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Foreign direct investment openness and income classes in Europe around the Great Recession

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ABSTRACT
Distributional implications of capital account regulation is eminently context-specific. This paper examines the distributional effects of the openness of foreign direct investment (FDI) flows across 27 European countries in different economic environments around the Great Recession, covering the period 2007–2013. Our multi-level approach allows us to combine country-level variables and sociodemographic characteristics of individuals. The results highlight that the openness of FDI flows heterogeneously affects the income share of individual groups, favouring in particular the highest income classes. This finding seems to be driven by the educational level. We argue that even though highly educated individuals are present along the entire distribution, the highest income classes are especially favoured by the openness of FDI flows. This biased distributional effect of the openness of FDI flows persists throughout the years examined, regardless of the economic environment; this is due, in part, to the fact that the distribution of highly educated people is not sensitive to the business cycle.

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1. Introduction

The past three decades have been associated with greater openness of capital accounts, especially in developed countries, due to a steady decline in the number of restrictions that countries impose on cross-border financial transactions. Policies freeing international capital movements have acquired a friendly tone and have sought to attract foreign investment, lowering entry barriers via regulatory changes, such as new policies enhancing exemptions of corporate taxes and import duties (UNCTAD, 2021).

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Traditionally the literature has tended to focus on the potential effects of financial globalisation for economic growth (Arestis & Caner, 2010; Bekaert et al., 2005; Kose et al., 2009; Prasad et al., 2005), in addition to financial stability (Arestis & Sawyer, 2016; Berger et al., 2017; Cubillas & González, 2014). Even if financial globalisation supports economic growth and increases overall living standards, the extent to which such benefits emerge might vary across countries and, within them, across households. In this vein, a first point that has attracted researchers' attention is the distributional consequences of the increased mobility of capital *vis-à-vis* labour (Blanchard, 2002; Crotty & Epstein, 1995; Rodrik, 1998). Similarly, more recently other authors have focused on the distributional implications of capital account liberalisation measures (see e.g. Eichengreen et al., 2021; Furceri et al., 2019).

Existing literature has made it clear that an equal sharing of economic growth is not guaranteed and predictable ex-ante. It is eminently context-specific and depends strongly on the socioeconomic environment, and the regulatory and policy framework (see also De Haan & Sturm, 2017; Furceri et al., 2019; Eichengreen et al., 2021, among others). Moreover, the effects of capital account liberalisation on inequality are not direct. Instead, they may depend on factors such as the soundness of domestic institutions (Claessens & Perotti, 2007; Delis et al., 2014) or the level of economic development (Eichengreen et al., 2011), as well as on the dynamics they may trigger (immoderate risk-sharing, excessive indebtedness, inclusiveness level of access, etc.). Additionally, the variability of this relationship, depending on the time horizon (Bussiere & Fratzscher, 2007) and the economic cycle (Gallagher et al., 2017), has also been highlighted.

This paper focuses on a specific area of financial (de-)regulation: capital account liberalisation and, within it, foreign direct investment (FDI). Capital account liberalisation refers to the decision by a country's government to move from a closed capital account regime to an open capital account system in which capital can enter and leave at will. Among the different cross-border capital flows affected by capital account policies, recent literature has suggested a potential nexus between financial liberalisation in FDI flows and income inequality as one of the drivers explaining recent increases in inequality in advanced economies (see e.g. Eichengreen et al., 2021; Furceri et al., 2019).

Previous literature focusing on the liberalisation of capital accounts tends to rely on comparisons betweencountries and evidence; for example, that distributional effects depend on their different levels of development or wages (see e.g. Eichengreen et al., 2021; Lane and Milesi-Ferreti, 2018). In our research, we provide a fresh look at the study of this topic by examining the extent to which capital account liberalisation alters the relative position of the income classes. Our point of departure is the share of market income gained by each income class in a set of 27 advanced European economies in different economic environments around the Great Recession (2007–2013). We analyse whether FDI liberalisation has distinct effects over different parts of income distribution, and whether its effects differ on the income share of the income classes, favouring to a greater degree the higher part of the distribution. A significant differential effect of FDI liberalisation over the income shares of the income classes leads us to look deeper into the potential drivers. In this vein, one of

the main theoretical arguments highlighted in the literature relates to the capital-skill complementarity hypothesis. Following this hypothesis, we empirically analyse to what extent the differential impact of FDI might be explained by the level of education of the individuals of the income classes. Our results suggest that although foreign direct investment liberalisation seems to have benefited all income classes, highly educated households seem to have benefited the most from it. Given that education endowment is more prominent in high-income classes, we suggest that FDI liberalisation has exacerbated income inequality through this specific channel in the set of countries composing our sample.

After this introduction, we discuss the relevant literature, followed by the theoretical framework of our contribution. Next we describe our methodology and data, followed by our empirical results and relevant discussion. Finally, we summarise and conclude.

2. Literature review

Since Schumpeter (1911), a traditional stream of literature regards financial liberalisation as Pareto improving and argues that financial liberalisation generates a more efficient international allocation of resources, supporting innovation and hence economic growth. These arguments tend to regard capital flows as driven by rather long-term investment strategies, contributing to capital accumulation in productive activities, wherever expected returns are the highest. However, empirics have not always backed such premise. Numerous authors have empirically addressed the link between capital account liberalisation and economic performance (see, for example, Edison et al., 2004; Henry, 2007 and references therein), obtaining ambiguous results. Some empirical analyses conclude that lifting legal restrictions, imposed on international capital transactions, leads to a better allocation of resources, exerting a positive impact on economic performance (Bekaert et al., 2005; Edwards, 2001; Klein & Olivei, 2008; Quinn, 1997;; Quinn & Toyoda, 2008). Others, however, reveal it does not have a clear effect (Andersen & Tarp, 2003; Bussiere & Fratzscher, 2007; Edison et al., 2002; O'Donnell, 2001; Rodrik, 1998). Information asymmetries, unpredictability, incompleteness and bounded (ir)rationality are endemic characteristics of financial markets, and financial liberalisation does not necessarily tend to overcome these distortions (Eichengreen, 2001; Rodrik, 1998). As evidenced by the 2007–08 global financial crisis, lack of financial regulation might bring about volatile cross-border capital flows, which could enhance systemic risk and fuel financial downturns disproportionately, and severely damage those who tend to suffer the most during crises; that is, low-income classes (see, for instance, Arestis, 2016; Furceri & Loungani, 2018; Panico et al., 2012). On this line, Arestis and Sawyer (2016) further identify large short-term flows as the trigger of undesirable side effects of capital mobility. In the same vein, the detrimental consequences of the interaction between excessive deregulation of the financial sector and rising income inequality, such as debt-financed consumption and depressed aggregate demand, have not passed unnoticed (Stiglitz, 2012; Stockhammer, 2015).

Therefore, the impact of capital account liberalisation depends on factors such as the type of capital flow it promotes, i.e. whether it is long-term physical investments or short-term arbitrage flows. Previous literature suggests that capital account

liberalisation may promote financial instability,[1] when it entails large short-term flows driven by arbitrage strategies, which tend to imply higher risk than long-term investment. On the contrary, capital account liberalisation seems to be particularly beneficial for economic growth when it implies the removal of restrictions on FDI flows, usually driven by long-term investment strategies. However, the implications for inequality are not straightforward and, from a theoretical perspective, these could go in either direction. The extent to which capital account liberalisation is associated with higher or lower income inequality remains an empirical question. This is the specific stream of the literature to which this paper contributes.

Previous empirical analyses estimating the effects of capital account liberalisation on inequality (Avdjiev & Spasova, 2022; Bumann & Lensink, 2016; De Haan & Sturm, 2017; Dorn et al., 2018; Furceri et al., 2019; Furceri & Loungani, 2018; Larrain, 2015; Gallagher et al., 2017; Jayadev, 2007; Li & Su, 2021) have addressed the issue from a purely macroeconomic approach, thereby ignoring sociodemographic characteristics of individuals. Furthermore, they tend to analyse a set of both developing and advanced countries, focusing fundamentally on the role played by the initial development condition in respect to how capital account liberalisation affects inequality, mostly by broadening or deepening the access to credit.

The core of the empirical literature addressing the effects of capital account liberalisation on inequality relies on the IMF's AREAER data, whether applying the original data or the condensed KAOPEN index developed by Chinn and Ito (2008).[2] It also tends to account for inequality using the Gini index (Bumann & Lensink, 2016; De Haan & Sturm, 2017; Furceri et al., 2019; Furceri & Loungani, 2018; Gallagher et al., 2017; Li & Su, 2021). These authors cover samples comprisingboth developed and developing countries. In this sense, Furceri and Loungani (2018) analyse 149 countries from 1970 to 2010 and find that on average capital account liberalisation reforms, typically increase the Gini coefficient by about 0.8 percent in the very short term, and by about 1.4 percent in the medium term. Bumann and Lensink (2016) develop and test a stylised theoretical model covering 106 countries over the period 1973 and 2008, while De Haan and Sturm (2017) extend Bumann and Lensink (2016) model and use a sample composed of 121 countries between 1975 and 2005. They find heterogeneous impacts across countries, depending on their level of financial depth. Gallagher et al. (2017) examine the distributional consequences of capital account openness for 141 countries from 1990 to 2013 and provide evidence of the impact of financial liberalisation on income inequality; their results highlight reductions of inequality during normal economic times, which increases during economic contractions. Furceri et al. (2019) estimate an unbalanced panel for 149 countries, from 1970 to 2010, and conclude that capital mobility poses an equity-efficiency trade-off, since it contains output gains, while increasing the Gini inequality index. Li and Su (2021) focus on inequality within OECD developed and non-OECD developing countries, using data on 148 countries for 1970–2008. They find that fully liberalising the capital account leads to a rise in the Gini coefficient.

Focusing on the personal income distribution in terms of income classes, Li and Su (2021) find that fully liberalising the capital account is associated with an expansion of the income share of the richest 10% (6.24 percentage points increase) at the cost of

the poorest half (2.37 percentage points reduction). They suggest the relationship is particularly pronounced when liberalising inward capital flows. Similarly, Das and Mohapatra (2003) analyse the impact on the income share for a sample composed of 11 emerging markets that underwent capital account liberalisation between 1986 and 1995, and a sample of 8 'control' countries that were not subjected to any major capital account reforms. Their evidence shows that the income share of the middle class (2nd, 3rd and 4th quintiles) fell after liberalisation by about 1.45 percentage points. By contrast, they find no statistically significant evidence for the poorer, while the upper quintile increased its income share after liberalisation.[3] Unlike our empirical research, the studies mentioned above perform macroeconomic analyses and ignore the sociodemographic composition of the population.

Other authors also include the IMF Exchange Arrangements and Exchange Restrictions data in their analyses, even though they focus on the functional income distribution, addressing the impact on the labour share of income instead (Furceri et al., 2019; Furceri & Loungani, 2018; Jayadev, 2007). Jayadev (2007) analyses labour shares from the United Nations System of National Accounts Statistics Database for over a hundred (developed and developing) countries between 1972 and 1995. They find a negative correlation between capital account openness and the labour share of income (except for low-income countries). Likewise, Furceri and Loungani (2018) also find a 0.7 percentage point reduction in the labour share of income in the short and medium run for the benefit of the wealthiest receiving returns to ownership. Furceri et al. (2019) support previous evidence. These findings may be attributed to an alteration of the bargaining conditions between labour and capital. Capital mobility may damage income going to labour by increasing the bargaining strength of capital *vis-à-vis* labour; greater capital mobility raises the share of income accruing to capital (Jayadev, 2007). In this sense, capital account liberalisation may represent a threat to reallocating production abroad, thus leading to a decrease in the labour share of income (Harrison, 2002), which acquires relevance in the total income obtained as we move towards the left side of the income distribution. Furthermore, the international mobility of capital, relative to labour, could impair governments' ability to tax capital and might generate comparatively higher taxes on labour income, further increasing inequality (Autor et al., 2017).

