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## **Income Inequality, Democracy, and Public Sector Size: Supplementary Analysis**

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FINAL PROOF

## SECTION A: Indicators of Institutional Democracy

**Table A1.** Polity IV Coding and Scale Weight

Authority Coding	Scale Weight
Competitiveness of Executive Recruitment	
Transitional	+1
Election	+2
Openness of Executive Recruitment	
Dual/election	+1
Election	+1
Constraint on Chief Executive	
Substantial limitations	+2
Intermediate category	+3
Executive parity or subordination	+4
Competitiveness of Political participation	
Factional	+1
Transitional	+2
Competitive	+3

*Note:* Excerpted from Marshall and Jagers 2000, p.14

In Marshall and Jagers's criteria, in order to reach the full score for each sub-component of their index, chief executives should be determined on the basis of institutionalized procedures of selection and recruitment, independent of the current regime. Subordinates should have equal opportunities to become superordinates through competitive elections where two or more independent candidates run for office (*competitiveness of executive recruitment*). The recruitment for chief executives should be open to all members of the relevant politically active population and chief executives should be determined by

designation and competitive election (*openness of executive recruitment*). There should also exist "accountability groups" who can monitor and check whether the decision-making authorities follow existing decision rules (*constraint on chief executive*). Lastly, electorates should be able to have preferences for alternative policies and parties, and secular competing political groups or organizations also should be able to pursue their own agenda free of coercion or disruption (*competitiveness of participation*) (Marshall and Jagers 2000:21–36)

## SECTION B: Regression Results Employing Different Estimation Strategies

**Table B1.** Unstandardized Coefficients from the Fixed Effects Models and the Generalized Linear Model of Income Inequality (the Gini) on Selected Independent Variables: 64 Countries, 1970 to 1994

	Fixed Effects Models			Generalized Linear Models			
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)
Population Increase	0.072 (0.64)	0.052 (0.47)	0.004 (0.04)	0.261 (2.05)*	0.146 (1.10)	0.284 (2.44)*	0.160 (1.28)
Labor Force Shift	0.262 (2.69)**	0.253 (2.29)*	0.245 (2.20)*	0.071 (0.79)	0.125 (1.47)	0.021 (0.26)	0.080 (1.03)
Sector Dualism	-0.110 (1.25)	-0.114 (1.12)	-0.127 (1.26)	0.019 (0.20)	0.016 (0.18)	0.050 (0.60)	0.045 (0.54)
School Enrollment	-0.087 (3.04)**	-0.091 (3.14)**	-0.096 (3.28)**	-0.105 (3.02)**	-0.093 (2.73)**	-0.103 (3.18)**	-0.090 (2.83)**
Year	0.218 (4.90)***	0.247 (4.82)***	0.192 (3.46)***	0.202 (3.10)**	0.197 (3.28)**	0.191 (3.05)**	0.189 (3.17)**
Type of Income Sources <sup>a</sup>							
Income (revenue)	6.254 (3.74)***	6.998 (4.24)***	7.035 (4.21)***	6.031 (3.55)***	6.220 (3.91)***	6.131 (3.89)***	6.241 (4.24)***
(ref.: expenditure)							
Gross income	2.316 (1.43)	1.671 (1.05)	1.770 (1.09)	2.031 (1.24)	2.245 (1.38)	1.732 (1.12)	1.890 (1.25)
(ref.: net income)							
Household income	0.207 (0.28)	0.795 (1.06)	0.704 (0.94)	0.505 (0.44)	0.717 (0.63)	0.632 (0.55)	0.969 (0.85)
(ref.: individual income)							
GDP per capita (log)		8.363 (1.23)	13.105 (1.91)	15.012 (2.26)*	11.896 (1.98)*	14.562 (2.35)*	11.875 (2.09)*
(GDP per capita) <sup>2</sup>		-0.622 (1.59)	-0.983 (2.48)*	-0.891 (2.08)*	-0.727 (1.90)*	-0.862 (2.14)*	-0.734 (2.02)*
Gov. Tax Revenue	0.610 (2.40)*	0.543 (2.16)*	0.487 (1.93)	0.658 (2.48)*	0.605 (2.31)*	0.372 (2.54)*	0.323 (2.23)*
(Gov. Tax Revenue) <sup>2</sup>	-0.012 (2.60)**	-0.011 (2.41)*	-0.011 (2.33)*	-0.013 (2.53)*	-0.012 (2.41)*		
Democracy Dummy						7.892 (2.50)*	6.590 (2.15)*
(Dem. Dummy)*(Revenue)						-0.465 (2.90)**	-0.416 (2.63)**
FDI stock/ GDP (log)		2.765 (3.34)***		2.775 (2.34)*	2.849 (2.37)*	3.005 (2.67)**	3.142 (2.75)**
FDI stock per capita (log)			-1.340 (0.34)				
(FDI stock per capita) <sup>2</sup>			0.448 (1.05)				
Semi periphery country				-0.604 (0.27)		0.417 (0.20)	
Periphery country				1.463 (0.53)		2.103 (0.82)	
Africa					2.424 (1.18)		1.813 (0.92)
Asia					-4.828 (2.36)*		-4.424 (2.31)*
Latin America					4.860 (2.45)**		4.853 (2.61)**
Constant	-407.718 (4.60)***	-491.070 (4.44)***	-392.508 (3.31)**	-437.172 (3.04)**	-414.475 (3.11)**	-414.178 (3.05)**	-395.729 (3.05)**
R <sup>2</sup>	0.404	0.444	0.454	—	—	—	—
Number of Cases <sup>b</sup>	341(64)	341(64)	341(64)	341(64)	341(64)	336(62)	336(62)

