convergence. Notice that these two indicators are inverse indexes; higher (lower) values imply a worse (better) situation. The political rights index value remains nearly constant over the 30 years. It is observed that except for Greece and Italy in some years, all political rights index values are 1 for all countries. As for the civil liberties index, the average index value in 1988 was observed as 1.4, decreasing to 1.13 in 2017.

Methodology

In our study, the dynamic panel data model showing the convergence process of income inequality is defined as below:

$$G_{it} = \delta G_{i,t-1} + \beta x_{it} + \mu_i + \alpha_t + \varepsilon_{it} \quad (1)$$

where G_{it} is income inequality (Gini index), $G_{i,t-1}$ is the lag of the dependent variable, x_{it} is the vector of control variables and β is the vector of coefficients of the x_{it}. The last three terms, μ_i, α_t, and ε_{it} denote the country-specific effects, the time-specific effects, and the error term, respectively. If the δ value is between 0 and 1, one may suggest the existence of a convergence process. The G_{jt} is constructed by 5-year span Gini index. Ten control variables, which are expected to affect income inequality, are included into the models. These are: GDP per capita, trade openness (% of GDP), foreign direct investment inflows (% of GDP), population growth (annual %), index of human capital, unemployment rate, government spending (% of GDP), investment (% of GDP), civil liberties, and political rights.

In a dynamic model, there might be endogeneity problem caused by the $y_{j,t-1}$. In this case, it is unwise to rely on the least-squares estimator, due to the potential inconsistency and biasness issues. Using generalized method of moments (GMM) and instrumental variable estimator would thus be a more reliable choice (Baltagi, 2005). To deal with this issue, an alternative estimator was suggested by Anderson & Hsiao (1981 and 1982). Holtz-Eakin, Newey & Rosen (1988), and Arellano & Bond (1991) then augmented this approach by allowing multivariate instruments. The augmented estimator is called the difference-GMM. By making an additional assumption suggesting that the first differences of the instrumental variables are not correlated with the fixed-effects, Arellano & Bover (1995) and Blundell & Bond (1998) developed the system-GMM approach. The system-GMM approach uses the differences as the instruments of the levels, while the difference-GMM approach uses the levels as the instruments of the differences. As distinct from the difference-GMM estimator, it is possible to exclude the constant term in the system-GMM estimator. The approach is mainly applicable for data sets in which the size of the units is larger than the size of the time dimension (N>T) (for more details, see Roodman, 2009). Blundell & Bond (1998), on the other hand, applied some simulations and found that the system-GMM estimator showed a better performance compared to the difference-GMM estimator.

Findings

The system GMM results of 5-year span data for EU-15 countries for the period 1988-2017 are shown in Table 2. The first row in Table 2 indicates the coefficient of the lagged value of the dependent variable (δ). A $\hat{\delta}$ value between zero and one; thus $\hat{\delta}$ – 1 is between – 1 and 0, implies the existence of convergence between the EU-15 countries. The higher the absolute value of $\hat{\delta}$ – 1, the higher the convergence. Since the first column in Table 2 presents the convergence speed without controlling any country-specific factors, the δ parameter here implies the speed of absolute convergence. In addition, columns 2 to 11 show the conditional convergence results obtained by using different control variables. According to the results, the lagged coefficient values of the Gini Index are between 0 and 1 in all models, which are statistically significant and indicate both absolute and conditional income inequality convergence across EU countries. The unconditional estimation result implies the lowest speed of convergence rate of lagged Gini Index, – 0.039 (=0.961–1). The conditional factors accelerate the convergence process of the income inequality in the models. In this case, according to Figure 2, using the control variables results in a steeper line, indicating the existence of convergence. The highest convergence is obtained from the model in column (2) where GDP per capita is the control variable. According to this model, the $\hat{\delta}$ – 1 parameter is – 0.215 (=0.785-1). Model results suggest that the coefficients of all the control variables are statistically significant, except for trade openness, human capital, unemployment, and government spending (% of GDP). Note that although these four variables are statistically insignificant, they may considerably strengthen the instruments set (Hoeffler, 2002). Note also that our goal in this study is to show convergence between the EU-15 member countries, rather than finding the best predicting variable for income inequality.

However, one can affirm, according to the estimates, the impact of these variables on the income inequality. The results indicate that, in the EU-15, a decrease in income inequality results from increases in GDP per capita, population growth rate, investments (% of GDP), civil liberties, and political rights, but that higher inequality results from an increase in foreign direct investment inflows. Notice that the civil liberties and political rights variables are inverse indices for which higher values imply lower performance in these areas. We observe, on the other hand, more rapid convergence when the country-specific economic and political factors are controlled.

