What Governments Maximize and Why: The View from Trade

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Abstract

Policy making power enables governments to redistribute income to powerful interests in society. However, some governments exhibit greater concern for aggregate welfare than others. This government behavior may itself be endogenously determined by a number of economic, political and institutional factors. Trade policy, being fundamentally redistributive, provides a valuable context in which the welfare mindedness of governments may be empirically evaluated. This paper investigates quantitatively the welfare mindedness of governments and attempts to understand these political and institutional determinants of the differences in government behavior across countries.

Keywords: Redistribution, Political Economy, International Trade, Institutions

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Abstract

Policy making power enables governments to redistribute income to powerful interests in society. However, some governments exhibit greater concern for aggregate welfare than others. This government behavior may itself be endogenously determined by a number of economic, political and institutional factors. Trade policy, being fundamentally redistributive, provides a valuable context in which the welfare mindedness of governments may be empirically evaluated. This paper investigates quantitatively the welfare mindedness of governments and attempts to understand these political and institutional determinants of the differences in government behavior across countries.

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1. Introduction

Although all governments are endowed with policymaking powers to redistribute income to powerful interests in society, some governments exhibit greater concern for aggregate welfare than others. Government behavior may itself be endogenously determined by a number of economic, political and institutional factors. For instance, in the presence of weak system of checks and balances or a low level of political competition, it may be easier for governments to redistribute resources towards those special interests they favor. It is the goal of this paper to study quantitatively the relative welfare mindedness of governments in a large sample of countries and to try and understand the differences in government behavior across countries using economic, political and institutional factors.

We proceed in two steps. The first step is to quantify the extent to which governments are concerned with aggregate welfare relative to any other private interests. This requires data in which the redistributive powers of governments are inherent, and which reflect this particular tradeoff between aggregate and private interest. In our analysis, we use trade policy determination as the context in which government behavior is evaluated. There are at least two reasons for this. First, it is well-established in theory and in empirical work that trade policy, like many other government policies, is redistributive and is used extensively by governments to favor certain constituents over others.[1]Second, the recent theoretical literature in this area (following the work of Grossman and Helpman (1994) offers a parsimonious and empirically amenable structural platform that is particularly suitable for estimating the primary parameter of interest: the relative preference of a governments for aggregate welfare over private rents, i.e., the welfare-mindedness of governments.[2]

In the second step of our analysis, we attempt to explain the estimated cross-country variation in government behavior using political, institutional and economic variables. Because of the nature of the question at hand, there is no single theory of how different political, institutional, and economic structures can affect government's willingness to trade off social welfare for political

[1]For theoretical work building on the Ricardo-Viner model of specific factors, see, for instance, Findlay and Wellisz(1982). For indirect evidence based on voting data, see Hiscox (2002), Bohara et al. (2004), Baldwin and Magee (2000), McGillivray (1997). For more direct evidence of governments favoring special interest groups in their trade policy decisions, and therefore exploiting the trade off between welfare and rents, the work of Schattschneider (1935) and Baldwin (1985) have spawned an enormous literature in economics and political science.

[2]Empirical contributions in this area, largely focused on US data include Goldberg and Maggi (1999), McCalman (2002), Mitra *et al.* (2002), and Eicher and Osang, 2003)

rents, but rather a multitude of independent theories (e.g., Lohmann and O' Halloran, 1994, Black and Henderson, 1999, La Porta *et al.*, 1999, Tsebelis, 1999, Elgie, 2001 Besley, 2005). Thus, the empirical analysis undertaken in this stage, is not structural in nature, but rather exploratory, allowing us to determine associations between political, institutional and economic variables on the one hand, and the preferences of policy-makers on the other.

Our results, obtained using data from over fifty countries, suggest that there is substantial variance across countries in the relative weight that their governments place on aggregate social welfare. For instance, the estimates for countries such as Nepal, Bangladesh, Ethiopia and Malawi are about a hundred times lower than for Hong Kong, Singapore, Japan and the United States. The determinants of this cross country variance in welfare mindedness are studied using factor analysis. There are a large number of institutional, political, and economic variables in existing databases which are all potential candidates for inclusion in such an analysis; Factor analysis allow us to reduce these large number of variables into an empirically tractable number. Variables that explain the variance in governments' inclination to maximize social welfare are those associated with factors capturing the absence of checks and balances in political and institutional structures, the finiteness of terms in office, and political competition for the post of executive, the extent of concentration of political parties in the government, the degree of urbanization and the economic performance of the country.

The rest of the paper is organized as follows. In Section 2, we derive a prediction from the Grossman-Helpman model of endogenous trade policy determination that enables estimation of the welfare-mindedness of governments. Industry-level data from fifty four countries are used in the estimation exercises; these data and the resulting estimates are described in Section 3. Section 4 describes the data and methods chosen to analyze why governments maximize what they do. Section 5 analyzes the determinants of the welfare mindedness of governments. Section 6 provides concluding observations.

2. What Governments Maximize: Theory

This section presents the Grossman-Helpman (1994, henceforth GH) model. It provides the theoretical basis for our estimates of the extent of government concern for welfare relative to private gain. Our notation borrows liberally from their exposition and that of Goldberg and Maggi (1999). Consider a small open economy with $n + 1$ tradable sectors. Individuals in this economy are as-

sumed to have identical preferences over consumption of these goods represented by the utility function:

$$U = c_0 + \sum_{i=1}^{n} u_i(c_i), \tag{1}$$

where good 0 is the numeraire good whose price is normalized to one. The additively separability of the utility functions eliminates cross-effects among goods. Consumer surplus from the consumption of good i, s_i, as a function of its price, p_i, is given by $s_i(p_i) = u(d(p_i)) - p_i d(p_i)$, where $d(p_i)$ is the demand function for good i. The indirect utility function for individual k is given by $v^k = y^k + \sum_{i=1}^{n} s_i^k(p_i)$, where y^k is the income of individual k.

On the production side the numeraire good is produced using labor only under constant returns to scale, which fixes the wage at one. The other n goods are produced with constant returns to scale technology, each using labor and a sector-specific input. The specific input is in limited supply and earns rents. The price of good i determines the returns to the specific factor i, denoted $\pi_(p_i)$. factor. The supply function of good i is given by $y_i(p_i) = \pi'_(p_i)$. Since rents to owners of a specific input increase with the price of the good that uses the specific input, owners of that specific input have a motive for influencing government policy in a manner that raises the good's price.

Government uses trade policy, specifically tariffs, that protect producers of import-competing goods and raise their domestic price. The world price of each good is taken as given. For good i the government chooses a specific (per unit) import tariff t_i^s to drive a wedge between the world price p_i^0 and the domestic price p_i, $p_i = p_i^0 + t_i^s$. The tariff revenue is distributed equally across the population in a lump-sum manner.

Summing indirect utility across all individuals yields aggregate welfare W. Aggregate income is the sum of labor income (denoted l), the returns to specific factors, and tariff revenue. Therefore aggregate welfare (as a function of domestic prices) is given by:

$$W = l + \sum_{i=1}^{n} \pi_i(p_i) + \sum_{i=1}^{n} t_i^s M_i(p_i) + \sum_{i=1}^{n} s_i(p_i), \tag{2}$$

where imports $M_i = d_i - y_i$.

We also assume that the proportion of the population of a country that is represented by organized

lobbies is negligible.[3]. This allow us to ignore the incentives to lobby for lower tariffs on goods that are consumed, but not produced by owners of specific factors, as well as the incentives to lobby for higher tariffs on goods that are neither consumed nor produced, but that generate tariff revenue. While this assumption is imposed on the theoretical model, it is based on relatively solid empirical grounds, as consumer (and taxation) lobbies are uncommon relatively to producer lobbies. In other words, in our setup lobbies only care about the rents to their specific factor. More formally, the objective function is simply given by:

$$W_i = \pi_i(p_i). \tag{3}$$

The objective function of the government reflects the trade-off between social welfare and lobbyists' political contributions. These contributions may be used for personal gain, or to finance re-election campaigns, or a variety of other self-interested expenditures that may buy the government favor with its constituents. Thus, as in the Grossman-Helpman model the government's objective function is a weighted sum of campaign contributions, C, and the welfare of its constituents, W:

$$G = aW + C = aW + \sum_{i \in L} C_i, \tag{4}$$

where the parameter a is the weight government puts on a dollar of welfare relative to a dollar of lobbying contributions. Lobby i makes contribution C_i to the government, and therefore maximizes an objective function given by $W_i - C_i$.

We presume that the equilibrium tariffs arise from a Nash bargaining game between the government and lobbies. Goldberg and Maggi (1999) show that this leads to the same solution as does the use of the menu auction model employed in Grossman and Helpman (1994). The Nash bargaining solution maximizes the joint surplus of the government and lobbies given by the sum of the government's welfare G and the welfare of each lobby net of its contributions. The joint surplus boils down to

$$\Omega = aW + \sum_{i} W_i, \tag{5}$$

[3]In our framework, this is equivalent to assuming that ownership of specific factors used in production is highly concentrated in all sectors

Note that (5) implicitly assumes that all sectors are politically organized. This is true of manufacturing sectors in most advanced countries, where political action committees (U.S.) or industry associations (Europe) lobby their governments. Such industry coalitions are prevalent in developing countries as well. Other than in the U.S., rules and regulations requiring lobbying activity to be reported are blatantly absent. We take this non transparency to be not only a data constraint in our modeling, but also a proof of the pervasiveness of lobbying activity. Also, since our analysis is conducted at the aggregation level of 29 ISIC 3-digit level industries, the assumption that all industries are organized is an empirically reasonable one.[4]

Under these two assumptions, the joint surplus takes the simple form:

$$\Omega = l + \sum_{i=1}^{n}[a+1]\pi_i + \sum_{i=1}^{n} a(t_i^s M_i + s_i), \tag{6}$$

The first order conditions are:[5]

$$[a+1]X_i + a[-d_i + t_i^s M_i'(p_i) + M_i] = 0, \qquad i = 1, \ldots, n. \tag{7}$$

Solving, we get the tariff on each good that maximizes the joint surplus:

$$\frac{t_i}{1+t_i} = \frac{1}{a}\left(\frac{X_i/M_i}{e_i}\right), \qquad i = 1, \ldots, n. \tag{8}$$

In (8) $t_i = (p_i - p_i^0)/p_i^0$ is the ad valorem tariff for good i, where p_i is the domestic price for good i in Home and p_i^0 its world price. X_i/M_i is the equilibrium ratio of output to imports and $e_i = -M_i' \cdot p_i/M_i$ is the absolute elasticity of import demand. Thus, producers of good i are able to

[4]For instance, in US data, significant contributions to the political process are reported by all 3-digit industries (and indeed industries at much finer levels of dis-aggregation).