Note: Absolute value of z statistics in parentheses. GDP = gross domestic product.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$  (two-tailed tests).

<sup>a</sup> Dummy variables are included to control for the fact that the Gini coefficients used in these analyses are based on three different income sources. If the Gini coefficient is based on income (revenue), the first dummy measured is coded 1, and it is 0 otherwise. Similarly, if the Gini is based on gross income, the second dummy is coded 1, etc.

<sup>b</sup> Number of countries in parentheses.

## SECTION C: Sample Selection Problem

**Table C1.** Distribution of the Dependent Variable (Gini Coefficient)

	Mean		Standard Deviation		Minimum		Maximum	
	Dropped	Included	Dropped	Included	Dropped	Included	Dropped	Included
Core	34.48	32.26	5.07	4.18	27.13	22.9	44	43
N	7	147						
Semi Periphery	37.17	37.83	8.24	7.73	27	24.42	50	55
N	13	85						
Periphery	45.35	43.96	9.63	8.22	28.27	28.85	63.18	61.76
N	57	109						

*Note:* Comparison of cases dropped from Deninger and Squire's (1996) dataset with those included in my sample.

Table C1 presents the summary statistics of the cases dropped from Deninger and Squire's (1996) dataset, and the cases included in my current analysis, classified by world system positions. After excluding observations before the 1970s and observations from communist countries, an additional 77 observations were dropped due to missing data on the main independent variables: the internal development variables, government tax revenue, institutionalized democracy, and FDI. Two reviewers raised concerns regarding the sample selection problems, as the absence of the data for some independent variables might be related to bureaucratic inefficiency in collecting and refining necessary information for governing. In response to these concerns, first, I compare the descriptive statistics of the distribution of the dependent variable for the excluded cases with those for the cases that were included in the analyses. Although a considerable number of the missing data

are generated from semi-periphery and periphery countries, the overall distributions suggest that these missing cases do not generate serious selection problems. The mean of the Gini coefficient for the cases dropped from core countries is 34.48 and the standard deviation is 5.07, neither of which is noticeably different from those of the cases included in the analyses. In semi-periphery countries, the mean and the standard deviation for the dropped cases are 37.17 and 8.24, both of which are again very close to those of the included cases. In periphery countries, those for the dropped and the included are very close to each other, as well. The range information (minimum and maximum values) also consistently shows a similar tendency. In addition, the number of observations included for semi-periphery and periphery (N = 193) are still large enough not to worry about the possibility of overrepresentation of advanced industrial countries (N = 147).<sup>1</sup>

<sup>1</sup> I used multiple imputation techniques (Little and Rubin 1987; Shafer 1997) to impute values for cases that were missing, using the SAS MI (MIANALYZE) procedure. I then reanalyzed the imputed data, comparing the results to those listed in the text. The results are consistent with those reported in the text. All main theoretical variables are statistically

significant after conducting multiple imputations, which suggests that missing data from key theoretical variables are 'ignorable' (Allison 2002). In other words, the probability of having missing data on the income inequality is not systematically related to the lower or higher values on the income inequality variable, controlling for other covariates.

## SECTION D: Analyses based on Government Spending

**Table D1.** Different Measures of Government Size and their Correlations with Income Inequality

Correlations	Overall	Institutional Democracies	Non- or Limited Democracies <sup>a</sup>
Between the Gini Index and Government Tax Revenue (World Bank: Central Gov't only) <sup>b</sup>	-0.4295 (N=336)	-0.5102 (N=216)	0.3185 (N=120)
Between the Gini and General Government Total Revenue <sup>c</sup> (United Nations National Accounts)	-0.5821 (N=237)	-0.5532 (N=182)	0.2406 (N=55)
Between the Gini and Total Expenditure (World Bank: Central Government only)	-0.3862 (N=336)	-0.4874 (N=216)	0.1583 (N=120)

<sup>a</sup> The correlation is based on Model 10 in Table 2 in the text, where France and Trinidad are dropped from the analysis.

<sup>b</sup> All measures from the World Bank are collected at the level of central government only.

<sup>c</sup> This measure derived from United Nations National Accounts (various years) covers both central and local levels. There is, however, serious sample reduction in developing countries in case of using this measure, thereby over-representing rich OECD countries.

