THE ECONOMIC EFFECTS OF CONSTITUTIONS: REPLICATING – AND EXTENDING – PERSSON AND TABELLINI

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Abstract

Persson and Tabellini (2003) show that presidential regimes and majoritarian election systems have important effects on fiscal policy, government effectiveness and productivity. Here, their dataset is extended in a number of ways: the number of countries included is increased from 85 to up to 116, and more recent data for both government effectiveness and productivity are used. In replicating and extending their analyses, we find that the effect of presidential regimes on all three groups of economic variables vanishes almost entirely. With regard to electoral systems, the original results are largely confirmed: majoritarian (as opposed to proportional) electoral systems lead to lower government expenditure, lower levels of rent seeking but also lower output per worker. The institutional details such as the proportion of candidates that are not elected via party lists and the district magnitude have proved to be of particular importance. The question whether societies can improve their lot by choosing specific constitutional rules remains open.

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1 Introduction

In their monograph "The Economic Effects of Constitutions", Torsten Persson and Guido Tabellini (for short PT, 2003) ask whether specific constitutional rules cause systematic differences in economic outcomes. More specifically, PT ask what economic effects two constitutional institutions, namely the form of government (presidential vs. parliamentary systems) and the electoral system (majoritarian vs. proportional, but also size of the electoral district, number of individual vs. list candidates) have on three groups of economically relevant variables: (1) fiscal policy (government expenditure, tax revenue, budget surplus, share of social welfare spending), (2) government efficiency (absence of corruption, graft) and (3) productivity (both labor and total factor productivity). Their results are striking: All else equal, presidential systems have significantly lower government expenditure than parliamentary systems, but also lower tax revenue, a lower budget deficit, and spend less on social and welfare programs. The results are similar – but substantially less significant – with regard to majoritarian systems. Most strikingly, if the presidential form of government and majoritarian electoral rules are combined, central government expenditure is more than 10 percent of GDP less than in the benchmark case of parliamentary government and proportional electoral rules!

With regard to government efficiency, PT find the size of the electoral district and the proportion of candidates not nominated via party lists to be hugely influential. The larger the district size and the higher the share of individual candidates, the higher government efficiency turns out to be. Finally, presidential systems seem to be rather inimical to improvements in both labor and total factor productivity. These results are, however, only significant on the ten percent level.

The book turned out to be an instant success. Simultaneously, the adequacy of the methods used by the two authors has been questioned. In his review for the *Journal of Economic Literature*, Daron Acemoglu (2005, 1033) writes: "If the results indeed correspond to the causal effects of the form of government and electoral rules on policies and economic outcomes as PT claim, we have learned more with this book than from the entire comparative politics literature of the past fifty years." Yet, Acemoglu believes the if to be very big and continues: "Despite these remarkable

results, there are reasons to question whether this research has successfully uncovered causal effects. The OLS and matching estimates ultimately rely on the exogeneity of political institutions. Nevertheless, political institutions are equilibrium outcomes, determined by various social factors that are not fully controlled for in the empirical models." Acemoglu's critique suggests that the search for better instruments ought to be on the agenda. Here, a different approach is chosen: PT rely on two data sets, their larger one encompasses 85 countries. We wanted to know whether their results are robust to the inclusion of additional countries. We extend their data set with up to 31 additional countries. It is noteworthy that the average of an indicator proxying for the degree of political rights and civil liberties that citizens enjoy (the Gastil Index) slighty improves as a consequence of this broader dataset.

Based on the broader dataset, we find that the effects of presidential systems on fiscal policies largely vanish, whereas the effects of electoral rules could be replicated. With regard to government efficiency, the results are less clear-cut than in the PT sample. In many regressions the indicators used to proxy for the characteristics of the electoral system are not significant anymore. Concerning output per worker, PT find that both presidential government forms as well as majoritarian electoral rules have marginally significant negative effects. As soon as our larger sample is used, the results resemble the other findings: the presidential variable loses its significance whereas the negative effect of majoritarian electoral systems on output per worker are largely confirmed. The significance of both the proportion of individual candidates as well as the size of the electoral district could also be reconfirmed.

The rest of the paper is organized as follows: section 2 summarizes the PT results in a little more detail, the following section describes the various extensions to the PT datasets. Section 4 contains both the replications of the original PT estimates as well as a number of extensions. Section 5 concludes and discusses a number of open questions.

2 Summarizing Persson and Tabellini

2.1 Preliminary Remarks

The most fundamental question of PT could be summarized as "Do constitutional rules have economically relevant effects?" More concretely, the authors ask whether different government forms (presidential vs. parliamentary systems) and electoral

systems (majoritarian vs. proportional, but also size of electoral districts and proportion of individual as opposed to list candidates) are correlated with a number of economically relevant variables. This section describes a number of theoretical conjectures according to which government form and electoral rules could have economically relevant effects (2.2), reports the criteria chosen by PT for ascertaining the two constitutional institutions as well as those used to choose the countries to be included in their database (2.3), depicts the dependent variables (2.4) and portrays the empirical results.

