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Labor versus capital in trade-policy: The role of ideology and inequality

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Abstract

Trade policy depends on the extent to which the government wants to redistribute income as well as on a country's overall factor endowments and their distribution. While the government's desire to redistribute income itself is dependent on asset distribution, it is to a large extent also driven by the partisan nature of the government, i.e., whether it is pro-labor or pro-capital. Using cross-country data on factor endowments, inequality and government orientation, we find that, conditional on inequality, left-wing (pro-labor) governments will adopt more protectionist trade policies in capital-rich countries, but adopt more pro-trade policies in labor-rich economies than right-wing (pro-capital) ones. Also, holding government orientation constant, higher inequality is associated with higher protection in capital-abundant countries while it is associated with lower protection in labor-abundant countries. These results are consistent with the simultaneous presence of both inequality as well as ideology as determinants of protection within a two-factor, two-sector Heckscher–Ohlin framework. Overall, various statistical tests support an umbrella model (that combines both the ideology and inequality models) over each of the individual models.

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1. Introduction

An important effect and sometimes an objective of trade policy is the redistribution of income from capital to labor or vice versa. A possible determinant of such redistribution is the political valence or the partisanship of the government, which we call “ideology.” It refers to whether the government is pro-labor (left-oriented), pro-capital (right-oriented) or relatively neutral (centrist). Another possible determinant is asset inequality. In a model with policy determined by majority voting (Mayer, 1984), any government, due to the inherently unequal nature of asset and income distribution, will have a tendency to redistribute income from those who are well endowed in assets (“capital”) to those who are relatively poorly endowed in it.

The precise manner in which the political ideology affects trade policy (the “ideology” hypothesis) can be derived using the political-support function approach, popularized by Hillman (1989) and Van Long and Vousden (1991). The effect of an increase in the government’s leftist orientation can be viewed as an increase in the weight placed by it on the welfare of individuals predominantly dependent on labor income relative to the welfare of those who mainly derive their income from capital ownership. This increase in the labor-welfare weight results in policies that are more pro-labor and that move the domestic terms of trade in favor of the labor-intensive sector. In a capital-abundant country, the labor-intensive good is the importable good and therefore, an increase in the leftist orientation of the government will result in a rise in import protection. In a labor-abundant country, however, the labor-intensive good is the exportable. Therefore, an increase in leftist orientation in such a country will result in a decline in import protection.

The median-voter prediction (or the “inequality” hypothesis) we test is based on a simple comparative-static exercise in the Mayer–Heckscher–Ohlin framework (as in Mayer, 1984) — an increase in inequality (the difference between the mean and the median capital–labor ratio), holding constant the economy’s overall relative endowments, raises trade barriers in capital-abundant economies and lowers them in capital-scarce economies. An increase in inequality increases the general demand for redistribution from capital to labor. This can be achieved through trade policies that increase further the factor reward to labor but reduce the reward to capital.

In Dutt and Mitra (2002) we empirically investigate the median-voter model of trade policy, followed by an investigation of a political ideology model in Dutt and Mitra (2005). We now address the issue of complementarity versus substitutability of these two models. One possibility is that ideology and inequality are correlated, and therefore, these models are observationally equivalent (substitutes). The other possibility is that there is extra information from each of the models and so a combination of the two, which we call the “umbrella” model, is a better predictor of trade policy than each of the individual models. Therefore, we empirically examine the two hypotheses (ideology and inequality) within a unified, nesting model. Using standard *F*-tests as well as other Bayesian and non-Bayesian criteria, we find overall that each component model provides additional information and so the umbrella model generally dominates each of them.

2. Estimation framework and econometric methodology

As explained in the previous section (Introduction), we focus on the following two hypotheses:

“Ideology” Hypothesis: Holding other things constant, an increase in the left orientation (pro-labor bias) of the government leads to more restrictive or less open trade policies in capital-abundant countries, while it leads to less restrictive or more open trade policies in capital-scarce economies.

“Inequality” Hypothesis: Holding other things constant, an increase in inequality leads to more restrictive or less open trade policies in capital-abundant countries, while it leads to less restrictive or more open trade policies in capital-scarce economies.