Several reviewers asked me to provide spending analysis as a complement to the revenue analysis presented in the text. I respond to the comment by presenting two tables; one with the bivariate correlation coefficients between income inequality and various measures of government size, and the other with regression results of income inequality on total central government spending. The first row of Table D1 is based on the same dataset I have used in this article. The current government tax revenue has a strong negative relationship with income inequality in institutionalized democracies, while it has a positive relationship with inequality in non- or limited democracies, as I proposed and demonstrated. The correlation reported in the second row is based on the data drawn from United Nations National Accounts (various years). In spite of its ideal coverage of the levels of government (both central and local), the dataset seriously under-represents non-

or limited democracies. However, the same pattern of relationship is evident as when using central government data only. Even though it includes just 55 cases (16 countries) for non- or limited democracies, the correlation between the Gini coefficient and general government revenue is moderately positive, while the correlation for democracies is strongly negative.<sup>2</sup> These results suggest that, regardless of the level of measurement used, the main theoretical framework holds. The third row reports the correlation between the central government spending and income inequality by the democracy indicator. The data coverage is exactly the same as that of revenue-side measure (for both countries and years). The government spending is negatively correlated with income distribution for democracies, while it is positively related with the Gini index for non- or limited democracies.

<sup>2</sup> I am aware of the possibility that public sector size in those countries with federal systems (especially the U.S., India, Germany, and possibly Sweden and Canada where local governments administer social welfare polices) may be significantly underestimated in my sample. Therefore, as shown in Table D1, it is

important to check whether the proposed argument is tenable with this smaller sample covering both central and local levels. The correlation between current tax revenue of central government (first row, World Bank) and total revenue of general government (second row, United Nations) is 0.776.

**SECTION D** (continued)

Table D2 presents the results of regression analyses for spending data. Models 1 to 6 in Table D2 correspond to Models 3, 5, and 6 in Table 1 and Models 10, 11, and 12 in Table 2 in my *ASR* February 2005 article. The polynomial function of government spending is marginally significant in Model 1 where influential outliers are eliminated,<sup>3</sup> and is still significant controlling for FDI, world system positions, and regional dummies in Models 2 and 3. Models 4 to 6 present the results based on the interaction model. As demonstrated in the analyses of correlations in Table D1, the positive effects of government spending on inequality captured by the linear term (0.17 to 0.18) are a bit smaller than those of the revenue-side analyses in Models 10 to 12 (0.33 to 0.42) in

Table 2 of my *ASR* article.<sup>4</sup> However, the proposed positive and negative relationships of government size on inequality, conditional on the presence of an institutionalized democracy, are highly significant and robust across different specifications. Regardless of the presence of FDI, world system position, or region-specific dummies, the three terms for the interaction model consistently show the same results as reported in the revenue analysis. Therefore, I conclude that the spending-side analysis of the relationship between public sector size and income inequality offers additional support to my argument that the public sector development has positive as well as negative effects on income inequality, depending upon the institutionalization of democracy.

*(Table on next page.)*

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<sup>3</sup> In the curvilinear model (models 1 to 3), six extremely outlying observations (Egypt 1975, 1991, Pakistan 1986, 1988, Jordan 1980, Nepal 1984) are identified and eliminated based on several diagnostic procedures such as Studentized residuals, Cook's D, Dfbeta, Welsch's W and Dffits (Belsley, Kuh, and Welsch 1980; Bollen and Jackman 1985b). Unduly influential observations from Trinidad and France (5 observations) regarding the interaction model are also dropped from models 4 to 6, following the same criteria employed in the main text.

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<sup>4</sup> Some might wonder why the positive relationship between the government size and income inequality is a little weaker when using the expenditure-side measure for the government size. This is, first, because the states in non- or limited democracies are more dependent upon revenue-side tax policies in sponsoring their clients, core industries, and public sector employees. Second, on the expenditure-side, government debt (interest payment) and military spending obscure the proposed relationship between government size and inequality, especially in non- or limited democracies.

**SECTION D** (continued)**Table D2.** Unstandardized Coefficients from the Random-Effects GLS Regression of Income Inequality (the Gini) on Total (Central) Government Spending: 336 Cases, 1970 to 1994