2.2 The Underlying Theory

Form of Government

The conjecture that presidential systems can systematically create incentives different from parliamentary systems is inspired by the concept of separation of powers. The basic idea is that in presidential systems, the separation of powers is stronger than in parliamentary ones. In order to remain in power, most presidents do not depend on the continued support of the majority of parliament. In most parliamentary systems, the chief executive does, however, depend on being able to secure a parliamentary majority. In a number of previous papers, Persson, Roland, and Tabellini (1997, 2000) had argued that it was easier for legislatures to collude with the executive in parliamentary systems which is why they expect both higher tax rates as well as higher corruption levels than in presidential systems. They further argue that the majority (of both voters and legislators) in parliamentary systems can pass spending programs whose benefits are clearly targeted at themselves, implying that they are able to make themselves better off to the detriment of the minority. This is why Persson, Roland and Tabellini (2000) predict that both taxes and government expenditures will be higher in parliamentary than in presidential systems.

Electoral Rules

The insight that electoral rules can have a crucial effect on the number of parties has been recognized for a long time. Duverger's (1954) observation that constitutions providing for first-past-the-post or majority rule often induce two party systems, whereas systems that provide for proportional representation often induce the existence of more parties has even been coined "Duverger's law" in order to express its general validity. Although this has been known for long, occupation with the economic consequences of electoral systems has just begun. It has been argued

(Austen-Smith 2000) that since the number of parties presented in parliament is higher under proportional representation, tax rates will not be decided upon by one single party but will be the result of legislative bargaining between a variety of parties with different constituents. This would explain that tax rates are, on average, higher under proportional representation than under majority rule. Lizzeri and Persico (2001) compare the composition of government spending under alternative electoral rules. They distinguish between the provision of a genuine public good on the one hand and of pork-barrel projects that serve redistributive purposes on the other and ask whether incentives to provide these goods differ systematically between systems with majority rule (called "winner-take-all systems" by them) and proportional representation. In majority rule systems, politicians have incentives to cater to the preferences of those who can help them to get the plurality of the votes. They will do so by promising pork barrel projects. In proportional representation systems, on the other hand, targeting makes less sense because every vote counts which is why politicians will provide more public goods. Their prediction is, hence, that the composition of the government budget will be different depending on the electoral regime.

PT deal with two additional aspects of electoral systems, namely (1) district size and (2) ballot structure. District size refers to the number of legislators of a voting district. Suppose single member districts are combined with plurality rule. Under such an institutional setting, a party only needs some 25% of the national vote to win the elections (50% of half of the districts; Buchanan and Tullock 1962). Contrast this with a single national district that is combined with proportional representation. Here, a party needs some 50% of the national vote to win. Persson and Tabellini (2000, ch. 9) argue that this gives parties under proportional representation strong incentives to offer general public goods, whereas parties under plurality rule have an incentive to focus on the swing states and promise policies that are specifically targeted on the constituents' preferences.

Milesi-Ferretti, Perotti, and Rostagno (2002) obtain a similar result. In large districts, legislators will primarily represent socioeconomic groups whereas in small districts, they will primarily represent geographical interests. Transfers would be a suitable instrument for paying allegiance to social constituencies whereas (local) public goods would be better suited for those paying geographical allegiance. They assume that in majoritarian systems just one representative is elected in each district, whereas in proportional systems, more than one representative is elected. Given this assumption, proportional systems will be spending more on transfers, whereas majoritarian

systems will be spending more on (local) public goods. They test their model with 20 OECD and 20 Latin American countries and find that, as predicted, transfers are higher under proportional representation. Going beyond the simple dichotomy between majoritarian and proportional systems, they find that higher degrees of proportionality are correlated with higher degrees of transfer spending (as opposed to public goods spending).

The effects of differences in the ballot structure is the last aspect of electoral systems to be considered. What is at stake here is how voters cast their ballots, i.e. whether they vote for individual candidates or for party lists. Often, majority rule systems rely on individual candidates, whereas proportional systems rely on party lists. Party lists can be interpreted as a common pool which means that individual candidates can be expected to invest less into their campaigns under proportional representation than under majority rule. Persson and Tabellini (2000, ch. 9) argue that corruption and political rents should be higher, the lower the ratio between individually elected legislators to legislators who are delegated by their parties.

2.3 Operationalizing Institutions

With regard to government forms, PT constructed a dummy variable which takes on a value of 1 in presidential regimes and 0 otherwise (PRES). All regimes in which the confidence of the lower house is not necessary for the executive to stay in power are defined as presidential, i.e. are coded 1. This implies that countries can be classified as presidential even if they do not have an elected president. Switzerland is, accordingly, coded as "presidential" although it does not have a directly elected president, whereas France is coded as "non presidential" because for his survival, the French prime minister depends on a confidence vote of parliament.

Concerning electoral rules, PT also constructed a dummy variable. If the entire lower house in a country is elected under plurality rule, it takes on the value of 1, 0 otherwise (MAJ). But relying exclusively on a dummy variable might be too coarse a brush. This is why PT constructed three more fine grained continuous measures: The first one is a proxy for the district magnitude defined here as the number of electoral districts divided by the number of legislators in the lower house. For the U.K., the variable MAGN takes on the value of 1, for Israel, which has one electoral district covering the entire nation, a value of close to 0. If all legislators are elected via party lists, voters will have a hard time monitoring their legislators, and it will be less risky

to be corrupt. This is why PT created a variable PIND that indicates the proportion of legislators elected by plurality rule via a vote on individuals (as opposed to party lists). For the U.K., it takes on the value of 1, for Poland the value of 0 because all of Poland's legislators are elected via party lists. PIND combines two criteria, namely plurality rule and proportion of legislators elected via vote on individuals. The variable PINDO is constructed to capture the differences of closed lists only. It is defined as the proportion of legislators in the lower house elected individually or on open lists. Here, the UK is still coded 1, but Poland now also receives a 1 because it votes on open lists.