Larrain (2015) and Furceri et al.'s (2019) contributions relate to the aforementioned literature due to its capital account liberalisation measure. However, they perform industry-level sectoral analyses. Larrain (2015) uses EU-KLEMS data on wage inequality as well as sectoral data on 20 mainly European relatively capital-scarce developed economies from 1975 through 2000, highlighting that wage inequality is exacerbated. Indeed, capital account liberalisation seems to increase the enhanced relative wage between workers with a college education and those without by 5%. Larrain (2015) remarks that the increase in sectoral wage inequality was particularly important in those industries with high financial dependence and strong skilled-labour complementarity. Accordingly, Furceri et al. (2019) support previous evidence and state that the labour share was especially damaged in industries with higher external financial dependence, higher probability to adjust to shocks by using layoffs, as well as those with higher elasticity of substitution between capital and labour.

Although most of the empirical evidence employs *de jure* variables, Naceur and Zhang (2016), Cabral et al. (2016), Gallagher et al. (2017), Dorn et al. (2018), and Avdjiev and Spasova (2022) made use of *de facto* variables to measure external financial liberalisation. Naceur and Zhang (2016) employed the ratio of consolidated foreign claims of BIS-reporting banks to GDP (larger values suggest a more liberalised financial system), while the others used cross-border portfolio and direct investment assets and liabilities as a percentage of gross domestic product. These variables contribute to the existing literature, in as much as many countries legally allow capital account transactions but do not receive flows. Naceur and Zhang (2016) use a sample of 143 countries from 1961 to 2011 and find that a more liberalised financial system increases the Gini income coefficients and widens the poverty gap. For a sample of 15 countries over the period 1970–2004, Cabral et al. (2016) conclude that financial integration has a large positive effect on top income shares, hence leading to income concentration in very rich households. Gallagher et al. (2017) underscore the negative impact of financial liberalisation on income inequality: it only arose during economic contractions. Looking at a set of 140 high and middle-income economies over the period 1970–2014, Dorn et al. (2018), provide evidence that FDI flows were positively associated with income inequality. Similarly, Avdjiev and Spasova (2022) analyse a panel of annual data for 48 advanced and emerging economies between 1991 and 2013, and conclude financial openness increases inequality. Both Cabral et al. (2016) and Avdjiev and Spasova (2022) highlight FDI instruments as a key channel through which financial openness affects income inequality.

Heimberger (2020) performs a systematic search and review of the existing literature and applies a meta-analysis to provide a quantitative review of the econometric literature. The findings point towards an inequality-increasing effect of financial globalisation, both in advanced and developing economies, but largely state-contingent.

Many of these authors find that high levels of financial development, understood as credit market access, reduce the negative impact of capital account openness on inequality (Bumann & Lensink, 2016; Furceri et al., 2019; Gallagher et al., 2017), at least in the medium-term (Furceri & Loungani, 2018). Thus, inequality tends to widen more in emerging markets. Indeed, results by Bumann and Lensink (2016) provide evidence of a positive effect of openness policies in terms of lowering inequality when the level of financial depth (measured as private credit over GDP) exceeds 25 percent. Nevertheless, De Haan and Sturm (2017) criticise the uncertainty and capital volatility that capital account liberalisation may entail, which may indeed counterbalance positive dynamics arising from greater financial development. In fact, they argue that financial development strengthens inequality, increasing the impact of financial liberalisation instead of reducing it. Similarly, Jayadev (2007), unlike other authors, suggests that the opening up of capital account has the strongest negative impact on the labour share in developed countries, especially middle-income countries.[4]

The existence of strong institutions is also crucial, especially in the developing world, where institutions are weak and access to credit is not always inclusive. In this context, the absence of ex-ante policies implies a greater probability of capital mobility, increasing inequality (Gallagher et al., 2017). Macroeconomic reforms that

strengthen creditor rights, contract enforcement, and financial institution regulations are essential to ensure that financial development and liberalisation fully support the reduction of poverty and inequality (Naceur & Zhang, 2016). Furthermore, the negative distributive impact that capital account liberalisation may entail is exacerbated when these policy reforms are followed by episodes of financial crises (Furceri et al., 2019; Furceri & Loungani, 2018). Empirical literature on this topic supports the idea that capital account liberalisation should proceed in a carefully designed and well-sequenced fashion, and in a stable macroeconomic environment to avoid offsetting the poverty-reducing gains it entails through economic development.

Empirically analysing the potential distributional impact of financial liberalisation, involves some caveats. First, initial conditions matter and differences across countries are prominent. Aspects related to economic, financial, and institutional development shape the extent to which the benefits from financial globalisation are reaped by the different socioeconomic strata. Therefore, the effects depend on specific situations and circumstances; hence, results cannot be generalised. Far from deriving results that hold under any condition, the literature aims instead to identify contingent effects. Secondly, different types of financial flows are backed by heterogeneous strategies, and therefore bring about different distributive consequences. In this regard, debt flows might serve short-term investment intentions and hence be prone to severe reversals during downturns, whereas foreign direct investment might seek a rather long-lasting development of the domestic business environment (see Eichengreen et al., 2021, for a detailed explanation).

While most research on this issue focuses on emerging economies or pools together developed and developing countries, less effort has been devoted to empirically deal with the role played by capital flow liberalisation on income inequality in advanced economies. In fact, evidence on this issue is especially scarce for Europe. Based on the capital-skill complementarity hypothesis, this paper attempts to provide theoretical and empirical evidence on the extent to which FDI openness affects the income share obtained by individuals belonging to different income classes in European countries, thereby highlighting how openness of FDI flows may have a heterogeneous effect across income classes.

3. Theoretical framework

Even if the liberalisation of financial flows is able to deliver higher rates of economic growth, it could still worsen income inequality, and hence be regarded as a two-edged sword (Eichengreen et al., 2021). It is usually underlined that free capital flows enhance access to credit opportunities for financially constrained individuals and firms and promote the financial development of emerging market economies (host countries), hence contributing to their convergence with industrialised nations (see, for instance, Fischer, 1998, 2003; De Haan & Sturm, 2017; Obstfeld, 1998; Rogoff, 1999; Summers, 2000). This would suggest that financial liberalisation has a heterogeneous effect across countries, particularly favouring those that might need it the most and consequently decreasing inequality between countries.

However, a simple transposition of the Stolpez-Samuelson theorem for international trade to financial markets would predict that such effect happens at the expense of labour in high income- origin countries. In this vein, labour-intensive production would relocate towards emerging countries with lower wages, where the associated return of capital is higher. These capital outflows could undermine workers in advanced economies, as their re-allocation towards other sectors would typically take time and leave scarring effects. Likewise, even if such international re-allocation of labour-intensive activities towards low-wage economies did not materialise, the fact that capital can seek higher returns from abroad easily alters the strategic bargaining positions between labour and capital (Harrison, 2002; Jayadev, 2007). In other words, if capital account openness imposes a credible threat to reallocate production abroad, it may affect the bargaining game between labour and capital, leading to an increase in the profit-wage ratio and thus decreasing the labour share of income.

Therefore, by strengthening the bargaining position of capital *vis-à-vis* labour, increased capital mobility raises income accruing to capital, and thus reduces the income obtained by labour-intensive workers in origin countries, who are mostly located at the bottom and medium part of the income distribution. Consequently, such international convergence enabled by capital account flows from advanced towards emerging economies might nonetheless increase within-country inequality in origin countries, at least in the short-run. However, education might shape these potential distributive effects: highly developed skills might make workers less substitutable and protect them against reallocation intentions, in as much as the lower part of the income distribution is more likely to be less educated and engaged in the type of unskilled job that tends to be subject to relocation intentions. In addition to being more dependent on wage earnings, capital account liberalisation may decrease the labour share of income (Furceri & Loungani, 2018; Jayadev, 2007), as well as exacerbate inequality by reducing unskilled job opportunities and, subsequently, further reducing workers' bargaining power.

Capital account inflows received by advanced economies might also have distributional implications for these countries. The so-called capital-skill complementarity hypothesis stresses that opening the capital account allows firms to raise funds from abroad to finance fixed-capital expenditure, thus promoting capital accumulation. This new capital tends to materialise in machinery and equipment, implying new technology that is more complementary with skilled, rather than unskilled, workers (Aghion & Howitt, 1998; Asteriou et al., 2014; Cragg & Epelbaum, 1996; Figini & Görg, 2011; IMF, 2007; Jaumotte et al., 2013; Krusell et al., 2000). As the latter may find it more difficult to develop the required know-how, since capital and skilled labour tend to be relative complements, capital flows may boost the demand for skilled labour compared to unskilled labour,[5] thus increasing the premium on highly-skilled labour and exacerbating wage inequality in as much as lower classes tend to be less educated on average.

In this sense, capital-skill complementarity provides a simple and explicit mechanism; namely, rapid growth in capital equipment stock, boosted by international liberalising capital policies, combined with the heterogeneous ways of capital-intensive

production systems, which interact with skills, tends to decrease the marginal product of unskilled labour, while the opposite is true for a highly educated labour force.[6] While the development of better and cheaper capital equipment benefits the economy, it might drive down the wages of unskilled worker and thus increase inequality. The final effects, however, depend on aspects such as the ability of countries to absorb foreign capital (Prasad et al., 2005), and the extent to which capital inflows are skill-intensive.

Overall, capital account liberalisation may accelerate the global tendency towards skill-biased technological change and may affect the labour-share of income, which represents the main source of income for the vast majority of the population, and particularly for modest households, in contrast to capital gains (Acemoglu, 2002). Nevertheless, as also suggested by Krusell et al. (2000), those current account restrictions established to protect domestic unskilled labour from competition with low-wage foreign labour, ignore the fact that foreign competition is not the only factor competing with domestic unskilled labour; technological change itself must also be taken into account. They point out the need for better education and training for unskilled workers, so that they can use the new equipment and increase their own productivity, rather than be replaced by new machines.[7]

In order to avoid potential confounding consequences arising from the effects of liberalising capital flows driven by rather short-term arbitrage strategies, which fall outside the scope of our theoretical framework, we zoom into the liberalisation of a specific component of capital account: foreign direct investment (FDI). Via FDI cross-border investments, a resident in a specific country obtains a significant degree of influence on the managerial aspects of a business that resides in a different economy, hence usually creating rather long-lasting ties.[8] These flows have proven to be key for capital formation, knowledge transferences and thus productivity and growth in host countries. As highlighted by the literature, education strongly shapes the potential distributive effect of FDI liberalisation in advanced economies:

i. On the inward FDI side, the distribution depends on the ability of domestic workers to act as a complement to capital. According to this capital-skill complementarity hypothesis, a better-educated labour force would benefit the most from additional capital inflows.[9] This 'skilled premium' mechanism would lead to an inequality-increasing effect.
ii. On the outward FDI side, and from the advanced economies' perspective, liberalisation might be related with a decline in demand for less-skilled labour in the source country,since the re-allocation of labour-intensive production might be outsourced to emerging countries, with comparatively lower wages.

Consequently, regardless of the direction of the flow, FDI liberalisation has the potential to increase within-country inequality in advanced economies, as poorly-educated individuals are not only overrepresented among the more modest households but are also more likely to work in labour-intensive sectors.

