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Effect of privatisation on income inequality: A European analysis

Abstract

This study analyses the link between privatisation reforms and income inequality on a sample of 25 European countries between 2003 and 2013. Previous literature has related privatisations with the level of poverty, welfare, and well-being of population, but findings regarding income inequality are scarce, especially in the European context. The empirical results of this study suggest a positive link between both topics, for different indicators of privatisation and inequality. Concretely, findings suggest that income inequality is higher in countries that have resorted to privatisation reforms to a greater extent. Then, social consequences should be considered when evaluating regulatory reform, such as privatisation.

Keywords: privatisation, income inequality, poverty, GINI, SOE.

1. Introduction

The controversy over income inequality and privatisation is a highly important social and political debate in contemporary societies. Privatisation programs are widely used in many countries, but they are not (nor have they been) homogeneous. The decision to privatise has been motivated by economic, financial, political, and institutional factors (Obinger et al., 2016). But, despite the plethora of papers on privatisation from the 1990s, there is little agreement on the reasons why governments tend to privatise (Gonzalo et al., 2003).

Although privatisation is often a part of a wide package of reforms (e.g. liberalisation, entry barriers, regulations, etc.), this paper isolates the effect of privatisation as a major trend all over the world and has redefined policy formulation in service delivery since the end of the 1970s, with the Thatcher's government in the UK (Bortolotti et al., 2001; 2003). In this study, privatisation is defined as the sale of a formerly public organisation to the private sector, i.e. the sale of State-owned enterprises' (SOEs) shares to private investors, resulting in the property and decision-making capability transference from the public to the private sector. The control of corporate ownership leads to control the production and labour process, so that, together with income derived from the ownership of assets (e.g. profits, interest payments, dividends, etc.), determines the distribution of income (Michie and Lobao, 2012).

Accordingly, we wonder if privatisation, understood as the change in the corporate ownership of SOEs, is related with income inequality, from a macroeconomic point of view. That is the research question that will be answered empirically by using a sample of 25 European countries between 2003 and 2013. Concretely, findings suggest that income inequality seems to be larger in European countries that have resorted to

privatisation reforms to a greater extent, also controlling the results by other socioeconomic and political factors that explain income inequality.

This paper contributes to the literature on privatisation. In general, previous studies analysed the effects of privatisation on welfare systems, citizens´ interests, and poverty in general. Additionally, most of the cited studies are focused on the OECD countries, developing and transitioning economies, or mixed samples of both developed and developing countries. We add evidence in the European context, explaining the effects of privatisation on income inequality by taking into account, not specific sectors, but all activity sectors.

The remainder of the paper is structured as follows: the second section reviews the most relevant literature on privatisation, being especially focused on income inequality. The third section explain the research question that will be empirically tested in this study. The fourth section describes the methodology in detail (sample, models, variables, and techniques of analysis). The fifth section shows the empirical findings and the last section offers conclusions and suggestions for future research.

2. Literature review on privatisation

Privatization has attracted academic attention for several decades, often focusing on explaining the reasons that lead a government to sell public assets, cede ownership of a SOE, and lose its control. According to the literature review carried out by Obinger et al. (2016) and Gonzalo et al. (2003), the reasons to explain privatisations in industrialized countries may be grouped into different types: economic, financial, political and institutional reasons. Among them, economic and financial reasons are the most relevant. They usually refer to the concept of efficiency from a micro- or macroeconomic point of view. On the one hand, studies that take the microeconomic perspective generally refer

to efficiency as profitability or productivity, analysing samples of companies that have been privatized in specific sectors and specific regions (e.g. Megginson et al., 1994; Villalonga, 2000; Cabeza-García & Gómez-Ansón, 2007; D'Souza et al., 2005; Cullinane et al., 2005; Tiemann & Schreyögg, 2012; Estache et al., 2002). On the other hand, those who take a macroeconomic perspective discuss efficiency in terms of economic growth or development, and financial and budgetary situation, such as reduction of deficits and debt (e.g. Bortolotti et al., 2001; 2003; Schmitt, 2011; 2013; 2014; Boubakri et al., 2009; Roberts & Saeed, 2012; Belke et al., 2007; Bortolotti & Pinotti, 2008; Schneider & Häge, 2008; Bacchiocchi & Florio, 2008).

Despite the positive consequences that numerous authors have shown in budgetary financial, and economic terms, citizens have a less positive vision of the privatization of public services. They are sceptical about its consequences in terms of well-being, equity and equality. For example, there is a tendency to think that the benefits of privatizations privilege the richest groups of the population, that working conditions worsen in privatized companies and that prices tend to increase after the privatization process (Kikeri & Nellis, 2004). Further, it has been observed that privatization can have negative consequences in terms of corruption (Cuadrado-Ballesteros & Peña-Miguel, 2018; Knott & Miller, 2006; Overman, 2016; Peña-Miguel & Cuadrado-Ballesteros, 2019).