[5]Differentiating with respect to the specific tariff on good i t_i^s is equivalent to differentiating with respect to the price of good i p_i, since $p_i = p_i^0 + t_i^s$. The derivatives of profits and consumer surplus are as follows: $\pi_i'(p_i) = X_i$ or output of good i, and $s_i'(p_i) = d_i$ or demand for good i.

"buy" protection ($t_i > 0$). Industry output X_i captures the size of rents from protection. Imports determine the extent of welfare losses from protection, so the smaller are imports the higher is the tariff. The Ramsey pricing logic is inherent in (8). The lower the absolute elasticity e_i, the higher the tariff.

3. What Governments Maximize: Comparative estimates of a

Equation (8) suggests a simple way of estimating the trade-off parameter a. Rewrite (8) as

$$\frac{t_i}{1+t_i}.e_i.\frac{M_i}{X_i} = \frac{1}{a} \qquad i = 1, \ldots, n. \tag{9}$$

We use a stochastic version of this equation to estimate the parameter a. The data, described below, are across industries and time for each of 54 countries. Indexing the time series by t, the econometric model we use to estimate the a's is

$$\frac{t_{it}}{1+t_{it}}.e_i.\frac{M_{it}}{X_{it}} = \beta_0 + \epsilon_{it} \qquad i = 1, \ldots, n, \tag{10}$$

where the error term ϵ_{it} is identically independently normally distributed across observations for any specific country, with homoscedastic variance σ^2. The variance is allowed to vary across countries. The coefficient $\beta_0 = \frac{1}{a}$. The assumption that all sectors are organized allows us to take the output-to-import ratio and import elasticity to the left-hand side (lhs) of the equation. This mutes issues concerning endogeneity to tariffs of output, imports and the elasticity of import demand.

Model (10) is estimated for a set of 54 high, middle, and low income countries.[6] For these countries we have tariff data (incompletely) across 28 3-digit ISIC industries over the 1988-2000 period.[7]

[6] They are Argentina, Bolivia, Brazil, Chile, China, Colombia, Ecuador, Hungary, Indonesia, India, Korea, Sri Lanka, Mexico, Malawi, Malaysia, Peru, Phillipines, Poland, Thailand, Trinidad and Tobago, Turkey, Taiwan, Uruguay, Venezuela, South Africa, Bangladesh, Cameroon, Costa Rica, Morocco, Nepal, Egypt, Ethiopia, Guatemala, Kenya, Latvia, Pakistan, Romania, Austria, Denmark, Spain, Finland, France, United Kingdom, Germany, Greece, Ireland, Italy, Japan, Netherlands, Norway, Sweden, United States, Hong Kong, and Singapore

[7] The tariff data are the applied Most-Favored-Nation rates from UNCTAD's Trains database. The 6-digit Harmonized System level data were mapped into the 3-digit ISIC industry level using filters available from the World Bank site www.worldbank.org/trade. Where possible, those data are augmented by WTO applied rates, constructed from the WTO's IDB and WTO's Trade Policy Reviews. The correlation between the two tariff series is above 0.93. Further, the direct and reverse regression coefficients are above 0.9, indicating that the errors in variables problem

Lower-middle income countries have fairly broad data coverage. Low-income countries have sufficiently available data for credible inferences about the model parameters.

Industry level output and trade data are from the World Bank's Trade and Production database. Import demand elasticities have been estimated for each country at the 6-digit HS level using a GDP function approach by one of the authors.[8] Since the standard errors of the elasticity estimates are known, they are treated as variables with measurement error and adjusted using a Fuller-correction (Fuller 1986).[9] Since the four countries Ecuador, Nepal, Pakistan and Taiwan do not have sufficient data to estimate import elasticities, for them we use the industry averages of the elasticity estimates for all other countries.

Estimates of the coefficient β_0 in (10), denoted $1/a$, and its standard error are displayed in Table 1.1 for the 54 countries. Inverting these coefficients yield estimates of the parameter a. They appear in the last column of Table 1.1. Several interesting and surprising features of these estimates are evident in Table 1.2, where countries are sorted by their a estimates. In general richer countries have higher values of a than poorer countries. That is, governments of richer countries are revealed by their trade data to place a much greater weight on a dollar of welfare relative to a dollar of private gain (contributions) or private goods. The last two columns indicate that countries with $a > 10$ have OECD-level per capita incomes (with the exception of Brazil and Turkey). Middle income countries have fairly high values of a. All South American economies in our sample, with the exception of Bolivia ($a = 0.68$), fall within this group. Other notable liberalizers come from Asia: India ($a = 2.72$), Indonesia (2.62), Malaysia (3.13), Philippines (2.84). The lowest a's belong to the poor Asian countries Nepal (0.06), Bangladesh (0.16), Pakistan (0.74), and Sri Lanka (0.93), and the African nations Ethiopia (0.17), Malawi (0.25), Cameroon (0.30), and Kenya, (0.84).

An important feature of our results is that, in contrast with previous examinations of the Grossman-Helpman model (Goldberg and Maggi 1999, Mitra et al. 2003, McCalman 2004, Eicher and Osang 2002), our estimates of a are reasonable, both qualitatively (poorer countries have smaller a's than richer countries) and quantitatively (only extremely low-tariff or zero-tariff countries like Hong

from mixing the two data sources is not a concern. Across the 40 countries, tariff data are available for an average of 7.2 years (minimum 2 and maximum 13).

[8] In this method imports are treated as inputs into domestic production, given exogenous world prices, productivity and endowments.

[9] The idea behind this correction is to limit the influence of estimates that are large and also have large standard errors. Without the correction, these large estimates would grossly overstate the true elasticity. The correction mutes their effect.

Kong and Singapore have a's greater than 50, while this was routinely found for Turkey, Australia, and the U.S. in the studies referenced above). We find the cross-country variation in a to be striking and intuitively pleasing. Countries with low a's accord with the widely accepted view that governments in those countries are also among the most corrupt in the world. Indeed the Spearman rank correlation between Transparency International Perception Corruption Index for the year 2005 and our measure of government willingness to trade off social welfare for political rents is 0.67, and we can statistically reject the assumption that the two series are uncorrelated. In 2005 the Transparency International Corruption index rank of the two countries at the bottom of our a rankings (Nepal and Bangladesh) were 121 and 156 out of 157 countries, respectively. Similarly, the Transparency International Corruption index rank of the two countries at the top of our a rankings (Singapore and Taiwan) were 5 and 15, respectively.

Some results we find to be interesting surprises are (i) the low a for Mexico, despite it's membership in NAFTA, (ii) the lower than expected a for the OECD countries of Norway, Ireland and the Netherlands (in the $3 < a \leq 5$ group), (iii) the relatively high a's for the socialist countries in transition, including Poland, Hungary and Romania, (iv) the relatively high a's for Japan and China, both of whom have been criticized for being mercantilistic – protectionist and export-oriented.

These unexpected results emphasize the fact that the theoretical model does not base it's prediction simply on openness (low or high tariffs), but also the import-penetration ratio, and import demand elasticities, as well as their covariance with tariffs, and each other. The incidence of tariffs in industries with high import demand elasticities reveals the willingness on the part of governments to (relatively) easily trade public welfare for private gain,[10] since Ramsey pricing in welfare-oriented countries dictates that the most price-sensitive goods should be distorted the least. The incidence of tariffs in industries with high import-to-output ratio also reveals the willingness on the part of those governments to trade public welfare for private gain since distorting prices in high-import sectors creates large deadweight losses. Empirically, this is not only revealed by the surprising estimates discussed above, but also by the relatively low correlation between our estimates of a, and average tariffs, which is estimated at 0.33, and compares badly with the correlation with the index of perceived corruption. Thus, the estimates underscore the need to consider more than simplistic measures of openness in order to make inferences about the terms at which different governments trade public welfare for private gain. The Grossman-Helpman measure is not only

[10]This results in a high estimate of β_0 and low estimates of a.

theoretically more appropriate, but also empirically, it appears to be quite distinct from simpler measures.

We are interested in the deeper question of why governments behave as they do. What explains the variation in the estimates of a across countries? Why do some countries have low a's and other high a's? Are polities in poorer countries content to let their governments cheaply trade their welfare away? If so, why? And why in richer countries do we observe the opposite? These are the questions to which we devote the remainder of the paper.

4. Explaining the variation in a: Data and Method

4.1: Data

What economic and institutional variables might explain the variation in government behavior across countries? In recent years there has been great interest in the question of how institutions influence, even determine, economic and political outcome across countries. High-quality cross-country databases of political and legal and historic institution have been constructed to answer these questions. We draw on three databases to make inferences for our study. The first is the database on political institution (DPI) constructed by Beck et al. (2001). This database has a compilation of over a hundred institutional variables across a variety of countries over the 1975-95 period. The broad categories of "government", "legislatures", "executive", and "judiciaries" are each measured by a number of qualitative and quantitative variables. These include the existence of checks and balances, the existence and number of "veto players", whether the executive or legislature are agenda driven, whether the system is presidential or parliamentary, and the number of parties in government and the opposition. It is an impressive database from which to conduct comparative political economic analysis. If there is a problem, it is the curse of plenty – there are simply too many variables from which to choose. Choosing from among these would be ad hoc at best and subjective (based on non transparent priors) at worst. We approach the choice of variables from this and other databases formally, as we discuss below.

The second database upon which we rely is the quality of government (QOG) database constructed by La Porta et al. (1999). In this database, too, there is a surfeit of variables that measure political and legal institutions across countries. Unique to it are data on the legal origins of countries, the

nature of business regulations, and a measure of ethnolingual fractionalization. The third database is compiled from annual World Development Indicators (WDI). They are the source of economic variables such as per capita incomes, urbanization, poverty, corruption, and the level of education.

Given the availability of so many variables, the question before us is this: Which variables are the relevant ones and how do we choose them? We take a factor analytic approach to this problem.

4.2: Method: Factor Analysis

Factor analytic methods reduce data by eliminating redundant interdependencies among the many variables. We reduce the DPI, QOG, and WDR variables to their essential factors using the maximum likelihood method (Lawley and Maxwell 1971, Joreskog 1967, Rubin and Thayer 1982). In describing the method we borrow liberally from Reyment and Joreskog (1993).