4. Methodology and data

We can identify two distinct approaches to explain the income shares: the micro level and the macro level. The micro-level approach effectively scrutinises the precise mechanisms of individual income shares but omits information on country characteristics, even though such macro-level differences may be manifest to some extent at the individual level. Alternatively, because macro-level studies can only control for individual characteristics, such as the mean proportion of individuals in the household with chronic illness at the aggregate level, the relevant studies ignore the specific mechanisms of these characteristics, as they are masked by the aggregation (Goldthorpe, 2000).

Specifically, individuals' income share varies widely across states due to different economic and social circumstances. Furthermore, lower income shares are not always attached to the same types of individuals across countries. As an example, younger people are far more at risk of unemployment in Southern European states than in Northern European ones. Since micro level factors are not entirely unconnected to macro-level ones, we have to be careful to separate individual factors from country-specific features when examining the effects of openness of direct investment capital inflows.

Hence, a complete and reliable analysis on the effects of capital flow liberalisation on income distribution must consider the socio-demographic composition of the population, as well as other characteristics related to the context of the countries for which the analysis is performed. The hierarchical structure of our data involves two levels: individuals (level 1) nested into countries (level 2). As individuals are clustered into countries, it is necessary to account for group effects in the analysis of the influence of FDI liberalisation on the income shares. A natural way to analyse such hierarchical data structure, especially if we are interested in country-level variables, is precisely with multilevel models (Goldstein, 2003; Rabe-Hesketh & Skrondal, 2008), also known as mixed models or hierarchical models or mixed error-component models. This is due to the fact that they allow, in the first place, the estimation of robust standard errors and clustering of the sample. Secondly, they allow measuring country-level variations (between group variations) in relation to individual-level variations (within-group variations) and control of country-level influences. To that end, the double perspective micro-macro of the multilevel approach allows us to control the variable 'at different levels' (hierarchical data). This way, one of the main advantages of the multilevel approach is attaining a greater precision in comparison to aggregate data (related to countries).

Formally, let us then consider a two-level structure where the income share of individual i, in country c, IS_{ic}, is a function of the vectors X_{ic} and Z_{ic} that contain, respectively, first level (individual) and second level (country) characteristics; capital flow liberalisation being our key country-level variable.[10] We estimate the following model:

$$IS_{ic} = \beta_0 + \beta_1 X_{ic} + \beta_2 Z_{ic} + \xi_{0c} + \varepsilon_{0ic},$$

where ξ_{0c} designates the random intercept and ε_{0ic} the individual-level residual with variance σ^2_{ε}. Both residuals are assumed to be independent and to follow normal distribution with zero mean. We denote the between-country variance as $\sigma^2_{\xi_0}$. That is, our model has a random intercept that allows income shares of individuals to vary between countries.

In accordance with the literature, we use the variance partition coefficient (VPC) to evaluate the proportion of variance in income shares attributed to differences between countries:

$$\mathrm{VPC} = \frac{\sigma^2_{\xi_0}}{\sigma^2_{\xi_0} + \sigma^2_{\varepsilon}}$$

The VPC ranges from 0 (no differences between countries) to 1 (no within countries differences).

We estimate alternative models and assess the role played by capital flow liberalisation on income shares and the possible differential effect, depending, on the one hand, on the income class to which the individuals belong, and, on the other, on the degree of skills of individuals proxied by the education level.

For this purpose, we use data on income distribution and individual sociodemographic characteristics from the EU-SILC. This data set collects timely and comparable cross-sectional and longitudinal multidimensional micro-data on income, poverty, social exclusion and living conditions. Our analysis pools data from the 27 European countries (Austria, Belgium, Bulgaria, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden).[11] Unlike most empirical analyses on this topic, in our case we work with a set of advanced countries sharing a comparable level of economic and institutional development and financial depth; even though we also perform a robust check of our findings with different compositions of the sample of countries (see the Robustness Section). Likewise, while all the previous studies use a purely macroeconomic empirical approach, we recognise the importance of microeconomic aspects in determining income distribution, and simultaneously consider both individual sociodemographic and cross-country variables.

The period of analysis is intended to account for both pre-, acute-, and post-crisis situations; we thus work with data for the period 2007–2013[12] (waves 2008–2014 as income refers to the previous year). For the sake of space, we present results for 2007, 2010, and 2013 (see Table A1 of the Appendix for the number of observations for each country and wave, and Tables A2–A5 of the Appendix for results for the remaining years).

In order to examine the potential effect of capital flow liberalisation on income distribution, instead of using an overall measure of inequality, such as the Gini index, we adopt an individual approach in which we take into account the situation of each individual within the income distribution in order to describe reality more faithfully. For this purpose, we compute as our dependent variable the income share (i.e. the proportion of total income of a country) obtained by each individual. This approach

Table 1. Descriptive statistics.

Variable	Description	2007 Average	2007 S.D.	2010 Average	2010 S.D.	2013 Average	2013 S.D.
Income share (dependent variable)	Income perceived by an individual as proportion of total income of the corresponding country (multiplied by 10^4)	0.704	1.853	0.683	1.817	0.673	1.865
Woman_head	1 if head is a woman, 0 otherwise	0.317	0.465	0.333	0.471	0.336	0.472
Age_head	age of the household head	46.391	11.443	47.252	11.615	47.882	11.738
Supervisory_head	1 if head of household having a managerial position, 0 otherwise	0.269	0.443	0.279	0.448	0.273	0.445
Children (%)	proportion of children in the household	0.169	0.212	0.164	0.211	0.164	0.213
Old (%)	proportion of individuals older than 65 in the household	0.039	0.129	0.043	0.136	0.044	0.140
Chronic (%)	proportion of individuals with chronic illness or condition in the household	0.211	0.298	0.218	0.306	0.229	0.317
Loneparent	1 if lone parenthood, 0 otherwise	0.035	0.184	0.037	0.188	0.039	0.193
Tertiary education (%)	proportion of individuals with tertiary education among older than 25 years-old in the household	0.267	0.384	0.278	0.386	0.301	0.395
Work (%)	proportion of individuals working full or part-time (including employees and self-employed) among active members in the household	0.917	0.228	0.875	0.281	0.864	0.293
GDPpc	real GDP per capita expressed in euros of 2010 per inhabitant	25250	11179	24843	10657	25131	10938
FDI	investment in a foreign business enterprise (between 0 and 1, 1 = fully liberalised)	0.394	0.288	0.380	0.291	0.387	0.279
Lower Class	1 if lower class, 0 otherwise	0.189	0.391	0.212	0.409	0.221	0.415
Lower-middle Class	1 if lower-middle class, 0 otherwise	0.410	0.492	0.390	0.488	0.386	0.487
Upper-middle Class	1 if upper–middle class, 0 otherwise	0.301	0.459	0.298	0.457	0.293	0.455
Upper Class	1 if upper class, 0 otherwise	0.100	0.300	0.099	0.299	0.100	0.300

Note: S.D.: standard deviation.
Source: authors' computation, based on EU-SILC (2008, 2011, 2014) data.

allows addressing the effect of capital flow liberalisation at different parts of the distribution, obtaining a more precise picture of different potential effects along the income distribution. For expositional purposes, we multiply the income share by 10^4.

The income concept used is disposable household income, defined as the sum of gross personal income components for all household members plus gross income components at the household level, minus regular taxes on wealth and income, social insurance contributions and regular inter-household transfers paid. The income data correspond to the year prior to the survey for all countries, except Ireland (the income data refer to the 12 months prior to the interview); the income data refer to 2007, 2010 and 2013. To adjust household income according to the size of the household, we use the modified Organization for Economic Cooperation and Development (OECD) equivalence scale.[13] This measure is attributed to every member of the household. Therefore, our unit of measurement is the household, while the unit of analysis is the individual. Then we compute the income share obtained by the individuals, defined as the percentage of total equivalent household income that corresponds to each member of the household.

Since all individuals in the same household share its particular characteristics, we consider the following explanatory variables related to the household as a whole or to the household head.[14] The descriptive statistics can be found in Table 1. We include variables related to demographic, labour and educational characteristics as determinants of household income. We control by means of demographic characteristics of the household head, such as the latter's gender and age, and of the household, such as the proportion of children, proportion of individuals with chronic disease, and proportion of individuals older than 65. The proportion of household members that are older than 65 years of age is a relevant demographic variable, as average income tends to be lower among retirees. We also identify households with children and only one parent. We additionally include labour characteristics, i.e. whether the head of the household has a managerial position at work, or the proportion of household members that work. Regarding education, we control for the proportion of members of the household with higher education.

In addition, we control for the income class to which individuals belong. We adopt a relative definition of the income class, which establishes thresholds in relation to percentages of the country's median income. We consider the income limits that are conventionally accepted (see, for example, Atkinson & Brandolini, 2013; Birdsall et al., 2000; Ravallion, 2010; Thurow, 1987). We use 75% and 125% of the median income to delimit the lower-middle class. These cut-offs demarcate the lower-middle class, *LMC*, as individuals 'comfortably' clear of being at-risk-of-poverty (below 60% of the median). Similarly, we define the upper-middle class, *UMC,* as the share of the population whose income is between 125% and 200% of the median income. Conveniently, the share of households belonging to the lower part of the income distribution (below 75% of the median income) is considered lower class, *LC,* whereas those at the top (above 200% of the median income) compose the upper class, *UC.* [15]

Finally, at the cross-country level we first control for the GDP per capita as a broad measure of average living standards of countries to control for the economic growth effect, given the strong relationship between income inequality and economic development highlighted in the literature (see e.g. Barro, 2000; Berg et al., 2012). Specifically, we introduce the variable *GDPpc*, which is the real GDP per capita expressed in euros of 2010 per inhabitant (Eurostat, 2021). Regarding our main country-level explanatory variable, capital flow liberalisation, we use the *de jure* capital account liberalisation index annually published by the IMF Exchange Arrangements and Exchange Restrictions (AREAER), based on regulations that countries apply. We focus on the openness of capital account with respect to the specific FDI asset category (IMF, 2021). This refers to investment in a foreign business enterprise that involves a long-term relationship and reflects a lasting interest and control by a resident (foreign) entity in a foreign (resident) economy, which can be a direct investor or a parent enterprise. This asset category implies that the investor exerts influence on the management of the resident enterprise and entails the provision of capital funding in exchange for an equity interest without the direct purchase of enterprises' regular shares (unlike portfolio investment). We thus focus on the financial regulation directly faced by this specific type of capital flows, since their main purpose entails long-term capital-enhancing business strategies, which is the subject matter of the

tested hypothesis. Indeed, the movement of international capital largely determines the investment in fixed capital formation. We then leave aside typically shorter-term capital flows, such as money market and derivative assets, more prone to be driven by arbitrage strategies and, on average, less associated with real economy goals than FDI. This index ranges from zero to one and achieves a unit value in case of full liberalisation. The main descriptive statistics for cross-country level variables are also reported in Table 1.

5. Empirical results and discussion

5.1. Baseline analysis

In order to analyse the links of FDI liberalisation with income distribution, we make use of household level data and include in our specification the main covariates that are associated to differences in income shares. We estimate multilevel models and show the results in Table 2 for the year 2007, Table 3 for 2010 and Table 4 for 2013 (Tables A2–A5 in the Appendix show results for the remaining years). We consider four specifications in which different variables are added to analyse in depth the link

Table 2. Estimation results of income share for 2007 (wave 2008).