This study is focused on one of these issues, namely income inequality. This focus is especially relevant given the nature of the current backlash in many countries against further privatisation. This backlash is nurtured by the widespread view that privatisation enriches already wealthy and powerful population groups at the expense of the poor (Nellis, 2006). Birdsall and Nellis (2003) conclude that privatisation has been carried out more to enhance efficiency than equity, and on average, it has worsened the distribution of wealth and income. Sometimes, gains from privatisation accrue mainly to high-income

classes (Chisari et al., 1999) at expense of the poorest. Scholars have shown that privatisation has significantly damaged the distribution of income and increased poverty in Asia and Latin America (e.g. Birdsall & Nellis, 2003; McKenzie & Mookherjee, 2003; Nellis, 2003; Nixon & Walters, 2006).

However, the results are not totally conclusive at this respect. For instance, Adams (2006) found that privatisation helped to reduce income inequality in sub-Saharan Africa. Paredes (2001) suggested that low-income groups also benefit from privatisation, but he pointed out that these benefits are not as large as they would obtain without privatisation. So, this line of research requires further analysis, and this study contributes by empirically testing the association between privatisation reforms and income inequality in Europe.

3. Research question

The research question of this study is: *is there a relationship between privatisation and the level of income inequality in Europe?* That link could be explained through different arguments.

Firstly, privatisation reforms result in the transfer of key economic assets from collective ownership into the wealthiest people ownership. Indeed, there is a widespread view that the effects of privatisation have been to enrich the already rich and powerful population groups (Nellis, 2006; Chisari et al., 1999). The power elitism theory explains this view (Stephens et al., 1998); members of the elite determine the basic shape of a country's economy, the private property, and the distribution of wealth (usually unequal) amongst the population. Peña-Miguel and Cuadrado-Ballesteros (2019) evidenced that privatization has not been effective in reducing corruption, and they explained such result through the concentration of market share (after privatisations in Europe) in the hands of powerful elites.

Then, assuming privatised companies perform better than SOEs, the improved performance ends up mainly in hands of the wealthiest people in society, and, only under conditions of tight government regulation, does the rest of society benefit. Without a strict regulation, monopolies or oligopolies would continue using market power despite they were privatised (Ortega, 2003). Greer and Doellgast (2017) suggested that marketisation, defined as an increase in competition at the level of the transaction, entails an increase in economic and social inequality. So, competition is not enough; regulation is essential, and especially in terms of prices, because the popular perception is that privatisation increases prices as subsidies are removed and private owners raise prices to cover costs (McKenzie & Mookherjee, 2003). Further, if privatisation raises efficiency, the relative price of output may fall without the existence of a competitive environment and regulatory frameworks (Nixon & Walters, 2006).

Secondly, there are also costs to workers in privatised companies. The review of several case studies by Hermann and Flecker (2012) show that the reduction of production costs of privatised companies has been reached at the cost of workers in many cases, which has led to worse employment and working conditions. Further, workers receive lower wages for doing the same job after privatisation (Flecker and Hermann, 2011). Wages are likely to decline after privatisation because of a convergence of pay levels between privatised and other firms is expected to occur (Monteiro, 2004) and due to the standardization of tasks (Greer and Doellgast, 2017). Nevertheless, at the same time, wages of top managers may greatly increase because of the alignment to the private sector standards, which in turn may include huge rents. The compensation of top managers tends to rise after privatisation; as pay scale constraints are released, executives are more explicitly linked to observable measures of firm performance and have more bargaining power (Monteiro, 2004).

In the end, all these arguments are related with a change in corporate goals of the privatised SOEs; after privatisation, it will be more focused on profits than social welfare and citizens' interests (Commander et al., 1999). This may lead, for example, to change tariff structures that may be detrimental to some vulnerable groups; direct subsidies or cross-subsidies tend to disappear, either as a government decision or as a consequence of market forces acting in a liberalized market (Estache et al., 2001). These authors noted that, while average nominal tariffs have declined with privatization in many instances, the need to raise the effective tariffs for some user groups follows from the need to guarantee the financial viability.

In sum, this paper is developed basically at macro level but it should be seen as a complement to the microeconomic literature that suggested that if there are efficiency gains from privatization they are often offset by the change of objectives in privatised SOEs, and by the mainly oligopolistic arrangements prevailing in the reformed markets, leading to higher markups. These macroeconomic consequences, which arise from the change at microeconomic level of privatised SOEs, lead us to wonder the link of privatisation reforms and income inequality.

4. Methodological approach

4.1. Sample for the analysis

To answer the research question, this study uses a sample composed of 25 European countries for the period 2003–2013. The sample selection is based on the availability of data on the main variables that represent privatisation reforms and income inequality. Data on privatisations were obtained from the Privatisation Barometer website, a project of the Fondazione Eni Enrico Mattei (FEEM), which is a non-profit, non-partisan research institution for the study of governance financed by KPMG

Advisory and the official privatisation data provider to the OECD and the World Bank. Data about income inequality was obtained from the World Development Indicators database that is available from the World Bank's databank.