	Curvilinear Models			Interaction Models		
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Population Increase	0.229 (2.90)**	0.158 (2.01)*	0.059 (0.79)	0.284 (3.58)***	0.218 (2.78)**	0.111 (1.49)
Labor Force Shift	0.103 (1.33)	0.072 (0.96)	0.110 (1.55)	0.056 (0.75)	0.018 (0.24)	0.061 (0.90)
Sector Dualism	0.019 (0.25)	0.045 (0.62)	0.057 (0.85)	0.039 (0.53)	0.064 (0.91)	0.082 (1.26)
School Enrollment	-0.099 (3.67)***	-0.099 (3.81)***	-0.082 (3.29)**	-0.107 (4.12)***	-0.110 (4.33)***	-0.092 (3.80)***
Year	0.236 (6.64)***	0.200 (5.29)***	0.192 (5.59)***	0.236 (6.73)***	0.195 (5.18)***	0.193 (5.63)***
Type of Income Sources <sup>a</sup>						
Income (revenue) (ref.: expenditure)	5.457 (3.78)***	5.850 (4.21)***	5.923 (4.52)***	5.362 (3.86)***	5.949 (4.42)***	6.240 (4.88)***
Gross income (ref.: net income)	3.162 (2.37)*	3.014 (2.34)*	3.523 (2.89)**	2.721 (2.11)*	2.034 (1.62)	2.058 (1.77)*
Household income (ref.: individual income)	0.195 (0.26)	0.346 (0.49)	0.570 (0.82)	0.754 (1.05)	1.025 (1.46)	1.292 (1.89)*
GDP per capita (log)	19.549 (4.28)***	15.911 (3.39)***	13.245 (3.25)**	17.969 (3.93)***	13.657 (2.92)**	11.165 (2.74)**
(GDP per capita) <sup>2</sup>	-1.167 (4.25)***	-0.978 (3.37)***	-0.846 (3.40)***	-1.063 (3.84)***	-0.817 (2.82)**	-0.697 (2.80)**
Government Spending	0.291 (2.02)*	0.272 (1.95)	0.295 (2.19)*	0.178 (2.98)**	0.176 (3.06)**	0.169 (3.07)**
(Government Spending) <sup>2</sup>	-0.005 (2.11)*	-0.005 (2.34)*	-0.005 (2.63)**			
Democracy Dummy				6.196 (3.33)***	6.365 (3.51)***	5.651 (3.28)**
(Dem. Dummy)*(Expenditure)				-0.238 (3.28)**	-0.275 (3.89)***	-0.282 (4.20)***
FDI stock/ GDP (log)		3.771 (4.86)***	3.804 (5.08)***		3.311 (4.36)***	3.454 (4.71)***
Semi periphery country		-0.841 (0.37)			0.405 (0.18)	
Periphery country		1.446 (0.61)			2.445 (1.02)	
Africa			3.175 (1.57)			2.119 (1.05)
Asia			-5.168 (2.65)**			-4.815 (2.45)*
Latin America			4.322 (2.42)*			5.069 (2.91)**
Constant	-516.674 (6.53)***	-430.769 (5.11)***	-403.952 (5.39)***	-512.592 (6.54)***	-413.661 (4.94)***	-397.440 (5.32)***
R <sup>2</sup>	0.686	0.682	0.754	0.705	0.715	0.781
Rho	0.782	0.784	0.705	0.791	0.778	0.692
Observations	335	335	335	336	336	336
Number of countries	62	62	62	62	62	62

Note: Absolute value of z statistics in parentheses.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$  (two-tailed tests).

<sup>a</sup> Dummy variables are included to control for the fact that the Gini coefficients used in these analyses are based on three different income sources. If the Gini coefficient is based on income (revenue), the first dummy measured is coded 1, and it is 0 otherwise. Similarly, if the Gini is based on gross income, the second dummy is coded 1, etc.

**SECTION E: Regression Results of Income Inequality on Additional Covariates**

Table E1 presents additional regression results to respond to some concerns (mainly about additional control variables) raised by reviewers. First, in Models 1 and 2 in Table E1, not only FDI but also trade openness, measured as exports and imports of goods and services as a % of GDP (logged), is included as another dimension of globalization in addition to FDI. One reviewer wondered about the generalizability of the main findings, addressing the possibility that globalization dynamics overwhelm the impact of state spending on income inequality in developing countries, while being overwhelmed by the impact of spending on inequality in developed countries. In a similar vein, another reviewer raised the question that globalization dynamics work as a third factor that nullify (for developing countries) or replace (for developed countries) the proposed relationship between the public sector size and income inequality. However, the curvilinear relationship of inequality with public sector size is still impressive enough to exclude any possibility that globalization might affect both the public sector size and income inequality unevenly or uniformly. Both the polynomial and the interaction models (Models 1 and 2) are highly significant in the presence of trade openness. I also tested the effect of trade openness on income inequality without FDI and regional dummies, but the openness variable was insignificant in any model including my key theoretical variables. These results lend convincing support to my claim that public sector development is positively associated with inequality in non- or limited democracies, while it is negatively associated with inequality in institutionalized democracies, independent of general internal development, globalization dynamics, world system