	Model 1	Model 2	Model 3	Model 4
Woman_head	−0.041 [0.056]	−0.053 [0.048]	−0.043 [0.052]	−0.042 [0.046]
Age_head	−0.001 [0.006]	0.001 [0.005]	−0.000 [0.006]	0.001 [0.005]
Supervisory_head	0.236** [0.117]	0.269** [0.113]	0.227** [0.111]	0.234** [0.105]
Children (%)	−0.497 [0.480]	−0.452 [0.379]	−0.536 [0.481]	−0.515 [0.457]
Old (%)	−0.299* [0.165]	−0.150 [0.121]	−0.332* [0.170]	−0.288* [0.174]
Chronic (%)	−0.086 [0.056]	−0.051 [0.054]	−0.108** [0.043]	−0.089** [0.044]
Loneparent	0.190 [0.293]	0.109 [0.223]	0.176 [0.285]	0.155 [0.271]
Tertiary education (%)	0.406 [0.262]	0.339 [0.212]	0.447 [0.404]	0.338 [0.306]
Work (%)	−0.182 [0.240]	−0.112 [0.189]	−0.167 [0.212]	−0.140 [0.195]
GDPpc	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
FDI	13.312*** [4.887]	25.748** [10.052]	11.410*** [4.318]	11.608*** [4.363]
Lower Class	−6.754*** [2.140]	−6.735*** [1.901]	−6.674*** [2.102]	−6.800*** [1.924]
Lower-middle Class	−5.292*** [1.659]	−5.336*** [1.512]	−5.260*** [1.646]	−5.331*** [1.475]
Upper-middle Class	−3.672*** [1.139]	−3.699*** [1.092]	−3.662*** [1.145]	−3.681*** [1.028]
FDI*Lower Class		−19.315** [7.979]		
FDI*Lower-middle Class		−15.131** [6.318]		
FDI*Upper-middle Class		−9.021** [4.121]		
FDI* Tertiary education			8.056*** [2.922]	17.528*** [6.795]
FDI* Tertiary education *Lower Class				−24.170*** [8.984]
FDI* Tertiary education *Lower-middle Class				−17.880*** [6.601]
FDI* Tertiary education *Upper-middle Class				−10.026** [4.533]
Constant	6.664** [3.118]	6.425** [3.232]	6.603** [3.104]	6.596** [3.133]
Observations	87,315	87,315	87,315	87,315
Number of groups	27	27	27	27
Var(intercept)	27.303	27.840	27.334	27.601
Var(residual)	13.556	10.648	12.839	11.901
Variance Partition Coefficient (VPC)	0.668	0.723	0.680	0.699
Log likelihood	−7422	−7100	−7349	−7248

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.
Source: authors' computation, based on EU-SILC (2008) data.

Table 3. Estimation results of income share for 2010 (wave 2011).

	Model 1	Model 2	Model 3	Model 4
Woman_head	−0.074* [0.044]	−0.073* [0.041]	−0.072 [0.044]	−0.066 [0.043]
Age_head	−0.005 [0.005]	−0.003 [0.003]	−0.005 [0.005]	−0.004 [0.004]
Supervisory_head	0.279* [0.148]	0.309** [0.143]	0.277* [0.145]	0.288** [0.144]
Children (%)	−0.568 [0.458]	−0.529 [0.376]	−0.566 [0.459]	−0.548 [0.431]
Old (%)	−0.018 [0.152]	0.042 [0.111]	−0.016 [0.152]	−0.014 [0.146]
Chronic (%)	−0.050 [0.080]	−0.089 [0.081]	−0.038 [0.085]	−0.047 [0.079]
Loneparent	0.280 [0.273]	0.208 [0.195]	0.251 [0.254]	0.261 [0.254]
Tertiary education (%)	0.308* [0.158]	0.283* [0.159]	0.332 [0.302]	0.276 [0.231]
Work (%)	−0.223 [0.265]	−0.158 [0.242]	−0.207 [0.256]	−0.191 [0.251]
GDPpc	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
FDI	11.402** [4.932]	21.170** [9.665]	10.055** [4.402]	10.208** [4.448]
Lower Class	−6.497*** [2.027]	−6.412*** [1.836]	−6.458*** [2.001]	−6.444*** [1.882]
Lower-middle Class	−5.074*** [1.573]	−4.984*** [1.405]	−5.035*** [1.548]	−5.013*** [1.434]
Upper-middle Class	−3.449*** [1.049]	−3.363*** [0.943]	−3.429*** [1.033]	−3.382*** [0.939]
FDI*Lower Class		−14.714** [7.293]		
FDI*Lower-middle Class		−11.846** [5.978]		
FDI*Upper-middle Class		−7.324* [3.842]		
FDI* Tertiary education			5.483** [2.561]	12.253** [5.646]
FDI* Tertiary education *Lower Class				−16.999*** [6.052]
FDI* Tertiary education *Lower-middle Class				−12.758** [5.525]
FDI* Tertiary education *Upper-middle Class				−7.499** [3.759]
Constant	5.862* [3.005]	5.589* [2.902]	5.772* [2.964]	5.707* [2.929]
Observations	91,427	91,427	91,427	91,427
Number of groups	27	27	27	27
Var(intercept)	30.489	30.594	30.592	30.712
Var(residual)	12.708	11.146	12.392	11.936
Variance Partition Coefficient (VPC)	0.706	0.733	0.712	0.720
Log likelihood	−7337	−7162	−7304	−7253

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.
Source: authors' computation, based on EU-SILC (2011) data.

between the openness of direct investment capital inflows and the income share of the income classes (i.e. the distribution of income).

For this purpose, we first test the suitability of multilevel models, concluding that the between-country variance is significantly different from zero. Therefore, income shares of individuals from the same country, after controlling for individuals and country-level variables, are significantly more alike than income shares of individuals from different countries, which supports the use of multilevel techniques.

We identify variables that explain the income share of individuals (Model 1). Our results suggest that, in general, the income share does not always seem to be affected by gender. Nonetheless, living in a household where the head has a supervisory job, that is, a managerial position, does have a positive influence on the income share in all specifications and years. Having a single-parent household, or a higher percentage of children or old people among household members, does not seem to be associated to income shares, as is the case for the age of the household head and the proportion of working members in the household. Likewise, in some models having members suffering from chronic diseases is negatively linked to the income share. For its part, living in a household with a greater percentage of highly educated household

Table 4. Estimation results of income share for 2013 (wave 2014).

	Model 1	Model 2	Model 3	Model 4
Woman_head	0.037 [0.041]	0.042 [0.041]	0.033 [0.041]	0.038 [0.043]
Age_head	−0.004 [0.005]	−0.003 [0.005]	−0.003 [0.005]	−0.003 [0.005]
Supervisory_head	0.349* [0.189]	0.387** [0.184]	0.347* [0.183]	0.356** [0.179]
Children (%)	−0.487 [0.377]	−0.422 [0.313]	−0.478 [0.379]	−0.463 [0.363]
Old (%)	−0.077 [0.199]	−0.081 [0.173]	−0.09 [0.202]	−0.095 [0.184]
Chronic (%)	−0.074 [0.061]	−0.132* [0.077]	−0.09 [0.060]	−0.099 [0.066]
Loneparent	0.074 [0.146]	−0.041 [0.091]	0.054 [0.139]	0.039 [0.128]
Tertiary education (%)	0.315* [0.179]	0.291 [0.181]	0.406 [0.329]	0.236 [0.238]
Work (%)	−0.477 [0.322]	−0.418 [0.296]	−0.461 [0.311]	−0.469 [0.308]
GDPpc	0 [0.000]	0 [0.000]	0 [0.000]	0 [0.000]
FDI	12.735* [6.898]	25.065* [14.070]	10.899* [5.871]	11.135* [5.974]
Lower Class	−7.031*** [2.110]	−6.751*** [1.837]	−6.911*** [2.046]	−6.961*** [1.917]
Lower-middle Class	−5.563*** [1.654]	−5.311*** [1.416]	−5.452*** [1.594]	−5.476*** [1.467]
Upper-middle Class	−3.977*** [1.195]	−3.711*** [0.995]	−3.875*** [1.147]	−3.829*** [1.022]
FDI*Lower Class		−18.058* [10.859]		
FDI*Lower-middle Class		−14.935* [9.036]		
FDI*Upper-middle Class		−9.91 [6.204]		
FDI* Tertiary education			6.885 [4.289]	15.766* [9.455]
FDI* Tertiary education *Lower Class				−22.065** [11.111]
FDI* Tertiary education *Lower-middle Class				−16.547* [9.289]
FDI* Tertiary education *Upper-middle Class				−10.431 [6.506]
Constant	6.535** [2.998]	6.184** [2.930]	6.402** [2.932]	6.409** [2.943]
Observations	90681	90681	90681	90681
Number of groups	27	27	27	27
Var(intercept)	28.767	29.106	28.935	29.016
Var(residual)	15.174	13.546	14.816	14.237
Variance Partition Coefficient (VPC)	0.655	0.682	0.661	0.671
Log likelihood	−7573	−7422	−7542	−7488

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.
Source: authors' computation, based on EU-SILC (2014) data.

members, seems to be positively associated with higher income shares for the years 2010 and 2013.[16]

Focusing on the cross-country level of our variable of interest, the openness of FDI flows (Model 1) shows that this financial regulation measure is positively and significantly associated with the income share. Moreover, when we disentangle this effect by income class (Model 2), an increase in the openness of FDI flows is significantly linked to an increase in the income share of the upper class (omitted category). This effect diminishes progressively as the income class is lower, revealing a non-homogeneous effect along the income distribution, especially lower for the bottom tranche.

In order to delve into the relationship between FDI liberalisation and income distribution, in the last models (Models 3 and 4) we analyse the role that education level plays in the association between the openness of FDI flows and the income share of individuals.

In this regard, Model 3 shows that highly educated individuals benefit more from an increase in FDI openness than poorly educated ones; that is, having a higher percentage of highly educated members[17] in a household positively shapes the effect of the openness of FDI flows on income share, thus providing a greater increase.

Furthermore, if we disaggregate by income classes the modulating role of education on FDI openness (Model 4), we find evidence of significant differences across classes. The shaping role of a high level of education on the positive link between FDI openness and income shares is heterogeneous by income classes, especially benefiting those at the upper part of the income distribution and being comparatively less profitable as we move left on the distribution. Once the education level is accounted for, we provide evidence that the positive link between the FDI liberalisation and the income share within any specific income class becomes stronger the higher the education level of the households' members. However, the education level seems to heterogeneously magnify the previously identified positive link between income share and FDI liberalisation policies, the benefits arising from said policies being more noticeable the higher the income class. Therefore, the lower class is the one that benefits the least from having highly skilled members.

Let us recall that highly educated individuals are not randomly distributed over the income classes, but instead tend to be overrepresented in the upper part of the distribution. We compute the proportions of highly educated individuals by income class for each country and confirm that even though there are highly educated individuals in all income classes, they are over represented in the highest income classes (see Tables A6 and A7 of the Appendix). This pattern interacts with the increase in the demand for a qualified labour force resulting from FDI flows, thus impelling the channel through which this macroeconomic policy may affect inequality, since capital flows openness benefits highest income classes the most. Our findings, therefore, seem to suggest that capital account liberalisation affecting FDI policies tends to enhance income inequality via the capital-skill complementarity hypothesis, with highly persistent results for all the years between 2007 and 2013 (see Tables A2–A5 of the Appendix).

