

STATE-OWNED ENTERPRISES, INEQUALITY, AND POLITICAL  
IDEOLOGY

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State-owned enterprises continue to play a considerable role in many economies. In this study we empirically investigate the connections between these enterprises and inequality as mediated through political ideology. Using cross-country data on the relative size of the state-owned enterprise sector, we find strong empirical support for an inverted U-shaped relationship between its size and income inequality. We also find strong evidence that left-wing (vis-a-vis right-wing) governments are associated with a larger state-owned enterprise sector in countries with higher inequality. This result is robust to using cross-sectional vs. panel data, different identification strategies, and various controls.

## 1. INTRODUCTION

Recent years have witnessed a widespread attempt in developing countries to dismantle one of their most entrenched institutions – the state-owned enterprises (SOEs). The significant headway that some countries have made in the global privatization drive, initiated largely by the Thatcher government in the United Kingdom in the early 1980s, shows up in some figures: the share of SOEs in GDP of middle income countries was around 6% in 1996, compared with the preprivatization share of 10% in 1985 (Megginson and Netter, 2001). Given the extensive discussion on privatization and the huge literature that followed, one might have been tempted to conclude that SOEs have by now mostly disappeared from the economic scene. However, a closer look at the data shows that many countries even today still have substantially large SOE sectors. Looking at the emerging economies, SOEs' share in the GDP was 29.7% in China and 13.2% in India in 2006 (OECD, 2009a, b). The figure for Vietnam was 36% in 2010. Kikeri and Solo (2006a) report that SOEs accounted for more than 50% of GDP in Middle East and North Africa and Central Asia and more than 15% in Sub-Saharan Africa in 2003. Furthermore, state ownership is widespread in many sectors of the economy. More than 40% of capital stock in India and 57% of industrial assets in China are state-owned. Infrastructure, finance, services, telecommunications, and utilities sectors are all dominated by government ownership in developing as well as some developed countries. For instance, power supplies are owned and operated in more than half of the developing countries and 70% of Sub-Saharan African countries. More than 70% of the transportation sector has not had any sort of private participation in these economies. Finally, as of 2003, public commercial banks held more than 70% of banking assets in India and in ratios varying between 20% and 40% in other developing countries (Kikeri and Solo, 2006a).<sup>1</sup>

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<sup>1</sup>Kikeri and Solo (2006a, p. 2) argue that several countries such as Argentina, Brazil, Mexico, and Chile have been successful in their privatization drives, whereas the state sector remains largely untouched in many other economies. Kikeri and Solo (2006b, p. 4) argue that privatization activity was concentrated in a small group of active countries, whereas only scratching the surface in others.

The literature on the subject explains the persistence of the SOE sector by pointing out that it continues to be a major instrument of income redistribution. A common belief in the political science literature is that, at least partially, SOEs owe their genesis to the recognition that they can be used as a tool to distribute income.<sup>2</sup> It is also thought that “the privatization drive ... has lost its attractiveness to the extent that it would impede the state from using the SOEs to ease the pain of other components of the structural adjustment process” [Waterbury (1992, p. 194)]. Similarly, Megginson and Netter (2001) argue that the main obstacle to the privatization of the Chinese SOEs is the “social welfare responsibilities” they shoulder.<sup>3</sup>

Given the vast literature on the subject, in this study we take it as given that an important function of the SOEs is to transfer income to certain segments of the population. In what follows, we do not attempt to identify these segments, nor do we try to establish the nature of the specific ways in which SOEs serve as vehicles of income transfer and rent seeking.<sup>4</sup> Instead, we focus on a deeper level and try to understand the oft-cited nexus between income and wealth inequality (in the data these two are highly correlated) on the one hand, and income redistribution on the other, as mediated through the politics of the size of the SOE sector. Insofar as we know, this study is the first one that attempts to tease out these connections empirically. Across different measures of the relative size of SOE sector and income inequality and addressing thoroughly the endogeneity of inequality, we find that income inequality and the size SOE sector display an inverted U-shaped relationship. We also find strong results with regard to political ideology. Our findings suggest a sharp and robust contrast between right-wing and left-wing governments in that the latter are associated with a larger SOE sector in countries with higher inequality. Furthermore, the political ideology channel also works in a nonlinear fashion, whereby left-wing governments tend to use SOEs at a decreasing rate. These results are robust in relation to the use of cross-sectional vs. panel data, econometric methods, and control variables used. Again, though there exists a nonformal political science literature on the subject, we are not aware of any formal econometric studies that use cross-country data documenting these empirical relationships.

The rest of the article is organized as follows. Section 2 discusses the literature and the background for a number of issues that arise when one views the SOE sector as a tool for income distribution. In section 3 we describe the data and our empirical specification. Section 3 discusses the results. Finally, section 4 provides some concluding remarks.

## 2. THE LITERATURE AND THE ISSUES

The empirical regularities we document between the size of the SOE sector and inequality on one hand, and the variables such as democracy and political ideology on the other hand, reflect the prevailing view in the literature that the size of the SOE

<sup>2</sup>See Waterbury (1993), p. 263 on this.

<sup>3</sup>An alternative way of thinking about this issue is to check whether the privatization of the SOE sector increases income or wealth inequality. There is an extensive literature that argues that this is indeed the case. For instance, two of the most prominent authorities in this area, Birdsall and Nellis (2003), conclude in their survey that that many privatization programs have worsened the distribution of assets and income. Similar results are reported, among others, by Carrera et al. (2005), and Ugaz and Waddams Price (2003). See also the studies collected in Birdsall and Nellis (2005).

<sup>4</sup>See Hillman (2010) for an elegant overview of rent seeking and other related issues.

sector can largely be explained by political factors. That this is the case has been argued for a number of developing economies. For instance, in Bolivia, which was ruled by the left-wing *Movimiento Nacionalista Revolucionaria* (MNR) by the early 1960s, there was “a form of state capitalism developed, controlled and exploited by various competing groups of the middle classes ... [T]he state enterprises became a source of enrichment for these private factions, some civilian and some military.”<sup>5</sup> Under the right-wing rule of General Hugo Banzer, who was installed as president of Bolivia following a coup d’état in August 1971, “... the public enterprises served frequently as a mechanism to transfer state-owned (or state-guaranteed) resources to privileged groups in the private sector. Access to government officials and government contracts was considered the most important assets from the viewpoint of many private sector-businessmen.”<sup>6</sup> Furthermore, “[i]n fact, a non-negligible part of the support for the Banzer government and succeeding military regimes was the willingness to create employment in the public sector. The return to democracy in 1982 was also accompanied by a big spurt in the expansion of jobs in the most important public enterprises, particularly in COMIBOL.”<sup>7</sup> When in 1970 the Mexican president Diaz Ordaz had to choose his successor unilaterally, the new president “Echeverria faced the difficult task of creating his own supporting coalition after assuming office. The simplest method of shoring up the weakening political consensus was to spend on everyone’s behalf: dole out subsidies to education and agriculture, increase government jobs for the middle classes, grant large wage increases to mollify organized labor, etc.”<sup>8</sup>

The conclusions in the literature concerning the *continued* role played by the SOEs in a number of economies and our empirical results regarding the connection between the size of the sector and inequality of the distribution of income can have several explanations. In this study, we focus on one of them, perhaps the most important: the use of the SOE sector as a political vehicle to transfer income. To pursue this explanation, one first needs to clarify the ways in which SOEs can be used to carry out these transfers. The literature has profusely illustrated that SOEs pay higher wages and benefits and employ surplus labor. It is frequently the case that SOEs are monopolies. The SOEs may also pay a compensating wage differential when they operate in locations where private firms may be reluctant to locate. The full compensation package of the SOEs may include superior leave privileges and retirement benefits. Moreover, even if wage rates in the SOEs are similar to those offered by private firms, given the low productivity endemic in the former, the ratio of wages to marginal productivity of labor is higher. Furthermore, there is strong empirical evidence from Latin America, Africa, and Southeast Asia that supports the observation that the SOEs pay high wages.<sup>9</sup> Finally, careful empirical studies suggest that the SOEs carry “surplus labor”, that is, they employ more workers than their operations would justify on strictly rational economic grounds.<sup>10</sup> Complaints by management of surplus workers in the

<sup>5</sup>See Morales and Sachs (1989), p. 180.