The factor analysis model is

$$\mathbf{X}_{(N\times p)} = \mathbf{F}_{(N\times k)}\mathbf{A}'_{(k\times p)} + \mathbf{E}_{(N\times p)}, \tag{11}$$

where $\mathbf{X}$ is the complete data matrix consisting of p variables, $\mathbf{F}$ is the matrix of $k < p$ factors, and N is the sample size. The $k \times p$ "factor loadings" matrix $\mathbf{A}'$ is used to linearly sum the factors to predict each column of $\mathbf{X}$. What cannot be predicted is collected in the error matrix $\mathbf{E}$. In the context of our data, each column of $\mathbf{X}$ is a variable containing "scores" on some measures for the sample of N countries. The individual components of $\mathbf{F}$ are the "scores" of *common factors* since they are common to several different data variables. The coefficients of the factors, called the *factor loadings*, are the elements of $\mathbf{A}'$. Thus, the p variables $x_j, j = 1, \ldots, p$ can each be written as a regression model:

$$x_j = a_{j1}f_1 + a_{j2}f_2 + \ldots a_{jk}f_k + e_j. \tag{12}$$

In (12) the factors $f_1, \ldots, f_k$ are the "exogenous" variables, and the coefficients $a_{j1}, \ldots, a_{jk}$ are the "loadings" contained in the jth column of $\mathbf{A}'$. While e_j is given the interpretation of a regression residual, in fact it is made up of the measurement error in x_j plus a "specific" factor that x_j does

not share in common with other measures. Written in this form makes it clear that factor analysis is a method of data-reduction. The method seeks to parsimoniously represent in a small set of factors $(f_1, \ldots, f_k)$ essentially the same information contained in the larger set of variables $(x_1, \ldots, x_p)$.[11]

The difference between model (11) and ordinary regression models is that the factors and coefficients are both unknown. That is, neither $\mathbf{F}$ nor $\mathbf{A}'$ are known and must be estimated.[12] We identify the model (i.e. eliminate the indeterminacy, see fn. 13) simply by requiring that factors be uncorrelated, that is, the (random, see fn 12) factors be distributed independently. This method of identification is attractive because, since its conception, factor analysis has sought to find fundamental and uncorrelated "dimensions" in the data.

The factor analysis is carried out using the correlation matrix of the data, that is, after the variables are standardized to have mean zero and unit standard deviation. Denote the correlation of the (random) factor matrix $\mathbf{F}$ as $\mathbf{\Phi}$. In order to proceed with maximum likelihood (ML) estimation we assume the following about the true covariances:

$$\frac{1}{N}\mathbf{X}'\mathbf{X} \to \mathbf{\Sigma}, \qquad \frac{1}{N}\mathbf{F}'\mathbf{F} \to \mathbf{\Phi}, \qquad \frac{1}{N}\mathbf{F}'\mathbf{E} \to \mathbf{0}, \qquad \frac{1}{N}\mathbf{E}'\mathbf{E} \to \mathbf{\Psi}, \tag{14}$$

that is, the existence of finite second moments and orthogonality of the factor and error matrices. The identifying assumption that the factors are uncorrelated implies $\mathbf{\Phi} = \mathbf{I}$.[13] Then, the true data variance (here correlation) matrix $\mathbf{\Sigma}$ is a function of the parameters $\mathbf{A}$ and $\mathbf{\Psi}$:

$$\mathbf{\Sigma} = \mathbf{A}'\mathbf{A} + \mathbf{\Psi}. \tag{15}$$

[11] Models that presume the factor matrix $\mathbf{F}$ to be random are distinct from models that presume $\mathbf{F}$ to be fixed. The random factors model is appropriate when we want to extend our inferences to different samples, while the non-random factors model is appropriate when the specific entity, and not just the model structure is of interest. Since the institutional data are for a sample of countries, we use the random factors model. Further, the likelihood function for (identified) models with random $\mathbf{F}$ is well defined while this is not true for models with non-random $\mathbf{F}$ (see e.g. Anderson, 1984 p 552)

[12] There is a fundamental indeterminacy in the model. If we (linearly) transform $\mathbf{F}$ and $\mathbf{A}'$, respectively, as $\mathbf{F^*} = \mathbf{F}\ \mathbf{C}^{-1}$ and $\mathbf{A^{*\prime}} = \mathbf{C}\ \mathbf{A}'$, then (11) is equivalently written as:

$$\mathbf{X}_{(N\times p)} = \mathbf{F^*}_{(N\times k)}\mathbf{A^{*\prime}}_{(k\times p)} + \mathbf{E}_{(N\times p)}. \tag{13}$$

Then, by observing $\mathbf{X}$ we cannot distinguish between these two models. This should be familiar from econometric textbook discussions on identification (e.g. Greene, 2004).

[13] Then, the only admissible transformation $\mathbf{C}$ is one where $\mathbf{C'C} = \mathbf{I}$. Pre-multiplication by $\mathbf{C}$ essentially rotates the factor matrix.

Maximum likelihood estimation of $\mathbf{A}$ and $\mathbf{\Psi}$ are based on the assumption that the error vector e_j is multivariate normal with mean 0 and variance $\mathbf{\Psi}$ for each observation i. Letting $\mathbf{S}$ denote the sample correlation matrix, the likelihood function for the multivariate data is given by

$$\ln|\mathbf{\Sigma}| + \text{tr}\left(\mathbf{S}\mathbf{\Sigma}^{-1}\right) - \ln|\mathbf{S}| - p. \tag{16}$$

The likelihood function is maximized over the parameters $\mathbf{A}$ and $\mathbf{\Psi}$.

Pre-estimation

Even if only a subset of the data variables are closely correlated, the sample covariance matrix $\mathbf{S}$ becomes near-singular. A prerequisite for ML estimation is to ensure this does not happen. Thus, before proceeding with estimation, we identify groups of correlated variables and choose one or a few variables that represent that group. Complete data from the three databases are available for sixty-three institutional variables. The process of inspecting the pairwise correlations among these variables and sifting them down to a set of variables for which the covariance $\mathbf{S}$ is nonsingular, yielded twenty-four variables. Table 2.1 displays the end result of this sifting, and provides a short description, the source, and descriptive statistics for the twenty-four variables. Detailed definitions of these variables, adapted from the source articles, are provided in the Appendix. These twenty-four variables constitute the matrix $\mathbf{X}$. The correlation of these twenty-four variables with some of the other 63 variables is indicated by their presence in Table 2.2 (when the correlation is above 0.5 in absolute value the variables is listed in Table 2.2).

Before estimating the parameters of the factor model, the number k of factors that are required to adequately capture the information in the twenty-four variables must be determined. Formal chi-squared tests of two hypotheses are used to determine k. The first is the hypothesis that k factors are preferred by the data to zero factors, and the second is the hypothesis that k factors are preferred by the data to strictly more than k factors. The smallest k for which the second hypothesis is rejected and the first fails to be rejected is eight. Table 3.1 reports the tests. We proceed with maximum likelihood estimation of the model with eight (pairwise uncorrelated) factors.

ML estimation of factors

ML estimates of the parameters $\mathbf{A}'$ in the factor model (11) are reported in Table 3.2. These "factor loadings" are the weights given to each factor in order to predict the variables. For example, the variable PCI95 is a linear function of the eight factors with the loadings in the row labeled "PCI95". Thus, PCI95 is predicted as:

$$\text{PCI95} = 0.05\text{F1} - 0.18\text{F2} - 0.15\text{F3} - 0.40\text{F4} + 0.73\text{F5} + 0.06\text{F6} - 0.05\text{F7} + 0.06\text{F8},$$

where $\text{F1} - \text{F8}$ are the eight factors. The factors are standardized to have mean zero and standard deviation one. The last column labeled "Unique" indicates that 25% of the variation in PCI95 is not explained by the factors. If a large percentage of a variable remains unexplained, we consider the variable to be a unique factor by itself. For example, the variables AUTON and MDMH are both considered to be unique factors. A cutoff level of uniqueness at 50% is used to determine whether the variable should be treated as a unique factor.

The loadings suggest names for the factors. Variables that have a loading above 0.5 in absolute value into different factors are highlighted in Table 3.2 Factor F1 is heavily loaded on the two variables EXECSPEC and GOVSPEC. These variables both indicate whether the government/coalition government is issue-driven even before they assume power (specifically whether they are rural, nationalist, religious, or green). Thus, factor F1 is termed "Issue Driven". Factor F2 is loaded heavily on the variables socialist legal origin (LEGOR_SO), from which the factor gets its name. Factor F3 is best described as "UK-French Law", as the UK legal origin weights heavily with a positive sign, whereas the French legal origin also weights heavily but with a negative sign. Factor F4 is an amalgam of variables measuring checks and balances in the system and is named "Absence of Checks and Balances" – the signs on the loadings indicate that countries with few checks and balances have higher scores on this factor.[14] Factor F5 is described as "Income & Economic Opportunities" since per capita income (PCI95) loads heavily on this factor. Factor F6 is named "Urbanization", as the percentage of the population living in urban areas (URBAN) loads heavily into this factor.

[14]This factor is negatively correlated with the variables EIEC and CHECKS, and positively with TENLONG and TENSHORT. The variables EIEC is a measure of how competitively the executive is elected (economy-wide elections get the highest score, and appointments or dictatorship get the lowest score). Thus, the Vetoes Checks and Balances factor varies inversely with the competitiveness of EIEC. The two other influential variables in this factor, TENLONG and TENSHORT, measure how entrenched the veto players are. In systems where the shortest and the longest tenure of the veto players have long durations, politicians are likely to get entrenched. Thus, the Absence of Checks & Balances factor varies positively with the potential for entrenchment and negatively with competitiveness with which politicians are elected.

Factor F7 is named "Competition for the Executive" due to the high loadings on the variable describing electoral competitiveness for the executive (EIEC). Finally, factor F8 is named "Party Concentration" because the Herfindhal index of seats hold by different parties in parliament loads heavily on this factor.

It is not surprising to note the existence of a number of unique factors in addition to the eight factors, because the analysis was preceded by the sifting stage. The twenty-four variables represent sets of highly correlated variables among the sixty-three possible variables, but they are not highly correlated with each other. Therefore, some variables are not correlated with the eight factors. In the regression analysis explaining variation in the a's, we will consider both, models with the eight factors as well as the eight plus the unique "factors".

5. Explaining the variation in a: Theory and Results

5.1 Theory

The preceding analysis has allowed us to identify eight factors which together represent the behavior of a wide range of institutional, economic and political variables of interest. We discusss here briefly some conjectures offered in the theoretical literature and some empirical findings that suggest possible linkages between our factors and the welfare mindedness of governments. We may note that the earlier literature has proposed multiple (and often contrary) channels of association. While, the empirical analysis we pursue in the next section will not be "structural" and will therefore not allow us to evaluate alternate theories, it will allow us to determine the quantitative significance and robustness of the linkages we examine.

Factor 1: Issue-Driven Government

The links between issue-driven governments and redistributive behavior are generally straightforward. If the executive or the government is issue driven (religious, rural, regional or nationalist), then they are more likely to be willing to trade off social welfare in order to reach its issue driven objective. As such, we expect a negative impact of "issue driven governments" on government willingness to trade off social welfare, i.e., on the parameter (a).