The specific countries in the sample are: Austria, Belgium, Cypress, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom. These are countries for which the Privatisation Barometer publishes information about privatisation reforms. These data are available through 2013, so that is the final point of our analysis period, which begins in 2003 because of the availability of income inequality variables in the World Bank database.

The empirical results are controlled by several variables obtained from the World Development Indicators database of the World Bank that represent the context: inflation rate, education level, foreign investment, and public deficit. Additionally, included are some political factors obtained from the Comparative Political Data Set (Armingeon et al., 2018).

4.2. Models and variables

The research question will be answered according to the results obtained from the following models:

$$Inequality_{it} = \beta_0 + \beta_1 Deals_{it-1} + \beta_2 Inflation_{it} + \beta_3 Education_{it} + \beta_4 FDI_{it} + \beta_5 Balance_{it} + \beta_6 Right_{it} + \beta_7 Fragmentation_{it} + \beta_8 Elections_{it} + \sum_{j=9}^{19} \beta_j Year_{j_{it}} + \eta_i + \varepsilon_{it} \quad \textbf{(1)}$$

$$Inequality_{it} = \beta_0 + \beta_1 Deals_{it-2} + \beta_2 Inflation_{it} + \beta_3 Education_{it} + \beta_4 FDI_{it} + \beta_5 Balance_{it} + \beta_6 Right_{it} + \beta_7 Fragmentation_{it} + \beta_8 Elections_{it} + \sum_{j=9}^{19} \beta_j Year_{j_{it}} + \eta_i + \varepsilon_{it} \quad \textbf{(2)}$$

$$Inequality_{it} = \beta_0 + \beta_1 Proceeds_{it-1} + \beta_2 Inflation_{it} + \beta_3 Education_{it} + \beta_4 FDI_{it} + \beta_5 Balance_{it} + \beta_6 Right_{it} + \beta_7 Fragmentation_{it} + \beta_8 Elections_{it} + \sum_{j=9}^{19} \beta_j Year_{j_{it}} + \eta_i + \varepsilon_{it} \quad \textbf{(3)}$$

$$Inequality_{it} = \beta_0 + \beta_1 Proceeds_{it-2} + \beta_2 Inflation_{it} + \beta_3 Education_{it} + \beta_4 FDI_{it} + \beta_5 Balance_{it} + \beta_6 Right_{it} + \beta_7 Fragmentation_{it} + \beta_8 Elections_{it} + \sum_{j=9}^{19} \beta_j Year_{j_{it}} + \eta_i + \varepsilon_{it} \quad \textbf{(4)}$$

In these models, *i* refers to each sample country, and *t* to year; β are parameters to be estimated; η_i represents the unobservable heterogeneity that refers to several characteristics that differ between countries but are invariant over the time; and ε_{it} is the classical disturbance term.

The dependent variable (*Inequality*) refers to income inequality and is represented by different indicators. The four models are tested by using the three inequality variables defined as follows: first, the Gini index (*GINI*) measures the extent to which the distribution of income among individuals within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus, *GINI* takes values between 0 and 100, from perfect equality to perfect inequality. Second, the *Poverty* variable refers to the poverty gap at $5.50 a day (2011 PPP); it is the mean shortfall in income from the poverty line of $5.50 a day (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty, so the higher the value, the higher the inequality. Third, the *Income10* variable refers to the income share held by highest 10%; that is, the percentage share of income is the share that accrues to subgroups of the population indicated by deciles or quintiles. Thus, the higher the value, the higher the

inequality. It is important to represent income inequality through different variables to obtain robust findings; as Figure 1 suggests, *Poverty* shows high variability, while *GINI* and *Income10* are more stable over the period of time.

<Insert figure 1 about here>

Privatisation reforms are represented by two variables, *Deals* and *Proceeds* (Bortolotti et al., 2001; Bortolotti et al., 2003; Zohlnhöfer et al., 2008). The former refers to the number of privatisation transactions (partial and total privatisations); the latter refers to the total incomes (current USD in millions) that are obtained from the privatisation transactions represented by *Deals*, as percentages of the GPD. It is important to take both variables into account because, on the one hand, the number of transactions could result in an underestimation of the economic effect of the privatisation reforms, while conversely, the impact of privatisations would be overestimated if they involved only a few large SOEs (Bortolotti et al., 2001). This issue is illustrated in Figure 2; while Poland is the country with the highest number of privatisation transactions, Portugal dominates in monetary terms. The models include the first- and second-order lags of privatisation variables, because privatisations occur over time rather than all at once (Katsoulakos & Likoyanni, 2002; Robinson 2003), so the effect on income inequality may be delayed.