<sup>6</sup>Ibid. pp. 192–193.

<sup>7</sup>Ibid. p. 197.

<sup>8</sup>See Buffie (1989), p. 420.

<sup>9</sup>For the evidence see Ramanadham (1988), Kale (2002), Zhang (2011).

<sup>10</sup>See, among others, Lin *et al.* (1998), Majumdar (1998), Bertero and Rondi (2000), Dewenter and Malatesta (2001), and Dong and Putterman (2003).

SOEs in Sri Lanka, Trinidad and Tobago, India, and Britain, *inter alia*, are well documented.<sup>11,12</sup> Other methods of transferring income through the SOEs include, but are not limited to, charging consumers and firms below market prices for their products as well as granting SOE-related contracts to well-connected individuals and groups.

What are the reasons for transfer of income by the governments, though? The literature provides a number of answers to this question. One prominent explanation relies on the possibility that in economies with unequal distributions of income the median “voter” representing the majority might prefer to redistribute income.<sup>13</sup> Under certain conditions democratic regimes would be responsive to the median voter. Even autocratic rulers might at times find it in their interest to carry out similar redistributions.<sup>14</sup> Another reason, emphasized by Bai *et al.* (2000), is that governments may want to quell potential social unrest by providing employment and benefits in the absence of other elements of a social safety net. Governments may also be captured or “bought” by special interests [similar to “protection for sale” of Grossman and Helpman (1994)].<sup>15</sup> Furthermore, prolabor governments whose constituents are workers and need their political support may be more likely to use the SOE sector for redistribution. It is also possible that such prolabor left-wing governments place a higher weight on egalitarianism. Procapital right-wing governments, on the other hand, may be more likely to adopt policies that reflect the preferences of their capital-rich constituents and may choose smaller SOE sectors and less redistribution to labor.<sup>16,17</sup> Such an interpretation would be consistent with the approaches of Hibbs (1977) and Alesina (1987) in a macroeconomic setting or with that of Dutt and Mitra (2005) in an international trade framework.<sup>18</sup> A related third explanation has to do

<sup>11</sup>See Ramanadham (1988), Bai *et al.* (2000), and Dewenter and Malatesta (2001) among others.

<sup>12</sup>This is not to deny that there may be other reasons for carrying surplus labor, including moral hazard [for an interesting survey of the soft budget constraint syndrome see Kornai *et al.* (2003)]. Nor do we want to suggest that surplus labor is the only reason for the losses SOEs suffer. However, the literature is quite clear that the main reason for surplus labor is the wish to transfer resources to those who are thus employed. Similarly, the literature singles out the use of surplus labor as one of the main reasons why SOEs lose money. This is why the first action taken after a privatization is the laying off of the excess labor.

<sup>13</sup>See Alesina and Rodrik (1994).

<sup>14</sup>See Acemoglu and Robinson (2000).

<sup>15</sup>Shleifer and Vishny (1994) provide a model where because “the public is disorganized” politicians cater to interest groups rather than the median voter. Among others, Claessens and Djankov (1998) find empirical support for this view using data from seven central and eastern European countries.

<sup>16</sup>As Dutt and Mitra (2005) point out, this line of reasoning could be couched in terms of the approach in Grossman and Helpman (1994) who use their political-contributions approach to provide microfoundations to the political-support function approach. Thus, suppose that the government’s objective function (sometimes called the political-support function) is a weighted sum of the welfare of workers and capitalists. One can then think of a switch from a left-wing to a right-wing government as reflecting a rise in the weight of capitalists in the government’s maximand due, perhaps, to higher contributions by the latter. Furthermore, the political-contributions approach of Grossman and Helpman (1994) can be derived from a model of electoral competition (Grossman and Helpman, 1996), where it is possible for party platforms to remain divergent.

<sup>17</sup>Bortolotti *et al.* (2003) find that right-wing governments are more likely to privatize, but this effect is significant with cross-sectional data and insignificant with panel data.

<sup>18</sup>Hibbs (1977) argues that politicians are “partisan”. Left-wing and right-wing governments have different objective functions and shows that countries and periods with left-wing governments had lower unemployment and higher inflation than others. In the rational partisan theory of Alesina (1987) the left-wing party attaches a higher weight to unemployment relative to inflation. Hibbs and Vasilatos (1982) and Hibbs *et al.* (1982) find that blue-collar groups are typically more concerned about unemployment, whereas the major concern of their white-collar counterparts is inflation. Dutt and Mitra (2005) find strong and robust support for the hypothesis of a partisan, ideology-based model in that left-wing governments adopt more protectionist trade policies in capital-rich countries, but adopt more protrade policies in labor-rich countries, than in right-wing ones. See also Hibbs (1987) and Hibbs (1994).

with why SOEs are used as tools of income transfer when there could be more efficient tools.<sup>19</sup> One possible answer to this question is that the lack of transparency in generating redistribution through nonmonetary transfers makes SOEs a politically efficient tool. Coate and Morris (1995) show that politicians would prefer to redistribute via public works rather than cash transfers when voters lack information.

In what follows, using different measures of both the relative size of SOE sector and income inequality we find a robust inverted U-shaped relationship between these two. This nonmonotonicity result, as well as others we document below, can be explained by the trade-off that is involved in the use of SOEs as vehicles of income transfer. On the one hand, governments can transfer more income to connected groups if the size of the SOE sector is larger. On the other hand, SOEs being relatively inefficient means of such transfers, the cost of these transfers rise as the SOE sector expands, rendering it too costly for the purpose. That is, starting at low levels of inequality, an increase in its level would make the SOE sector a cost-effective mechanism to transfer income. However, with higher levels of inequality and a larger SOE sector, the rising cost of the sector would make it a less attractive or efficient mechanism for transferring income.

One would also expect the relationship between inequality and the size of the SOE sector to be contingent on political ideology. Here, the contrast would be between right-wing and left-wing governments. As the latter depend on the support of core labor groups that typically benefit from high levels of employment and wages that the SOE sector offers, we expect a larger SOE sector under left-wing governments. This expectation is justified by empirical analysis suggesting that there exists a sharp difference between right-wing and left-wing governments, with the latter being associated with larger SOE sectors. Again, given the rising cost of redistribution with the expansion of the SOE sector, we would expect and indeed do find that the political ideology channel operates nonlinearly: left-wing governments use SOEs at a decreasing rate.<sup>20</sup> These results remain robust across different measures of political ideology, econometric methods, and types of data.<sup>21</sup>

### 3. EMPIRICAL ANALYSIS

#### 3.1 Econometric Specification

Our basic econometric specification aims to test the relationship between income inequality and the size of the SOE sector as mediated through political variables. To keep our model general enough, we formulate a nonmonotonic specification:

$$SOE_i = \beta_1 + \beta_2 GINI_i + \beta_3 GINI_i^2 + \beta_4 WING_i + \beta_5 WING_i \times GINI_i + \beta_6 WING_i \times GINI_i^2 + \theta X_i + u_i \tag{1}$$

<sup>19</sup>Other policy instruments that can be used for redistribution include trade policy, education, health, and social security (some of these may overlap with SOEs).

<sup>20</sup>Dutt and Mitra (2005) also find strong empirical support for the hypothesis that left-wing governments tend to transfer income more *via trade policy* than right-wing governments.

<sup>21</sup>It is also worth noting that our empirical findings are also consistent with the literature that emphasizes the concept of common property and the attempt by different groups in societies to appropriate the common property [See, for instance, Tornell and Velasco (1992) and Benhabib and Rustichini (1996)]. These models are said to apply to societies where there is “extreme inequality”. If the resources of the SOEs are viewed as common property by the “various competing groups of the middle classes,” then our findings should be interpreted as also giving empirical support to the common property notion and the models built to elucidate it.

where  $i$  denotes the countries,  $SOE$  is an indicator of the relative size of the SOEs in overall economic activity,  $GINI$  denotes a measure of inequality,  $WING$  comprises indicators of the government's political ideology, i.e., left-, center- or right-wing, and  $X$  is a vector of control variables.