We next write down the following “umbrella” specification that nests both these hypotheses:

$$TR_i = \alpha_0 + \alpha_1 \text{Ideology}_i + \alpha_2 \text{Ideology}_i \times (K/L)_i + \alpha_3 \text{Ineq}_i + \alpha_4 \text{Ineq}_i \times (K/L)_i + \alpha_5 (K/L)_i + \epsilon_i \quad (1)$$

where TR_i measures trade restrictions in country i , Ideology_i measures the extent of the government’s left-wing ideology, Ineq_i is the level of inequality and $(K/L)_i$ the capital–labor ratio.² Taking the partial derivative of TR_i with respect to Ideology_i and Ineq_i respectively, we have $\frac{\partial TR_i}{\partial (\text{Ideology}_i)} = \alpha_1 + \alpha_2 (K/L)_i$, $\frac{\partial TR_i}{\partial (\text{Ineq}_i)} = \alpha_3 + \alpha_4 (K/L)_i$. The prediction of the “ideology” hypothesis is that $\alpha_1 < 0$ and $\alpha_2 > 0$ such that $\alpha_1 + \alpha_2 (K/L)_i \geq 0$ as $(K/L)_i \geq (K/L)^*$ where $(K/L)^* = -\alpha_1/\alpha_2$ is the turning point capital–labor ratio determined endogenously from the data, given our estimating equation. Another requirement for the prediction to hold is that $(K/L)^*$ should lie within the range of values of (K/L) in the dataset, i.e., $(K/L)^{\text{MIN}} < (K/L)^* < (K/L)^{\text{MAX}}$. Similarly the “inequality” hypothesis predicts $\alpha_3 < 0$ and $\alpha_4 > 0$ such that $\alpha_3 + \alpha_4 (K/L)_i \geq 0$ as $(K/L)_i \geq (K/L)^{**}$ where $(K/L)^{**} = -\alpha_3/\alpha_4$ is the turning point capital–labor ratio for inequality and again has to be within the range of values of K/L in our dataset.

We perform Hausman tests to investigate the possible endogeneity of the capital–labor ratio (suggested by the two-sector Solow model) and inequality (due to the use of income inequality measure implying reverse causation) with respect to trade protection and then correct for any detected endogeneity through instrumental variable estimation.

Finally, imposing the restriction $\alpha_1 = \alpha_2 = 0$ gives us our stand-alone inequality model, while $\alpha_3 = \alpha_4 = 0$ gives us our stand-alone ideology model. We compare these restricted models to the umbrella model using a variety of Bayesian and non-Bayesian criteria.

² We present regression results with capital-ratios in natural logs (and not in levels) as they generate very few outliers, to which our estimation is extremely robust for the majority of our protection measures.

3. Data sources and some basic statistics

Our trade policy measures are an average tariff rate calculated by weighing each import category by the fraction of trade in that category (TARIFF), a coverage ratio for non-tariff barriers to trade (QUOTA), total import duties collected as a percentage of total imports (IMPORT DUTY), an indirect measure of trade restrictions — the magnitude of trade flows relative to GDP, defined as $(X+D)/GDP$, and the newly available Hiscox–Kastner measure. While the first two (both available for only one point in time for each country in the 1980s) are taken from Barro and Lee, the next two (which are averages for the 1980s) are taken from the World Development Indicators (WDI). The Hiscox–Kastner measure of protection, based on the standard gravity model from Hiscox and Kastner (2002), captures also the implicit protection through substitutes (including domestic policies adopted) of standard trade policy measures that governments use after commitment to tariff levels in international agreements.

The data on political orientation are obtained from the Database of Political Institutions (DPI) (Beck et al., 2001). For each year, we use the ideological orientation (“Left”, “Center” or “Right” coded as 3, 2 and 1 respectively to capture the extent of left orientation) of the chief executive (that of the chief executive’s party or when considered appropriate that of the chief executive himself/herself) for political systems classified as presidential in the database, that of the largest government party for systems classified as parliamentary, and the average of these two orientations for systems classified as assembly-elected president. We take the average of this variable for the 1980s. For inequality we use the Dollar–Kraay data on the Gini-coefficient and the share of the third quintile in national income, Q_3 which is an inverse measure of inequality. The Easterly–Levine data on capital–labor ratios are based on aggregate investment and depreciation. Finally, we use the Freedom House (Gastil) measure of democracy that provides a subjective classification of countries on a scale of 1 to 7 on political rights, with higher ratings signifying less freedom. Our instruments, savings rate and the population growth rate are obtained from the WDI.^{3,4}