positions, and region-specific indicator variables.<sup>5</sup>

Second, the sensitivity analyses in Models 3 and 4 aim to demonstrate that my theoretical models and empirical evidence account for a few long-established democracies that have recently experienced resurgent rising income inequality due to globalization or deindustrialization (Alderson and Nielsen 1999). Models 3 and 4 report regression results without two countries, the United Kingdom and the United States, both of which have been quoted as representative countries showing the so-called “Great-U turn” (Harrison and Bluestone 1988; Alderson and Nielsen 2002) in income inequality trends.<sup>6</sup> The coefficients of public sector size for both the polynomial model and the interaction model are diminished slightly due to the loss of observations (N = 42) on the decreasing portion of the curve (or the negative slope for the interaction term), while all relevant coefficients are still highly significant in the presence of the full set of controls used in Models 6 and 12 in the text. Specifically, the coefficient of the interaction term between the democracy indicator and the government size decreased from -0.442 in Model 12 in Table 2 (in my *ASR* article) to -0.382 in Model 4 in Table E1 following the exclusion of the U.K. and the U.S. observations. This result suggests that the observations from two liberal advanced industrial democracies contribute to the proposed (negative) relationship of income inequality with public sector size. In my model, as most of the variations explained are present in the cross-sections and the variations between these are much bigger than those present in the time-series within units, it is quite proper that the inclusion or exclusion of some advanced industrial countries do not significantly affect the main results.

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<sup>5</sup> This paper is a part of a bigger project where all international factors including FDI, trade openness, and trade dependence measures such as foreign trade structure, export commodity concentration, and export partner concentration suggested by Galtung (1971) were tested against income inequality with domestic economic and political factors. The proposed arguments on the relationship of inequality with public sector size were robust across any set of international factors. As one of the

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reviewers of an earlier draft asked me to remove the globalization/ open-economy portion of analyses, I include only the most commonly used or statistically prominent international factors (FDI, World system positions, and regional dummies) as controls in the current paper.

<sup>6</sup> For the U.K., the Gini index increased from 22.9 in 1977 to 32.4 in 1991, and for the U.S., it increased from 34.16 in 1974 to 38.16 in 1989.

## SECTION E (continued)

However, based on the sensitivity analyses by which different sets of long-established democracies are dropped from the sample, I found that the proposed inverted U-curve relationship or the interaction model adequately captures the recent rising income inequality trends in long-established democracies. Throughout the 1980s, the governments in both the U.S and the U.K. implemented the policies that lowered tax revenue, cut social spending, and favored large businesses and upper classes over unions and lower classes. As a result, the decline in government size led to worse distributional outcomes.<sup>7</sup> Regardless of (or possibly as an intervening factor in) the accelerated globalization dynamics during the same periods, public sector size tends to capture the influence of distributional politics of either right- or left-wing parties on the final income distribution.

In addition, the variation due to increasing within-unit inequality is captured by the ‘year’ variable in the regression equations that was

originally included to control for ‘time-trends.’ Its coefficients are highly significant and positively-signed in all regression models. More specifically, the coefficient of the ‘year’ variable in Model 12 in Table 2 (of my *ASR* article) was 0.188 ( $t = 5.52$ ), but has been reduced to 0.138 ( $t = 3.53$ ) in Model 4 in Table E1 after excluding the U.K. and the U.S from the sample. This result suggests that the resurgent rising income inequality is reasonably controlled for by this variable. The reduction of the size of the coefficient for the year variable is due to the exclusion of the U.K. and U.S. cases from the system that contributed to the highly significant and strong positive effect of the time trend variable on inequality. While this variable is a-theoretical, it plays a role in sorting out the time trend effects that might otherwise have been spread over the other main covariates.

I include unemployment rate in Model 5 and male employment rate in Model 6, both of which were drawn from the World Bank (2002) and were

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<sup>7</sup> One reviewer raised a question of whether the U.S. fits well in the measure of democracy. The reviewer does not consider the United States as one of the fully institutionalized democracies, because she or he thinks that the U.S. lacks real party competition and left alternatives, and therefore the fit between the measure of democracy and the US is not satisfactory. However, it is proper to classify the U.S. as one of the fully institutionalized democracies with other advanced industrial democracies. First, the current democratic institutions and party structure in the U.S. provide electorates with quite a wide range of policy choices, as the Democratic Party arguably provides some components of social democratic alternatives in its electoral agenda. Second, the lack of left alternatives should be accounted for by Americans’ historical and

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cultural roots embedded in individualism, racial conflicts, and conservative Protestantism. In other words, Americans have had choices in terms of alternative policies and parties. They have repeatedly chosen not to use their democratic institutions for the purpose of reducing inequality. For instance, if Roosevelt’s “bold relief” (Amenta 1998) had been maintained and fully developed, we would have been able to find the U.S. in the right end of the inverted U-shaped curve or the decreasing portion of the interaction model with other European welfare states. If Americans choose candidates who favor higher spending on social policies over tax cuts for a handful of the wealthy, the U.S. will begin to move toward the right end of the curve even at this point. Therefore, the U.S. fits well in my model.