Several control variables are used to help identify the impact of inequality and ideology on  $SOE$  and to "clean" the error term as much as possible. First, we control for oil producers, as oil production may be, and in developing countries typically is, a state monopoly. We also control for small island countries, whose economies may be dominated by fishery or tourism, implying a smaller role for the state. The level of state involvement in the economy might also be affected by sectoral composition. We control for this with an urbanization variable. In addition to being highly correlated with sectoral shares (such as agriculture and manufacturing), urbanization also helps control for overall level of development.<sup>22</sup> Furthermore, we control for civil liberties as a measure of democracy because  $WING$  comprises left-, center- and right-wing executives with no distinction made between democratic or authoritarian (military, etc.) regimes. Civil liberties are our preferred democracy measure as it comprises freedom of speech and association consistent with median-voter and lobbying arguments.

### 3.2 Data

We employ two types of datasets: cross-sectional and panel. The former includes the 1978–1991 averages of the data, and the latter spans the time period 1970–2004 in 5-yearly time windows. For the dependent variable, our  $SOE$  measure is the share of the SOE sector production in GDP. The data come from the World Bank's (1995) *Bureaucrats in Business: The Economics and Politics of Government Ownership* as averages for the 1978–1991 period.<sup>23</sup> The panel data measure is the share of SOE investment in total investment activity, the data for which are obtained from Fraser Institute's Economic Freedom of the World database (Gwartney et al., 2007). The latter is a very comprehensive database with a broad country coverage, and is used widely to analyze the impact of institutions on economic performance. The data are available in 5-yearly time windows between 1970 and 1995 and annually after 2000.<sup>24</sup> We also convert this measure into cross-sectional form, which enables us to use two different  $SOE$  measures in the cross-sectional analysis. The explanatory variables are utilized both in cross-sectional and panel datasets accordingly.

One concern with the SOE investment measure is that government investments may be based on purely economic and nonpolitical grounds. However, most political scientists would strongly argue for the presence of political motives behind SOE investments, and suggest that investment is at least partially determined by noneconomic concerns, political ideology, and the type of political regime. We check for the cross-sectional correlation between the share of SOE production and SOE investment in

<sup>22</sup>Our dataset includes both developing and developed countries. We initially used income per capita in 1970 to control for the stage of development, but because this variable was highly correlated with urbanization, it was dropped from the regressions.

<sup>23</sup>The source actually provides the data in a panel format, but many missing observations prevent us from forming a viable panel dataset. Thus, we average the available data to use for the cross-sectional analysis. We also use the share of SOE in nonagricultural GDP as an alternative dependent variable, but this makes virtually no difference to our results.

<sup>24</sup>We average the annual observations between 2000 and 2004 so as to form a panel comprising 5-yearly periods of 1970, 1975, 1980, 1985, 1990, 1995, and 2000.

GDP, and find it to be 0.52. Bearing in mind that the data come from different sources, we consider this correlation to be moderately high. Thus, we use the data on SOE investment together with the other metric we have.

We use the income Gini coefficient as the measure of inequality. As income distribution becomes more unequal, the share of SOEs in GDP would initially increase, and hence, we expect a positive sign for *GINI*. The data have been obtained from UNU/WIDER (2005). We also considered the share of median quintile in income distribution as a measure of (reverse) inequality. The correlation between this measure and income Gini is found to be  $-0.95$ , and thus, we do not pursue this variable further in this study. We also experiment with land Gini as an indicator of wealth inequality. The data are obtained from Deininger and Olinto (2000). We also adopt the schooling inequality data, obtained from Castello and Domenech (2002), as an instrumental variable (see below), which is a Gini index representing educational inequality in the population 15 and above.

The political ideology data have been obtained from Database of Political Institutions (Beck *et al.*, 2001). This database includes annual data starting from 1975, and provides qualitative information on the political leaning of the executive power for each country in the form of leftist, centrist, and rightist ideologies. We utilize this information in several ways for the *WING* variable. First, we use the shares of years in which each ideology dominated the country over the course of the relevant time period (i.e., the period of 1978–1991 for the cross-sectional dataset, and within each 5-yearly interval for the panel dataset). This provides a continuous measure of political ideology. Second, we adopt the discrete form of the measure by creating dummy variables (i.e., leftist, centrist, and rightist dummies): When a regime is observed over more than half of the relevant time period in the country, the dummy takes the value 1, otherwise, zero. A few marginal cases have been handled using the approach of Dutt and Mitra (2005).<sup>25</sup> An important issue here is the “unspecified” category for political ideology. Beck *et al.* (2001) list some country-year observations as having “no information”. For instance, the Mahatir period of Malaysia, several monarchs in the Middle East such as King Hassan of Morocco, King Hussein of Jordan, Sheikh Zayed of UAE, several governments that ran Pakistan during the 1980s and 2000s, and some military regimes in Africa are listed with no specific information regarding their ideologies. We manage the unspecified category in several different ways. First, we treat these rulers as “unspecified-wing”, i.e., a fourth type of political leaning, and include them in the regressions to explore the related implications. Second, we incorporate them into the centrist category (as in Dutt and Mitra, 2005). Third, we remove them from the sample. Our results are robust to different ways of treating this category.<sup>26</sup> With these exercises in the background, the results we present below are based on the continuous construction of the *WING*

<sup>25</sup>See Dutt and Mitra (2005, pp. 63–64). In our case Argentina had six years of centrist and six years of autocratic regimes, whereas Uruguay had seven years of autocratic and seven years of rightist regimes. We assumed these governments to have centrist ideologies. Our results are robust to variations in such classifications. We also followed a similar strategy for the panel dataset, and these results, too, are robust to variations in the categorization.

<sup>26</sup>We also considered an ordinal approach to political ideology, whereby leftist regimes could take the value 0, centrist regimes 1, and the rightist regimes 2. In doing so, countries with unspecified political leaning had to be removed from the sample. Our results are robust to this approach as well.

variable, with the “unspecified-wing” treated as a separate political ideology category.

Table 1 presents the summary statistics of the cross-sectional data, their sources, and some relevant explanations.

### 3.3 Estimation Methodology

The main econometric problem in our context is that *GINI* may be endogenous due to reverse causation because the size of the SOE sector may affect income inequality. In other words, countries with high income inequality may be associated with greater levels of income transfers that aim at reducing inequality. Thus, to test our main argument, *GINI* needs to be instrumented. For a valid instrumentation, IVs should be strong, exogenous, and excludable from the SOE equation. We use initial schooling

TABLE 1. SUMMARY STATISTICS FOR CROSS-SECTIONAL DATA, DATA SOURCES, AND EXPLANATIONS

Variable	Mean	Median	Max	Min	SD	<i>N</i>	Data source and explanations
SOE share in GDP (%)	11.80	8.35	64.60	1.20	11.39	68	World Bank, <i>Bureaucrats in business</i> . Averages of 1978–1991.
SOE share in total investment (%)	8.40	7.67	23.29	3.02	3.48	62	Gwartney et al. (2007). Panel data converted into cross-sections by averaging 1975, 1980, 1985, 1990, and 1995 obs.
Income Gini	45.11	45.84	68.80	24.48	10.16	68	UNU/WIDER (2005). 0–100 scale
Person-based Gini dummy	0.72	1	1	0	0.42	68	UNU/WIDER (2005)
Net income-based Gini dummy	0.33	0	1	0	0.46	68	UNU/WIDER (2005)
Cons./Exp.-based Gini dummy	0.31	0	1	0	0.45	68	UNU/WIDER (2005)
Earnings-based Gini dummy	0.04	0	1	0	0.18	68	UNU/WIDER (2005)
Monetary income-based Gini dummy	0.16	0	1	0	0.36	68	UNU/WIDER (2005)
Quality of Gini (1–4)	2.32	2.50	4	1	0.82	68	UNU/WIDER (2005)
Land Gini	66.78	68.23	92	35.25	15.27	68	Deininger and Olinto (2000). 0–100 scale
Unspecified wing	0.37	0.21	1	0	0.42	68	Beck et al. (2001). Continuous measure
Left wing	0.30	0.04	1	0	0.39	68	Beck et al. (2001). Continuous measure
Center wing	0.06	0	1	0	0.18	68	Beck et al. (2001). Continuous measure
Right wing	0.27	0.14	1	0	0.34	68	Beck et al. (2001). Continuous measure
Schooling inequality	0.48	0.46	0.95	0.16	0.23	63	Castello and Domenech (2002)
Oil producing dummy	0.06	0	1	0	0.24	68	World Bank, GDN database
Civil liberties in 1970	3.99	4.17	7	1	1.73	68	<a href="http://www.freedomhouse.org">http://www.freedomhouse.org</a>
Urbanization in 1970 (%)	38.70	36.92	94.08	2.72	22.95	68	World Bank, World development indicators
Small Island dummy	0.06	0	1	0	0.24	68	CIA World Factbook. Island countries whose surface areas are less than 10,000 sqkm