³ 40% of our sample are dictatorships (Gastil index 4–7), which becomes 36% with Gastil scores of 5–7 as dictatorships. In terms of ideology in dictatorships, about a third of the countries are right wing (average 1980s ideology measure 1–1.5), almost half are left wing (ideology 2.5–3) and the rest centrists (ideology 1.5–2.5). For democracies, the split is a third right wing, a fourth left wing and the rest centrists (a large proportion due to governments oscillating between left and right as a result of elections). Note that in the case of dictatorships, as expected, it is the chief executive’s orientation, in most cases, that gets coded as the government’s ideology.

⁴ The summary statistics for all the variables are available at: <http://faculty.maxwell.syr.edu/dmitra/umbrella.htm>. Note that even though each of our variables has 90 or more observations, the sample size for each of our regressions ranges from 54 to 79, depending on the measure of protection or openness used. The sample size turns out not to be a function of the type of inequality measure (Gini or Q_3) used. The main limiting factor are the protection data, followed by ideology.

4. Results

4.1. The umbrella model and model comparisons

4.1.1. OLS estimates

All our regression models as a whole are significant at the 5% level (Table 1). As predicted, across all measures of protection save import duty, we find that the variables relevant to the ideology model (left-wing ideology and its interaction with the capital–labor ratio) and the variables relevant to the inequality model (inequality and its interaction with the capital–labor ratio) are strongly significant. Further as predicted, we obtain negative signs on ideology and inequality and positive signs on each of the interaction terms. For $(X+M)/GDP$ a measure of openness, the signs are reversed (as predicted by theory) and significant. The critical capital–labor ratios range from 8 to 11.2, and include the median capital–labor ratio within the 2 standard error confidence-interval. The R^2 ranges from 0.17 in the case of quotas, to 0.47 for the Hiscox–Kastner measure. The results are the strongest and most robust for tariffs and quotas, and for the Hiscox–Kastner measure which also captures implicit protection.

4.1.2. IV estimates

Consistent with the theoretical prediction of a multi-sector Solow model, the Hausman test suggests the endogeneity of the capital–labor with respect to the measures of trade

Table 1
The umbrella model

	Tariff	Quota	Import duty	Hiscox–Kastner	$(X+M)/GDP$
Ideology	−0.367*** (0.114)	−0.433** (0.232)	−9.793* (6.846)	−34.096*** (13.205)	49.506** (26.57)
Ideology * capital–labor ratio	0.036*** (0.011)	0.039** (0.022)	1.119* (0.707)	3.673*** (1.377)	−5.538** (2.946)
Inequality	−0.017** (0.009)	−0.019** (0.011)	−0.284 (0.626)	−1.845*** (0.786)	3.746*** (1.854)
Inequality * capital–labor ratio	0.002** (0.001)	0.002** (0.001)	0.034 (0.062)	0.19*** (0.088)	−0.408** (0.217)
Capital–labor ratio	−0.198*** (0.032)	−0.205*** (0.06)	−7.027 (2.93)	−20.158*** (3.568)	39.624*** (11.355)
Constant	2.09*** (0.339)	2.131*** (0.626)	74.293 (30.567)	224.049*** (36.162)	−336.88*** (99.638)
No. of observations	59	58	62	54	79
R^2	0.4	0.17	0.36	0.47	0.39
F -statistic	12.98***	2.51***	10.12***	9.83***	8.07***
Joint test for inequality	1.83	1.81	0.33	3.03**	2.02*
Joint test for ideology	4.33***	2.75***	1.62	3.73***	2.43**
Critical capital–labor ratio (ideology)	10.1	11.2	8.8	9.3	8.9
Critical capital–labor ratio (inequality)	9.3	8	8.3	9.7	9.2

Standard errors in parentheses; *** — significant at 5% level; ** — significant at 10% level; * — significant at 15% level.