Hence, our analysis tests the joint association of FDI liberalisation with the income class to which households belong and their proportion of highly educated members. Results suggest that households' ability to profit from the liberalisation policy analysed is closely determined by their sociodemographic characteristics. More precisely, our findings highlight the role played by the education level in explaining the unequal capitalisation of FDI openness in terms of income share across the households. This form of capital account liberalisation has fundamental implications for capital accumulation and technology transmission, which contribute to the demand for an educated labour force. It should thus be stressed that a crucial aspect of financial globalisation, that is the liberalisation of FDI, tends to boost economic growth by enhancing investment flows and technology transmission, whose benefits seem to end up being unevenly distributed across the different segments of the population according to its sociodemographic characteristics.

5.2. Robustness

We perform diverse additional tests and analyses to assess the robustness of our findings. We assess the sensitivity to different sample compositions and definitions of income classes and higher education. Results from these robustness checks are

provided in Appendix Tables A8–A11. The tables show that the main results are very similar under these alternative specifications.

In the relevant literature, we find different definitions of income class in the relative approach, such as the ones based on the percentiles of the income distribution, where the proportion of people that make up each class is fixed. In this paper, we define income classes based on thresholds relative to percentages of the median income of the distribution, and calculate what proportion of the population is corresponds to each class. This way, the proportion of people in each income class is not fixed and does not correspond exactly with an individual's income rank, since the same income shares in two different countries do not necessarily belong to the same income class. Our results are robust in terms of the definition of income class as shown in Table A8 and A9 in the Appendix, where the middle class is constituted by individuals located between the second and eighth deciles (Table A8), or alternatively between the first and ninth deciles (Table A9).

Regarding the definition of higher education, we test the results against alternative definitions. Our results hold when we use the proportion of individuals with secondary or tertiary education (Table A10 in the Appendix) instead of the proportion of individuals in the household that are older than 25 and have tertiary education.

Finally, we test for the sensitivity of our results when excluding certain groups of countries. Based on the 27 European countries we work with, we repeat the analysis for different sub-samples of countries, as explained in Tables A11 in the Appendix. Our results for sub-samples underscore that the findings are not sensitive to the composition of the sample, even though some of them must be interpreted with caution due to the occasional small number of countries.(less than 25)

6. Summary and conclusions

As remarked by Furceri and Loungani (2018), financial globaliszation is expected to boost long-run growth and general welfare. Nevertheless, it is unclear to what extent these potential benefits are shared across all segments of the population. This paper aims to help to account for this gap in the case of advanced economies. In particular, we focus on a set of European economies between 2007 and 2013, and empirically address the link between the openness of FDI flows and the income share of the different income classes.

Although our results provide evidence that capital flow liberalisation seems to benefit all income classes, they highlight how the effects of FDI openness on income share is heterogeneous along the income distribution and it is closely related to individuals' level of education, in the sense that highly educated individuals benefit more than poorly-educated ones from said openness. This entails a disproportionately greater increase of the income share for the upper classes, as highly educated individuals are not randomly distributed across the population, but mostly located on the right side of the distribution.

Previous literature acknowledges that the incidence capital account reforms may have on income inequality is highly context-specific, and in particular in terms of business cycles. Our findings, however, hold under different economic environments

in European countries for the years around the Great Recession, highlighting that the distributional effects of FDI openness examined do not seem to differ substantially depending on the economic situation. Moreover, in view of the distribution of highly educated people, said effects have, to a certain extent, a structural nature and are not susceptible to short-term economic changes.

Our study thus provides a set of implications at both theoretical and practical levels. First, this research may help advance the theoretical analysis of distributional effects of capital account liberalisation, taking into account that FDI flows tend to materialise in capital accumulation and the transfer of technology and expertise, thus opening the door for potential distributional effects through the channel of the capital-skill complementarity hypothesis, regardless of the business cycle phase. Second, from a policy point of view, our results reveal that the distribution of education, as a significant source of inequality of opportunity, constitutes a central element when examining the links between financial liberalisation in FDI flows and income inequality. Therefore, beyond policy decisions on the degree of capital account liberalisation, larger and more equitable investment in education that helps to create a more level playing field for all members of society might be regarded as a key public intervention that can shape the relationship between the openness of FDI and income inequality among income classes. Similarly, the implementation of policies aiming to liberalise cross-border capital flows should be accompanied by the debate regarding the parallel implementation of additional protection measures to shield disadvantaged groups.

Some limitations in our analysis should be noted, from which a series of research paths open up in this field. First, the paper essentially focuses on examining the capital-skill complementary hypothesis as a crucial channel in the European context, even though the mechanisms through which capital flow liberalisation can affect income distribution are many. More research, therefore, would be required to delve into other potential channels. Second, our findings should not be generalised across the globe. If the study were to be replicated in a different area, for instance, in emerging countries, the importance of other mechanisms, such as the implications of capital flow liberalisation in terms of the accumulation of international financial reserves by the central banks and their consequences, are likely to be more relevant. At the same time, the educational channel should be explored in each particular socioeconomic context. Third, as a measure of capital flow liberalisation, the study uses the *de jure* capital account liberalisation index, published annually by the IMF, based on the regulations countries apply, which focuses on the openness of capital account with respect to the specific FDI asset category. Nevertheless, shorter-term capital flows, such as money market and derivative assets, which are more prone to be driven by arbitrage strategies and, on average, less associated with real economy goals than FDI, are left aside. Finally, our approach of examining distributional impacts taking into consideration the situation of each individual within the income distribution is based on a relative definition of income classes that employs conventionally accepted income thresholds. Although relevant robust tests have been performed by using alternative definitions of income classes, a broader analysis of alternative approaches to determine socioeconomic classes could also be enriching.

Notes

1. Although financial intermediaries' vulnerability to bank runs and financial panic are heavily influenced by mismatches between short-term liabilities and long-term assets, this problem reaches a new level of severity in cross-border transactions, where there is no international lender of last resort (Radelet et al., 1998; Sachs, 1995). Besides, it is usually argued that financial liberalisation is typically followed by pronounced boom-bust cycles: bank credit expands rapidly during the booms, and excessive credit risk tends to be assumed, which, in turn, makes the economy more fragile and more prone to financial crises (Jaumotte et al., 2013; Jaumotte & Osorio Buitron, 2015; Rancière et al., 2006). Lately, these dynamics have been reaching previously unheard-of levels due to financial innovation.
2. IMF's Annual Report on Exchange Arrangement and Exchange Restrictions (AREAER) database reports the restrictions on cross-border financial transactions; Chinn and Ito (2008) provide details on the relevant methodology. Based on these data, the KAOPEN index develops *de jure* measures to assess a country's degree of capital account openness.
3. Although the middle class 'suffers' from a liberalising reform while the upper quintile gains, this statement is true for income shares. Das and Mohapatra (2003) found that income levels in liberalising nations almost universally rose after liberalisation.
4. Our sample includes advanced economies with a similar level of development. While this homogeneity allows us to control for the potential differential effect related to economic development, we do not address the analysis of low- versus middle- or high-income countries.
5. Bernard (1995) and Revenga (1994) show that more capital-intensive plans, involve hiring a larger proportion of skilled workers and offer higher wages.
6. This argument is especially important in the current global context, where income growth rates of low and middle classes in advanced economies are fairly stagnated, as revealed by the elephant graph in Lakner and Milanovic (2013). The supply and price of skilled labour relative to unskilled labour have changed dramatically over the last decades, and the skill premium has grown significantly since 1980. In fact, one of the most studied questions arising from these facts is why the skill premium has risen during a period of significant growth in the relative supply of skilled labour. Skill-biased technological change has been the immediate answer, although there is no widely accepted standard economic theory for interpreting this change.
7. Trade openness might also be a channel for inducing income inequality, as trade flows may cause sudden changes in the relative demand of highly skilled workers as well as in relative wages, thus increasing income inequality (Anderson, 2005). Similarly, Cragg and Epelbaum (1996) find that current account liberalisation and reduced costs of capital goods, due to trade liberalisation reforms, may increase relative demand for skilled labour and thus increase the college premium due to a special relationship between capital and skilled labour.
8. The threshold that distinguishes portfolio from direct investments is officially defined as an investment amounting to 10% or more of an entity's equity. However, in practice, most FDI holdings reflect a majority control on the side of the holder.
9. Some authors have evidenced that FDI tends to flow into sectors that are more likely to employ high-skilled workers, hence increasing inequality (see e.g., Acharyya, 2011; Wu & Hsu, 2012; and Jaumotte et al., 2013).
10. The number of upper level units in the sample limit the number of country-level variables.
11. Data on capital account is available for both Great Britain and Ireland, while EU-SILC database offers microdata on the UK, on the one hand, and Ireland, on the other. Due to this mismatch, the UK is left outside our sample, but we do include Ireland.
12. Even though the IMF makes data on capital account liberalization available from 2000 up to 2013, as EU-SILC provides data for the pre-crisis period only for a reduced number of

countries, we start our study in 2007. Otherwise, the reduced number of countries would undermine our analysis.

13. A value of 1 is assigned to the first adult in the household, 0.5 to each remaining adult and 0.3 to each member younger than 14.
14. Defined as the person owning or renting the accommodation.
15. We perform a robust check using an alternative definition of the income class, where individuals located between the second and eighth deciles constitute the middle class. See the Robustness section.
16. We have performed a robust check in which Model 2 does not control the income class. We obtain those potential drivers of income share gain explanatory power once dropping the income classes. Thus, all household level variables are significant, except the age of the household head. The results are available from the authors upon request.
17. We have checked the robustness of this result against an alternative definition of higher education. See the Robustness Section.

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Disclosure statement

No potential conflict of interest was reported by the authors. The views expressed are those of the authors and do not necessarily represent the views of the European Central Bank and the Eurosystem.

Data

In this paper we made use of the European Union Statistics on Income and Living Conditions (EU-SILC) data. This data is public and can be freely accessed by contacting EUROSTAT, but we cannot provide it due to the privacy clause signed in the contract with EUROSTAT.

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Appendix

Table A1. Observations by country and wave.

Country	2008	2011	2014
Austria	2,604	2,837	2,662
Belgium	2,877	2,692	2,692
Bulgaria	2,114	3,359	2,432
Cyprus	1,504	1,914	2,130
Czechia	5,181	4,011	3,555
Germany	5,297	6,742	6,315
Denmark	2,158	2,120	2,372
Estonia	2,667	2,690	3,056
Greece	2,039	1,746	2,698
Sprain	6,050	6,014	5,646
Finland	3,778	3,278	2,883
France	4,444	4,947	4,869
Hungary	3,906	5,648	4,578
Ireland	1,887	1,678	2,168
Italy	7,945	7,426	7,706
Lithuania	2,472	2,655	2,605
Luxembourg	2,049	2,868	2,114
Latvia	2,720	3,407	3,039
Malta	1,320	1,667	1,857
Netherlands	3,013	3,007	2,971
Norway	1,891	1,538	2,970
Poland	5,603	5,311	5,420
Portugal	1,864	2,346	3,123
Romania	2,811	2,789	2,779
Sweden	3,295	2,890	2,323
Slovenia	2,820	2,927	2,769
Slovakia	3,006	2,920	2,949
	87,315	91,427	90,681

Source: EU-SILC (2008, 2011, 2014).

Table A2. Estimation results of income share for 2008 (wave 2009).