The diagnostic test results for System GMM model support the consistency of the results from the models. The Hansen tests show that the null hypothesis of validity of over-identifying restrictions (Hansen, 1982) is not rejected. The p-values given by AR(2) do not provide any evidence for significant second order autocorrelation. All models meet the requirement that the number of cross-sections should be greater than the number of instruments, otherwise the over-fitting bias problem would be encountered in the models (Roodman, 2009). To summarize, the model results are consistent with respect to the validity of instrument variables and the expected signs, and the significance of variables.

Table 2: Panel Regression of 5-year span data, System GMM Estimations

Dependent Variable: Gini Index											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Gini Index of the previous period	0.961*** (0.042)	0.785*** (0.041)	0.847*** (0.054)	0.814*** (0.061)	0.866*** (0.037)	0.858*** (0.134)	0.808*** (0.051)	0.844*** (0.049)	0.833*** (0.032)	0.798*** (0.048)	0.808*** (0.054)
GDP per capita	-	-0.068*** (0.011)	-	-	-	-	-	-	-	-	-
Openness (% of GDP)	-	-	0.002 (0.015)	-	-	-	-	-	-	-	-
Foreign Direct Investment, net inflows (% of GDP)	-	-	-	0.005** (0.003)	-	-	-	-	-	-	-
Population Growth (annual %)	-	-	-	-	-0.020* (0.011)	-	-	-	-	-	-
Index of Human Capital	-	-	-	-	-	-0.077 (0.198)	-	-	-	-	-
Unemployment, total (% of total labor force)	-	-	-	-	-	-	0.017 (0.011)	-	-	-	-
Government Spending (% of GDP)	-	-	-	-	-	-	-	0.005 (0.042)	-	-	-
Investment (% of GDP)	-	-	-	-	-	-	-	-	-0.076*** (0.025)	-	-
Civil Liberties	-	-	-	-	-	-	-	-	-	0.026* (0.011)	-

Political Rights	-	-	-	-	-	-	-	-	-	-	0.022* (0.008)
Time Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of Observations	75	75	75	75	75	75	75	75	75	75	75
Number of Groups	15	15	15	15	15	15	15	15	15	15	15
Number of Instruments	10	14	13	13	11	13	13	13	12	12	10
Hansen test p-value	0.400	0.385	0.538	0.235	0.179	0.331	0.518	0.561	0.201	0.201	0.383
AR(2)	0.313	0.378	0.351	0.359	0.454	0.330	0.343	0.365	0.463	0.417	0.397

Note: Windmeijer (2005) finite sample correction for standard errors is employed. The superscripts ***, ** and * denote the significance at 1%, 5%, and 10% level, respectively. The values reported for AR(2) are the p-values for the second order autocorrelated disturbances in the first differences equations.

3. Conclusion

In this study, we aimed to test the inequality convergence in the EU-15 member countries through System GMM estimator. Our estimation results find evidence of the existence of absolute convergence in income inequality between the EU-15 countries over the period 1988-2017. When the control variables are included, our estimates indicate a more rapid convergence process across countries. The overall performances of all specifications of the model are generally robust in terms of the validity of instruments, and the expected signs and significance of the lagged convergence variable and the control variables.

One important result of our study is that convergence in income inequality occurs at higher values of the Gini coefficient. This 'unpleasant' result may indicate the lack of effectiveness of the EU's extensive social and developmental projects and programs aimed at reducing national and regional disparities. A key initiative in this area is the cohesion policy, which aims to promote and support the 'overall harmonious development' of EU member countries and regions. Approximately 32% of the EU budget during the period from 2014 to 2020 [1] is allocated to financial instruments supporting cohesion policy.

Another important result of our study is that an increase in FDI inflows leads to higher income inequality within individual countries. This interesting result, although not inconsistent with the existing literature (i.e. Gopinath & Chen, 2003; Choi, 2006; Basu & Guariglia, 2007), is related to the European single market providing free movement of goods, services, and capital. An intuitive explanation for this impact could be that FDI inflows increase the relative demand for higher-skilled labor, which in turn leads to higher wages compared to those of low-skilled workers. But this issue should be further developed in future research.

1 https://ec.europa.eu/regional_policy/en/policy/what/glossary/c/cohesion-policy

Our empirical results also indicate the importance of political rights and civil liberties in lowering income inequality. To be precise, in countries where political rights and civil liberties are well established, income inequality tends to be lower.

Some issues for further exploration arise from this study. In May 2004, the EU underwent the largest expansion in its history, in terms of territory, states, and population, therefore, investigating the inequality convergence in the EU-27 could verify the robustness of our results.

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