Many formal rules are never enforced in reality. PT deal with this problem by introducing a cut-off criterion. Countries that do not meet it were not included into their sample. The cut-off criterion was the average of two indicators provided by the NGO Freedom House: political rights on the one hand and civil liberties on the other. PT call the average of these two indicators "GASTIL" commemorating the founder of the datasets. Freedom House codes the countries from 1 ("free") to 7 ("nonfree"). In order to be included in their sample, the average of this score had to be lower than 5 for the period from 1990 to 1998.

2.4 The Dependent Variables

PT deal with three groups of economically relevant variables, namely (1) fiscal policy, (2) rent extraction, and (3) productivity. In order to capture the effects of the constitutional institutions on fiscal policy, PT focus on the following variables (the panel covering the period from 1990 to 1998):

- Central government spending (social security included) as a percentage of GDP (CGEXP);
- Central government revenue as a percentage of GDP (CGREV);
- The level of social security and welfare spending by central government as a percentage of GDP (SSW);
- The size of the budget surplus of the central government as a percentage of GDP (SPL).

To operationalize their second group, i.e. rent extraction, PT rely on the following indicators:

- The average of the Corruption Perception Index as produced by Transparency International for the years 1995 to 2000 (recoded by PT such that 0 stands for perfectly clean and 10 for highly corrupt; CPI9500);
- A cluster of the governance indicators produced by Kaufmann et al. (1999) from the World Bank called "Graft" which is to capture the success of a society in developing an environment where fair and predictable rules form the basis of economic and social interactions, with perceptions of corruption playing a central role (GRAFT).
- Another cluster of the governance indicators is government effectiveness. It is to combine perceptions of quality of public service provision, the quality of a country's bureaucracy, the competence of civil servants, and their independence from political pressures (GOVEF).

Finally, the two measures for productivity employed by PT are straightforward, both are taken from Hall and Jones (1999):

- Labor productivity (i.e. output per worker) for 1988 (LOGYL);
- Total factor productivity also for 1988 (LOGA).

2.5 The Empirical Results

Government Form

PT's results are quite impressive: (1) Government spending is some 6% of GDP lower in presidential than in parliamentary systems. (2) The size of the welfare state is some two to three percent lower in presidential systems. (3) The influence of the government form on the budget deficit is rather marginal; the binary variable explains only a small proportion in the variation of budget deficits. (4) Presidential systems seem to have lower levels of corruption. (5) There are no significant differences in the level of government efficiency between the two forms of government. (6) Presidential systems seem to be a hindrance to increased productivity but this result is significant on the 10%-level only.

Electoral Rules

PT find that the electoral system has (economically and statistically) significant effects on a number of economic variables: (1) in majoritarian systems, central government expenditures are some 3% of GDP lower than in proportional

representation systems. (2) Expenditures for social services ("the welfare state") are some 2 to 3% lower in majoritarian systems. (3) The budget deficit in majoritarian systems is some 1 to 2% below that of systems with proportional representation. (4) A higher proportion of individually elected candidates does indeed lead to lower levels of (perceived) corruption. (5) Countries with smaller electoral districts tend to have more corruption. (6) A higher proportion of individually elected candidates leads to higher output per worker. (7) Likewise, countries with smaller electoral districts tend to have lower output per worker.

These results are stunning indeed. PT claim that the consequences of presidential regimes and majoritarian electoral systems are largely additive. If a parliamentary proportional country introduced a presidential-majoritarian system, government size would be decreased by a "whopping 10% of GDP" (PT 160). In the next section, we want to ask a number of questions regarding their approach, discuss a number of possible extensions and present some extensions factually carried out here.

3 Extensions

3.1 Possible Extensions

At least four possible extensions come to mind: (1) the robustness of the results given that the codings are slightly modified, sample size is changed, outliers are included/excluded and the period for which the coefficients are estimated is changed. (2) Inclusion of additional control variables might change the results. (3) Given that the constitutional variables have any effects on the chosen dependent variables, one would like to know more about the transmission channels through which the effects are produced. (4) Institutions are man-made which means that there is always a potential endogeneity problem that needs to be dealt with. We now set out to deal with these possible extensions in a little more detail and begin with the robustness of the results.

The results depend on the specific definition of the independent variables chosen. If minor modifications make the results disappear, they are not robust. Hence, a possible extension would be to rely on variables created for similar purposes but based on slightly different criteria. It could also be the case that dummy variables are too coarse and that the explicit recognition of additional criteria (president elected directly by population, by an electoral college or drawing on yet another election

mode?) would lead to more fine-grained indicators. But the exact delineation of the dependent variables is just as important. With regard to government expenditure – which is part of the group of fiscal policy variables – PT confine their analysis to central government expenditure whereas total government expenditure is not used. They motivate this choice by both better data availability and comparability (37f.) and argue that where both measures are available, they are highly correlated (r ≈ 0.9). Yet, it could be that their results are not robust to drawing on total government expenditure, and we propose to use it as an alternative dependent variable.[1]

Further, it could be that the cut-off criterion employed by PT introduces systematic bias into their regressions: Suppose that the large majority of countries excluded due to their bad rankings in political freedom and civil liberties were presidential systems. This could taint the results in favor of presidential systems. It might therefore make sense to broaden the dataset and check the robustness of the results by including a larger number of countries. Eventually, the results might also be influenced by a small number of outliers, hence explicitly checking whether the residuals are normally distributed could be an important check.