Factors 2 & 3: Socialist Law & UK-French Law

La Porta *et al* (1999) make a case for legal origins as determinants of the quality of governments. They especially distinguish between the private property rights focus of British and French law and the lack of such emphasis on private property in the legal origin of Socialist countries. While these features of legal origin may impact La Porta et al. measures of government quality (the degree of government intervention, public sector efficiency, public good provision, size of government, and political freedom), it is unclear whether their logic applies to the quality of government as measured by our a's. For example, in countries with socialist law there may be little to trade social welfare for, as the private sector is often also in the hands of the government. Nevertheless one of the proxies used by La Porta *et al* for the quality of government (corruption) has a clear connection with our measure of government's willingness to trade social welfare for political rents. Moreover, David and Brierly (1978) argue that French civil law imposes less constraints than UK common law on public officials, which can in turn allow them to "sell" policies more easily. Given that Factor 3 loads positively on UK law and negatively on French law this would imply that it will tend to be positively correlated with the a estimates.

Factor 4: Absence of Checks & Balances

There is a large independent literature on the association between checks and balances in an economy and government behavior. Our Factor 4 loads heavily on variables measuring the tenure length of veto players in the political system, on the number of veto players in the system and on political competitiveness.

The length of tenure of veto players (both the longest and the shortest tenure) load heavily and positively into this factor. Veto players are individuals or collective actors whose agreement is necessary for a change in the status quo (Tsebelis 1999). In a parliamentary system, for example, the party in government is a veto player but there may be others – legislation in coalition governments may require the assent of many veto players. In Tsebelis' model, the greater the number of veto players, the more rigid is policy. Policy change is also more difficult to achieve the greater the ideological distance among veto players. In our cross-sectional setting this theory does not indicate a priori how the factor containing veto player variables (Absence of Checks & Balances) should influence a. Tsebelis' theory predicts that whatever policy is in existence it will endure in governments with many veto players or one with ideologically distant veto players. But whether

governments consisting of veto players with long tenures are more likely to enact welfare-oriented trade policies than governments with veto players with shorter tenures is not answered by Tsebelis' veto player model.

However, one can reasonably argue that the more secure are veto players about their longevity, the more fragile are the checks and balances in the system, as healthy political competition imposes some discipline on policy makers. With longer tenures for veto players, the degree of political accountability declines.[15] De Figuereido (2002) interestingly shows that in political systems with high turnover, parties are more likely to cooperate over policy rather than impose their preferred policies while in power. Kenya, Egypt, Mexico, Singapore, Indonesia, and Morocco have the highest values of TENLONG (17 years or more) and Kenya, Malawi, Egypt, Indonesia for TENSHORT (12 years or more). Since these two variables are positively related to the Absence of Checks & Balances factor, de Figuereido's theory of political turnover indicate that the high scores on this factor should cause lower a's.

Finally, the ultimate check and balance in a democracy are elections and voters. The democracy index is highly correlated with EIEC which loads heavily on Factor 4 (see Tables 2.2 and 3.2). A recent literature argues that democracies are more likely to have trade policy regimes that reflect voters interests rather than those of interest groups. Milner and Kubota (2005) argue that democratization reduces the ability of governments to use trade barriers as a strategy for gaining political support. The reason is that democratization means a movement towards majority rule, rather than maintaining leaders with the backing of fairly small groups. They then show in an elegant and simple trade model that the optimal level of protectionism declines with the size of the winning coalition. Similarly Mansfield, Milner and Rosendorff (2000 and 2002) also argue that democracies are more likely to adopt trade policies that reflect voters interests rather than the interest of a small group of pressure groups, but for a different reasons. In a world with asymmetric information where voters cannot distinguish perfectly between economic shocks over which leaders have little control and extractive policies by their leaders, trade agreements may help leaders signal their actions to home voters as other partners in the trade agreement will help monitor their actions. Thus these studies would suggest that high scores in Factor 4 (Absence of Checks and Balance) should cause lower a's.

[15] See Besley (2005) for a discussion of the role of political accountability in selecting good quality policy makers.

Factor 5: Income & Economic opportunities

Several arguments may be advanced for how a country's wealth may affect government behavior. Wealthier nations may, on average, have superior legal systems (as captured by Factors 2 and 3), superior political institutions (as captured by Factor 4). Our Factor 5, which loads heavily on per capita income and the relative size of the private sector, will capture links between income and economic opportunities that are not already captured by Factors 2, 3 and 4. One possible association of this nature has been argued by Besley (2005) who argues that alternative economic opportunities in society may determine the quality of candidates entering the political arena. Specifically, Besley (1995) enumerates four basic inputs that go into the selection of political leaders and policymakers. One of them is a measure of the strength of the outside options for good and bad policy makers.[16] The more outside options there exist and the more valuable they are, the higher the quality of those who choose careers in politics – as it is the (non-monetary) value of public service that attracts people into this pool and overwhelms the (monetary) value of their outside options. The level of economic activity in the economy (PIC95) and the size of the private sector as a percent of GDP are likely to be good indicators, and they are indeed highly correlated in our sample. The former loads heavily into Factor 5 (Income & Economic opportunities). Since this factor measures the strength of outside options in an economy, it may be argued that countries for which this factor takes high values also have a higher quality pool of political candidate and thus high a's.

Factor 6: Urbanization

The links between urbanization and redistributive behavior are numerous. If urbanization is associated with inequality (either within urban sectors or between urban and rural areas)), governments may wish to offset some of this inequality for political gain. This would suggest that greater urbanization is associated with greater redistribution and lower values of a. Differently, urbanization may induce a concentration of (urban) interests that has a greater ability to lobby governments to pursue distortionary policies. Alternately, a high degree of urbanization may be an outcome of redistributive policies of governments which incentivize the growth of the urban manufacturing sector over other sectors in the economy. Thus high urbanization may be linked to high a's.

[16]The other three are the attractiveness of being in government (measured by the ratio of political rents to wages), the degree of accountability, and the polity willingness ratio which is a measure of how likely it is to elect a bad politician versus a good politician.

Factor 7: Competition for the Executive

Factor 7 loads heavily on EIEC which measures the degree of competition for the executive. The index ranges from 1 to 7, with competitively elected presidents or prime ministers depending on who is assigned the Chief Executive title (e.g., in the US, it would be president, in the UK, it would be prime minister) getting 6 or 7. At the other end of the spectrum, Chief Executives elected by small appointed juntas or electoral colleges, as well as Chief Executives in countries with armed conflicts get a 1 or 2.[17] Another variable that loads heavily in Factor 7 is whether there are finite terms in office. An increase in both variables measres the increase in the degree of competition for the executive. Using de Figuereido's (2002) logic one would expect higher levels of competition for the executive to lead to higher a's. More generally, the move to more democratic regimes is likely to lead to more Checks and Balances and therefore a larger a. Since the Absence of Checks and Balance factor picks up this effect, it is not clear whether Factor 7 will capture it.

The rational institutional choice theory of Bueno de Mesquita *et al* (2003) also provide an alternative that works in the same direction. Their idea is that poor policy performance, where it is found, enhances the prospects of political survival, and good policy performance, as induced by democratic institutions, enhances political survival in democracies. "Selection" institutions select leaders. In pure democracies such an institution consists of a group of voters that elect the leader, while in other forms of government it consists of people who control enough instruments of power to keep the leader in office. Policy outcomes from these institutions are driven by the winning coalition. The leader must command the loyalty of a sufficient number of members in the winning coalition, else challengers can replace them.

Since private goods are distributed only to members of the winning coalition, this theory structurally establishes the causal connection between characteristics of the winning coalition and the parameter a which defines the terms at which the government is willing to trade off the public welfare for political contributions or private goods. As the size of the coalition increases, leaders rationally shift their focus to the provision of public goods to benefit all in society (leading to large a's).

But the extent of competition for the executive, and the fall in the probability of being reelected associated with it, also imposes some limits on the extent to which policy makers are willing to trade

[17]See Beck *et al.*) (2000) for more details.

off short term political gains for long term social welfare, especially in the presence of asymmetric information regarding the benefits of policies that will provide future returns (Bardhan and Yang, 2004). Thus, in this setting a higher degree of competitiveness for the executive can lead to lower levels of a. Whether this effect dominates the ones discussed above is an empirical question.

Factor 8: Party Concentration

Just as in the case of Factor 7, a higher degree of concentration in the number of seats in parliament indicates two forces at play. On the one hand, a more concentrated parliament implies fewer checks and balances, but also a higher probability of being reelected, which allows policy makers to undertake politically more risky policies. But this can produce greater long term economic returns, rather than maximize short run political rents. Again whether the Figuereido and the Bueno de Mesquita *etal*. view of the world dominates the Bardhan and Yang view is an empirical question.

5.2 Results

Since there is wide variation in the measurement of a (Table 1.1), in order to provide results that are robust to departures from the usual econometric assumptions about the distribution of the dependent variable, we investigate determinants of a variety of transformations of a. We begin in Table 4 with OLS estimates from six model specifications. The dependent variable in the first model is a transformation of a that maps the a estimates to the unit interval. This transformation mutes the influence of large values of a which might otherwise exert undue influence over the regression results (the value of this variable is 1 for Hong Kong). The adjusted R-squared of 0.66 indicates that the eight factors adequately explain the variation in "a in [0,1]". Except for factor 3 (UK-French Legal Origin) and factor 8 (Legislature), all other factors are statistically significant at the 5% level. The coefficient of -0.038 on the first factor indicates that countries in which the largest government party or other government parties are agenda-driven are less welfare-oriented than governments that do not represent rural, religious, regional or nationalist interests.

The dependent variable in the second model is the inverse of a. While this transformation also mutes the influence of large values of a (the value of this variable is 0.0001 for Hong Kong), unlike the unit-interval transformation it plays up observations with small values (the first column of countries in Table 1.2) of a. In this model, only three of the eight factors are statistically significant. The absence of checks and balances leads to lower a's (or higher $1/a$'s), higher scores on the Income

and Economy Factor and higher scores on the Urbanization factor both cause higher a's. The third model indicates that the statistical significance of the coefficients on the three factors are robust to measuring the dependent variable as the log transformation of a (the value of this variable for Hong Kong is 9.21). This third dependent variable also mutes the influence of large a's but not as much as the other two transformations.

The last three models in Table 4, labeled (4)-(6), have the same dependent variables as models (1)-(3), respectively, but add the eight variables that were considered to be unique, that is, which failed to be explained adequately by the eight factors. Interestingly, none of these unique variables are statistically significant across models (4)-(6). The Akaike and the Bayes information criteria (AIC, BIC) for comparing models penalize excessive parametrization. They both heavily favor the abridged models. None of the unique factors are statistically significant across the three models. Even where they are, the AIC and BIC indicate a preference for the smaller model (Model 4 vs. Model 1). In the presence of the eight factors, the unique factors do not add significant explanatory power. Therefore all the subsequent econometric analysis is based on models with the eight factors only.

Across the six models in Table 4 the most robust results are the statistically significant coefficients on factors F4 (Absence of Checks & Balances), F5 (Income &Economy) and F6 (Urbanization), and to a lesser extent those on factors F7 (Competition for the Executive) and F8 (Party Concentration). We use them to infer about the validity of theories that are measurable by these factors.