inequality and land Gini as the IVs.<sup>27</sup> In terms of the IV characteristics, first, these variables are not expected to be directly influenced by *SOE*, and therefore, they are exogenous. Second, regressing *GINI* on these variables delivers high F-statistics (greater than 10), implying that they are strong instruments (see Stock and Yogo, 2005). Third, we do not expect schooling inequality to influence *SOE* directly, thus it should be excludable. Land Gini may directly influence *SOE* through the suggested mechanism in this study. To explore the direct relationship between land Gini and *SOE*, we run a number of regressions under several plausible scenarios, but never find a significant direct relationship.<sup>28</sup>

An additional issue with *GINI* is that UNU/WIDER reports Gini observations as based on income vs. consumption, net vs. gross income, and person vs. household income constructions, as well as referring to other income types such as earnings and monetary income. In addition, UNU/WIDER provides a quality indicator for the income distribution series (quality depends on the original source of data). Knowing the source of the measurement and quality differences helps address it; we use *NET*, *PERSON*, *EARNINGS*, *MONETARY*, and *CONSUMPTION* dummies<sup>29</sup> and the *QUALITY* variable as IVs.<sup>30,31,32</sup>

This IV strategy results in the number of instruments being greater than the number of independent variables – thus, our equations are overidentified. We then perform the suggested Sargan tests. In the case of cross-sectional data we fail to reject the null hypothesis for every specification. Having valid instruments at our disposal, we next conduct Durbin-Wu-Hausman tests to check whether the endogeneity of *GINI* is statistically supported (Davidson and McKinnon, 2004, p. 338). These tests show that inequality is indeed endogenous in most of the specifications and across different *WING* measures. It is, however, difficult to tease out whether the reason is reverse causality or measurement error. Nevertheless, with all the tests approving our instrumentation strategy, our estimation methodology for cross-sectional analysis is 2SLS.

In addition to the standard instrumental variable estimation, we also adopt the recently developed identification-through-heteroskedasticity method by Lewbel (2012). Although this method is applicable to cross-sectional data only, it has the major advantage of being immune to the exclusion restrictions problem. We use this

<sup>27</sup>For “initial” schooling inequality, we use the 1965 observation for the cross-sectional dataset. For panel dataset, we use the observation that belongs to two periods (i.e., 10 years) before the income inequality observation. For land inequality as an explanatory factor for income inequality, see Li *et al.* (1998).

<sup>28</sup>Note that land Gini would be exogenous to *SOE* in our context, so using it as a regressor instead of income Gini would not require instrumentation.

<sup>29</sup>Kuznets (1989) favors gross, household-based income to measure inequality.

<sup>30</sup>The *QUALITY* indicator takes values 1, 2, 3, and 4, with the lowest value representing the highest quality.

<sup>31</sup>Deininger and Squire (1996) suggest adding 6.6 points to expenditure-based Gini coefficients to address the construction differences. This practice seems more relevant for the older version of their dataset; the data have been updated since with new observations. Importantly, there are other construction issues that affect the Gini observations (e.g., some Gini values are based on net, personal, and monetary incomes). We do not prefer this sort of mechanical approaches (where the values to be added or excluded can be obtained, for instance, through averaging or regression-based methods). With this practice, at least in theory, Gini values can exceed the maximum value of 100. One might also recommend using only high-quality Gini data, but these data do not provide enough data points (given the need to cover a specific time period such as 1978–1991).

<sup>32</sup>Our controls oil, small island dummy, and regional dummies are strictly exogenous to *SOE*. We do not expect democracy and urban population to be endogenous to *SOE*, but use their 1970–1974 averages as a safeguard.  $GINI^2$  is also instrumented with the quadratic values of the continuous IVs wherever it applies.

approach to check the robustness of our main result, i.e., nonright-wing governments are associated with larger SOE sectors. The operational details of this method are discussed in section 3.2. below.

In panel data analysis, we first adopt the conventional cross-sectional time-series approach to account for country-specific fixed and/or random effects. Using the same set of instruments defined above, but utilizing them in panel form, we run pooled data regressions. In these regressions, Sargan tests do not allow for overidentifying restrictions. A number of exercises show that the problem originates from variables that control the construction differences in Gini observations. This is not surprising because measurement error creates complex problems in panel data (Woolridge, 2002, pp. 311–314). We do not elect to play with the IV matrix as it is essential to control for construction differences in Gini observations. Thus, we do not pursue this panel approach – instead, we change the panel design, and employ the data as cross-sections pooled over time, estimating equations relating to each time period in a system of equations framework. We adopt GMM to estimate the system (and used the same set of IVs as in the cross-sectional case). In doing so, we allow the intercepts to vary over time, but impose coefficients to be the same for right-hand side variables. The J-statistic obtained from the GMM minimization criterion is used to construct Sargan test statistics, which suggest to accept the overidentifying restrictions for the system (Woolridge, 2002, p. 201).

We also adopt a general-to-specific modeling approach a la Hendry (1995) by removing insignificant controls, a procedure justified with Wald tests, both to check the sensitivity of the main variables of interest and to save degrees of freedom. We use two-stages least squares (2SLS) for the cross-sectional analysis and generalized method of moments (GMM) for the panel analysis. Overall, our results are robust across both cross-sectional and panel data.

#### 4. RESULTS

Table 2 presents the first-stage results of *GINI*. Regressing *GINI* on all instruments finds that the majority of instruments are significant except monetary income and earnings (Model 1). Removing the latter in two steps (Models 2 and 3) yields that the remaining instruments are highly significant. Model 3 yields an F-statistic of 13.5, rejecting the presence of weak instruments. The model also estimates all the instruments with expected signs: higher land inequality, initial schooling inequality, and person-based income Gini construction are associated with higher income Gini observations, whereas net income- and consumption-based Gini constructions are associated with lower Gini values.<sup>33</sup> In addition, higher quality Gini observations are on average lower. In what follows, we use the variables in Model 3 (Table 2) as instruments.

##### 4.1 Simple Relationship between SOE Size and Income Inequality

Tables 3a–c present the estimation results for equation (2) with cross-sectional data and  $\beta_{i=4-6} = 0$ , and as such portray the simple and direct relationship between the

<sup>33</sup>Person-based income Gini construction takes into account within-household income inequality, and hence is higher relative to household-based construction. Net income is after-tax income and obviously is more even relative to gross income. Likewise, consumption-based Gini captures after-saving income distribution, which is more even relative to income-based distribution.