We now move on to the second group of potential extensions dealing with control variables: In their paper on the effects of electoral systems on the amount of redistribution, Iversen and Soskice (2003) notice that three out of four governments under majoritarian systems have been center right between 1945 and 1998, whereas three out of four governments have been center-left under PR. But if that is the case, a closer look at the transmission mechanism that leads from electoral systems to government expenditures is needed because it is unclear if the difference is due to the constitutional rule or due to the different ideologies of government – and the population at large. A second possible extension would be to add control variables, e.g. one controlling for the ideological orientation of governments.

This leads us directly to a third possible extension dealing with transmission channels. According to PT, presidential systems do better than parliamentary ones with regard to a number of different criteria. Yet, at the end of the day, when it comes

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[1] In a study that draws on the framework of PT but is interested in the economic effects of direct democracy, Voigt and Blume (2006) find that the distinction between total and central government expenditure (revenue) can be important: a higher degree of direct democracy is correlated with lower total government expenditure (albeit insignificantly) but also with higher central government revenue.

to income and growth (i.e. productivity development), parliamentary systems seem to have an advantage over presidential ones, if only on a low level of significance. *Ex ante*, the effects of fiscal policy on productivity are unclear because it can be both productivity enhancing as well as diminishing. *Prima facie*, one would, however, expect countries that have advantages in government efficiency to do better in terms of productivity. But this not what PT find. It would, hence, be interesting to inquire more specifically into the possible transmission channels through which the two constitutional institutions under consideration affect total factor productivity.

The likelihood that formal institutions will be factually enforced possibly is a function of the kind of institution formally promulgated. It could, e.g., be that politicians have a higher likelihood of breaking with the rules of the game under presidential than under parliamentary institutions, *although* the formal degree of separation is higher under the former. Presidents often claim that they are the only ones who represent the people as a whole. This might make them more audacious than, e.g., prime ministers in reneging upon constitutional constraints. Political parties are regularly weaker in presidential than in parliamentary systems.[2] This might further increase the incentives of presidents not to take constitutional rules too seriously: if parties are weak, the possibility to produce opposition against a president who reneges upon the constitution might be less than in systems with strong political parties. A reduced likelihood of opposition does, of course, make reneging upon constitutional rules more beneficial. There might be yet another transmission mechanism concerned with political parties. Brennan and Kliemt (1994) show that organizations like political parties often develop longer time horizons than individual politicians: whereas presidents will be out after one or two terms (as in Mexico or the U.S.), political parties might opt for staying in power indefinitely (like in Japan). If the discount rate of presidents is indeed higher than that of, say, prime ministers or party leaders, this might also let offenses against formal constitutional rules appear more beneficial to presidents than to prime ministers. It would, hence, be desirable to

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[2] "Strong" and "weak" here refers to the organizational structure of parties; they are called "strong" if they have many paying members who are active in both political office but also follow political events closely. Due to the organizational structure, strong political parties have the capacity to mobilize many people within a short period of time. This might enable them to produce focal points different from those that the executive would like to create. Executives in an environment with strong parties are expected to be more likely to play by the constitutional rules than executives in an environment with weak parties.

have a better metric allowing to compare systematically the differences between constitutional institutions and constitutional reality.

These arguments thus call for a third extension, namely to deal more closely with the transmission mechanisms at play here. It might make sense to think about additional independent variables: It could, e.g., be that the willingness to pay taxes is a reflection of the perceived legitimacy of a political system which might, in turn, depend on some constitutional institutions.

A fourth potential extension is to take the endogeneity of constitutional rules explicitly into account. PT call their book "The Economic Effects of Constitutions". Thus, they do not try to explain the emergence of different forms of government in any detail. Institutions are, however, always man-made and it is hence critical to adequately control for that. A possible extension would, hence, be to use better instruments than those factually used by PT.

3.2 Extensions Carried Out

Not all of the potential extensions mentioned in the last subsection are carried out here. In fact, we limit ourselves to the most straightforward ones, namely to the robustness of PT's results. More specifically, five major modifications are presented here: (1) the dataset is enlarged, (2) an alternative measure for the distinction between presidential and parliamentary systems is used, (3) the measures for productivity are recalculated for the year 2000 instead of the year 1988, (4) a number of control variables are added and (5) total government expenditure is used in addition to central government expenditure. We now move on to describe these extensions.

The first – and supposedly also the most important – extension consists of enlarging the database. We decided to include all countries that carried out free elections in the 1990ies (according to Golder 2005) and for which a sufficient amount of data were available. This led to the inclusion of 31 additional countries (a list can be found in appendix 1). This changes the composition of the dataset and some of the changes are highlighted here: the proportion of African countries has increased which we consider as a plus since African countries are underrepresented in the PT dataset. Relatedly, our average country is closer to the equator than PT's. Our average country is significantly smaller, the population is younger, and the ethnolinguistic fractionalization is higher than in the smaller sample. In terms of economic variables, per capita income is smaller as is labor as well as total factor productivity. In terms of

religion, the proportion of both catholic and protestant countries is higher, and, inversely, the proportion of Confucian countries lower. On average, countries are younger in the broad sample, and the proportion of the population that speaks English as their first language is higher than in the PT sample.