The coefficient on Factor F4, the Absence of Checks & Balances factor, are line with those predicted by different theories (Elgie's theory of divided government, the Elgie-Tsebelis combination of veto player theories, Besley's theory of political selection, and de Figuereido's theory of political turnover), which all predict (through different mechanisms) that the Absence of Checks & Balances is likely to lead to lower levels of a.

The positive coefficient on factor F5, the Income & Economy factor, affirms Besley's quality-of-candidates theory posits that if people in fact select into lower-paying political careers in high-income countries when they could exercise their more lucrative outside options, then it also must be the case that their public service motivation is much higher, on average, than the pool of political candidates in low income countries who have few outside options.

The effect of the Urbanization factor (F6) is robust across a variety of models. The positive coefficient indicates that the higher is Urbanization, the greater is a. In an empirical study of the determinants of democracy Barro (1999) finds that, for a given standard of living, democracy falls with urbanization. If this were true then there is no particular a priori reason why dictatorship would be associated with small a's and democracies large a's. The constitution behind the democracy or autocracy or dictatorship, we believe, determines that relationship. Pushing Barro's argument further, if greater urbanization lowers the democracy score for countries, which then tend to autocracies or dictatorships with small selectorates, then we would expect large a's to be related with *lower* levels of urbanization. Our results show exactly the converse is true. We therefore favor the urbanization-as-incentives mechanism in the Black-Henderson model as the candidate explanation for our result. In general, governments do take advantage of local dynamic externalities that occur through urbanization by providing the complementary public goods. Barro's finding of an inverse correlation between democracy and urbanization, does not imply that urbanization leads to smaller a's. In other words, democracy per se does not determine whether a cross-section of countries will have large or small a's. Indeed, we see in our sample many countries with high a's that are either dictatorships or socialist emerging countries (e.g. China, Latvia, Poland). Part of this puzzle can be explained by Barro's finding that growth is stimulated in new democracies that have transitioned from dictatorships because the benefits from the new limitations on government power are significant. But where a moderate amount of democracy has already been achieved, further democracy, impairs growth due to more social programs that redistribute resources. Therefore, our finding is consistent with the theory – beyond a certain level of democracy we see low a's.

The negative coefficient on the Competition in Executive factor (F7) provides support to the Bardhan and Yang view of the world, rather than de Figuereido or Bueno de Mesquita *et al*: high degrees of competition for the executive leads to a lower value of a, as policy makers maximize the short term political rents as the probability of being reelected gets smaller. The fact that Figuereido and Bueno de Mesquita *et al* theories may not be captured by this factor can also be explained by the fact that Absence of Checks and Balances (Factor 4), and Income & Economic Opportunities (Factor F5) may be partly capturing the forces through which these theories work. Note also that this empirical finding is not robust across the three measures of a.

The positive coefficient on the Party Concentration factor (F8) also provides support to the Bardhan and Yang view of the world, rather than the alternatives offered by de Figuereido and Bueno de Mesquita *et al*: a higher degree of concentration in the share of seats hold by different parties in

parliament leads to higher levels of a, but results are again statistically not very robust.

Table 5 reports standardized beta coefficients which are coefficients from the regression of the standardized $z-$scores of the dependent variable on the independent variables. They convey the economic and political significance of the factors, as distinct from their statistical significance. Thus, the Absence of Checks, Income & Economy, and Urbanization factors are the most influential determinants of the tradeoff parameter a.

Table 6 investigates the robustness of our results further by eliminating the influence of possibly large values of a. Therefore, the a's are trimmed to equal 100 if their value exceeds 100. Three variables are constructed based on this trimmed a. The first is a standardized value of a, denoted $a01$, with sample mean 0 and standard deviation of 1; the second is the simple rank of a across the sample; and the third is the log of the trimmed a. Standardizing or trimming a yields qualitatively the same inferences as before. When a is measured as a ranking, therefore ignoring the difference in magnitudes of a across the sample, our earlier inference remain valid. In addition, however, Competition for the Executive (factor F7) and Party Concentration (factor F8) become statistically significant, and provide support for the Bardhan and Yang (2004) view of the world. The $\ln(a)$ results naturally compare with their counterparts in Table 4. They are quite close, indicating that large a's are not really influential in the sense of altering our earlier inferences.

We finally present quartile regressions of a on the eight factors presented in Table 7. These regressions minimize the sum of mean absolute deviations rather than the sum of squared errors as in OLS. Thus, these regressions protect against the influence of outlier. Not surprisingly, the three factors – Absence of Checks, Income & Economy, and Urbanization continue to be statistically robust determinants of a. But also Competition for the Executive and Party Concentration emerge as statistically significant factors once mean absolute deviation is used as the criterion function rather than least squares. We believe these results legitimize their inclusion in the set of factors that importantly determine the cross-country variation in a.

Sensitivity Analysis

The models estimated convey the robustness of the results to a variety of specifications. In addition we performed the following three additional sensitivity tests. First, the dependent variables are themselves estimates from the Grossman-Helpman regression. Unconditionally, their values are

independent draws from distributions with known standard error. If this were the only source of variation in the data, weighted least squares estimates with weights equal to the inverse of the variance in the estimates of the dependent variable are appropriate. Since the standard error of $1/a$ is known from the Grossman-Helpman regressions, the delta method was used to compute the variance in the variables $a01$ and $\ln(a)$. The weighted least squares estimates are remarkably robust to the weighting. There is not a single coefficient with a sign change compared to those in Table 4. There are some small differences in statistical significance, in particular Absence of Checks and Balances is no longer significant across the six specifications.[18]

The second type of sensitivity analyzes explores the robustness of results to considering all European Union (EU) countries as one observation. Indeed, given that the EU countries are a customs union and that many policy decisions are undertaken at the community level it seems appropriate to check whether results are sensitive to the disaggregation of the EU to its member countries. The estimated coefficients are qualitatively and quantitatively robust to the aggregation of EU members into one observation.

The third type of sensitivity analysis investigates the exogeneity of the factors, which is required for the OLS estimates to be consistent. Otherwise the error term is correlated with the factors, which leads to unbiased estimates. We use as instruments Acemoglu et al. (2001) settler mortality rates in the 19th century and average protection against expropriation risk for the period 1985-1995. Because we only have 2 instruments, we can only correct for the bias in 2 factors. We chose these two factors to be the ones that are robust across specifications: the Income factor and the Absence of Checks & Balances factor.[19] Since by construction other factors are uncorrelated with these 2, the failure to instrument for other factors does not affect the estimates for the Income factor and the Absence of Checks & Balances factor.

The results from Table 4 (base regressions) and Table 6 (trimmed regressions) stay affirmed quan-

[18]Note that the $t-$values in Table 4 are computed using robust standard errors which take account of an unspecified form of heteroscedasticity in the error term. In contrast, the weighted least squares estimates commit to a specific term of heteroscedasticity using information about the known variance in the dependent variable. In fact, we presume that this measurement error is the only source of the variance in the error term, and we weight accordingly. The variance in the error term in a regression is probably due a mixture of the measurement error in the dependent variable and variance in the regression error. If the variance of the regression error overwhelms that of the measurement error in the measures of a, then the results from Table 4 are appropriate, while the weighted estimates are more relevant if the measurement error dominates the variance in the regression error. Judgment about which of these two views is relevant, however, rests on prior, probably subjective, information.

[19]Note that for 30 countries we have Acemoglu et al. (2001) matching data, but for the other 25 countries we used the average of the nearest 2 neighbors.

titatively and qualitatively. The first stage results are also very good. The Income factor is well explained by protection from expropriation variable, and the Absence of Checks & Balances factor is well explained by settler mortality.

6. Conclusion

This paper has studied quantitatively the welfare-mindedness of governments, having observed government behavior through the lens of trade policy determination. Our analysis suggests a very substantial variation in government behavior in the cross-section of (over fifty) countries that we have studied. The variation broadly matches our *a priori* beliefs regarding the weight governments put on social welfare relative to industry lobbying in their policy decisions. They are also consistent with the Transparency International perception index of corruption.

More importantly, the determinants of this variation were studied using a large set of political and institutional variables. Our results suggest that political institutions that have a larger number of checks and balances embedded in the decision making process, together with economic growth, cause more welfare minded governments. The degree of urbanization and, to some extent, the degree of competition for the executive and the level of party concentration are also important determinants of the weight governments put on social welfare when making trade policy decisions. A variety of sensitivity checks indicate the econometric sturdiness of these results.

While the analysis establishes the quantitative significance and robustness of the association between these institutional factors and government behavior, and is consistent with a wide variety of existing institutional theories, it is not structural in nature. The results of this paper encourage the development of econometrically amenable theoretical structures linking government behavior and institutions in future research. Finally, the results of this paper inform in influential emerging literature seeking to explain liberalizations. The accepted wisdom is that large shocks are the main source and motive for liberalizations. We suggest a political economy approach to thinking about liberalizations. Specifically, trade liberalizations may be traced to increases in a. The results in this paper suggest, in contrast to the shocks hypothesis, that it is more fundamental changes in the underlying factors where the source of recent liberalization episodes across the world may be found.

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Appendix: Detailed Variable Definitions (from Beck et al 2001; La Porta et al. 1999)

FINITTRM: Is there a finite term in office? (1 if yes, O if no). Is there a constitutional limit on the number of years the executive can serve before new elections must be called? Deviating from the convention, a 0 is recorded if a limit is not explicitly stated. This gets a 0 in the cases where the constitution with year limits is suspended or unenforced.

HERFGOV: Herfindahl Index Government
The sum of the squared seat shares of all parties in the government. Equals NA if there is no parliament. If there are any government parties where seats are unknown (cell is blank), the Herfindahl is also blank. No parties in the legislature results in a NA in the Herfindahl. In the case of "other" parties, Herfindahl divides the number of "other" seats by the number of "other" parties and uses this average for the size of the "other" parties. Independents are calculated as if they were individual parties with one seat each.

NUMGOV: # of Govt. Seats
Records the total number of seats held by all government parties. See Beck et al. for classification of parties into government and opposition. Because other variables are generated by formulas that reference this cell, a real number must always be reported. Therefore, when our conventions would call for a NA or blank, this variable gets a zero.

EXECSPEC:Executive special interests
This is a 1 if the party of the executive represents any special interests, i.e. if there EXECNAT, EXECRURL, EXECREG, or EXECREL equal 1). 0 otherwise, where
• EXECNAT (Nationalist)=1 if: (1) Party is listed as nationalist in Europa, Banks, or www.agora; (2) A primary component of the partys platform is the creation or defense of a national or ethnic identity. Examples: parties that have fought for independence, either militarily or politically, from a colonial power; advocates persecution of minorities; is listed as "xenophobic" on the Agora website.
• EXECRURL (Rural)=1 if: words such as "Rural" or "Peasant" appear in the partys name. Alternatively, if sources list rural issues as a key component of the partys platform, or if farmers are a key party constituency.
• EXECREG (Regional)=1 if: rural issues are a key component of the partys platform, or if farmers are a key party constituency.
• EXECREL (Religious)=1 if: CH:Christian, CA: Catholic, IS: Islamic, HD: Hindu, BD: Buddhist,

JW: Jewish, 0: otherwise). All parties that are called Christian-Democratic are listed as "Christian". "Islamic" only recorded if (1) The chief executive is also a religious leader, and (2) That religion is Islam. In all other cases, platform and constituency are main indicators. Otherwise, 0.