TABLE 2. FIRST-STAGE REGRESSION OF INCOME INEQUALITY

	Dependent variable: income gini		
	(1)	(2)	(3)
Net income-based construction	-9.629 (3.12)***	-9.550 (3.32)***	-9.501 (3.42)***
Monetary income-based const.	0.354 (0.10)	0.312 (0.09)	
Personal income-based const.	7.050 (2.30)**	7.108 (2.39)**	7.175 (2.30)**
Quality of Gini	3.204 (1.99)*	3.245 (2.08)**	3.261 (2.06)**
Cons/Exp.-based construction	-9.741 (2.45)**	-9.818 (2.52)**	-10.387 (2.58)**
Earnings-based construction	0.644 (0.08)		
Initial schooling inequality	9.285 (1.67)*	9.277 (1.67*)	9.050 (1.66)*
Land Gini	0.257 (3.13)***	0.257 (3.14)***	0.253 (3.04)***
Constant	17.225 (2.66)**	17.103 (2.67)**	17.422 (2.79)***
Observations	61	61	61
R <sup>2</sup>	0.46	0.46	0.46
Wald test		0.86	0.78
F-statistic	10.26	11.56	13.51

Note: Absolute value of the robust *t*-statistics in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Wald test: *p*-values of the F-statistic for joint insignificance of the eliminated control variables, with the null hypothesis being they are jointly insignificant. F-statistic for excluded instruments.

TABLE 3A. SIMPLE RELATIONSHIP BETWEEN SOE AND INCOME GINI – OLS

	Dep. Var: SOEGDP		Dep. Var: SOEINV	
	(1)	(2)	(3)	(4)
Gini	0.036 (0.34)	1.496** (2.14)	0.006 (0.16)	0.700*** (2.87)
Gini <sup>2</sup>		-0.0162** (-2.04)		-0.008*** (-2.94)
Constant	10.19* (1.93)	-21.07 (-1.48)	8.162*** (5.40)	-6.674 (-1.30)
Observations	68	68	62	62
R <sup>2</sup>	0.00	0.03	0.00	0.07

Note: Absolute value of the robust *t* statistics in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

role of the SOEs in the economy and income inequality. Using the two dependent variables, *SOEGDP* and *SOEINV*, and OLS estimation, Table 3a clearly shows that the relationship is nonlinear, rather than linear. Further indications of the nonlinear relationship are in Figures 1 and 2. The locally weighted regression lines between *GINI* and *SOEGDP* and *SOEINV*, respectively, are estimated to be nonlinear. The estimation results with 2SLS in Table 3b are reinforcing. Table 3c presents the sensitivity of the 2SLS results to control variables. The latter are added to the regressions

TABLE 3B. SIMPLE RELATIONSHIP BETWEEN SOE AND INCOME GINI – 2SLS

	Dep. Var: SOEGDP		Dep. Var: SOEINV	
	(1)	(2)	(3)	(4)
Gini	0.178 (1.23)	3.048 (1.74)*	0.028 (0.69)	1.047 (2.32)**
Gini <sup>2</sup>		-0.033 (1.69)*		-0.010 (2.19)**
Constant	3.630 (0.60)	-54.583** (1.52)	6.73 (3.61)***	-15.902 (1.63)
Observations	61	61	56	56
Hansen's J	0.24	0.19	0.28	0.33

Note: Absolute value of the robust *t* statistics in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Hansen's J: *p*-value for the heteroskedasticity-consistent Sargan test for overidentifying restrictions, with the null hypothesis being that the restrictions are valid.

TABLE 3C. SOE AND INCOME GINI – 2SLS AND CONTROLS

	Dep. Var: SOEGDP		Dep. Var: SOEINV	
	(1)	(2)	(3)	(4)
Gini	1.010 (0.72)	2.292 (1.77)*	0.855 (2.10)**	1.026 (2.38)**
Gini <sup>2</sup>	-0.012 (0.78)	-0.025 (1.72)*	-0.009 (2.06)**	-0.011 (2.28)**
Oil exporter	22.746 (1.87)*	21.33** (2.13)	3.593 (2.18)**	3.372 (2.10)**
Small Island	-6.261 (0.83)		-2.224 (1.74)*	-1.576 (1.72)*
Civil liberties 1970	1.518 (1.37)	1.503 (1.83)*	-0.198 (0.63)	
Urban Pop. 1970	-0.020 (0.29)		-0.031 (1.70)*	
Constant	-14.439 (0.46)	-44.506 (1.58)	-9.301 (1.00)	-15.306 (1.63)
Observations	61	61	56	56
Hansen's J	0.25	0.46	0.13	0.28
Wald test		0.78		0.51

Note: Absolute value of the robust *t*-statistics in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Hansen's J: *p*-value for the heteroskedasticity-consistent Sargan test for overidentifying restrictions, with the null hypothesis being that the restrictions are valid. Wald test: *p*-values of the F-statistic for joint insignificance of the eliminated control variables, with the null hypothesis being that they are jointly insignificant.

in two steps. Model 1 includes oil exporter and small island dummies, initial democracy, and initial urbanization. Model 2 excludes the insignificant controls. Focusing on Models 2 and 4, nonlinearity prevails with both dependent variables. These results encourage us to look for further factors that play a role in the data-generating process, and which we believe are related to the political ideology of the government.

#### 4.2 Political Ideology

Table 4 presents the estimation results for equation (2) without the previous restrictions on the parameters. DWH tests, presented at the bottom of the table, provide

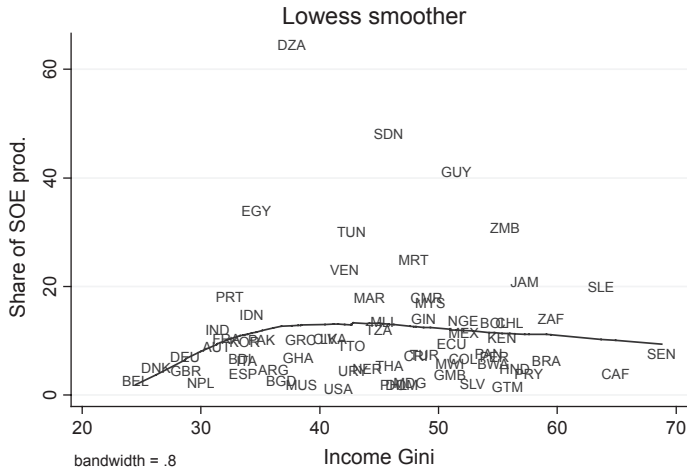


Figure 1. SOE share in production and Income Gini.

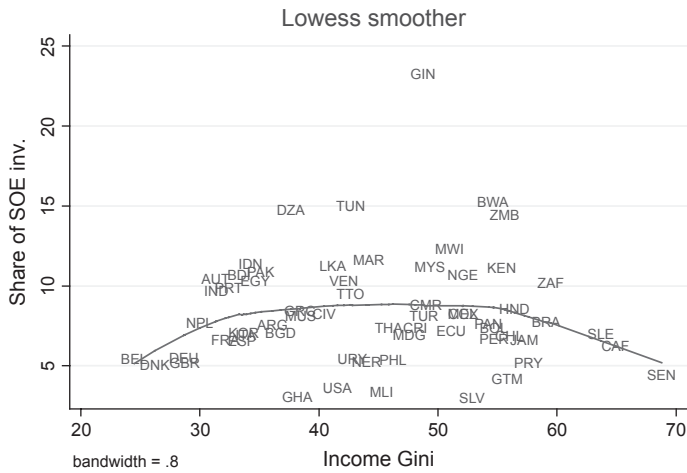


Figure 2. SOE share in investment and Income Gini.

some evidence for the endogeneity of *GINI*. Hansen’s J-statistics presented justify our instrumentation procedure. For each dependent variable, three models are presented. In the first, equation (2) is estimated without controls; in the second, controls are included; and in the third, insignificant controls are removed. As before, the removal of the insignificant controls is justified with Wald tests.