Amazingly, the average of the Gastil index (that was used by PT as their cut-off criterion) is slightly lower in our sample, implying that on average, the countries in our extended dataset enjoy a <u>higher</u> degree of political freedom and civil liberties (based on the average of their ratings from 1990 to 1999).[3] On the other hand, the extension countries are newer democracies, government efficiency is lower and corruption significantly higher (table A3 in the appendix contains a comparison of the statistical averages of the PT dataset, the added countries as well as newly created larger dataset).

For coding the various aspects of electoral rules, we relied on a dataset provided by Matt Golder (2005) who defines a presidential regime as "one in which the government serves at the pleasure of the elected president. The president may be directly or indirectly elected; the important feature is that the president selects and determines the survival of government" (ibid., 117). In turn, the coding of the variable proxying for the form of government was done by consulting the countries' constitutions (the coding for both the electoral rules as well as the form of government can be found in appendices 1 and 3). Drawing on an alternative measure of government form serves to check the robustness of PT's results and is our second extension.

The third extension is a recalculation of both labor and total factor productivity. PT take the two measures of productivity from Hall and Jones (1999) who computed both measures for the year 1988. The indicators used to explain variation in productivity are, however, from the period between 1990 and 1998 which means that they could not have possibly caused the variation in productivity. This is why we decided to refresh the productivity estimates and recalculated them for the year 2000. Following Hall and Jones (1999), we calculate productivity as the residual of a Cobb-

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[3]   Incidentally, PT's cutoff criterion is also fulfilled in our more extended sample: The Central African Republic as the worst performer scores a 4.2 which is still well below 5, PT's cutoff score.

Douglas production function.[4] Instead of the output per worker for 1988 the output per worker for the year 2000 was taken from the Penn World Tables 6.1 by Heston et al. (2002). The physical capital stock was calculated as an arithmetic mean of the capital stock calculated by Hall and Jones for 1988 and the aggregate investment in the period 1990-2000 again taken from Heston et al. (2002). An assumed depreciation rate of 6 percent for the capital stock means that the value of the 1988 capital stock has nearly lost half its value by the year 2000. Missing data for the 1988 capital stock in countries like Croatia, Ukraine, Slovakia were imputed by taking the data of the "mother countries" USSR, Yugoslavia and CSSR. The human capital variable is based on the average number of years that citizens above the age of 15 of the respective country spent in schools. It is assumed that school attendance is subject to decreasing marginal returns. Accordingly, the first years spent in school are supposed to lead to higher marginal returns than the last years spent there. Like Hall and Jones (1999), we assume a rate of return of 13.4 percent for the first four years of education, of 10.1 percent for the next four years and of 6.8 percent for education beyond the eighth year. The data for the years of schooling were taken from www.worldbank.org/data. Missing data were imputed by augmenting the data in Hall and Jones for 1985 (originally provided by Barro and Lee 1993) with the average growth rate in schooling between 1985 and 2000.

PT use the average of the Corruption Perception Index (produced by Transparency International) as a proxy for government efficiency. More precisely, they draw on the average over the years 1995 through 2000. Again, this is problematic because most of the explanatory variables cover the period from 1990 to 1998. We have, hence, decided to use the average of the CPI for the years 2000 to 2005. On top of being more adequate conceptually, this period has the additional advantage of being available for a larger number of countries.

When estimating the effects of constitutional rules on fiscal policy, PT have relied on both central government expenditure and revenue. True, they have included a dummy variable for federalism, but the ratio between central and non-central government

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[4] Hall and Jones (1999) assume a production function $Y_i = K_i^\alpha (A_i H_i)^{1-\alpha}$ with Y_i=Output per worker in country i (taken from the Penn World Tables), K_i=stock of physical capital in country i, H_i=amount of human capital-augmented labor used in production in country i and A_i=labor-augmenting measure of productivity in country i. After rearranging the equation, A_i as the residual is calculated assuming α to be $1/3$.

expenditure (revenue) might not be the same in all unitary and all federal states. We have, hence, decided to check the robustness of their results by estimating the effects of the constitutional variables on total government expenditure (revenue). The variable TOTEXP is taken out of the Penn World Tables (Heston et al., 2002) and covers the Government share of real GDP using a fixed base, the reference year being 1996. We have used the average of this indicator for the 1990s.

4 Estimations

4.1 Introductory Remarks

This section serves to test the robustness of PT's results after having carried out the modifications proposed in the last section of the paper. In order to be certain that possible differences are not due to different datasets, different software programs etc., we begin all estimations by replicating the original model of PT. In order to keep our results as reader-friendly as possible, all tables are constructed in an identical fashion:

(1)   The first column simply reports the results as found in PT (2003).
(2)   The second column contains an exact replication of that model.
(3)   The third column contains the regression based on the larger dataset.
(4)   If there are more columns, the underlying modifications (e.g. an updated dependent variable, additional controls and so on) are explicitly specified.

In order to ensure readability of the paper, we do not display all the control variables included in the various regressions but simply the ones that we are interested in here.[5] In order not to overburden the paper, we confine ourselves to OLS estimates here (or WLS where PT used them, too).[6] Following PT, in parentheses underneath the coefficients we display standard errors, significance levels are indicated as *** (one percent), ** (five percent), and * (ten percent).

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[5]   The complete estimates can be assessed via our webpage at: http://www.uni-marburg.de/fb02/insecon.

[6]   Due to problems of data availability, we do not replicate PT's estimates with regard to central government expenditures on social services and welfare as a percentage of GDP as well as the Budget Surplus.