GOVSPEC:Government special interests
This is a 1 if the party of the largest government party represents any special interests (i.e. if there is a 1 in GOVNAT, GOVRURL, GOVREG, or GOVREL defined similarly as above). 0 otherwise.

COALSPEC: Coalition special interests
This is a 1 if the 2nd or 3rd government parties represent any special interests (National, Rural, Green). 0 otherwise.

EIEC : Executive Index of Political Competitiveness
Executives who are: (1) Elected directly by population, or (2) Elected by an electoral college that is elected by the people and has the sole purpose of electing the executive, are scored on the above scale.
• Executives elected by bodies other than these are given the same score that the electing body would get. Even if the electing body is not the actual "legislature" that is tracked in the LIEC (such as an appointed electoral college), the competitiveness of that body is used to score the executive.
• This means that competitively elected prime ministers get 6 or 7. The chief executives of Communist nations (the chairman of the Communist Party) is given a 3, because they are elected by the Party Congress, electing bodies which they do not appoint. Executives elected by small, appointed juntas or by appointed electoral colleges get 2.
• Rival chief executives in one country, particularly in the setting of armed conflicts, are counted as No executives, and thus score a 1.
• Referenda and votes by "popular acclamation" on unelected executives are scored as 3.
• If executives unilaterally extend their terms of office, they get a 2 starting in the year they should have held elections. Any executive elected for life, even by the people or an elected assembly, gets a 2. This elected-for-life rule is slightly different from that followed for legislatures that unilaterally extend their rule.

LIEC : Legislative Index of Political Competitiveness
Scale: No legislature: 1 Unelected legislature: 2 Elected, 1 candidate: 3 1 party, multiple candidates: 4 multiple parties are legal but only one party won seats: 5 multiple parties DID win seats but the largest party received more than 75the seats: 6 largest party got less than 75
• In the case of "Front" parties (as in many Communist nations), the same criteria as in the legislature is used to separate single from multiple parties.

• Voting irregularities are picked up elsewhere, and are ignored here.
• If an elected legislature exists but parties are banned (i.e. a legislature made up of independents), the legislature gets a 4.
• Constituent assemblies, if convened for the sole purpose of drafting a constitution, are not counted as legislatures (i.e. system gets a 1 if there are no other assemblies).
• Appointed advisory councils (frequently used in the Middle East and North Africa) are given a 2, but only if they have legislative power.
• If it is unclear whether there is competition among elected legislators in a single-party system, a "3.5" is recorded.
• If multiple parties won seats but it is unclear how many the largest party got, a "6.5" is recorded.
• If it is not clear whether multiple parties ran and only one party won or multiple parties ran and won more than 75% of the seats, a "5.5" is recorded
• Assemblies that are elected with indefinite (or life-long) terms are scored based on their competitiveness, then marked down by one.
• Assemblies that are elected by other groups are scored based on the competitiveness of those groups.
• If an assembly is partly elected and party appointed, the score is based on how the majority is decided.
• Assemblies operating under conditions of civil war or where there are power struggles within a country, with the result that its institutions do not control most of the territory or the most important parts of the territory, are scored as 1. This is irrespective of how competitively the assembly has been elected and its formal powers.
• Even if the right to vote or the right to run for office is restricted to a small sub-group of the population, it is still scored according to the normal system.

FRAUD: Were vote fraud or candidate intimidation serious enough to affect the outcome of elections?
This variable captures extra-constitutional irregularities, which are recorded only if mentioned in sources. 0 reported for countries where, for example, opposition parties are officially and constitutionally banned or where irregularities are not mentioned (although may still exist); "1" when opposition is officially legal but suppressed anyway. If not an election year, or if elected government has been deposed, refers to most recent election (i.e. the only way to get rid of a "1" is to hold a fair election). Recording is irrespective of whether only opposition claims that fraudulent elections have occurred or whether allegations are backed by independent international observers. Recorded also are any forms of boycotts carried out by important parties before or after parliamentary elections. In the cases where irregularities are mentioned in the text of the sources, they were recorded.

TENLONG: Longest tenure of a veto player
Measures the tenure of the veto player with the longest tenure. If LIEC is less than 5, then only the chief executives years in office are counted. Otherwise, In presidential systems, veto players are defined as the president and the largest party in the legislature. In parliamentary systems, the veto players are defined as the PM and the three largest government parties.

TENSHORT: Shortest tenure of a veto player
Measures the tenure of the veto player with the shortest tenure. If LIEC is less than 5, then only the chief executives years in office are counted. In presidential systems, veto players are defined as the president and the largest party in the legislature. The shorter tenure between these two is taken as the value of this variable. In parliamentary systems, the veto players are defined as the PM and the three largest government parties.

CHECKS : equals one if LIEC OR EIEC is less than 5 countries where legislatures are not competitively elected are considered countries where only the executive wields a check.
In countries where LIEC and EIEC are greater than or equal to 5:
CHECKS is incremented by one if there is a chief executive; is incremented by one if the chief executive is competitively elected; is incremented by one if the opposition controls the legislature.
In presidential systems, CHECKS is incremented by one: for each chamber of the legislature UNLESS the presidents party has a majority in the lower house AND a closed list system is in effect (implying stronger presidential control of his/her party, and therefore of the legislature).
For each party coded as allied with the presidents party and which has an ideological (left-right-center) orientation closer to that of the main opposition party than to that of the presidents party.
In parliamentary systems, CHECKS is incremented by one:
For every party in the government coalition as long as the parties are needed to maintain a majority (the previous version of CHECKS Checks3 in DPI3 incremented by one for each of the three largest parties in the government coalition, regardless of whether they were needed for a legislative majority).
For every party in the government coalition that has a position on economic issues (right-left-center) closer to the largest opposition party than to the party of the executive. In parliamentary systems, the prime ministers party is not counted as a check if there is a closed rule in place the prime minister is presumed in this case to control the party fully.

STABS: This counts the percent of veto players who drop from the government in any given year. Veto players are defined as in CHECKS. If LIEC is less than 5 in year t-1, then it is assumed that the only veto player in year t-1 is the executive. STABS in year t is 1 if chief executive changes in year t, 0 otherwise.

If LIEC is 5 or greater: In presidential systems, if the president does not control the legislature (via closed list and a majority), then veto players are the president, and each chamber. If presidents gain control of the legislature in time t, then the chambers are counted as no longer being veto players. Similarly, if the president changes. If the largest opposition party has a majority in the legislature in time t-1 but not in time t, a change in veto players is again recorded. If the largest government party has a majority in the legislature (and there is no closed list) in time t-1 but not in time t, a change in veto player is again recorded.
In parliamentary systems, if members of the government coalition in t-1 are no longer in government in t, that number of veto players changes. Similarly if the prime minister changes. If an opposition party has a majority in t-1 but that same party does not have a majority in t, then one veto player is said to have dropped. If parliamentary systems go from no government majority or no closed list to government majority and closed list in time t, then the chambers are counted as no longer being veto players.

AUTON: Are there contiguous autonomous regions?
Autonomous regions are not the same as states, provinces, etc. An autonomous region is recorded if a source explicitly mentions a region, area, or district that is autonomous or self-governing. Autonomous regions are required to be contiguous with the country to which they belong, on the presumption that such regions are more likely to impose a check on central government decision making than would non-contiguous regions. Hence, the Basque region in Spain and Montenegro in Yugoslavia are counted as autonomous regions, but Northern Ireland, Hong Kong, Puerto Rico are not. Furthermore, they must be constitutionally designated as "autonomous" or "independent" or "special". Federal Districts or Capital Districts do not count as autonomous regions. Disputed autonomy is not recorded. Indian reservations are not counted as autonomous. Deviating from convention, no information recorded as 0.

MDMH: Mean District Magnitude (MDM), House.
The weighted average of the number of representatives elected by each constituency size, if available. If not, the number of seats divided by the number of constituencies (if both are known) is used. If the constituencies are the provincial or state divisions, the number of states or provinces is used to make this calculation. If the only information on the number of constituencies comes from the Inter Parliamentary Union (IPU), and the constituencies are not the states/provinces, then IPUs number is used to calculate the Mean District Magnitude for 1995.
If there are no positive data on district magnitude, it is extrapolated backwards from the last year for which positive data exists, until there is a constitutional overhaul or an electoral law change. MDMH is not measured where there is no legislature. Information about constitutional

and electoral law changes were obtained through Europa and Political Handbook yearbooks, as well as online sources (ACE Project, 1upinfo.com).

AVELF: Average value of five different indices of ethnolinguistic fractionalization. Its value ranges fro 0 to 1. The five component indices are (1) index of ethnolinguistic fractionalization in 1960. which measures the probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group (the index is based on the number and size of population groups as distinguished by their ethnic and linguistic status); (2) probability of two randomly selected individuals speaking different languages; (3) probability of two randomly selected individuals do not speak the same language; (4) percent of the population not speaking the official language; (5) percent of the population not speaking the most widely sued languages.

CATHO80 The percentage of the population of each country that belonged to the Catholic Religion in the World of 1980. The numbers are in percent (scale from 0 to 100).

LEGAL ORIGIN: Identifies the legal origin of the Company Law or Commercial Code of each country. There are five possible origins. (1) English Common Law; (2) French Commercial Code; (3) German Commercial Code; (4) Scandinavian Commercial Code; (5) Socialist/Communist laws. With the exception of the fourth origin, all origins are considered here.
legor_uk: English legal origin
legor_fr: French legal origin
legor_so: Socialist legal origin
legor_ge: German legal origin

F_REGU97: Business Regulation Index: A rating of regulation policies related to opening a business and keeping open a business (on a scale from 1 to 5). Higher score means that regulations are straight-forward and applied uniformly to all businesses and that regulation are less of a burden to business.

NO_CPM80: The percentage of the population of each country that is neither Catholic, Protestant, nor Muslim. The numbers are in percent (scale from 0 to 100).