We next proceed with the discussion. While we touch upon all models, our focus will be on Models 3 and 6 which are obtained with the general-to-specific approach. In all these models, there is overall a remarkably consistent pattern for the political ideology channel, with the significance of coefficients varying mostly within conventional levels. In other words, there is a strong nonlinearity in the impact of political ideology on SOE which varies at different levels of inequality. This nonlinearity sug-

gests, however, that there is a limit to which political ideology is associated with a larger SOE sector. Specifically, compared with right-wing governments, left-wing, center-wing, and unspecified-wing governments prefer larger SOE sectors, but this effect tapers off at higher levels of inequality. The direct effects of *GINI* and political ideology are also significant with *SOEGDP* as the dependent variable, although they are significant at around 15% when *SOEINV* is used. Hence, Model 3 suggests the following regression equation:

$$\begin{aligned} SOEGDP = & 64.89 - 3.29GINI + 0.04GINI^2 - 139LEFT - 281CENTER \\ & - 135UNSPEC + 7.09LEFT \times GINI + 12.98CENTER \times GINI \\ & + 6.59UNSPEC \times GINI - 0.08LEFT \times GINI^2 \\ & - 0.14CENTER \times GINI^2 - 0.07UNSPEC \times GINI^2 + \dots + u_i \end{aligned}$$

The impact of *GINI* on *SOEGDP* is shown as follows:

$$\begin{aligned} \frac{\partial SOEGDP}{\partial GINI} = & -3.29 + 0.08GINI + 7.09LEFT + 12.98CENTER \\ & + 6.59UNSPEC - 0.16LEFT \times GINI \\ & - 0.28CENTER \times GINI - 0.14UNSPEC \times GINI \end{aligned}$$

This derivative implies that redistribution through SOEs depends on the political ideology of the government and the level of inequality. Take, for instance, the minimum Gini value in the sample, 24.5.<sup>34</sup> Conditional on there being a left-wing government in the entire 1978–1991 period, we have  $\partial SOEGDP/\partial GINI = 1.8$ , which means that a 1 unit increase in Gini increases the SOE share in GDP by 1.8%. When the government ideology is of the 'unspecified' type, similar amount of increase is observed (1.5%).<sup>35</sup> These effects taper off and reach a turning point around the mean Gini value, 45. After this point, higher Gini values start having a negative impact on *SOEGDP*, possibly because the costs of a larger SOE sector become significant. For instance, around the Gini value 60, and with the full sample period governed by a left-wing government, an increase in Gini by 1 unit decreases *SOEGDP* by 1.4%.

Importantly, the impact of left-wing ideology on *SOEGDP* is seen through the following derivative:

$$\frac{\partial SOEGDP}{\partial LEFT} = -139 + 7.09GINI - 0.08GINI^2$$

This derivative suggests that between the income Gini levels 27.25 and 61.25, left-wing governments are always associated with a higher SOE share in GDP. This effect reaches its maximum level around the mean Gini value of 45. Note that these are "corrected" Gini levels, i.e., corrected during the instrumentation procedure, and thus refer to household gross income-based constructions. In our sample, there are two countries with income Gini values lower than 27.25 (Belgium and Denmark), but these values are net income-based constructions; accounting for the "understatement" of

<sup>34</sup>We disregard the type of Gini construction for the moment.

<sup>35</sup>When the government has the center-wing ideology, a one unit increase in GINI increases *SOEGDP* by almost 4.8%, but the mean share of center-wing governments in the sample is quite low, i.e., around 5%, in which case the estimated coefficient can yield such huge variations.

TABLE 4. SOE, POLITICAL IDEOLOGY, INCOME INEQUALITY – CROSS-SECTIONAL DATA – 2SLS ESTIMATIONS – CONTINUOUS WING MEASURE

	Dep. Var: SOEGDP			Dep. Var: SOEINV		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	88.540 (1.64)	68.794 (1.77)*	64.888 (1.68)*	15.460 (1.24)	24.883 (2.22)**	25.006 (2.20)**
Gini	-4.247 (1.71)*	-3.485 (1.82)*	-3.290 (1.75)*	-0.572 (0.86)	-0.815 (1.40)	-0.821 (1.42)
Gini <sup>2</sup>	0.049 (1.85)*	0.040 (1.80)*	0.037 (1.83)*	0.008 (0.99)	0.010 (1.48)	0.010 (1.48)
Left wing	-225.423 (2.11)**	-129.569 (1.85)*	-139.394 (2.05)**	-33.975 (1.61)	-33.661 (1.89)*	-33.852 (1.76)*
Center wing	-277.327 (2.96)***	-316.812 (1.62)	-280.623 (1.72)*	-156.345 (4.01)***	-99.463 (1.94)*	-101.021 (1.82)*
Unspecified wing	-143.781 (1.75)*	-125.093 (1.51)	-134.547 (1.77)*	-19.852 (0.91)	-32.996 (1.62)	-33.784 (1.73)*
Left wing × Gini	10.883 (2.26)**	6.893 (2.10)**	7.089 (2.17)**	1.900 (1.86)*	1.859 (2.18)**	1.863 (2.16)**
Center wing × Gini	13.303 (3.04)***	14.592 (1.65)	12.977 (1.78)*	7.625 (3.92)***	4.933 (1.95)*	4.939 (1.99)*
Unspec. wing × Gini	7.384 (1.91)*	6.396 (1.69)*	6.586 (1.86)*	1.092 (1.02)	1.547 (1.63)	1.584 (1.71)*
Left wing × Gini <sup>2</sup>	-0.116 (2.33)**	-0.078 (2.20)**	-0.078 (2.18)**	-0.022 (1.99)*	-0.022 (2.36)**	-0.022 (2.34)**
Center wing × Gini <sup>2</sup>	-0.152 (3.07)***	-0.161 (1.70)*	-0.143 (1.78)*	-0.089 (3.71)***	-0.058 (1.90)*	-0.058 (1.93)*
Unspec. wing × Gini <sup>2</sup>	-0.084 (1.97)*	-0.075 (1.82)*	-0.074 (1.90)*	-0.013 (1.05)	-0.017 (1.61)	-0.018 (1.68)
Oil exporter		20.197 (2.33)**	19.039 (1.95)*		3.084 (5.50)***	3.086 (5.59)***
Civil liberties 1970		2.221 (1.86)*	2.352 (1.98)*		0.001 (0.00)	
Small Island		-6.734 (0.78)			-2.837 (2.53)**	-2.838 (3.18)***
Urban Pop. 1970		-0.000 (0.01)			-0.055 (2.07)**	-0.055 (2.17)**
Observations	61	61	61	56	56	56
Hansen's J	0.67	0.43	0.37	0.24	0.38	0.38
DWH test	0.17	0.16	0.21	0.06	0.09	0.11
Wald test			0.51			0.19

Note: Absolute value of the robust *t*-statistics in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Hansen's J: *p*-value for the heteroskedasticity-consistent Sargan test for overidentifying restrictions, with the null hypothesis being that the restrictions are valid. Wald test: *p*-values of the F-statistic for joint insignificance of the eliminated control variables, with the null hypothesis of joint insignificance. DWH test: *p*-values of the  $\chi^2$  test statistic of the Durbin-Wu-Hausman test, with null hypothesis of no endogeneity. Specifically, the test is carried out by regressing GINI on instruments, saving the residuals next, and then inserting them back to the OLS regression in appropriate form (i.e., in levels as well as by interacting them with variables interacted with GINI itself where necessary), and finally, testing the joint significance of all residual variables and their interaction.

inequality would push these countries into the estimated band 27.25–61.25, implying a positive impact of left-wing governments on *SOEGDP*. Likewise, in our sample there are three income Gini values higher than 61.25 (Sierra Leone, Central African Republic, and Senegal). These are person-based income Gini constructions with a

quality rating 3; correcting the “overstatement” of inequality would put these countries into the estimated band. This implies that potentially in all countries in our sample, left-wing governments are associated with a higher SOE share in GDP.

In terms of control variables, as expected, oil exporter countries tend to have higher shares of SOE in GDP, as oil production in many developing countries remains a state monopoly and the SOEs associated with oil production are viewed as “cash cows.” The political ideology variables remain robust with controls.

Model 6 (Table 4) shows that using *SOEINV* as the dependent variable also results in the same pattern of signs. Despite *GINI* and *GINI*<sup>2</sup> being weak in significance, the effects related to political ideology are robustly significant. In terms of control variables, oil exporter countries are associated with higher SOE investment, but the magnitude of the coefficient is much smaller compared with SOE production. In addition, small island economies are involved with less SOE investment.