4.2 Fiscal Policy

Central Government Expenditure

The replication of the PT estimate leads to exactly identical results (column 2). With regard to presidential regimes, inclusion of the additional countries reduces both the size of the coefficient as well as its level of significance. This is true regardless of whether countries are coded according to PT or to Golder (columns 3, 6 and 7; the other columns are introduced to make comparability between the various approaches with an identical number of observations possible) implying that the lacking robustness of the variable is not due to the different coding introduced here. Concerning the effects of a majoritarian electoral system on central government expenditure, the PT results appear quite robust. We have replicated all other estimates of PT regarding central government expenditure but refrain from reporting them individually here as the results are always quite similar: whereas the PRES variable is not robust to the inclusion of additional countries, the MAJ variable is.

We now move on to estimate the effects of government form and electoral system in combination. Remember that PT found that government size would be decreased by a "whopping 10% of GDP" (PT 160) if a parliamentary proportional country introduced a presidential-majoritarian system. This result is not robust to the extension of the survey. It does not matter whether one follows the PT classification of the PRES variable or uses Golder's classification instead. More specifically, parliamentary systems with majoritarian electoral rules display central government expenditure of some 7% less than the default group of countries that are a parliamentary democracy with a proportional electoral system. This is in line with the findings reported above: central government expenditures are driven much more by the electoral rules than by the form of government.

Table 1: Size of Government (CGEXP)

Column Number	1	2	3	4	5	6	7	8	9
Sample	85	85	116	85	85	116	116	85	116
Pres-Variable	PT	PT	PT	PT	GO	PT	GO	PT	PT
Description	original	replication	extended	-	golder	-	goldext	TOTEXP	TOTEXP
PRES	-5.29*** (1.92)	-5.29*** (1.92)	-3.66 (2.48)	-4.21** (1.95)	-6.01*** (1.86)	-2.82 (2.46)	-3.23 (2.64)	-0.26 (2.10)	-0.40 (2.40)
MAJ	-5.74*** (1.95)	-5.74*** (1.95)	-6.13*** (1.99)	-5.31** (2.24)	-5.25** (2.13)	-5.59** (2.31)	-5.44** (2.22)	-2.35 (1.76)	-1.01 (1.77)
Observations	80	80	92	70	70	82	82	77	89
Adj. R²	0.63	0.63	0.59	0.62	0.63	0.59	0.59	0.49	0.38
J.-B. Test		2.97	3.77	3.42	2.91	2.88	2.92	1.49	1.97

These OLS-regressions are a replication (and modification) of Persson/Tabellini 2003 (table 6.1, p. 159), i.e. they all include the following controls, not shown in the table: LYP, GASTIL, AGE, TRADE, PROP65, PROP1564, FEDERAL, OECD, AFRICA, ASIAE, LAAM, COL_UKA, COL_ESPA, COL_OTHA. The numbers in parentheses are White heteroscedasticity-consistent standard errors. '***', '**' or '*' show that the estimated parameter is significantly different from zero on the 1, 5, or 10 percent level, respectively. J.–B. is the value of the Jarque-Bera-test on normality of the residuals. PT refers to the PRES-Variable originally used by Persson and Tabellini, GO is a newly created PRES-Variable based on the coding of Golder 2005. The interaction term between MAJ and PRES never turned out to be significant.

As soon as total government expenditure is used as the dependent variable (columns 8 and 9), the picture changes substantially again: In this case, neither the form of government nor the electoral system display any significant influence. In both the original PT sample (column 8) and in our extended sample (column 9), only two variables turn out to be highly significant: first, OECD membership leads to a significantly *lower* level of total government expenditure (on the one percent level of significance; OECD membership is, *c.p.*, correlated with an expenditure level of some 12% less than non OECD members!). Secondly, and as expected, the age structure has an influence on total government expenditure: the higher the proportion of the population above 65, the higher the expenditure level, the higher the proportion of the population aged between 15 and 64, the lower the expenditure level.

Government Revenue

Estimating the effects of the constitutional variables on government revenue rather than government expenditure does not really change the picture: extending the

country sample makes the PRES variable insignificant for explaining differences in government revenue. This is true regardless of whether PT's or Golder's coding is used. It is also noteworthy that the MAJ variable which remained insignificant in the original estimate (column 1) now turns out to be significant at the ten percent level. This is, astonishingly, true not only when the sample is broadened but also when it is diminished in size (in order to be able to use the Golder variable instead of PT's PRES). These general insights remain true for all variations in which government revenue serves as the dependent variable which is why we refrain from reporting them here. The Jarque-Bera statistic in columns 2 and 3 indicates that the residuals are not normally distributed; the actual values for Botswana and Brazil were both more than 2.5 standard deviations away from their predicted values. Exclusion of these two countries makes the Jarque-Bera statistic insignificant, i.e. secures the normal distribution of the residuals.