<Insert figure 2 about here>

Regarding control variables, we take into account different factors that may affect income inequality according to previous literature: the situation of public accounts by inflation rate (Mocan, 1999; Barro, 2000); education level (Bourguignon & Morrisson, 1998; Barro, 2000); the openness of the economy (Barro, 2000; Reuveny & Li, 2003); the situation of the public accounts (Tanninen, 1999; Salti, 2015; Fournier & Johansson,

2016); and some factors that represent the political context, such as the government ideology and fragmentation, and the electoral cycle (Opper, 2004; Bortolotti & Pinotti, 2003, 2008; Breen & Doyle, 2013; Obinger et al., 2014; Obinger et al., 2016).

The *Inflation* variable is the inflation rate. *Education* is represented by the gross enrolment in secondary school, which is the ratio of total enrolment (regardless of age) to the population of the age group that officially corresponds to the level of education shown. The openness of the economy is represented by foreign direct investment (*FDI*), which is the net inflows (new investment inflows minus disinvestment) in the reporting economy from foreign investors, divided by GDP. The situation of the public accounts (*Balance*) is represented by net lending/net borrowing, which is the total general government revenue minus total general government expenditure. Regarding political factors, *Right* refers to the relative power position of right-wing parties in government based on their seat share in parliament, measured as the percentage of total parliamentary seat share of all governing parties, and weighted by the number of days in office in a given year; *Fragmentation* is the index of legislative fractionalisation of the party system according to the formula proposed by Rae (1968), taking values between 1 (maximal fractionalisation) and 0 (minimal fractionalisation); and, the *Elections* variable refers to the number of years left until the next elections. Finally, the temporal moment is also controlled. It is represented by using 12 dummy variables ($Year_{2003}$, $Year_{2004}$, …, $Year_{2013}$) that equal 1 for each year of the sample period (2003–2013), and 0 otherwise.

4.3. Technique of analysis

For panel data, fixed and random effects (FE and RE) estimators could be used to estimate β, but both require some initial conditions: homoscedasticity, errors that are not serially correlated, and independent variables (including control variables) should be

strictly exogenous. Before selecting the estimator, these initial conditions are ensured. To check heteroscedasticity and autocorrelation problems, we used the Breusch-Pagan test and the Wooldridge test, respectively. The p-values are lower than 0.05, so we rejected the null hypothesis in the two cases at 95% confidence level; concretely, the results lead us to reject: (i) homoscedastic errors; and (ii) a lack of serial correlation between errors. Thus, where heteroscedasticity and autocorrelation problems exist, FE and RE are not appropriate.

Furthermore, independent variables should be exogenous because, on the contrary, there is an endogeneity problem, i.e. explanatory variables are correlated with the error term. In this case, endogeneity problems appear for three reasons, already discussed by Bastianin et al. (2018): (i) conceptual and measurement errors due to using of proxy variables to represent privatisation reforms; (ii) omitting some relevant explanatory (control) variables, because some of them are unobservable (e.g. corruption, regulation quality, political stability, etc.) and others will introduce multicollinearity problems (e.g. public spending, indebtedness, etc.); and (iii) there is reverse causality, since not only income inequality is affected by privatisation, but also inequality may affect the likelihood that policy makers implement these reforms, as well as the timing and sequence in which they are enforced. Then, the empirical results do not prove causality; they suggest statistical association between privatisation and inequality.

According to Bastianin et al. (2018), a solution to avoid simultaneity biases is to make use of instrumental variables, but selectin valid instrument is not easy. Instrumental variables must be uncorrelated with the error term and must be correlated with the endogenous variable. In such a situation, dynamic panel data techniques, such as the Arellano and Bond (1991) estimator are often used to deal with possible endogeneity problems. Lagged values of the dependent variable and of the regressors are used as

instruments after first differencing the regression model (Hyland, 2016; Alesina et al., 2005; Polemis, 2016).

The question now is how many instruments (lags) are the most appropriate to solve endogeneity. Increasing the number will improve the efficiency, but this may generate too many instruments and results may be biased. So, the validity of instruments should be checked through two tests: (i) the Arellano-Bond test for AR (2), which is the test for the second-order serial correlation, in the residuals of first differences; and (ii) the Hansen test, which verifies whether the chosen instruments are correlated with the error term. In the first test, the null hypothesis is the 'lack of serial correlation between the error terms'; in the second test, the null hypothesis is the 'nonexistence of correlation between the instruments and the error term'. Therefore, in both cases, the p-value must be greater than 0.05 in order to avoid rejecting the null hypothesis at 95% confidence, thus guaranteeing the validity of the instruments. The results of these tests are at the end of the results tables.