Our main result that nonright-wing governments are associated with larger SOE sector is important. Thus, we seek to check its robustness with another identification method: identification through heteroskedasticity, a la Lewbel (2012). This approach is based on one (or more) of the exogenous variables in  $SOE_i = \mathbf{X}'_i\boldsymbol{\beta} + \varepsilon_i$ , say,  $\mathbf{W}$  ( $\in \mathbf{X}$ ), generating heteroskedastic distribution of errors in a regression of  $GINI_i = \mathbf{W}'_i\boldsymbol{\gamma} + v_i$ , and an instrument to be constructed as a result,  $(\mathbf{W} - \bar{\mathbf{W}}) \times v$ , where  $\bar{\mathbf{W}}$  refers to the mean of  $\mathbf{W}$ , being used to instrument *GINI* in the regression of  $SOE_i = \mathbf{X}'_i\boldsymbol{\beta} + \varepsilon_i$ . This suggests that the method attains identification from nonspherical errors, rather than exclusion restrictions. The downside of the method, however, is that it is more inefficient compared with 2SLS given that identification is obtained from a second-order relationship. Proceeding with the *GINI* regression in the first stage, our  $\mathbf{W}$  includes the dummy variables for oil producers and small islands, and democracy and urbanization in 1970.<sup>36</sup> The  $\mathbf{W}$  vector can also include standard IVs with desirable properties, hence we include the dummies indicating construction differences in *GINI*, in this stage as well. It turns out that in this regression urbanization in 1970 generates the heteroskedastic residuals needed for the unbiased and consistent estimation, with the Breusch–Pagan test confirming heteroskedasticity at the 5% level. This heteroskedastic distribution is clear in Figure 3, where lower levels of urbanization are associated with higher variance in *GINI*, and vice versa.<sup>37,38</sup> Table 5, which displays the results for the SOE equation, lends support to our main result that nonright-wing governments are associated with larger SOE sector, and that this effect is nonlinear in inequality. The said effect is statistically significant at conventional levels using *SOEGDP* as the dependent variable, although regressions using *SOEINV* yield

<sup>36</sup>As the Lewbel method is immune to the exclusion restrictions issue, we also include in the first-stage dummies for former colony, landlocked country and British and French legal system as other possible determinants of *GINI* (as a result of which those variables will be included in the main SOE equation in the second stage too).

<sup>37</sup>The heteroskedasticity result is robust to the exclusion of democracy in 1970 from the first stage. One question that might arise can be whether urbanization in 1970 is exogenous in the SOE equation. The time frame considered, the established fact that countries of different urbanization levels had large SOE sectors, as well as other control variables included in the regression pertaining to time-invariant country-fixed characteristics all suggest that exogeneity of urbanization in 1970 to SOE size seems to be a plausible assumption in this exercise.

<sup>38</sup>This picture is not particularly surprising given that lower levels of urbanization would be associated with a handful of sectors (primarily agriculture) leading to very high or very low income inequality depending on who owns the factor endowments (primarily land). On the other hand, higher levels of urbanization would mean less concentrated sectoral structure, where factor ownership may be relatively more spread over larger segments in the population.



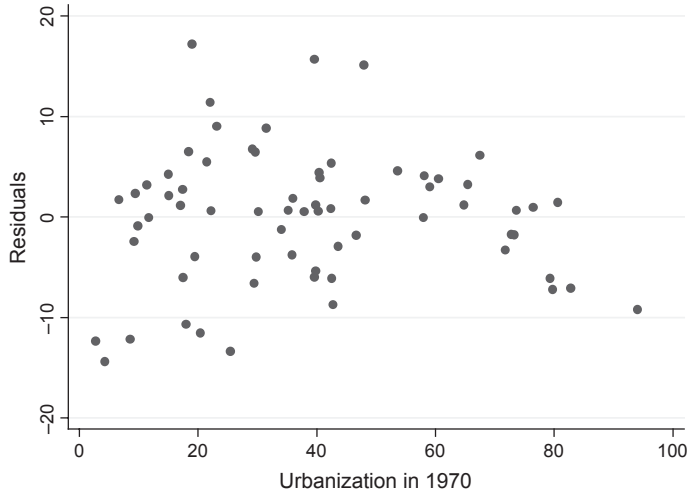


Figure 3. Residuals of Income Gini and Urbanization in 1970.

higher standard errors, but no *t*-statistic is lower than 1 and the coefficients still possess the same signs as in the case of other dependent variables.

Table 6 presents the panel data results using 2SLS. Our panel dataset brings together a collection of cross-sectional data sets with short time windows (i.e., each covering 5-yearly time periods). Noting that we are able to use only *SOEINV* as the dependent variable, the positive relationship with left-wing orientation in the government ideology and the SOE sector and that this relationship varies nonlinearly across the inequality observations, are robustly mimicked with the panel data. The same effect is also shown robustly for governments of the unspecified wing. On the other hand, the evidence is, while still statistically strong, linear for center-wing governments. Similarly, the stand-alone effects of *GINI* and *GINI*<sup>2</sup> are strongly significant, pointing out to the nonlinear direct effect consistent with Tables 3b and c.<sup>39</sup>

### 4.3 SOEs and Employment Protection

Pagano and Volpin (2005) analyze the political determinants of investor and employment protection. They find that proportional (vs. majoritarian) electoral systems, political ideology of the government, and origin of the legal system explain cross-country differences

<sup>39</sup>Policy-makers may tend to be responsive to certain popular concerns regardless of whether they are democratically elected or not. One could, however, plausibly counter that there certainly might be a significant difference in degree if not in kind between dictatorial and democratic policy-makers. To investigate this claim in the context of the SOE sector as a means of income transfer to specific segments of the population, we also explored the following relationship using both cross-sectional and panel data:

$$SOE_i = \gamma_1 + \gamma_2 GINI_i + \gamma_3 GINI_i^2 + \gamma_4 DEMOC_i + \gamma_5 DEMOC_i \times GINI_i + \gamma_6 DEMOC_i \times GINI_i^2 + \lambda Z_i + v_i, \quad (2)$$

where *DEMOC* is civil liberties. The 2SLS regressions provide robust evidence that at levels of Gini observations below 35 (i.e., at relatively low levels of inequality) and above 50 (i.e., at relatively high levels of inequality) an extension of democratic rights (that is a decrease in *DEMOC*) leads to a larger SOE sector, whereas at intermediate levels of inequality the opposite occurs. The results are available upon request.

TABLE 5. SOE, POLITICAL IDEOLOGY, INCOME INEQUALITY – IDENTIFICATION THROUGH HETEROSKEDASTICITY

Dependent variable	(1) SOEGDP	(2) SOEINV
Gini	4.410** (2.021)	1.007 (1.384)
Gini <sup>2</sup>	-0.0475*** (1.971)	-0.0111 (1.444)
Right wing × Gini	-8.593** (2.381)	-1.505 (1.074)
Right wing × Gini <sup>2</sup>	0.102** (2.318)	0.0172 (1.052)
Right wing	156.5** (2.350)	29.33 (1.072)
Civil liberties 1970	2.286** (2.098)	0.345 (0.989)
Oil exporter	17.06* (1.692)	2.780** (2.462)
Small Island	-0.858 (0.190)	-0.829 (0.872)
Urbanization 1970	0.115 (1.572)	-0.0250 (1.105)
Colony	-2.635 (0.643)	-0.177 (0.174)
Landlocked	-4.055 (1.136)	-0.212 (0.142)
British Leg. Sys.	-3.571 (1.155)	-0.563 (0.394)
French Leg. Sys.	-9.323*** (3.225)	-1.593 (1.184)
Constant	-87.79* (1.811)	-11.94 (0.754)
Observations	68	62
Hansen's J ( <i>p</i> -value)	0.36	0.72

Note: Absolute value of the robust *t*-statistics in parentheses. \*\*\**p* < 0.01, \*\**p* < 0.05, \**p* < 0.1. Estimations carried out using Lewbel's (2012) "Identification Through Heteroskedasticity" method.

in employment protection. Furthermore, once the electoral systems and legal origins are controlled for, the political ideology of the government ceases to have explanatory power (see also Botero *et al.*, 2004 for regulation of labor). As SOEs have long been argued to be instruments for the creation of secure employment, we include the Pagano–Volpin variables in our models to check for this effect. As shown in Table 7, these variables do not change our main results related to left-wing and unspecified-wing governments.<sup>40</sup>

## 5. CONCLUSIONS

Despite several decades of privatization, state-owned enterprises still account for relatively high levels of economic activity in most developing economies. Using cross-country and panel datasets, we document a number of empirical regularities

<sup>40</sup>Our results also show that the British legal system and in one case the German legal system are associated with higher SOE shares in the economy (with respect to the French legal system). This seems to contradict Pagano and Volpin (2005) (who use the OECD data), as they find that these legal systems are associated with lower employment protection. However, different models and different country compositions in the datasets can explain the differing findings.