Table 2: Size of Government (CGREV)

Column Number	1	2	3	4	5	6	7
Sample	85	85	116	85	85	116	116
Pres-Variable	PT	PT	PT	PT	GO	PT	GO
Description	original	replication	Extended	-	golder	-	goldext
PRES	-5.17** (2.44)	-5.17** (2.44)	-2.54 (2.35)	-3.68* (2.08)	-5.37** (2.19)	-2.12 (2.32)	-2.40 (2.59)
MAJ	-3.03 (1.85)	-3.03 (1.85)	-3.10* (1.74)	-3.66* (2.14)	-3.63* (2.09)	-3.57* (2.04)	-3.45* (2.01)
Observations	76	76	88	66	66	78	78
Adj. R²	0.58	0.58	0.57	0.61	0.62	0.62	0.62
J.-B. Test		6.97**	12.11***	2.59	1.94	2.60	2.50

These OLS-regressions are a replication (and modification) of Persson/Tabellini 2003 (table 6.1, p. 159), i.e. they all include the following controls, not shown in the table: LYP, GASTIL, AGE, TRADE, PROP65, PROP1564, FEDERAL, OECD, AFRICA, ASIAE, LAAM, COL_UKA, COL_ESPA, COL_OTHA. The numbers in parentheses are White heteroscedasticity-consistent standard errors. '***', '**' or '*' show that the estimated parameter is significantly different from zero on the 1, 5, or 10 percent level, respectively. J.–B. is the value of the Jarque-Bera-test on normality of the residuals. PT refers to the PRES-Variable originally used by Persson and Tabellini, GO is a newly created PRES-Variable based on the coding of Golder 2005. The interaction term between MAJ and PRES never turned out to be significant.

In sum, presidential systems are not robustly correlated with either central government expenditure or central government revenue. Majoritarian systems are

significantly correlated with lower government expenditures even in the larger sample.[7]

4.3 Political Rents

PT use three proxies for political rents, namely the amount of graft as contained in the governance indicators provided by Kaufmann et al. (1999). The other indicator also focusing on corruption is the so-called Corruption Perception Index provided by Transparency International. The variable government effectiveness is also drawn from the governance indicators provided by Kaufmann et al. (1999). PT put an emphasis on the graft indicator as it is available for the largest number of countries.

Graft

Comparing the PT estimate with our replication reveals some differences which can be easily explained: the original estimate is based on governance indicators (here GRAFT) that were collected in 1997 and 1998. In our replication, we rely on the average of the GRAFT variable for the years from 1996 to 2004.[8] Based on this longer period, the significance of the PRES variable vanishes whereas the effect of both the proportion of individually nominated candidates (PIND) as well as district magnitude (MAGN) prove to be robust; in fact, the coefficient of both variables is somewhat higher than in the original estimates.

These results are reconfirmed when various extensions are carried out, namely a larger sample is used (columns 3 and 6), an alternative classification for presidential form of government is employed (column 5), or the two extensions are combined (column 7). The Jarque Bera statistic in columns 6 and 7 indicates outliers, these are Chile and Mali. Notice that this table was produced on the basis of weighted least squares. Replicating the results on the basis of OLS (instead of WLS) does not change the results dramatically: the PRES variable remains insignificant whereas PIND and MAGN lose in significance but remain significant on the ten percent level.

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[7] In addition, both central government expenditure and central government revenue are significantly less in federal states (on the five percent level). PT also observed this correlation but it was not significant in their sample.

[8] Note that we follow PT here in applying weighted least squares. They argue that weighted least squares would help to reduce noise from measurement error (p.191). The weights are given by the (inverse) standard deviation of the dependent variable.

Table 3: Rent Seeking (GRAFT)

Column Number	1	2	3	4	5	6	7
Sample	85	85	116	85	85	116	116
Pres-Variable	PT	PT	PT	PT	GO	PT	GO
Description	original	replication	extended	-	golder	-	goldext
PRES	-0.52*	-0.30	-0.21	-0.40	-0.40	-0.19	-0.16
	(0.30)	(0.31)	(0.28)	(0.28)	(0.30)	(0.27)	(0.29)
PIND	-2.12***	-2.32***	-1.85***	-2.89***	-2.84***	-1.57**	-1.53**
	(0.76)	(0.69)	(0.60)	(0.65)	(0.65)	(0.59)	(0.58)
MAGN	2.72***	2.96***	2.53***	3.57***	3.55***	2.25***	2.22***
	(0.87)	(0.82)	(0.71)	(0.78)	(0.78)	(0.71)	(0.71)
Observations	78	78	90	69	69	79	79
Adj. R²	0.84	0.89	0.88	0.92	0.92	0.90	0.90
J.-B. Test		0.93	1.55	0.02	0.10	7.30**	8.92**

These WLS-regressions are a replication (and modification) of Persson/Tabellini 2003 (table 7.1, p. 192), i.e. they all include the following controls, not shown in the table: LYP, GASTIL, AGE, TRADE, LPOP, EDUGER, FEDERAL, OECD, AVELF, PROT80, CATHO80, CONFU, AFRICA, ASIAE, LAAM, COL_UKA, COL_ESPA, COL_OTHA. The numbers in parentheses are White heteroscedasticity-consistent standard errors. '***', '**' or '*' show that the estimated parameter is significantly different from zero on the 1, 5, or 10 percent level, respectively. J.–B. is the value of the Jarque-Bera-test on normality of the residuals. PT refers to the PRES-Variable originally used by Persson and Tabellini, GO is a newly created PRES-Variable based on the coding of Golder 2005. Column 1 relies on GRAFT for the years 1997 and 1998, whereas GRAFT in column 2 relies on the period from 1996 to 2004, hence the deviations. The interaction term between MAJ and PRES never turned out to be significant.