Table 1.1: Estimates of *a*

	Country	ccode	1/*a*	se(1/*a*)	*a*
1	Argentina	ARG	0.19	0.02	5.25
2	Austria	AUS	0.11	0.01	8.79
3	Bangladesh	BGD	6.34	2.27	0.16
4	Bolivia	BOL	1.47	0.20	0.68
5	Brazil	BRA	0.04	0.00	24.91
6	Chile	CHL	0.21	0.02	4.83
7	China	CHN	0.12	0.01	8.33
8	Cameroon	CMR	3.31	2.54	0.30
9	Colombia	COL	0.13	0.01	7.88
10	Costa Rica	CRI	0.50	0.07	1.98
11	Germany	DEU	0.09	0.01	11.55
12	Denmark	DNK	0.12	0.01	8.10
13	Ecuador	ECU	0.81	0.14	1.23
14	Egypt	EGY	0.80	0.18	1.24
15	Spain	ESP	0.07	0.00	15.16
16	Ethiopia	ETH	5.92	2.26	0.17
17	Finland	FIN	0.09	0.01	10.57
18	France	FRA	0.09	0.01	10.96
19	U.K.	GBR	0.08	0.01	11.86
20	Greece	GRC	0.20	0.02	5.11
21	Guatemala	GTM	0.65	0.08	1.53
22	Hongkong	HKG	**0.00**		**inf.**
23	Hungary	HUN	0.25	0.02	3.96
24	Indonesia	IDN	0.38	0.09	2.62
25	India	IND	0.37	0.05	2.72
26	Ireland	IRL	0.29	0.04	3.50
27	Italy	ITA	0.07	0.01	13.42
28	Japan	JPN	0.03	0.00	37.81
29	Kenya	KEN	1.16	0.33	0.86
30	Korea	KOR	0.06	0.00	16.15
31	Sri Lanka	LKA	1.08	0.18	0.93
32	Latvia	LVA	0.17	0.01	5.75
33	Morocco	MAR	0.87	0.14	1.14
34	Mexico	MEX	0.77	0.07	1.29
35	Malawi	MWI	3.93	1.17	0.25
36	Malaysia	MYS	0.32	0.02	3.13
37	Netherlands	NLD	0.35	0.05	2.85
38	Norway	NOR	0.24	0.05	4.22
39	Nepal	NPL	15.56	5.66	0.06
40	Pakistan	PAK	1.35	0.31	0.74
41	Peru	PER	0.21	0.03	4.85
42	Phillipines	PHL	0.35	0.03	2.84
43	Poland	POL	0.13	0.01	7.48
44	Romania	ROM	0.11	0.01	9.25
45	Singapore	SGP	0.00	0.00	404.29
46	Sweden	SWE	0.08	0.03	12.28
47	Thailand	THA	0.94	0.17	1.06
48	Trinidad and Tobago	TTO	0.90	0.16	1.11
49	Turkey	TUR	0.07	0.00	14.53
50	Taiwan	TWN	0.12	0.01	8.53
51	Uruguay	URY	0.28	0.02	3.62
52	United States	USA	0.04	0.01	26.14
53	Venezuela	VEN	0.18	0.01	5.41
54	South Africa	ZAF	0.19	0.02	5.13

Notes:

1. Hong Kong has zero tariffs. In the runs with 54 obs. (full sample) HKG's *a* is set to 10000.

Table 1.2: Countries ranked by their estimates of a

$a<1$		$2<a\leq1$		$3<a\leq5$		$5<a\leq10$		$10<a$	
Nepal	0.06	Thailand	1.06	Indonesia	2.62	Greece	5.11	Finland	10.57
Bangladesh	0.16	Trinidad and Tobago	1.11	India	2.72	South Africa	5.13	France	10.96
Ethiopia	0.17	Morocco	1.14	Phillipines	2.84	Argentina	5.25	Germany	11.55
Malawi	0.25	Ecuador	1.23	Netherlands	2.85	Venezuela	5.41	U.K.	11.86
Cameroon	0.30	Egypt	1.24	Malaysia	3.13	Latvia	5.75	Sweden	12.28
Bolivia	0.68	Mexico	1.29	Ireland	3.50	Poland	7.48	Italy	13.42
Pakistan	0.74	Guatemala	1.53	Uruguay	3.62	Colombia	7.88	Turkey	14.53
Kenya	0.86	Costa Rica	1.98	Hungary	3.96	Denmark	8.10	Spain	15.16
Sri Lanka	0.93			Norway	4.22	China	8.33	Korea	16.15
				Chile	4.83	Taiwan	8.53	Brazil	24.91
				Peru	4.85	Austria	8.79	United States	26.14
						Romania	9.25	Japan	37.81
								Singapore	404.00
								Hongkong	∞

Table 2.1: Variable Description and Descriptive Statistics

Source	Variable	Description	Mean	sd	Min	Max
Estimated	$1/a$	Estimate from Grossman-Helpman model	0.97	2.40	0.00	15.56
Estimated	se($1/a$)	standard error of $1/a$	0.31	0.93	0.00	5.66
Estimated	a 01	a transformed to lie in unit interval	0.73	0.25	0.06	1.00
Estimated	ln(a)	log of a	1.43	1.87	-2.81	9.21
WDR	PCI95	Per capita income, 1995.	10.00	11.77	0.11	42.71
WDR	URBAN	% of population living in urban area	0.61	0.24	0.10	1.00
DPI	FINITTRM	1 if finite term in office, 0 otherwise	0.95	0.17	0.00	1.00
DPI	HERFGOV	Herfindahl index of number of parties in government	0.74	0.22	0.28	1.00
DPI	NUMGOV	Number of seats (constituencies)	218.35	394.64	22	2978
DPI	EXECSPEC	1 if executive's party is issue driven (religious, rural, regional, nationalist), 0 otherwise	0.16	0.30	0.00	1.00
DPI	GOVSPEC	1 if government's party is issue driven (religious, rural, regional, nationalist), 0 otherwise	0.16	0.31	0.00	1.00
DPI	COALSPEC	1 if coalition's party is issue driven (religious, rural, regional, nationalist), 0 otherwise	0.29	0.33	0.00	1.00
DPI	EIEC	Executive index of political competitiveness	6.39	1.21	2.00	7.00
DPI	FRAUD	1 if vote fraud/ candidate intimidation serious enough to affect election outcome, 0 otherwise	0.08	0.22	0.00	1.00
DPI	TENLONG	Longest tenure of a veto player (see definition of veto player in Notes below)	7.94	6.55	1.89	34.00
DPI	TENSHORT	Shortest tenure of a veto player	3.97	3.25	1.27	15.73
DPI	CHECKS	Number of veto players	3.62	1.49	1.00	9.73
DPI	STABS	% of veto players dropping from government (averaged over 10 years)	0.16	0.11	0.00	0.39
DPI	AUTON	1 if there exist autonomous regions inside the country, 0 otherwise	0.11	0.32	0.00	1.00
DPI	MDMH_N	Mean district magnitude, House	11.54	24.34	0.90	150.00
QOG	AVELF	Average value of five indices of ethnolinguistic fractionalization	0.27	0.26	0.00	0.85
QOG	CATHO80	% population of a country that is catholic, 1980	37.01	39.10	0.00	96.90
QOG	LEGOR_UK	1 if English legal origin of commercial code, 0 otherwise	0.33	0.48	0.00	1.00
QOG	LEGOR_FR	1 if French legal origin of commercial code, 0 otherwise	0.44	0.50	0.00	1.00
QOG	LEGOR_SO	1 if Socialist legal origin of commercial code, 0 otherwise	0.09	0.29	0.00	1.00
QOG	LEGOR_GE	1 if German legal origin of commercial code, 0 otherwise	0.06	0.23	0.00	1.00
QOG	F_REGU97	Business regulation index, 1997. range: 1-5, 5 indicates ease of starting and doing business.	3.00	0.91	1.00	5.00
QOG	NO_CPM80	100-Catholic%-Protestant%-Muslim% (in 1980)	35.73	34.27	0.40	98.50

Notes:

1. All statistics for 54 countries. Since Hong Kong has zero tariffs, it's a ia set to 10000.

2. Sources: (i) DPI refers to Database on Political Institutions (Keefer et al 2001), (ii) QOG refers to Quality of Governments data used in La Porta et al. (1999), and (iii) WDR refers to various issues of the World Development Report.

3. Veto players: In presidential systems, veto players are defined as the president and the largest party in the legislature. In parliamentary systems, veto players are defined as the prime minister and the three largest government parties.

4. See appendix for detailed definitions and origianl sources.

Table 2.2: Institutional variables in the analysis and their associations with other institutional variables

Variables used in analysis	Also correlated with (correlation)									
PCI95	newspc(.8)	catho80(-0.5)	tensys(0.7)	corrupt(0.7)	lmorinfa(-0.9)	demo_av(0.7)	f_prop97(0.6)	gini(-0.7)	lscho_av(0.5)	gg_pop(0.5)
URBAN	laf(0.5)	finitrm(0.7)	tenshort(0.5)							
FINITTRM										
HERFGOV	govfrac(-1.0)	govothst(-0.6)	hefopp(0.6)							
NUMGOV										
EXECSPEC	govspec(0.9)									
GOVSPEC	execspec(0.9)									
COALSPEC	legor_sc(0.6)	protmg80(0.5)								
EIEC	liec(0.9)	muslim80(-0.8)	polariz(0.5)	pright(0.7)	demo_av(0.6)	mil_g(-0.6)				
FRAUD	avelf(0.5)									
TENLONG	tenshort(0.7)	muslim80(0.6)	f_regu97(0.6)							
TENSHORT	tenlong(0.7)	urban(0.5)								
CHECKS	polariz(0.5)									
STABS	stabns(1.0)									
AUTON	unemp(0.5)									
MDMH_N										
AVELF	fraud(0.5)									
CATHO80	pci95(-0.5)	protmg80(-0.6)	legor_fr(0.7)	f_prop97	no_cpm80(-0.7)					
LEGOR_UK	legor_fr(-0.6)	no_cpm80(0.5)								
LEGOR_FR	legor_uk(-0.6)	lschvo_av(-0.6)	corrupt(-0.6)	catho80(0.8)	no_cpm80(-0.5)					
LEGOR_SO	fi_2b_av(-0.6)									
LEGOR_GE	no_cpm80(0.5)									
F_REGU97	mil_g(-0.5)									
NO_CPM80	polariz(-0.5)	housessys_n(0.5)	catho80(-0.7)	legor_uk(0.5)	legor_fr(-0.5)	legor_ge(0.5)				

Note: The desciption for the variables that were not listed in Table 2.1 is as follows. Newspc is per capita newspaper in circulation from World Development Indicators (WDI); catho80 is the percentage of catholic in the population in 1980; tensys is the tenure of the government in democratic regimes, and tenure of chief executive in non democratic regimes; corrupt is transparency international index of perceived corruption, where a large value of the index indicates little corruption; lmorinfa is the log of infant mortality from WDI; demo_av is the average democracy index over the period; f_prop97 is a property right index; gini is the index of income inequality from WDI; lschvo_av is the log of (1+average year of school attainment during the period 1985-1990; gg_pop is the ratio of average government wages and GDP per capita; govfract is the probability that two deputies randomly picked are from the same party; govothst is the total number of seats held by deputies from parties not belonging to the government; hefopp is the herfindhal index for the opposition; legor_sc stands for scandinavian legal origin; protmg80 is the share of the non-religious population; liec is a legislative index of electoral competitiveness; muslim80 is the precentage of muslims in the population in 1980; polariz stands for polarization of parliamentary systems, and is measured as the maximum difference between the chief executive's party's value and the values of the three largest government parties and the largest opposition party.; pright is an index of political rights; mil_g is military spending as a share of GDP; stab_ns is the number of veto players in the main chamber (it does not include the second chamber) that dropped from the government in any given year; unemp is the level of unemployment; fi_2b_av is an index of the share of state-owned enterprise in the economy; and housesys_n takes the value 1 when the majority of the House seats are governed by plurality (winner takes all) rather than proportional representation.