TABLE 6. PANEL (POOLED CROSS-SECTIONS) RESULTS – GMM ESTIMATION

Dependent variable	SOEINV
	(1)
Gini	0.294 (3.74)***
Gini <sup>2</sup>	-0.003 (3.14)***
Left wing	-1.864 (0.79)
Center wing	-7.775 (2.24)
Unspecified wing	-12.349 (3.79)
Left wing × Gini	0.266 (2.42)**
Center wing × Gini	0.432 (2.53)**
Unspec. wing × Gini	0.653 (4.37)***
Left wing × Gini <sup>2</sup>	-0.004 (3.23)***
Center wing × Gini <sup>2</sup>	-0.005 (2.36)
Unspec. wing × Gini <sup>2</sup>	-0.008 (4.52)***
Lagged civil liberties	0.751 (14.95)***
Oil exporter	2.842 (13.3)***
Small Island	-0.112 (0.88)
Lagged urban Pop.	-0.419 (1.97)**
Constant 1980	-1.129 (0.68)
Constant 1985	-2.372 (1.40)
Constant 1990	-2.940 (1.74)*
Constant 1995	-4.117 (2.47)**
Constant 2000	-5.382 (3.24)***
No. of Observations	231
Hansen's J ( <i>p</i> -value)	0.97

Note: Absolute value of robust *t*-statistics in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

regarding the SOEs and suggest some explanations of these findings. The main regularity we discover concerns the shape of the relationship between the size of the SOE sector and the level of income inequality: at low levels of inequality, increases in it are positively linked to the size of the SOE sector, whereas at high levels of inequality the reverse is true. We also find strong evidence that left-wing (as opposed to right-wing) governments are associated with larger SOE sectors in countries with higher inequality. Furthermore,

TABLE 7. SOES AND EMPLOYMENT PROTECTION – CROSS-SECTIONAL DATA – 2SLS ESTIMATIONS

	Dep Var: SOEGDP		Dep Var: SOEINV	
Constant	67.469 (1.61)	64.888 (1.68)*	22.440 (1.63)	12.140 (0.84)
Gini	-3.493 (1.71)*	-3.290 (1.75)*	-0.778 (1.85)*	-0.443 (1.98)*
Gini <sup>2</sup>	0.042 (1.69)*	0.037 (1.80)*	0.010 (1.82)*	0.006 (1.78)*
Left wing	-131.688 (1.73)*	-139.394 (2.05)**	-31.694 (1.62)	-23.530 (1.14)
Center wing	-297.408 (1.34)	-280.623 (1.72)*	-73.223 (1.29)	-107.515 (2.22)**
Unspecified wing	-92.652 (1.04)	-134.547 (1.77)*	-32.496 (1.47)	-21.855 (0.97)
Left wing × Gini	7.096 (1.90)*	7.089 (2.17)**	1.815 (1.86)*	1.461 (1.93)*
Cen. wing × Gini	-0.155 (1.36)	-0.143 (1.78)*	-0.042 (1.28)	-0.062 (2.15)**
Uns. wing × Gini	5.275 (1.39)	6.586 (1.86)*	1.629 (1.61)	1.140 (1.02)
Left wing × Gini <sup>2</sup>	-0.080 (1.93)*	-0.078 (2.18)**	-0.022 (1.98)*	-0.018 (2.11)**
Cnt wing × Gini <sup>2</sup>	-0.155 (1.36)	-0.143 (1.78)*	-0.042 (1.28)	-0.062 (2.15)**
Uns. wing × Gini <sup>2</sup>	-0.066 (1.64)	-0.074 (1.90)*	-0.019 (1.70)*	-0.013 (1.04)
Oil exporter	20.971 (2.37)**	19.039 (1.95)*	2.707 (3.36)***	3.160 (3.39)***
Civil Lib. 1970	1.606 (1.37)	2.352 (1.98)*	0.131 (0.42)	
Small Island	-6.539 (0.83)		-2.422 (1.35)	-2.823 (3.09)***
Urban Pop. 1970	0.072 (0.84)		-0.026 (0.81)	
British legal origin	3.232 (0.72)		2.425 (2.00)*	1.923 (2.00)*
German legal Orig.	3.805 (0.76)		1.380 (1.15)	
Scandinavian Leg.	2.235 (0.44)		-0.054 (0.04)	
Proportionality	0.302 (0.17)		0.314 (0.63)	0.302 (0.17)
Tenure of Democ.	-0.035 (0.29)		-0.015 (0.38)	-0.035 (0.29)
Comp. of Democ.	-1.128 (0.74)		-0.286 (0.73)	-1.128 (0.74)
Observations	56	61	53	56
Hansen's J	0.34	0.24	0.33	0.46
Wald's test		0.17		0.43

Note: Absolute value of the robust  $t$ -statistics in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Hansen's J:  $p$ -value for the heteroskedasticity-consistent Sargan test for overidentifying restrictions, with the null hypothesis being that the restrictions are valid. Wald test:  $p$ -values of the F-statistic for joint insignificance of the eliminated control variables, with the null hypothesis referring to joint insignificance.

the political ideology channel also works in a nonlinear fashion, whereby left-wing governments tend to use SOEs at a decreasing rate. These results are robust in relation to use of cross-sectional vs. panel data, econometric methods, and control variables used. Our findings call for a more nuanced understanding of the deep relationship between the size of the SOE sector and inequality as mediated through other political institutions.

TABLE A1. COUNTRIES IN THE SAMPLE

WB code	Country	WB code	Country	WB code	Country
DZA	Algeria	GHA	Ghana	PAK	Pakistan
ARG	Argentina	GRC	Greece	PAN	Panama
AUT	Austria	GTM	Guatemala	PRY	Paraguay
BGD	Bangladesh	GIN	Guinea	PER	Peru
BEL	Belgium	GUY	Guyana	PHL	Philippines
BOL	Bolivia	HND	Honduras	PRT	Portugal
BWA	Botswana	IND	India	SEN	Senegal
BRA	Brazil	IDN	Indonesia	SLE	Sierra Leone
BDI	Burundi	ITA	Italy	ZAF	South Africa
CMR	Cameroon	JAM	Jamaica	ESP	Spain
CAF	Central Afr. Republic	KEN	Kenya	LKA	Sri Lanka
CHL	Chile	KOR	South Korea	SDN	Sudan
COL	Colombia	MDG	Madagascar	TZA	Tanzania
CRI	Costa Rica	MWI	Malawi	THA	Thailand
CIV	Cote d'Ivoire	MYS	Malaysia	TTO	Trinidad and Tobago
DNK	Denmark	MLI	Mali	TUN	Tunisia
DOM	Dominican Republic	MRT	Mauritania	TUR	Turkey
ECU	Ecuador	MUS	Mauritius	GBR	United Kingdom
EGY	Egypt, Arab Rep.	MEX	Mexico	USA	United States
SLV	El Salvador	MAR	Morocco	URY	Uruguay
FRA	France	NPL	Nepal	VEN	Venezuela
GMB	Gambia, The	NER	Niger	ZMB	Zambia
DEU	Germany	NGA	Nigeria		

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