Table 2
The umbrella model (IV estimates)

	Tariff	Quota	Import duty	Hiscox–Kastner	$(X+M)/GDP$
Ideology	−0.605*** (0.227)	−0.648*** (0.318)	−32.427*** (16.169)	−58.147*** (19.036)	123.559*** (46.015)
Ideology* capital–labor ratio	0.061*** (0.023)	0.061** (0.032)	3.465*** (1.653)	6.052*** (1.895)	−13.056*** (4.702)
Inequality	−0.048*** (0.018)	−0.052*** (0.026)	−2.258** (1.398)	−3.627*** (1.298)	9.118*** (3.472)
Inequality* capital–labor ratio	0.005*** (0.002)	0.006*** (0.003)	0.237** (0.144)	0.362*** (0.133)	−0.951*** (0.365)
Capital–labor ratio	−0.4*** (0.092)	−0.4*** (0.165)	−21.293*** (7.959)	−33.442*** (8.001)	82.443*** (20.703)
Constant	4.09*** (0.924)	4.066*** (1.623)	214.027*** (80.316)	360.765*** (83.453)	−764.075*** (208.598)
No. of observations	58	57	60	53	73
R^2	0.36	0.15	0.27	0.43	0.34
F -statistic	6.58***	1.56	6.81***	9.14***	7.11***
Critical capital–labor ratio (ideology)	9.9	10.6	9.4	9.6	9.5
Critical capital–labor ratio (inequality)	9.6	8.7	9.5	10	9.6
OID test (p -value)	0.55	0.95	0.16	0.2	0.3

Standard errors in parentheses; *** — significant at 5% level; ** — significant at 10% level; * — significant at 15% level.

protection. Therefore, we perform a two-stage, least-squares estimation where we instrument capital–labor ratio by the log of the population growth rate and the log of the savings rate.⁵ Based on the Hausman test results, we do not instrument for inequality. As Table 2 shows, across all measures of protection the predictions of both models are supported. The relevant terms are all significant and the critical capital–labor ratios are again very close to the mean and the median capital–labor ratios. More importantly, we see that now for the import duty measure as well, we obtain support for the umbrella model.

4.1.3. Umbrella vs. Stand-Alone Models

Next we examine whether the umbrella model is an improvement on the individual ideology and the inequality models. First, for tariffs, the Hiscox–Kastner measure and $(X+M)/GDP$ the adjusted R^2 is highest in the umbrella model. For import duty and quota, the adjusted R^2 is highest in the ideology model and in fact in the latter it is higher than the umbrella model by only 0.0019. Second, we run regressions of the actual measure of trade policy on the predicted values of protection from both component models thrown in together (run in levels and logs) and find both coefficients to be individually and jointly significant for all trade policy measures, except import duty. This suggests that the two

⁵ Hausman tests did not indicate any endogeneity problems for either of the interaction terms. For these Hausman tests, we used ideology and inequality interacted with the saving and population growth rates as additional instruments, resulting in the estimating equation being overidentified. Moreover, overidentifying (OID) tests confirm that our instruments are valid and of good quality (last row of Table 2).

individual models complement one another. Third, we see in Table 1 that for all measures of protection, both the ideology and inequality related variables are individually significant. The F -test for the inequality-related variables (inequality and its interaction with the capital–labor ratio) shows joint significance for the Hiscox–Kastner measure (our most comprehensive measure) and $(X+M)/GDP$, while the test for the ideology-related variables shows their joint significance for all protection measures except for import duty. The Akaike Information Criterion (AIC) selects the umbrella model for tariffs, Hiscox–Kastner and $(X+M)/GDP$ over each of the stand-alone models whereas it selects the ideology model over the umbrella model for quotas and import duty. The same is the case for the Bayesian Information Criterion (BIC) except that it selects the ideology model over the umbrella model in the case of tariffs as well. None of these criteria ever suggest that the inequality model is better than the umbrella model.