2008	Model 1	Model 2	Model 3	Model 4
Woman_head	−0.016 [0.063]	−0.036 [0.050]	−0.018 [0.062]	−0.008 [0.061]
Age_head	−0.002 [0.004]	−0.000 [0.003]	−0.001 [0.004]	−0.000 [0.004]
Supervisory_head	0.206* [0.120]	0.240** [0.115]	0.195* [0.108]	0.222** [0.113]
Children (%)	−0.673 [0.486]	−0.646 [0.395]	−0.668 [0.485]	−0.669 [0.469]
Old (%)	−0.234 [0.164]	−0.092 [0.155]	−0.254 [0.187]	−0.243 [0.199]
Chronic (%)	−0.179*** [0.065]	−0.131** [0.059]	−0.177*** [0.061]	−0.136*** [0.052]
Loneparent	0.046 [0.179]	0.013 [0.148]	0.050 [0.169]	0.050 [0.166]
Tertiary education (%)	0.258 [0.251]	0.235 [0.196]	0.320 [0.412]	0.251 [0.320]
Work (%)	−0.177 [0.251]	−0.074 [0.176]	−0.165 [0.220]	−0.143 [0.205]
GDPpc	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
FDI	13.169*** [4.856]	26.288*** [10.169]	11.325*** [4.308]	11.527*** [4.351]
Lower Class	−7.025*** [2.242]	−6.908*** [1.896]	−6.976*** [2.205]	−7.029*** [1.989]
Lower-middle Class	−5.492*** [1.749]	−5.468*** [1.525]	−5.473*** [1.734]	−5.519*** [1.550]
Upper-middle Class	−3.892*** [1.230]	−3.848*** [1.099]	−3.900*** [1.227]	−3.904*** [1.093]
FDI*Lower Class		−20.301** [8.122]		
FDI*Lower-middle Class		−15.784** [6.467]		
FDI*Upper-middle Class		−9.849** [4.246]		
FDI* Tertiary education			7.850*** [2.864]	17.289*** [6.622]
FDI* Tertiary education *Lower Class				−25.094*** [8.711]
FDI* Tertiary education *Lower-middle Class				−17.943*** [6.420]
FDI* Tertiary education *Upper-middle Class				−10.180** [4.350]
Constant	7.026** [3.199]	6.730** [3.256]	6.949** [3.193]	6.942** [3.207]
Observations	89,151	89,151	89,151	89,151
Number of groups	27	27	27	27
Log likelihood	−7602	−7302	−7542	−7453

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.

Table A3. Estimation results of income share for 2009 (wave 2010).

2009	Model 1	Model 2	Model 3	Model 4
Woman_head	0.001 [0.055]	−0.001 [0.049]	−0.005 [0.053]	0.005 [0.054]
Age_head	−0.000 [0.004]	0.002 [0.003]	−0.000 [0.004]	0.001 [0.004]
Supervisory_head	0.399* [0.219]	0.424** [0.215]	0.400* [0.215]	0.412* [0.219]
Children (%)	−0.654 [0.562]	−0.617 [0.468]	−0.638 [0.557]	−0.663 [0.539]
Old (%)	−0.237 [0.244]	−0.124 [0.184]	−0.250 [0.258]	−0.213 [0.247]
Chronic (%)	−0.037 [0.111]	−0.096 [0.114]	−0.031 [0.115]	−0.041 [0.107]
Loneparent	0.243 [0.314]	0.193 [0.242]	0.202 [0.292]	0.240 [0.300]
Tertiary education (%)	0.292 [0.183]	0.246 [0.177]	0.332 [0.333]	0.224 [0.266]
Work (%)	−0.198 [0.252]	−0.166 [0.222]	−0.177 [0.239]	−0.173 [0.234]
GDPpc	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
FDI	11.375** [4.879]	21.960** [10.124]	9.958** [4.334]	10.126** [4.386]
Lower Class	−7.273*** [2.301]	−7.197*** [2.080]	−7.202*** [2.260]	−7.229*** [2.143]
Lower-middle Class	−5.699*** [1.786]	−5.613*** [1.594]	−5.630*** [1.748]	−5.636*** [1.631]
Upper-middle Class	−4.037*** [1.263]	−3.961*** [1.132]	−3.991*** [1.235]	−3.952*** [1.134]
FDI*Lower Class		−15.749** [7.992]		
FDI*Lower-middle Class		−12.796** [6.526]		
FDI*Upper-middle Class		−8.289* [4.414]		
FDI* Tertiary education			5.967** [2.736]	13.097** [6.019]
FDI* Tertiary education *Lower Class				−17.737*** [6.706]
FDI* Tertiary education *Lower-middle Class				−13.847** [5.957]
FDI* Tertiary education *Upper-middle Class				−8.296** [4.179]
Constant	6.252** [3.110]	6.044** [3.041]	6.135** [3.058]	6.115** [3.035]
Observations	83,776	83,776	83,776	83,776
Number of groups	26	26	26	26
Log likelihood	−7455	−7310	−7427	−7385

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.

Table A4. Estimation results of income share for 2011 (wave 2012).

2011	Model 1	Model 2	Model 3	Model 4
Woman_head	−0.027 [0.035]	−0.035 [0.033]	−0.027 [0.036]	−0.036 [0.034]
Age_head	−0.003 [0.005]	−0.003 [0.004]	−0.003 [0.005]	−0.003 [0.005]
Supervisory_head	0.302* [0.161]	0.313** [0.149]	0.287* [0.149]	0.305** [0.155]
Children (%)	−0.613 [0.516]	−0.511 [0.395]	−0.601 [0.511]	−0.574 [0.475]
Old (%)	−0.151 [0.164]	−0.035 [0.108]	−0.147 [0.168]	−0.108 [0.142]
Chronic (%)	−0.111* [0.058]	−0.119** [0.057]	−0.104* [0.056]	−0.108* [0.057]
Loneparent	0.151 [0.208]	0.036 [0.121]	0.118 [0.184]	0.117 [0.187]
Tertiary education (%)	0.243 [0.151]	0.256* [0.150]	0.336 [0.279]	0.194 [0.227]
Work (%)	−0.197 [0.250]	−0.132 [0.239]	−0.177 [0.243]	−0.185 [0.242]
GDPpc	0 [0.000]	0 [0.000]	0 [0.000]	0 [0.000]
FDI	13.099* [7.125]	24.396* [14.207]	11.587* [6.351]	11.763* [6.422]
Lower Class	−6.686*** [2.066]	−6.447*** [1.859]	−6.606*** [2.028]	−6.662*** [1.954]
Lower-middle Class	−5.246*** [1.603]	−5.029*** [1.412]	−5.167*** [1.564]	−5.212*** [1.488]
Upper-middle Class	−3.645*** [1.108]	−3.423*** [0.971]	−3.575*** [1.080]	−3.552*** [1.004]
FDI*Lower Class		−16.945 [10.969]		
FDI*Lower-middle Class		−13.83 [8.876]		
FDI*Upper-middle Class		−8.508 [5.926]		
FDI* Tertiary education			5.892* [3.540]	13.827 [8.588]
FDI* Tertiary education *Lower Class				−18.779* [10.142]
FDI* Tertiary education *Lower-middle Class				−14.831* [8.787]
FDI* Tertiary education *Upper-middle Class				−8.731 [5.987]
Constant	6.133** [2.935]	5.825** [2.878]	6.043** [2.893]	6.100** [2.939]
Observations	92598	92598	92598	92598
Number of groups	27	27	27	27
Log likelihood	−7549	−7416	−7526	−7489

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.

Table A5. Estimation results of income share for 2012 (wave 2013).

2012	Model 1	Model 2	Model 3	Model 4
Woman_head	−0.047 [0.042]	−0.061 [0.046]	−0.055 [0.044]	−0.051 [0.042]
Age_head	−0.002 [0.005]	−0.002 [0.004]	−0.002 [0.005]	−0.002 [0.004]
Supervisory_head	0.351** [0.169]	0.386** [0.162]	0.344** [0.163]	0.368** [0.166]
Children (%)	−0.507 [0.405]	−0.415 [0.298]	−0.482 [0.388]	−0.453 [0.365]
Old (%)	−0.141 [0.138]	−0.112 [0.128]	−0.148 [0.149]	−0.149 [0.150]
Chronic (%)	−0.128* [0.077]	−0.168** [0.077]	−0.130* [0.076]	−0.137* [0.072]
Loneparent	0.136 [0.207]	0.018 [0.119]	0.094 [0.178]	0.097 [0.180]
Tertiary education (%)	0.310** [0.139]	0.295** [0.144]	0.424 [0.297]	0.239 [0.208]
Work (%)	−0.265 [0.256]	−0.213 [0.244]	−0.244 [0.245]	−0.261 [0.246]
GDPpc	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
FDI	12.787* [7.002]	23.829* [14.039]	11.049* [6.038]	11.248* [6.126]
Lower Class	−6.839*** [2.097]	−6.566*** [1.881]	−6.706*** [2.034]	−6.780*** [1.969]
Lower-middle Class	−5.402*** [1.633]	−5.154*** [1.454]	−5.281*** [1.578]	−5.323*** [1.513]
Upper-middle Class	−3.829*** [1.151]	−3.572*** [1.012]	−3.711*** [1.107]	−3.679*** [1.040]
FDI*Lower Class		−16.816 [10.802]		
FDI*Lower-middle Class		−13.414 [8.839]		
FDI*Upper-middle Class		−8.312 [5.941]		
FDI* Tertiary education			6.714 [4.254]	14.301 [9.330]
FDI* Tertiary education *Lower Class				−18.843* [10.105]
FDI* Tertiary education *Lower-middle Class				−14.384 [8.961]
FDI* Tertiary education *Upper-middle Class				−8.586 [6.411]
Constant	6.193** [2.881]	5.861** [2.829]	6.066** [2.813]	6.100** [2.854]
Observations	88,709	88,709	88,709	88,709
Number of groups	27	27	27	27
Log likelihood	−7600	−7472	−7572	−7534

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.

Table A6. Percentage of individuals living in highly educated households by income class and year.

	2007				2010				2013			
country	LC	LMC	UMC	UC	LC	LMC	UMC	UC	LC	LMC	UMC	UC
Austria	10.63	6.43	13.58	31.26	7.65	6.67	16.40	33.11	9.75	14.58	25.17	48.64
Belgium	11.40	21.63	40.64	61.01	13.10	22.99	43.91	68.30	14.99	23.99	48.20	73.82
Bulgaria	1.64	11.32	13.57	31.56	2.33	7.81	17.89	50.88	2.50	10.00	24.23	52.19
Cyprus	6.64	11.58	35.96	68.89	7.83	14.25	34.68	63.08	6.44	17.89	36.06	63.24
Czechia	1.53	4.84	13.55	35.09	2.07	5.17	14.96	43.53	2.86	7.13	22.93	43.93
Germany	21.49	22.75	40.34	56.05	12.41	18.98	35.01	55.68	10.39	17.09	30.92	55.23
Denmark	23.14	19.58	29.52	52.97	19.27	19.26	36.33	49.36	27.14	23.28	36.93	56.47
Estonia	8.15	18.71	29.41	49.01	11.40	17.43	35.50	56.33	15.61	18.65	29.62	52.90
Greece	4.78	8.93	27.14	49.23	6.38	12.60	33.58	57.69	6.66	16.33	33.23	56.06
Sprain	6.52	10.09	26.71	59.07	5.40	10.95	26.01	55.13	8.58	13.57	31.69	57.65
Finland	9.78	19.64	35.96	67.42	14.48	25.18	41.47	72.23	17.02	29.59	45.59	74.91
France	6.45	13.63	35.16	49.55	8.52	16.69	31.82	50.47	8.35	20.62	35.51	61.64
Hungary	2.66	6.13	19.64	46.87	2.17	6.78	18.46	53.76	3.37	10.52	28.93	53.10
Ireland	10.56	11.70	31.60	60.34	10.65	19.23	39.86	72.80	11.53	28.08	45.93	81.68
Italy	1.95	3.74	9.87	31.46	3.24	3.82	11.14	30.46	3.72	8.37	15.10	39.35
Lithuania	9.80	11.46	20.69	59.90	8.39	11.53	27.90	61.52	6.66	12.28	32.70	62.38
Luxembourg	6.26	12.50	37.20	63.40	4.48	12.31	33.66	61.35	5.79	13.70	39.68	68.63
Latvia	3.94	8.90	16.85	40.46	3.54	10.14	23.20	44.01	7.00	11.34	22.84	48.85
Malta	0.60	3.60	11.32	23.18	0.31	3.90	9.71	35.39	0.95	3.75	15.75	47.78
Netherlands	15.28	17.71	34.19	52.87	12.71	20.95	38.08	59.53	10.24	21.81	44.55	61.02
Norway	18.81	19.87	32.36	47.23	22.18	24.56	37.58	53.36	28.38	35.87	44.95	61.82
Poland	2.33	4.34	16.04	41.29	2.45	5.49	19.33	46.08	2.74	7.96	22.22	48.51
Portugal	0.36	1.21	3.40	36.52	0.73	2.39	7.22	40.67	2.11	2.92	14.82	46.22
Romania	0.08	1.16	6.73	43.18	1.09	4.25	18.36	46.31	0.72	3.88	15.69	50.34
Sweden	15.25	17.26	25.21	48.18	23.46	21.92	28.58	41.83	16.69	24.13	29.15	53.32
Slovenia	3.03	4.92	28.47	68.92	4.25	7.94	30.95	63.28	3.21	11.62	38.43	72.79
Slovakia	2.31	6.26	15.59	39.45	2.73	7.95	17.46	42.47	2.74	10.25	19.18	42.02