**SECTION E** (continued)

suggested as additional controls by one reviewer. With the inclusion of these variables, the sample size is reduced by half ( $N = 164$ ), with missing data generated mostly from non- or limited democracies (64%). The democracy indicator and the interaction term are marginally significant at either the  $\alpha=0.05$  or  $\alpha=0.1$  level. The insignificant coefficient for the proposed positive effect of public sector size in non- or limited democracies is mainly driven by the fact that a significant portion of the missing data came from developing countries or non- or limited democracies. However, the fact that the coefficients for both unemployment rate and male employment

rate were statistically insignificant, even in the sample mainly composed of advanced industrial democracies, calls into question the necessity of including these variables. This result is also consistent with a previous work where unemployment rate is used as one of the covariates predicting income inequality in advanced industrial democracies (Gustafsson and Johansson 1999). As it seems not empirically meaningful to include these variables in the current analyses, and the loss of observations in non- or limited democracies is costly,<sup>8</sup> I exclude these variables in the main analyses.

*(Table on next page.)*

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<sup>8</sup> In addition, statistics on unemployment or employment in developing countries are sometimes highly questionable, as a large number of unemployed

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or non-employed in informal sector is considered employed in their labor force surveys.

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**Table E1.** Unstandardized Coefficients from the Random-Effects GLS Regression of Income Inequality (the Gini) on Additional Covariates: 1970 to 1994

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Population Increase	0.178 (2.30)*	0.196 (2.60)**	0.056 (0.68)	0.063 (0.78)	0.276 (2.13)*	0.275 (2.14)*
Labor Force Shift	0.135 (1.85)*	0.108 (1.56)	0.071 (0.95)	0.039 (0.54)	-0.076 (0.65)	-0.060 (0.52)
Sector Dualism	0.033 (0.48)	0.041 (0.62)	0.072 (1.02)	0.086 (1.26)	0.110 (0.76)	0.103 (0.72)
School Enrollment	-0.086 (3.50)***	-0.082 (3.42)***	-0.077 (2.90)**	-0.074 (2.84)**	-0.100 (2.52)*	-0.085 (2.13)*
Year	0.209 (5.82)***	0.206 (5.88)***	0.144 (3.60)***	0.138 (3.53)***	0.231 (3.76)***	0.241 (3.96)***
Type of Income Sources <sup>a</sup>						
Income (revenue)	5.979 (4.61)***	6.129 (4.83)***	6.578 (4.93)***	6.708 (5.09)***	8.010 (3.87)***	8.123 (3.94)***
Gross income (ref.: net income)	2.291 (1.94)	1.843 (1.58)	1.967 (1.62)	1.528 (1.26)	3.002 (1.39)	2.998 (1.40)
Household income (ref.: individual income)	0.612 (0.90)	0.858 (1.28)	0.469 (0.65)	0.749 (1.04)	-1.951	-2.003 (1.64)
GDP per capita (log)	11.088 (2.58)**	10.791 (2.61)**	12.890 (2.94)**	13.068 (3.09)**		
(GDP per capita) <sup>2</sup>	-0.629 (2.38)*	-0.616 (2.43)*	-0.854 (3.14)**	-0.875 (3.33)***		
Government Tax Revenue	0.544 (2.57)*	0.348 (3.10)**	0.558 (2.62)**	0.295 (2.61)**	0.268 (1.30)	0.282 (1.37)
(Government Tax Revenue) <sup>2</sup>	-0.012 (2.94)***		-0.012 (2.82)**			
Democracy Dummy		7.730 (3.55)***		5.718 (2.56)*	8.213 (2.10)*	8.389 (2.18)*
(Dem. Dum)*(Tax Rev)		-0.480 (4.03)***		-0.382 (3.13)**	-0.427 (1.93)	-0.447 (2.04)*
FDI stock (% of GDP)	1.796 (2.03)*	2.090 (2.36)*	2.831 (3.60)***	3.114 (3.93)***		
Trade Openness	0.367 (0.42)	0.290 (0.35)				
Unemployment					-0.060 (0.62)	
Male Employment						0.037 (0.40)
Africa	3.077 (1.40)	2.258 (1.06)	2.653 (1.26)	2.013 (0.97)		
Asia	-4.169 (2.00)*	-3.781 (1.86)	-4.901 (2.46)*	-4.782 (2.44)*		
Latin America	5.939 (3.25)**	5.983 (3.43)***	4.801 (2.66)**	4.828 (2.75)**		
Constant	-438.757 (5.55)***	-430.245 (5.60)***	-306.083 (3.55)***	-292.935 (3.47)***	-425.949 (3.50)***	-451.783 (3.73)***
R <sup>2</sup>	0.761	0.788	0.757	0.787	0.700	0.703
Rho	0.735	0.703	0.704	0.665	0.864	0.860
Observations	333	328	299	294	162	164
Number of countries	64	62	62	60	39	39

Note: Absolute value of z statistics in parentheses.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$  (two-tailed tests).

<sup>a</sup> Dummy variables are included to control for the fact that the Gini coefficients used in these analyses are based on three different income sources. If the Gini coefficient is based on income (revenue), the first dummy measured is coded 1, and it is 0 otherwise. Similarly, if the Gini is based on gross income, the second dummy is coded 1, etc.