With IV estimation, across all measures of protection, our tests and model selection criteria unambiguously favor the umbrella model, thereby removing all ambiguity (when comparing models) and providing strong evidence to reject the assertion that ideology or inequality on its own can explain variations in protectionism. Rather, the two seem to be complementary.⁶

4.2. Other robustness checks

First, the extent of political rights, as an additional independent variable to control for the degree of democracy, turns out to be insignificant and does not alter our earlier results qualitatively. Per capita income, which is highly correlated with capital–labor ratio ($r=0.94$) as an additional control also does not affect any of our results. It is not itself significant, but K/L is always significant. Using land gini in place of the income gini drastically reduces our sample size and produces statistically insignificant results, which is understandable in the light of the small correlation between the two ginis. Next, using membership in free trade areas and customs unions (obtained from Andrew Rose’s website) on the right hand side does not alter any of our results while this variable itself is significant and has a negative effect on protection. If this same variable is treated as a dependent variable (an indicator of openness) in a probit model, all our ideology and inequality variables (along with their K/L interactions) have the correct signs and are jointly significant, but only inequality and its interaction with K/L are individually significant. Similar results are obtained with GATT membership. Next, we use an alternative (inverse) measure of inequality — the share of the third quintile ($Q3$) in national income. The regressions show that both inequality and ideology considerations significantly influence trade policies in the predicted direction for tariffs, quotas and the Hiscox–Kastner measure, marginally for $(X+M)/GDP$, but not for import duty. Critical capital–labor ratios are indistinguishable from those in Table 1.⁷

⁶ We failed to find support for an argument that the political ideology of the government is endogenous with respect to the level of inequality. First, the correlation between left-wing ideology and income inequality is only 0.01. Second, when we used the generated residuals from the ideology-on-inequality regression as a proxy for left-wing ideology in the umbrella model, our results remain completely unaffected.

⁷ All the robustness results are available at <http://faculty.maxwell.syr.edu/dmitra/umbrella.htm>.

Table 3
The ideology hypothesis

	Low inequality					High inequality				
	Tariff	Quota	Import duty	Hiscox–Kastner	$(X+M)/GDP$	Tariff	Quota	Import duty	Hiscox–Kastner	$(X+M)/GDP$
Ideology	−0.534*** (0.145)	−0.306** (0.183)	−6.945 (11.862)	−45.727*** (15.341)	67.114* (43.419)	0.03 (0.314)	−1.163 (0.803)	−13.294 (13.389)	−19.105 (21.296)	−48.397** (24.283)
Ideology * capital–labor ratio	0.054*** (0.015)	0.028* (0.019)	0.963 (1.234)	5.191*** (1.497)	−7.804** (4.389)	−0.005 (0.033)	0.112 (0.085)	1.37 (1.491)	1.772 (2.253)	5.845*** (2.683)
Capital–labor ratio	−0.18*** (0.037)	−0.091** (0.047)	−5.432** (3.041)	−17.163*** (4.05)	31.473*** (11.115)	−0.001 (0.095)	−0.313 (0.243)	−6.422* (3.981)	−7.109 (6.214)	−10.419 (7.338)
Constant	1.96*** (0.37)	1.097*** (0.468)	58.343** (30.292)	190.988*** (42.652)	−255.692*** (113.349)	0.202 (0.904)	3.4 (2.313)	71.976** (36.386)	101.741* (59.521)	111.447* (67.58)
No. of observations	29	28	31	27	39	30	30	31	27	40
R^2	0.58	0.19	0.4	0.74	0.43	0.06	0.17	0.28	0.15	0.31
F -statistic	11.69***	2.0*	6.1***	22.63***	8.68***	0.54	1.8	3.5***	1.4	5.45***
Critical capital–labor ratio	9.9	11	7.2	8.8	8.6	5.9	10.4	9.7	10.8	8.3

Standard errors in parentheses; *** — significant at 5% level; ** — significant at 10% level; * — significant at 15% level.