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.
Note: highly educated households are those in which more than 50% of members older than 25 have tertiary education.
Source: Authors' computation, based on EU-SILC (2008, 2011, 2014).

Table A7. Distribution of individuals living in highly educated households by income class and year.

	2007				2010				2013			
country	LC	LMC	UMC	UC	LC	LMC	UMC	UC	LC	LMC	UMC	UC
Austria	17.25	24.41	36.14	22.20	13.05	24.97	41.63	20.35	9.61	33.55	37.52	19.32
Belgium	7.07	31.39	48.61	12.94	8.40	31.79	45.32	14.49	8.36	28.94	50.60	12.11
Bulgaria	3.43	31.23	33.36	31.98	3.86	18.33	33.21	44.60	3.55	20.72	36.26	39.48
Cyprus	5.05	20.68	44.06	30.22	6.51	25.92	37.64	29.93	6.17	25.95	35.33	32.55
Czechia	2.96	26.97	46.34	23.72	3.26	25.11	40.93	30.70	3.93	27.30	48.67	20.10
Germany	10.54	30.84	41.34	17.28	10.24	28.73	42.95	18.08	9.11	28.21	40.61	22.08
Denmark	7.44	40.62	42.53	9.42	6.96	32.89	48.94	11.20	9.45	34.41	43.54	12.60
Estonia	6.68	31.91	37.13	24.29	9.43	23.40	39.69	27.48	11.73	21.48	31.13	35.66
Greece	4.87	17.15	45.83	32.15	6.60	18.36	47.92	27.12	8.00	20.47	42.23	29.30
Sprain	7.35	17.46	39.06	36.13	6.64	17.62	37.56	38.18	11.39	17.75	37.89	32.98
Finland	4.20	32.17	44.19	19.44	5.30	33.47	45.97	15.26	8.03	36.72	41.79	13.47
France	5.51	31.59	44.66	18.24	8.07	34.25	38.21	19.47	6.69	37.97	36.76	18.58
Hungary	4.65	24.94	43.77	26.63	4.02	20.01	38.39	37.58	5.54	25.02	43.65	25.79
Ireland	7.12	19.33	45.58	27.97	6.50	23.71	41.15	28.64	6.54	30.36	35.85	27.25
Italy	5.57	17.82	41.19	35.41	8.52	16.72	41.89	32.87	7.30	24.88	38.18	29.65
Lithuania	9.62	19.34	27.48	43.55	9.95	15.42	33.68	40.95	5.28	15.57	40.29	38.87
Luxembourg	6.67	23.54	46.19	23.60	5.65	23.46	49.20	21.69	6.87	23.49	47.98	21.66
Latvia	6.75	18.75	33.17	41.33	5.39	17.79	38.12	38.71	8.36	19.30	33.11	39.23
Malta	1.38	20.00	49.17	29.44	0.67	18.97	38.13	42.23	1.54	13.94	40.54	43.98
Netherlands	9.28	35.08	41.28	14.36	7.55	36.60	40.23	15.63	5.41	33.83	44.72	16.04
Norway	7.07	40.84	42.82	9.26	8.14	43.73	38.74	9.40	6.84	47.29	38.43	7.43
Poland	4.23	13.51	37.90	44.37	4.16	15.10	40.38	40.37	3.98	18.32	39.39	38.32
Portugal	1.16	6.78	11.81	80.25	1.79	10.28	21.39	66.53	4.34	9.49	31.85	54.32
Romania	0.13	3.75	19.99	76.14	1.42	9.98	38.64	49.96	0.90	8.76	34.31	56.03
Sweden	8.75	37.71	41.72	11.82	12.55	37.26	40.09	10.10	9.17	37.21	40.30	13.32
Slovenia	3.63	15.73	54.60	26.04	3.89	21.63	53.48	21.00	2.92	25.25	50.74	21.10
Slovakia	3.71	31.28	46.19	18.82	4.25	27.81	43.64	24.30	3.76	34.50	43.68	18.07

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.
Note: highly educated households are those in which more than 50% of members older than 25 have tertiary education.
Source: Authors' computation, based on EU-SILC (2008, 2011, 2014).

Table A8. Estimation results of income share for Model 4 for years 2007, 2010 and 2013 (wave 2008, 2011 and 2014), defining 3 income classes with thresholds 20th and 80th percentile.

	2007	2010	2013
Woman_head	−0.036 [0.051]	−0.098* [0.052]	0.003 [0.042]
Age_head	0.002 [0.005]	−0.003 [0.004]	−0.001 [0.005]
Supervisory_head	0.383*** [0.135]	0.424** [0.178]	0.494** [0.210]
Children (%)	−0.780 [0.554]	−0.829 [0.530]	−0.758* [0.421]
Old (%)	−0.397* [0.206]	−0.029 [0.153]	−0.119 [0.203]
Chronic (%)	−0.144*** [0.048]	−0.091 [0.071]	−0.148** [0.071]
Loneparent	0.030 [0.247]	0.152 [0.235]	−0.035 [0.116]
Tertiary education (%)	0.744** [0.312]	0.667** [0.265]	0.701** [0.295]
Work (%)	−0.001 [0.230]	0.028 [0.194]	−0.272 [0.256]
GDPpc	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
FDI	11.561*** [4.368]	10.090** [4.407]	11.018* [5.926]
Lower Class	−4.724*** [1.357]	−4.580*** [1.361]	−4.850*** [1.410]
Middle Class	−2.968*** [0.819]	−2.874*** [0.855]	−3.113*** [0.878]
FDI*Lower Class	14.196*** [5.034]	9.876** [4.303]	13.094* [7.393]
FDI*Middle Class	−21.994*** [8.463]	−15.298*** [4.935]	−19.783** [9.396]
FDI* Tertiary education	14.196*** [5.034]	9.876** [4.303]	13.094* [7.393]
FDI* Tertiary education*Lower Class	−21.994*** [8.463]	−15.298*** [4.935]	−19.783** [9.396]
FDI* Tertiary education*Middle Class	−12.756*** [4.401]	−9.227** [3.900]	−12.323* [6.693]
Constant	4.318 [2.647]	3.594 [2.575]	4.081 [2.577]
Observations	87,315	91,427	90,681
Number of groups	27	27	27
Log likelihood	−7341	−7329	−7571

***Stignificant at 1% level; **Significant at 5% level; *Significant at 10% level.
Source: authors' computation, based on EU-SILC (2008, 2011, 2014) data.

Table A9. Estimation results of income share for Model 4 for years 2007, 2010 and 2013 (wave 2008, 2011 and 2014), defining 3 income classes with thresholds 10th and 90th percentile.

	2007	2010	2013
Woman_head	−0.025 [0.046]	−0.097* [0.053]	−0.012 [0.043]
Age_head	0.001 [0.005]	−0.002 [0.004]	−0.001 [0.005]
Supervisory_head	0.412*** [0.152]	0.512** [0.211]	0.577** [0.235]
Children (%)	−1.187* [0.656]	−1.149* [0.617]	−1.092** [0.529]
Old (%)	−0.430** [0.202]	0.020 [0.150]	−0.099 [0.206]
Chronic (%)	−0.229*** [0.068]	−0.141* [0.081]	−0.199** [0.078]
Loneparent	−0.194 [0.204]	−0.057 [0.196]	−0.244** [0.115]
Tertiary education (%)	0.851*** [0.314]	0.815*** [0.292]	0.875*** [0.333]
Work (%)	0.352 [0.277]	0.424*** [0.159]	0.126 [0.169]
GDPpc	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
FDI	11.561*** [4.338]	10.103** [4.411]	11.037* [5.935]
Lower Class	−6.133*** [1.703]	−5.786*** [1.659]	−6.288*** [1.776]
Middle Class	−4.034*** [1.104]	−3.823*** [1.131]	−4.177*** [1.171]
FDI*Lower Class	17.592*** [6.437]	12.320** [5.499]	16.736* [9.637]
FDI*Middle Class	−28.534*** [10.909]	−18.526*** [6.171]	−24.214** [12.237]
FDI* Tertiary education	17.592*** [6.437]	12.320** [5.499]	16.736* [9.637]
FDI* Tertiary education*Lower Class	−28.534*** [10.909]	−18.526*** [6.171]	−24.214** [12.237]
FDI* Tertiary education*Middle Class	−14.396*** [5.162]	−10.314** [4.598]	−14.285* [8.103]
Constant	5.297* [2.840]	4.332 [2.725]	5.008* [2.772]
Observations	87,315	91,427	90,681
Number of groups	27	27	27
Log likelihood	−7330	−7332	−7562

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.
Source: authors' computation, based on EU-SILC (2008, 2011, 2014) data.

Table A10. Estimation results of income share for Model 4 for years 2007, 2010 and 2013 (wave 2008, 2011 and 2014), defining high education as secondary or tertiary education.

	2007	2010	2013
Woman_head	−0.048 [0.041]	−0.072* [0.043]	0.045 [0.042]
Age_head	0.004 [0.006]	−0.001 [0.003]	−0.003 [0.005]
Supervisory_head	0.253** [0.104]	0.289** [0.125]	0.389** [0.180]
Children (%)	−0.495 [0.406]	−0.548 [0.402]	−0.414 [0.317]
Old (%)	−0.028 [0.127]	0.195 [0.164]	0.033 [0.236]
Chronic (%)	−0.036 [0.065]	−0.056 [0.080]	−0.119 [0.080]
Loneparent	0.070 [0.220]	0.173 [0.189]	−0.050 [0.092]
Tertiary & Secondary education (%)	1.160* [0.662]	1.229 [0.767]	0.733 [0.770]
Work (%)	−0.130 [0.188]	−0.193 [0.258]	−0.429 [0.301]
GDPpc	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
FDI	8.571* [4.434]	8.788** [4.413]	9.456 [6.095]
Lower Class	−6.599*** [1.814]	−6.290*** [1.760]	−6.772*** [1.835]
Lower-middle Class	−5.306*** [1.453]	−4.949*** [1.365]	−5.348*** [1.419]
Upper-middle Class	−3.710*** [1.058]	−3.356*** [0.917]	−3.730*** [0.987]
FDI* Tertiary & Secondary education	17.506** [6.824]	12.640** [5.728]	15.892* [8.958]
FDI* Tertiary & Secondary education *Lower Class	−19.246** [8.164]	−15.283** [7.634]	−18.523 [11.411]
FDI* Tertiary & Secondary education *Lower-middle Class	−15.090** [6.435]	−12.052** [6.126]	−15.030 [9.299]
FDI* Tertiary & Secondary education *Upper-middle Class	−8.979** [4.199]	−7.478* [3.938]	−10.012 [6.321]
Constant	5.242 [3.348]	4.414 [3.066]	5.580* [3.252]
Observations	87,315	91,427	90,681
Number of groups	27	27	27
Log likelihood	−7123	−7165	−7426

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.
Source: authors' computation, based on EU-SILC (2008, 2011, 2014) data.