Table 3.1: Testing for number of factors

Hypothesis tests to determine number of factors (*k*)

H1: 8 vs. zero factors. $\chi^2_{(192\ df)} = 775.66^{***}$, Prob > $\chi^2 = 0.0000$

H2: 8 vs. more than 8 factors. $\chi^2_{(112\ df)} = 127.81$, Prob > $\chi 2 = 0.146$

Table 3.2: Factor Analysis of Institutional Variables: Loadings and Names

	Factors and their Names								
	Issue Driven	**Socialist Law**	**UK-French Law**	**Absence of Checks & Balances**	**Income & Economy**	**Urbanization**	**Competion for Executive**	**Party concentration**	
Variable	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**Unique**
PCI95	0.05	-0.18	-0.15	-0.40	**0.73**	0.06	-0.05	0.06	0.25
URBAN	-0.02	-0.02	-0.28	-0.45	0.47	**0.61**	-0.12	0.00	0.11
FINITTRM	-0.16	0.07	0.03	-0.40	0.15	0.26	0.48	0.31	0.39
HERFGOV	0.23	-0.13	0.19	0.24	0.06	0.13	0.16	**0.60**	0.43
NUMGOV	-0.08	0.42	0.07	0.28	0.06	-0.08	-0.18	0.41	**0.52**
EXECSPEC	**1.00**	0.07	-0.06	0.00	0.00	0.00	0.00	0.00	0.00
GOVSPEC	**0.96**	-0.07	-0.04	0.02	0.00	0.00	-0.03	-0.04	0.07
COALSPEC	0.25	0.17	0.12	0.03	0.15	-0.41	-0.22	-0.47	0.43
EIEC	-0.27	-0.20	-0.02	**-0.71**	-0.03	0.07	**0.51**	-0.11	0.10
FRAUD	0.19	-0.01	-0.18	**0.45**	-0.16	-0.11	0.26	0.05	**0.62**
TENLONG	0.00	-0.22	-0.09	**0.70**	0.28	0.21	-0.19	-0.28	0.22
TENSHORT	0.17	-0.11	-0.10	**0.88**	0.27	0.11	0.23	-0.01	0.05
CHECKS	-0.19	-0.10	0.16	**-0.53**	0.02	-0.20	0.28	-0.19	0.49
STABS	-0.18	0.23	-0.06	-0.39	-0.26	-0.36	0.04	0.14	**0.53**
AUTON	0.03	0.12	-0.10	0.10	-0.17	0.00	-0.17	0.22	**0.86**
MDMH_N	0.02	0.04	-0.18	-0.03	0.04	0.20	0.13	-0.19	**0.87**
AVELF	0.15	-0.22	0.22	**0.43**	-0.37	-0.23	0.00	-0.10	**0.50**
CATHO80	-0.16	0.02	-0.36	-0.21	**-0.40**	0.48	0.24	-0.10	0.34
LEGOR_UK	0.29	-0.39	**0.87**	0.00	0.00	0.00	0.00	0.00	0.00
LEGOR_FR	-0.20	-0.16	**-0.73**	0.18	**-0.49**	0.31	-0.04	0.01	0.04
LEGOR_SO	-0.08	**0.98**	0.20	0.00	0.00	0.00	0.00	0.00	0.00
LEGOR_GE	0.00	-0.03	-0.21	-0.13	**0.52**	-0.27	0.08	0.13	**0.57**
F_REGU97	0.14	-0.16	0.13	-0.39	0.42	0.45	-0.35	-0.05	0.29
NO_CPM80	0.09	0.13	0.48	0.03	0.17	-0.22	-0.24	0.37	0.47

Notes:

1. Factor loadings and factor scores estimated by maximum likelihood.
2. Unique factors defined as those variables for which their correlation with the error [see eq. (12)] exceeds 0.50.
3. Names of factors based on loadings (and first-stage correlations).

Table 4: Determinants of a, OLS

		(1) a in [0,1]	(2) $1/a$	(3) Ln(a)	(4) a in [0,1]	(5) $1/a$	(6) Ln(a)
F1	Issue Driven Govt.	-0.038	0.279	0.115	-0.025	0.221	0.116
		(2.42)*	(1.41)	(0.39)	(1.31)	(1.10)	(0.40)
F2	Socialist Law	0.050	-0.339	0.172	0.013	-0.071	0.123
		(3.92)**	(1.66)	(1.71)	(0.53)	(0.31)	(0.61)
F3	UK-French Law	-0.033	0.453	-0.047	-0.041	0.636	-0.118
		(1.54)	(1.16)	(0.30)	(1.79)	(1.39)	(0.71)
F4	Absence of Checks	-0.101	0.406	-0.637	-0.106	0.691	-0.757
		(4.88)**	(2.76)**	(5.19)**	(3.63)**	(2.24)*	(4.12)**
F5	Income & Economy	0.125	-0.767	0.940	0.160	-1.106	1.158
		(6.91)**	(2.68)*	(7.05)**	(6.40)**	(2.52)*	(6.13)**
F6	Urbanization	0.112	-1.037	0.869	0.162	-1.538	1.164
		(4.79)**	(2.16)*	(4.08)**	(5.81)**	(2.26)*	(5.64)**
F7	Competition for executive	-0.038	0.086	-0.537	-0.027	-0.009	-0.536
		(2.63)*	(0.57)	(2.28)*	(1.48)	(0.05)	(1.92)
F8	Party concentration	0.031	0.169	0.403	-0.019	0.604	0.255
		(1.85)	(0.81)	(2.40)*	(0.71)	(1.38)	(0.81)
Unique	Autonomous regions				0.011	0.132	-0.008
					(0.70)	(1.02)	(0.05)
Unique	District magnitude				-0.010	0.202	-0.149
					(0.37)	(0.80)	(0.85)
Unique	# Government seats				0.062	-0.719	0.158
					(2.30)*	(1.87)	(0.69)
Unique	Vote fraud				0.020	-0.459	0.493
					(0.14)	(0.32)	(0.59)
Unique	Dropped veto players				0.080	-0.548	0.319
					(2.71)**	(1.70)	(1.39)
Unique	Ethnolinguistic fract.				0.037	-0.604	0.360
					(1.26)	(1.73)	(1.94)
Unique	German legal origin				0.004	-0.036	0.192
					(0.04)	(0.03)	(0.33)
	Constant	0.727	0.967	1.432	0.726	1.004	1.384
		(37.10)**	(3.42)**	(8.94)**	(33.44)**	(2.86)**	(7.58)**
	N	54	54	54	54	54	54
	Adjusted R^2	0.66	0.25	0.60	0.70	0.21	0.58
	log likelihood	32.94	-111.24	-80.49	40.88	-108.11	-77.62
	AIC	-47.87	240.49	178.98	-49.77	248.21	187.25
	BIC	-29.97	258.39	196.89	-17.94	280.04	219.07

Notes:

1. Robust t-statistics in parentheses. * significant at 5%; ** significant at 1%

2. AIC=Akaike information criterion; BIC=Bayes information criterion
   AIC = -2 logl+2k, and BIC = -2 logl+ k*ln(N), where logl is the log likelihood,
   p =number of parameters estimated, and N is the number of observations.

Table 5: Beta Coefficients

		(1) a in [0,1]	(2) $1/a$	(3) Ln(a)
F1	Issue Driven Govt.	-0.16	0.12	0.06
F2	Socialist Law	0.20	-0.14	0.09
F3	UK-French Law	-0.14	0.19	-0.03
F4	Absence of Checks	**-0.40**	0.17	**-0.34**
F5	Income & Economy	**0.49**	**-0.31**	**0.49**
F6	Urbanization	**0.43**	**-0.41**	**0.44**
F7	Competition for executive	-0.14	0.03	-0.27
F8	Party concentration	0.11	0.06	0.19

Notes:

1. Beta coefficients are regression coefficients of the standardized dependent variable on standardized explanatory variables.

Table 6: Robustness to outliers I -- Trimmed *a*

	(1) stdz *a*	(2) Rank(*a*)	(3) Ln(*a*)
Issue Driven Govt.	0.167	-1.169	-0.120
	(0.85)	(1.21)	(0.96)
Socialist Law	-0.068	2.349	0.208
	(0.91)	(2.44)*	(2.62)*
UK-French Law	0.135	-1.739	-0.134
	(1.12)	(1.40)	(1.03)
Absence of Checks	-0.155	-6.618	-0.589
	(1.95)	(8.61)**	(6.27)**
Income & Economy	0.391	8.750	0.840
	(3.11)**	(7.59)**	(7.59)**
Urbanization	0.348	5.704	0.695
	(2.01)*	(4.46)**	(4.57)**
Competition for executive	-0.322	-3.188	-0.329
	(1.97)	(4.05)**	(3.12)**
Party concentration	0.243	3.994	0.282
	(2.03)*	(4.16)**	(2.91)**
Constant	0	27.500	1.321
	0	(21.70)**	(11.00)**
N	54	54	54
Adjusted R^2	0.36	0.65	0.66

Robust t-statistics in parentheses

* significant at 5%; ** significant at 1%

Trimmed *a*: $a = 100$ if $a > 100$

Table 7: Robusteness to Outliers II -- Median and Quartile Regressions of *a*

	(1) Median	(2) 1st Quartile	(3) 3rd Quartile
Issue Driven Govt.	0.496	0.009	1.368
	(1.24)	(0.05)	(0.66)
Socialist Law	0.017	0.490	0.054
	(0.04)	(1.74)	(0.04)
UK-French Law	-0.088	-0.323	1.179
	(0.22)	(1.20)	(0.61)
Absence of Checks	-1.884	-1.136	-3.890
	(5.94)**	(6.27)**	(2.47)*
Income & Economy	3.556	2.359	6.638
	(9.42)**	(9.92)**	(2.78)**
Urbanization	1.089	0.668	4.101
	(2.58)*	(2.36)*	(1.71)
Competition for executive	-1.122	-0.889	-3.677
	(2.69)**	(4.93)**	(1.92)
Party concentration	1.599	1.356	5.077
	(3.59)**	(6.53)**	(2.69)**
Constant	5.670	3.685	12.957
	(14.88)**	(13.69)**	(6.42)**
N	54	54	54

Absolute value of t-statistics in parentheses

* significant at 5%; ** significant at 1%

Dependent Variable: *a*