**SECTION F: Testing an Alternative Measure of Democracy: Bollen's Index of Liberal Democracy**

In Table F1, I test whether a popular measure of democracy, Bollen's (1998) index of liberal democracy [1972-1988], operate in my analytical framework in a similar manner to Marshall and Jagers' index of institutional democracy. I enumerated in the text that Marshall and Jagers' index was chosen to devise an indicator (0,1) variable and the choice was made on a theoretical basis putting more emphasis on the degree of democratization of state institutions than on the existence of broader civil liberties and rights. Nevertheless, some readers might still want to see more discussions of the following issues: (1) If different specifications were used, would the proposed interaction effects of democracy with public sector size on inequality still be viable? (2) Are other popular measures of democracy, e.g. Bollen's, also non-significant in Model 7 in the text? (3) Given that Bollen's measure of liberal democracy is highly correlated with Marshall and Jagers' measure of institutional democracy (Correlation coefficient = 0.89), what impacts would liberal democracy have on the relationship between public sector size and income inequality?

Model 1 tests whether the proposed curvilinear relationship still operates in this smaller dataset in which some countries and years are dropped in the process of incorporating Bollen's index of liberal democracy.<sup>9</sup> Both linear and squared terms are highly significant. In Models 2 and 3, I test whether Bollen's index of liberal democracy has either a linear or a curvilinear effect on democracy. As I contended, democracy as a continuum is not associated with income inequality in any meaningful way in both linear and polynomial models. Model 4 tests whether a dichotomous measure based on Bollen's liberal

democracy has the same conditional effect on the relationship between public sector size and income inequality, controlling for internal development models and the polynomial function of GDP per capita. Substantially, this model hypothesizes that highly institutionalized democracy coexists with a fairly high level of civil rights. To generate an indicator variable from the continuous measure of democracy, I conducted sensitivity analysis, testing several dummy variables and their interactions with public sector size. If the index of liberal democracy (range: 0 to 100) is bigger than 80, the indicator variable for highly liberal democracy is 1, otherwise 0. In model 4, all three terms of the interaction model -- a linear term for public sector size, an indicator variable for liberal democracy, and an interaction term between the two -- are included. The results show that two of the three terms are statistically significant at  $\alpha=0.05$  level. The interaction term reverses the coefficient of the linear term for the public sector size as hypothesized. However, in Models 5, the effect of the interaction term is considerably reduced when tested with other international factors, foreign direct investment, and region specific dummies. This result can be interpreted as indicating the weaker impacts of liberal democracy on converting the effects of public sector expansion on inequality. However, with the smaller sample size ( $N = 251$ ) than the one used in the text ( $N = 336$ ) being considered, a direct comparison between two results is of questionable validity. Even if the effect is weaker than the one in the text, a very similar pattern of the relationship among public sector size, democracy, and income inequality can be found by testing Bollen's measure of liberal democracy.

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<sup>9</sup> Bollen's index of liberal democracy just covers 1972 to 1988, while the dataset used in the text covers 1970 to 1994. The index also does not cover some countries included in the analysis in the text. 7 countries are completely dropped from the original dataset: Bolivia, Botswana, Ecuador, Kenya, Madagascar, Nicaragua, and Zimbabwe. In addition, unduly influential observations

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from Trinidad have been identified and eliminated based on several diagnostic procedures such as Cook's D, Dfbeta, Welsch's W and Dffits (Belsley, Kuh, and Welsch 1980; Bollen and Jackman 1985b) from models 1 to 5 (France is now included in the dataset, as Bollen's index rates France as having a fairly high level of liberal democracy).

**SECTION F** (continued)

In brief, it turns out that two measures of democracy, Bollen's liberal democracy and Marshall and Jagers' institutional democracy, are highly correlated and generate very similar outcomes in my analytical frameworks.

Nevertheless, I chose Marshall and Jagers' measure for the following reasons: (1) I put more theoretical emphasis on the democratization of state bureaucracy in explaining the relationship between public sector and income inequality; and (2) Marshall and Jagers' index covers larger numbers of observations across countries and over time.

Models 6 to 7, following a reviewer's suggestion, reintroduce the continuous measure of institutional democracy along with the dummy variable for democracy and the interaction term between democracy and public sector size. The main interaction models are not influenced by the inclusion of this linear term. I infer that the reviewer wanted to see whether democracy variable becomes significant after sorting out the proposed

conditional effects. The results, however, reconfirm my argument that democracy operates only as a conditional factor and does not affect income inequality directly on its own.

NOTE: Following a reviewer's suggestion, I have also checked other measures of income inequality against the same set of selected independent variables. With the information on quintiles from Deninger and Squire's (1996) dataset, I have constructed different ratios of the income share of top quintile divided by the income share of bottom 20%, bottom 40%, and bottom 80%, respectively. Overall, the results are no less impressive than those based on the Gini index. The tests of different measures of income inequality against the same set of covariates offer additional convincing support to my arguments that public sector size has a positive as well as a negative relationship with income inequality, depending on the institutionalization of democracy.