5. Results

5.1. Descriptive analysis

Table 1 shows the descriptive statistics of all variables entered into the models. The Gini index has a mean value of 31.13, in a range from 0 to 100, meaning that inequality in the sample countries is not excessive on average. The results suggest the same situation regarding the mean value of *Poverty* and *Income10*, which are not excessively large. Concerning privatisation variables, there are about 2 or 3 transactions (*Deals*) on average, which means incomes average around 52.81% of GDP. However, there are large differences among the sample countries; in 2010, Poland displays the

maximum value of *Deals*; while Portugal displays the maximum value of *Proceeds* in 1997. These results are aligned with those in Figure 2.

<Insert table 1 about here>

Table 1 also shows the mean values of control variables. Table 2 shows the bivariate correlations between all variables previously defined. The three inequality indicators (*GINI, Poverty, Income10*) are highly correlated, suggesting that they are all similarly informative about the concepts they represent. *Deals* and *Proceeds* are also significantly correlated, because both variables represent privatisation reforms in different terms. In general, independent variables are weakly correlated; in descriptive terms most of the correlation coefficients were less than 0.3, which is the accepted threshold for multicollinearity problems (Wooldridge, 2010). There is an exception, since *Balance* is highly correlated with *Inflation*; therefore, we calculated the variance inflation factor (VIF) and the results suggest that multicollinearity is not present in our models.

<Insert table 2 about here>

5.2. Empirical analysis

Table 3 shows the link between privatisation variables and the Gini index. We can see that the first-order lag of *Deals* is not statistically relevant, and it is the second-order lag at 90%, being positive. This suggests a positive association between income inequality and privatisation reforms. Coefficients of *Proceeds* are also positive; the first-order lag is statistically relevant at 99.9% and the second-order lag is significant at 90%. These results indicate again a positive link between income inequality and privatisation reforms, i.e. countries that have used privatisation reforms to a greater extent tend to have a higher level of income inequality.

<Insert table 3 about here>

Table 4 shows the effects of privatisations on *Poverty* variable. The results are similar to those obtained previously for the Gini index; the first-order lag of *Deals* is not statistically relevant, but the coefficient of the second-order lag is positive (model 2), indicating that the number of privatisation transactions are positively associated with the poverty gap. The first- and second-order lags of *Proceeds* are also positive and statistically relevant at 95%. This means that the shortfall in income from the poverty line of $5.50 a day tend to be higher in countries where the government sell relevant (in monetary terms) SOEs. These findings suggest that privatisation reforms tend to be positively related with income inequality.

<Insert table 4 about here>

Table 5 shows the statistical association of privatisation variables and the third inequality variable, called *Income10*. The results are similar to those obtained previously for the other two variables: the first-order lag of *Deals* is not statistically relevant, but the second-order lag has a positive coefficient, being relevant at 10%. This means that the percentage of income that accrues to the richest 10% of population tend to be higher in countries that use privatisation reforms to a greater extent than other with less interest in such reforms. Further, in models 3 and 4, the first- and second-order lags of *Proceeds* are positively related with *Income10*, being significant at 99%. These findings suggest, again, that income inequality tend to be higher in countries that have resorted to privatisation reforms to a greater extent.

<Insert table 5 about here>

Regarding control variables, the most relevant results may be summarised as follows: in the three tables, *Inflation* is positively related with the three dependent variables, indicating that income inequality seems higher in countries with larger inflation rates. *FDI* is statistically relevant, especially in explaining *GINI* and *Income10* (Tables 3 and 5); and, its coefficients are negative, which means that income inequality tend to be lower when foreign direct investment is increased. Similarly, *Balance* variable is negatively associated with the three dependent variables, suggesting that countries with large deficits tend to show larger levels of income inequality.

Regarding political factors, the results are not totally conclusive: *Right* and *Elections* are statistically relevant only in Table 4, where the dependent variable is *Poverty*. There, the two factors have positive coefficients, indicating that countries governed by right-wing governments tend to show higher levels of income inequality; also, inequality is higher when there are more years left to the next elections. However, *Right* and *Elections* are not relevant in the rest of tables. Finally, the effect of *Fragmentation* is not conclusive because coefficients are positive or negative depending on the way that inequality is represented.

5.3. Robustness checking: the role of capital income share

Following Bengtsson and Waldenström (2018), the link between privatisation and income inequality may be explained by the role of capital in the economy. These authors found that capital share in national income is positively associated with top income shares, which means that higher capital share is related with higher inequality in personal distribution of income. Then, it seems that privatization would have a much more effect at the top of the income distribution than at the bottom, since top earners have another place to achieve returns on their capital.

Accordingly, we test the same previous equations but changing the dependent variable to *Capital*, which is the capital share in the national income as percentage of GDP. It has been calculated by subtracting labour share (i.e. labour compensation as wages, salaries and employers' social contributions) from GDP. The results are showed on table 6. We can see similar results to those obtained previously for the other indicators of income inequality, but here *Deals* variable is also relevant in the two equations. These findings suggest that countries with a greater use of privatisation reforms tend to show a higher level of inequality in the personal distribution of income.