Table A11. Estimation results of income share for Model 4 for years 2007, 2010 and 2013 (wave 2008, 2011 and 2014), for different subgroups of countries.

	2007					2010					2013				
	EA19	Exc. LU NL	Exc. LU NL IE	Exc. CZ, HU, PL, SK	Exc. CZ, HU, PL, SK, RO, SL	EA19	Exc. LU NL	Exc. LU NL IE	Exc. CZ, HU, PL, SK	Exc. CZ, HU, PL, SK, RO, SL	EA19	Exc. LU NL	Exc. LU NL IE	Exc. CZ, HU, PL, SK	Exc. CZ, HU, PL, SK, RO, SL
Woman_head	−0.047	−0.017	−0.018	−0.027	−0.025	−0.095	−0.026	−0.029	−0.038	−0.042	0.039	0.016	0.016	0.020	0.009
	[0.061]	[0.044]	[0.046]	[0.050]	[0.057]	[0.060]	[0.027]	[0.029]	[0.033]	[0.035]	[0.057]	[0.037]	[0.038]	[0.043]	[0.049]
Age_head	0.004	−0.003	−0.004	−0.003	−0.005	−0.003	−0.005	−0.005	−0.005	−0.007	−0.004	−0.003	−0.003	−0.003	−0.005
	[0.008]	[0.003]	[0.003]	[0.004]	[0.003]	[0.005]	[0.004]	[0.004]	[0.005]	[0.005]	[0.006]	[0.006]	[0.006]	[0.007]	[0.007]
Supervisory_head	0.172**	0.231**	0.240**	0.253**	0.214**	0.286**	0.215*	0.220*	0.229*	0.232	0.289**	0.331*	0.345*	0.361*	0.323*
	[0.083]	[0.101]	[0.107]	[0.114]	[0.105]	[0.137]	[0.121]	[0.128]	[0.133]	[0.143]	[0.143]	[0.177]	[0.186]	[0.196]	[0.189]
Children (%)	−0.831	−0.583	−0.610	−0.680	−0.733	−0.799	−0.519	−0.55	−0.62	−0.648	−0.678	−0.326	−0.339	−0.404	−0.491
	[0.646]	[0.530]	[0.561]	[0.618]	[0.644]	[0.596]	[0.502]	[0.539]	[0.584]	[0.610]	[0.527]	[0.383]	[0.405]	[0.457]	[0.498]
Old (%)	−0.292	−0.145	−0.151	−0.192	−0.150	0.067	0.049	0.06	0.032	0.076	−0.014	−0.156	−0.146	−0.204	−0.232
	[0.219]	[0.122]	[0.126]	[0.151]	[0.167]	[0.233]	[0.135]	[0.137]	[0.163]	[0.175]	[0.341]	[0.179]	[0.185]	[0.208]	[0.221]
Chronic (%)	−0.062	−0.097	−0.099*	−0.097	−0.081	0.028	−0.025	−0.027	−0.02	0.017	−0.123	−0.147**	−0.147**	−0.186***	−0.183**
	[0.070]	[0.059]	[0.058]	[0.077]	[0.078]	[0.111]	[0.080]	[0.083]	[0.098]	[0.104]	[0.090]	[0.059]	[0.061]	[0.071]	[0.074]
Loneparent	0.256	0.149	0.149	0.205	0.271	0.348	0.261	0.274	0.346	0.405	0.094	0.041	0.041	0.077	0.144
	[0.341]	[0.283]	[0.288]	[0.341]	[0.369]	[0.299]	[0.268]	[0.277]	[0.324]	[0.348]	[0.179]	[0.129]	[0.134]	[0.156]	[0.172]
Tertiary education (%)	0.978	0.211	0.219	0.152	0.129	1.093	0.22	0.251	0.145	0.165	0.577	−0.045	−0.042	−0.192	−0.257
	[0.730]	[0.227]	[0.250]	[0.219]	[0.195]	[0.836]	[0.258]	[0.293]	[0.244]	[0.223]	[0.939]	[0.259]	[0.277]	[0.282]	[0.273]
Work (%)	−0.041	−0.109	−0.114	−0.057	−0.122	−0.343	−0.037	−0.038	−0.04	−0.155	−0.723*	−0.365	−0.377	−0.424	−0.629*
	[0.240]	[0.200]	[0.211]	[0.244]	[0.258]	[0.328]	[0.209]	[0.207]	[0.234]	[0.243]	[0.384]	[0.315]	[0.320]	[0.356]	[0.367]
GDPpc	0.000	−0.000	−0.000	−0.000	−0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	−0.000	−0.000	−0.000	−0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
FDI	15.935***	9.330**	9.332**	9.890**	12.370**	14.854**	8.948**	8.947**	9.510**	11.862**	21.898***	9.632	9.643	10.773	13.995*
	[5.665]	[4.350]	[4.355]	[4.703]	[5.740]	[5.934]	[4.248]	[4.252]	[4.673]	[5.702]	[8.415]	[5.940]	[5.950]	[7.330]	[8.035]

Table A11. Continued.

	2007					2010					2013				
	EA-19	Exc. LU, NL	Exc. LU, NL, IE	Exc. CZ, HU, PL, SK	Exc. CZ, HU, PL, SK, RO, SL	EA-19	Exc. LU, NL	Exc. LU, NL, IE	Exc. CZ, HU, PL, SK	Exc. CZ, HU, PL, SK, RO, SL	EA-19	Exc. LU, NL	Exc. LU, NL, IE	Exc. CZ, HU, PL, SK	Exc. CZ, HU, PL, SK, RO, SL
Lower Cl.	−8.751***	−5.907***	−5.964***	−6.293***	−7.131***	−8.371***	−5.625***	−5.670***	−6.027***	−6.689***	−9.272***	−6.272***	−6.350***	−6.616***	−7.183***
	[2.174]	[1.753]	[1.812]	[1.915]	[2.115]	[2.302]	[1.653]	[1.711]	[1.829]	[2.014]	[2.161]	[1.796]	[1.861]	[1.889]	[2.021]
Lower-middle Cl.	−6.959***	−4.749***	−4.797***	−4.995***	−5.791***	−6.604***	−4.494***	−4.530***	−4.749***	−5.361***	−7.405***	−5.068***	−5.134***	−5.261***	−5.765***
	[1.660]	[1.395]	[1.447]	[1.500]	[1.655]	[1.770]	[1.305]	[1.356]	[1.419]	[1.579]	[1.600]	[1.421]	[1.477]	[1.455]	[1.553]
Upper-middle Cl.	−4.868***	−3.275***	−3.312***	−3.383***	−4.065***	−4.491***	−3.084***	−3.111***	−3.214***	−3.698***	−5.183***	−3.641***	−3.696***	−3.715***	−4.164***
	[1.079]	[0.970]	[1.007]	[1.016]	[1.094]	[1.109]	[0.878]	[0.915]	[0.932]	[1.025]	[1.002]	[1.027]	[1.070]	[1.024]	[1.085]
FDI* Tertiary education	25.983***	12.724**	12.695**	13.398**	18.443***	19.889***	12.888**	12.853**	13.376**	17.637**	34.666***	16.341*	16.267*	17.627	25.359**
	[7.978]	[5.494]	[5.456]	[5.991]	[7.129]	[6.643]	[5.684]	[5.640]	[6.124]	[7.447]	[11.568]	[9.485]	[9.437]	[11.178]	[12.471]
FDI* Tertiary education* Lower	−33.215***	−17.392***	−17.373***	−18.286**	−23.108***	−24.690***	−17.696***	−17.655***	−18.257***	−22.332***	−41.510***	−22.669**	−22.593**	−24.405*	−31.458**
	[10.483]	[6.703]	[6.654]	[7.155]	[8.446]	[6.681]	[6.153]	[6.086]	[6.444]	[7.723]	[13.108]	[11.305]	[11.234]	[12.873]	[14.258]
FDI* Tertiary education *Lower-middle	−25.777***	−13.478**	−13.444**	−14.108**	−18.879***	−19.870***	−13.352**	−13.314**	−13.793**	−17.942**	−34.733***	−17.094*	−17.016*	−18.394*	−25.471**
	[7.687]	[5.458]	[5.416]	[5.890]	[6.983]	[6.436]	[5.533]	[5.485]	[5.906]	[7.185]	[10.818]	[9.309]	[9.256]	[10.834]	[11.994]
FDI* Tertiary education *Upper-middle	−16.608***	−7.377**	−7.343**	−7.712*	−11.668**	−13.172***	−7.805**	−7.773**	−8.049*	−10.849**	−24.881***	−10.817*	−10.747*	−11.554	−17.512**
	[5.257]	[3.729]	[3.709]	[4.173]	[4.531]	[4.469]	[3.777]	[3.746]	[4.129]	[4.776]	[7.022]	[6.463]	[6.426]	[7.700]	[8.379]
Constant	8.328**	8.076***	8.119***	8.327***	10.776***	6.037	7.522***	7.541***	7.866**	9.929***	7.753**	8.504***	8.572***	8.745***	10.283***
	[4.121]	[2.878]	[2.900]	[3.225]	[3.805]	[4.020]	[2.784]	[2.804]	[3.138]	[3.756]	[3.595]	[2.954]	[2.988]	[3.083]	[3.594]
Observations	60,356	82,253	80,366	64,557	58,926	63761	85552	83874	67662	61946	64,252	85,596	83,428	69,094	63,546
N. of groups	19	25	24	21	19	19	25	24	21	19	19	25	24	21	19
Log likelihood	−5303	−6391	−6181	−5530	−5038	−5330	−6368	−6159	−5511	−5023	−5456	−6730	−6506	−5816	−5287

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.

Note: EA-19 stands for the 19 countries that composed Euro Area from January 2015: Belgium (BE) Germany (DE) Estonia (EE) Ireland (IE) Greece (EL) Spain (ES) France (FR) Italy (IT) Cyprus (CY) Latvia (LV) Lithuania (LT) Luxembourg (LU) Malta (MT) Netherlands (NL) Austria (AT) Portugal (PT) Slovenia (SI) Slovakia (SK) and Finland (FI).

Exc. LU, NL: stands for the 27 countries except Luxembourg and Netherlands.

Exc. LU, NL, IE: stands for the 27 countries except Luxembourg, Netherlands and Ireland.

Exc. CZ, HU, PL, SK: stands for the 27 countries except Czechia, Hungary, Poland, and Slovakia. Is as.

Exc. CZ, HU, PL, SK, RO, SL: stands for the 27 countries except Czechia, Hungary, Poland, Slovakia, Romania and Slovenia.

**Source: authors' computation, based on EU-SILC (2008, 2011, 2014) data.