Table 4
The inequality hypothesis

	Pro-labor government					Pro-capital government				
	Tariff	Quota	Import duty	Hiscox–Kastner	$(X+M)/GDP$	Tariff	Quota	Import duty	Hiscox–Kastner	$(X+M)/GDP$
Inequality	−0.017** (0.009)	−0.02** (0.011)	−0.51 (0.72)	−1.576** (0.786)	3.393** (2.031)	−0.061*** (0.022)	−0.037 (0.058)	−0.217 (0.792)	−2.562 (2.374)	−9.356** (4.832)
Inequality* capital–labor ratio	0.002** (0.001)	0.002** (0.001)	0.047 (0.069)	0.138* (0.091)	−0.36** (0.219)	−0.006*** (0.002)	0.004 (0.006)	−0.006 (0.082)	0.288 (0.242)	−1.008*** (0.496)
Capital–labor ratio	−0.091*** (0.04)	−0.082* (0.051)	−4.398 (3.065)	−8.356*** (3.595)	23.875*** (8.957)	−0.309*** (0.078)	−0.211 (0.201)	−2.736 (2.955)	−16.112** (9.003)	−55.419*** (20.155)
Constant	1.034*** (0.432)	0.898** (0.468)	54.309 (33.066)	119.608*** (33.455)	−195.349*** (86.083)	3.174*** (0.789)	2.091 (2.056)	29.24 (29.458)	177.234** (90.098)	−491.462*** (204.252)
No. of observations	38	37	39	33	52	33	32	35	31	41
R^2	0.2	0.05	0.3	0.4	0.37	0.52	0.15	0.4	0.43	0.38
F -statistic	3.32***	1.46***	4.7***	5.23***	9.39***	20.99***	2.84**	17.26***	7.83***	7.55***
Critical capital–labor ratio	9.9	9.3	10.8	11.4	9.4	9.6	8.7	35.8	8.9	9.3

Standard errors in parentheses; *** — significant at 5% level; ** — significant at 10% level; * — significant at 15% level.

4.3. Ideology–inequality interactions and the role of democracy

We analyze whether the importance of ideology as a determinant of trade policy varies with inequality. With very high levels of inequality, we expect governments to eschew partisan considerations and adopt the preferred policies of the median voter to ensure re-election or to prevent revolution. From Table 3, we see that for the majority of the regressions, the ideology model has greater explanatory power and that the estimated coefficients are individually as well as jointly significant in countries with low levels of inequality. In contrast, it fares poorly in countries with high levels of inequality. The absolute value of residuals from the ideology model is increasing in inequality for tariff, quota, and the Hiscox–Kastner measure. Moreover, the predicted values of protection from the same ideology model have a much greater correlation with the actual values for the low-inequality sample (Gini coefficient less than 40) than for the high-inequality sample. Thus the fit of the ideology model is superior in countries with low levels of inequality.

Next we test the efficacy of the median voter models and evaluate its explanatory power separately in countries with pro-labor governments and those with pro-capital ones. In countries with pro-labor governments in power, inequality and ideology considerations overlap. On the other hand, it can also be argued that left-wing governments who have already adopted pro-labor policies have less room to manoeuvre. Table 4 shows that the relevant coefficients for the inequality model are significant for tariffs and $(X+M)/GDP$ regardless of whether pro-labor or pro-capital governments are in power. But for quotas and the Hiscox–Kastner measure, inequality and its interaction with the capital–labor ratio are significant only when pro-labor governments are in power. We again fail to find any significant effect of inequality on import duties regardless of the government’s ideological orientation. Finally, using residuals and predicted values from the inequality model, as we did above for the ideology model, we are unable to find a relationship between the model fit for the inequality model and ideology of the government.

Next, we investigate the relationship between redistributive concerns and the extent of democracy. We generate residuals from our umbrella model and regress the absolute values of the residuals on the Gastil political rights variable. We find that for all our direct measures of trade protection (tariff, quota, import duty, and Hiscox–Kastner measure), the absolute residuals are higher for dictatorships. Also, the predicted values of protection from Table 1, have a lower correlation with the actual values in the dictatorship sample (Gastil measure above 4) than for the democracy sample. Overall, this suggests that the extent of democracy matters less in determining the level of trade policy, but that the umbrella model fits democracies better. Democratic governments, to ensure their re-election, seem to be more sensitive to demands for redistributive policies from the majority and as well as their electoral base.

5. Conclusion

Using cross-country data on factor endowments, inequality and government orientation, we find that, conditional on inequality, left-wing (pro-labor) governments will adopt more protectionist trade policies in capital-rich countries, but adopt more pro-trade policies in

labor-rich economies than right-wing (pro-capital) ones. Also, holding government orientation constant, higher inequality is associated with higher protection in capital-abundant countries while it is associated with lower protection in labor-abundant countries. These results hold simultaneously within a unified econometric model. Overall, using various Bayesian and non-Bayesian statistical tests, we find strong support for using such an umbrella model over the component, ideology and inequality models, especially when we control for the endogeneity of the capital–labor ratio. Finally we show that the umbrella model works better for democracies than for dictatorships.

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