<Insert table 6 about here>

6. Conclusions

This analysis set out to test the link between privatisation reforms and income inequality in EU governments. The empirical findings suggest that income inequality tends to be higher in countries that have resorted to privatisation reforms to a greater extent. Our findings are in line with the main conclusions of Anderson et al. (1997), Sheskinski and Lopez-Calva (2003), Birdsall and Nellis (2003), and Nellis (2006).

This study contributes to privatisation literature by considering a social perspective instead of a management perspective, showing the association between privatisation reforms and income inequality. Findings adds evidence in the European context, since the most of previous studies that relate privatisation with inequality and poverty are focused on Asia and Latin America (e.g. Birdsall & Nellis, 2003; McKenzie & Mookherjee, 2003; Nellis, 2003; Nixon & Walters, 2006). The causality link between privatisation and income inequality is consistent with most of empirical literature summarised by Bastianin et al. (2018) and complement their previous results.

However, it would be interesting to refine our findings through further analyses by, firstly, taking into account the sector affected and the method of privatisation – it is a fact that different programmes and sectors tend to exhibit different dynamics (Zohlnhöfer et al., 2018); and secondly, using other variables to measure income inequality such as the human development index or living standards. If activity sectors are controlled, some specific indicators on energy poverty (Castaño-Rosa et al., 2019). In addition, it would be interesting to control the regulatory environment (Boubakri et al., 2009), and taking into account other reforms that usually accompany to privatisation, e.g. entry barriers, liberalization, unbundling, corporatization, etc. This is especially relevant in some sectors, such as energy, transport and telecommunications (Bastianin et al., 2018; Bacchiocchi et al., 2015; Erdogdu, 2011).

Furthermore, the period of analysis ends in 2013, due to the limit on availability of data in the Privatisation Barometer. However, there has been a new wave of privatisation in recent years (promoted by the Troika), in attempts to recover the financial situation in certain countries, such as Greece and Ireland (Clifton et al., 2018). It would be interesting to include this more recent wave of privatisation in future studies, by using other sources of data that include more recent reforms.

A future study will be focused on the role of the distribution of the national income (capital share vs labour share) as a mediator in the relationship between privatisation and personal income inequality. This means to expand our robustness checking analysis. As we have indicated previously, after privatisation, top earners have another place to achieve returns on their capital, but the effects on income at the bottom are less clear. In fact, at the bottom of the income distribution, the association might be on the expenditure side (paying more for privatised services) than the income side; in the income side, the link might be via job loss. This needs further analysis.

In addition, future research could consider the conditions of the current political environment; for example, future changes within the EU, the consequences of Brexit, and the collateral effects of important political and social issues, such as migration waves. These movements serve to encourage governments to carry out policies focussed on the poor and the middle class, which could mitigate income inequality. More generally, complementarities between growth and income equality objectives suggest that policies aimed at raising average living standards can also influence the distribution of income and ensure a more inclusive prosperity.

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Table 1. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
GINI	31.1328	3.5457	23.7	39
Poverty	0.7542	1.0044	0	7
Income10	24.5405	2.2592	20.1	30.8
Deals	2.8291	4.6163	0	55
Proceeds	0.5281	1.1656	0	11.8134
Inflation	2.3649	-2.5295	9.6797	20.1160
Education	106.4971	14.3003	90.0863	161.0192
FDI	14.1918	-47.7899	58.3229	451.7155
Balance	-3.2048	4.0113	-32.0246	5.1328
Right	41.8805	38.4060	0	100
Fragmentation	0.7145	0.1021	0.4916	0.8814
Elections	1.9673	1.2450	0	4

Table 2. Bivariate correlations

	GINI	*Poverty*	*Income10*	*Deals*	*Proceeds*	*Inflation*
GINI	1					
Poverty	0.5595***	1				
Income10	0.9591***	0.4648***	1			
Deals	0.137*	-0.0214	0.1469*	1		
Proceeds	0.2143***	0.0867	0.2243***	0.3643***	1	
Inflation	0.1586*	0.2151***	0.156*	-0.0821	-0.0491	1
Education	-0.1392*	-0.1135†	-0.168**	-0.0494	-0.0146	-0.113†
FDI	-0.0622	-0.0937	-0.0811	-0.1174†	0.049	0.0368
Balance	-0.2804***	-0.0939	-0.2368***	-0.1098†	-0.1696**	0.3509***
Right	0.1058†	0.1382*	0.1256*	0.1325*	0.048	0.0054
Fragmentation	-0.2799***	0.1198†	-0.2496***	-0.1441*	-0.1289*	0.0659
Elections	0.0711	0.144*	0.043	-0.0473	0.0291	0.0577
	Education	*FDI*	*Balance*	*Right*	*Fragmentation*	*Elections*
Education	1					
FDI	-0.025	1				
Balance	0.0684	0.0457	1			
Right	0.057	-0.2008***	-0.0243	1		
Fragmentation	0.3545***	-0.2333***	0.3147***	0.072	1	
Elections	-0.0407	0.0087	-0.0626	0.0739	0.0054	1

Notes:
†, *, **, ***significant at 10, 5, 1, and 0.1 percent level, respectively.