**Table F1.** Unstandardized Coefficients from the Regression of Income Inequality (the Gini) on Bollen's Index of Liberal Democracy and Alternative Specifications Not Shown in the Text

	Testing Bollen's Index of Liberal Democracy					Alternative Specifications	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Population Increase	0.293 (3.46)***	0.235 (2.74)**	0.236 (2.77)**	0.256 (3.03)**	0.154 (1.87)	0.348 (4.47)***	0.209 (2.77)**
Labor Force Shift	0.200 (2.57)*	0.156 (2.07)*	0.151 (1.99)*	0.184 (2.37)*	0.164 (2.26)*	0.070 (0.94)	0.074 (1.05)
Sector dualism	-0.058 (0.74)	-0.022 (0.29)	-0.015 (0.20)	-0.075 (0.95)	-0.011 (0.15)	0.020 (0.27)	0.048 (0.71)
School Enrollment	-0.076 (2.62)**	-0.077 (2.62)**	-0.077 (2.63)**	-0.074 (2.57)*	-0.062 (2.23)*	-0.101 (3.92)***	-0.091 (3.70)***
Year	0.200 (4.68)***	0.180 (4.35)***	0.179 (4.27)***	0.184 (4.39)***	0.133 (3.20)**	0.231 (6.67)***	0.175 (5.13)***
Type of Income Sources <sup>a</sup>							
Income (revenue) (ref.: expenditure)	3.583 (2.00)*	3.293 (1.86)	3.265 (1.86)	3.778 (2.12)*	4.241 (2.55)*	5.606 (4.16)***	6.286 (4.90)***
Gross income (ref.: net income)	3.806 (2.60)**	3.519 (2.46)*	3.549 (2.50)*	3.373 (2.30)*	2.896 (2.12)*	2.537 (2.04)*	1.438 (1.23)
Household income (ref.: individual income)	0.035 (0.04)	-0.021 (0.03)	-0.014 (0.02)	0.007 (0.01)	0.202 (0.26)	0.492 (0.69)	0.832 (1.21)
GDP per capita (log)	27.419 (5.47)***	30.136 (6.12)***	30.170 (6.05)***	28.095 (5.71)***	21.256 (4.42)***	18.003 (4.05)***	12.030 (2.83)**
(GDP per capita) <sup>2</sup>	-1.558 (5.09)***	-1.729 (5.76)***	-1.733 (5.69)***	-1.614 (5.39)***	-1.204 (4.06)***	-1.064 (3.94)***	-0.695 (2.66)**
Gov. Tax Revenue	0.581 (2.51)*			0.321 (2.56)*	0.205 (1.61)	0.469 (4.01)***	0.357 (3.13)**
(Gov. Tax Revenue) <sup>2</sup>	-0.011 (2.41)*						

(Table continued on next page.)

**Table F1.** Unstandardized Coefficients from the Regression of Income Inequality (the Gini) on Bollen's Index of Liberal Democracy and Alternative Specifications Not Shown in the Text (continued)

	Testing Bollen's Index of Liberal Democracy					Alternative Specifications	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Democracy Index		-0.016 (1.15)	-0.023 (0.50)			0.171 (1.49)	0.148 (1.35)
(Democracy Index) <sup>2</sup>			0.000 (0.14)				
Democracy Dummy				4.523 (1.84)	3.319 (1.38)	8.210 (3.62)***	6.718 (3.08)**
Dem. Dummy*Rev				-0.332 (2.49)*	-0.264 (1.99)*	-0.499 (3.93)***	-0.442 (3.61)***
FDI stock/ GDP(log)					2.475 (2.98)**		2.867 (3.84)***
Africa					3.635 (1.80)		4.430 (2.44)*
Asia					-1.053 (0.54)		-0.398 (0.20)
Latin America					5.103 (2.97)**		6.636 (4.05)***
Constant	-489.158 (5.27)***	-451.023 (4.94)***	-449.113 (4.84)***	-457.671 (4.97)***	-330.197 (3.61)***	-506.870 (6.57)***	-374.172 (4.93)***
R <sup>2</sup>	0.721	0.718	0.718	0.735	0.780	0.724	0.777
Rho	0.794	0.786	0.772	0.789	0.737	0.758	0.699
Observations	254	254	254	254	254	336	336
Number of countries	56	56	56	56	56	62	62

Note: Absolute value of z statistics in parentheses.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$  (two-tailed tests)

<sup>a</sup> Dummy variables are included to control for the fact that the Gini coefficients used in these analyses are based on three different income sources. If the Gini coefficient is based on income (revenue), the first dummy measured is coded 1, and it is 0 otherwise. Similarly, if the Gini is based on gross income, the second dummy is coded 1, etc.

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