Table 3. Effect of privatization on GINI index

	Model 1		Model 2		Model 3		Model 4	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
$Deals_{t-1}$	0.0428	0.0655						
$Deals_{t-2}$			0.0667†	0.0349				
$Proceeds_{t-1}$					0.5740***	0.1173		
$Proceeds_{t-2}$							0.2706†	0.1365
Inflation	0.3936†	0.2081	0.2592*	0.1075	0.3307**	0.0926	0.1562	0.1035
Education	0.0553†	0.0300	0.0517†	0.0297	0.0576†	0.0308	0.0292	0.0183
FDI	-0.0075*	0.0032	-0.0071**	0.0024	-0.0089***	0.0012	-0.0078***	0.0020
Balance	-0.2437†	0.1299	-0.1780*	0.0693	-0.2366***	0.0481	-0.1528**	0.0515
Right	0.0009	0.0056	0.0100	0.0060	0.0023	0.0040	0.0033	0.0038
Fragmentation	-6.3484	4.8443	-10.7743*	4.5256	-1.9536	5.1980	-7.0418*	2.6627
Elections	0.0867	0.1003	0.1087	0.1246	0.2215†	0.1190	0.0532	0.1118
_cons	2.8014***	6.2217	3.1229***	5.1356	2.3694***	5.2274	3.1891***	2.3257
Arellano-Bond test for AR(2)	Pr > z = 0.179		Pr > z = 0.342		Pr > z = 0.269		Pr > z = 0.388	
Hansen test	Pr > chi2 = 1.000		Pr > chi2 = 1.000		Pr > chi2 = 1.000		Pr > chi2 = 1.000	

Notes:
†, *, **, ***significant at 10, 5, 1, and 0.1 percent level, respectively.

Table 4. Effect of privatization on poverty gap

	Model 1		Model 2		Model 3		Model 4	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
$Deals_{t-1}$	-0.0195	0.0143						
$Deals_{t-2}$			0.0225*	0.0101				
$Proceeds_{t-1}$					0.0584*	0.0271		
$Proceeds_{t-2}$							0.0792*	0.0312
Inflation	0.0406	0.0255	0.0788**	0.0224	0.0483*	0.0221	0.0493*	0.0212
Education	-0.0004	0.0055	-0.0006	0.0044	-0.0027	0.0038	0.0035	0.0055
FDI	0.0006	0.0007	-0.0003†	0.0002	-0.0004	0.0003	-0.0003	0.0007
Balance	-0.0290*	0.0141	-0.0351*	0.0134	-0.0225	0.0161	-0.0371*	0.0139
Right	0.0045*	0.0017	0.0031**	0.0010	0.0037**	0.0010	0.0037*	0.0015
Fragmentation	1.3021†	0.6408	1.8562**	0.5575	1.4303*	0.6686	0.8751	0.5171
Elections	0.0657†	0.0321	0.0478**	0.0164	0.0840**	0.0240	0.0373	0.0226
_cons	-0.7693	0.5274	-1.1901†	0.6087	-0.7299	0.5442	-0.9676*	0.4579
Arellano-Bond test for AR(2)	Pr > z = 0.238		Pr > z = 0.170		Pr > z = 0.227		Pr > z = 0.202	
Hansen test	Pr > chi2 = 1.000		Pr > chi2 = 1.000		Pr > chi2 = 1.000		Pr > chi2 = 1.000	

Notes:
†, *, **, ***significant at 10, 5, 1, and 0.1 percent level, respectively.

Table 5. Effect of privatization on income share

	Model 1		Model 2		Model 3		Model 4	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
$Deals_{t-1}$	0.0298	0.0208						
$Deals_{t-2}$			0.0545†	0.0276				
$Proceeds_{t-1}$					0.2461**	0.0716		
$Proceeds_{t-2}$							0.2319**	0.0781
Inflation	0.1363*	0.0541	0.1356*	0.0530	0.1685*	0.0710	0.0904	0.0651
Education	0.0190	0.0121	0.0419*	0.0181	0.0109	0.0183	0.0093	0.0095
FDI	-0.0050***	0.0009	-0.0036**	0.0010	-0.0059***	0.0007	-0.0059***	0.0009
Balance	-0.0728†	0.0375	-0.0895**	0.0282	-0.0751	0.0478	-0.0434	0.0427
Right	0.0021	0.0036	0.0042	0.0028	-0.0013	0.0028	0.0035	0.0026
Fragmentation	-6.7578***	1.5638	-1.4417	2.0719	-0.1282	3.6896	-4.0510*	1.7989
Elections	0.0522	0.0634	0.0347	0.0679	0.0047	0.0633	0.0254	0.0578
_cons	2.6418***	1.6462	1.9916***	2.5549	2.3025***	1.7088	2.5882***	0.9658
Arellano-Bond test for AR(2)	Pr > z = 0.192		Pr > z = 0.532		Pr > z = 0.129		Pr > z = 0.545	
Hansen test	Pr > chi2 = 1.000		Pr > chi2 = 1.000		Pr > chi2 = 1.000		Pr > chi2 = 1.000	

Notes:
†, *, **, ***significant at 10, 5, 1, and 0.1 percent level, respectively.

Table 6. Robustness checking: effect of privatization on capital share

	Model 1		Model 2		Model 3		Model 4	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
$Deals_{t-1}$	0.0927*	0.0418						
$Deals_{t-2}$			0.0853†	0.0438				
$Proceeds_{t-1}$					0.5344*	0.1989		
$Proceeds_{t-2}$							0.7078***	0.1560
Inflation	0.2358	0.1382	0.4098***	0.0805	0.3083***	0.0860	0.2106*	0.0816
Education	-0.1170***	0.0235	-0.0692*	0.0289	-0.1330***	0.0207	-0.0632*	0.0244
FDI	0.0054**	0.0016	0.0029†	0.0015	0.0018	0.0030	0.0023*	0.0010
Balance	-0.1426†	0.0703	-0.1375***	0.0354	-0.1166*	0.0510	-0.0527	0.0573
Right	0.0230**	0.0082	0.0229***	0.0050	0.0139*	0.0060	0.0185***	0.0040
Fragmentation	1.7898	5.4842	-2.0017	4.1149	3.3441	4.6191	2.0048	2.6435
Elections	-0.1431	0.0959	-0.1346	0.1328	-0.3594*	0.1719	-0.1624	0.1659
_cons	6.3507***	0.3576	6.0989***	0.3093	6.5302***	0.5204	5.8014***	0.2943
Arellano-Bond test for AR(2)	Pr > z = 0.136		Pr > z = 0.082		Pr > z = 0.558		Pr > z = 0.545	
Hansen test	Pr > chi2 = 1.000		Pr > chi2 = 1.000		Pr > chi2 = 1.000		Pr > chi2 = 1.000	

Notes:
†, *, **, ***significant at 10, 5, 1, and 0.1 percent level, respectively.

Figure 1. Evolution of inequality variables (2003-2013)

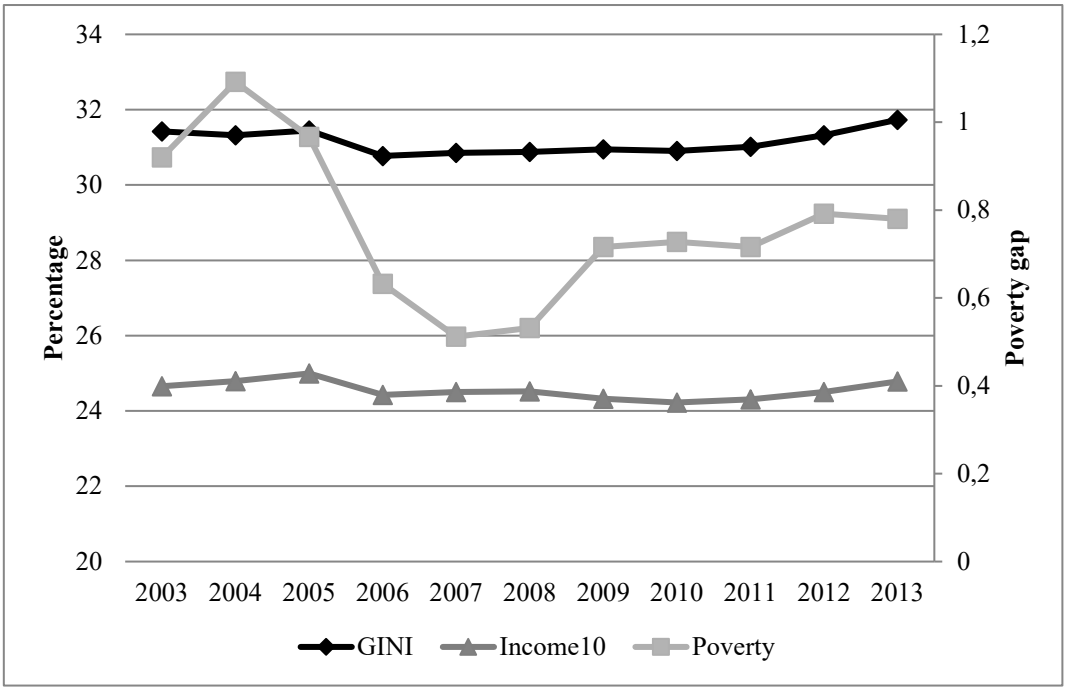

Figure 2. Distribution of privatization variables by country