Summing up our results so far, it is the electoral system rather than the form of government that explains the variation in the dependent variables. It is, hence, interesting to have a closer look at the details of the electoral system to ascertain what specific institutional provision is responsible for the difference. Following PT (192/195), we include three variables proxying for the electoral system into one equation in table 4 (although they are highly correlated among themselves). As soon as the sample is extended, the MAJ variable has additional explanatory power. This also remains the case if the sample size is reduced (columns 4 and 5; due to countries covered in the Golder data). The replications also show that the effect of PIND is not

very robust: based on a smaller sample (columns 4 and 5 again) it is significant on the five percent level, based on the extended Golder set (columns 6 and 7), it is not significant anymore. This is further re-enforced if the estimate is done on the basis of OLS: in the 79 country sample, only MAGN turns out to be significant.

Table 4: Rent Seeking (GRAFT), MAJ included

Column Number	1	2	3	4	5	6	7
Sample	85	85	116	85	85	116	116
Pres-Variable	PT	PT	PT	PT	GO	PT	GO
Description	original	replication	extended	-	golder	-	goldext
PRES	-0.53*	-0.37	-0.30	-0.53*	-0.56*	-0.34	-0.35
	(0.31)	(0.31)	(0.27)	(0.28)	(0.31)	(0.27)	(0.29)
MAJ	-0.24	-0.75	-0.99**	-0.89*	-0.92*	-1.07**	-1.09**
	(0.62)	(0.53)	(0.46)	(0.50)	(0.50)	(0.47)	(0.48)
PIND	-1.83*	-1.61*	-0.97	-2.03**	-1.95**	-0.62	-0.55
	(1.06)	(0.85)	(0.71)	(0.80)	(0.80)	(0.70)	(0.71)
MAGN	2.63***	2.87***	2.46***	3.45***	3.45***	2.16***	2.12***
	(0.90)	(0.82)	(0.70)	(0.76)	(0.77)	(0.69)	(0.68)
Observations	78	78	90	69	69	79	79
Adj. R²	0.84	0.89	0.89	0.92	0.92	0.91	0.91
J.-B. Test		0.57	0.79	0.62	0.63	1.05	1.51

These WLS-regressions are a replication (and modification) of Persson/Tabellini 2003 (table 7,1, p. 192), i.e. they all include the following controls, not shown in the table: LYP, GASTIL, AGE, TRADE, LPOP, EDUGER, FEDERAL, OECD, AVELF, PROT80, CATHO80, CONFU, AFRICA, ASIAE, LAAM, COL_UKA, COL_ESPA, COL_OTHA. The numbers in parentheses are White heteroscedasticity-consistent standard errors. '***', '**' or '*' show that the estimated parameter is significantly different from zero on the 1, 5, or 10 percent level, respectively. J.–B. is the value of the Jarque-Bera-test on normality of the residuals. PT refers to the PRES-Variable originally used by Persson and Tabellini, GO is a newly created PRES-Variable based on the coding of Golder 2005. The interaction term between MAJ and PRES never turned out to be significant.

Corruption

The next couple of regressions use the Corruption Perception Index (CPI) as the dependent variable (tables 5 and 6). Due to data availability, the larger sample contains only 3 more countries than the original PT dataset. These are Albania,

Mongolia, and Ghana.[9] It is noteworthy that this minor extension makes PIND lose its significance entirely and MAGN shrink from the one to the ten percent level. Other modifications (using the Golder variable instead of that used by PT) also lets MAGN use its significance. As in many tables before, the form of government does not seem to have any impact, in this case on the CPI.

Table 5: Rent Seeking (CPI9500)

Column Number	1	2	3	4	5	6	7
Sample	85	85	116	85	85	116	116
Pres-Variable	PT	PT	PT	PT	GO	PT	GO
Description	Original	replication	extended	-	golder	-	goldext
PRES	-0.27 (0.43)	-0.15 (0.40)	-0.29 (0.43)	-0.43 (0.46)	-0.51 (0.50)	-0.61 (0.51)	-0.66 (0.56)
PIND	-2.88*** (1.02)	-2.11** (0.98)	-1.30 (1.03)	-2.02* (1.02)	-2.02* (1.01)	-1.53 (1.17)	-1.51 (1.16)
MAGN	3.39*** (1.14)	2.58** (1.07)	2.22* (1.16)	2.13* (1.16)	2.14* (1.15)	2.21 (1.34)	2.19 (1.34)
Observations	68	68	71	60	60	62	62
Adj. R²	0.88	0.93	0.94	0.93	0.93	0.94	0.94
J.-B. Test		2.06	1.09	1.38	1.15	1.01	0.96

These WLS-regressions are a replication (and modification) of Persson/Tabellini 2003 (table 7.1, p. 193), i.e. they all include the following controls, not shown in the table: LYP, GASTIL, AGE, TRADE, LPOP, EDUGER, FEDERAL, OECD, AVELF, PROT80, CATHO80, CONFU, AFRICA, ASIAE, LAAM, COL_UKA, COL_ESPA, COL_OTHA. The numbers in parentheses are White heteroscedasticity-consistent standard errors. '***', '**' or '*' show that the estimated parameter is significantly different from zero on the 1, 5, or 10 percent level, respectively. J.–B. is the value of the Jarque-Bera-test on normality of the residuals. PT refers to the PRES-Variable originally used by Persson and Tabellini, GO is a newly created PRES-Variable based on the coding of Golder 2005.

For their estimates of the effects of their constitutional variables on the Corruption Perception Index, PT relied on CPI data from 1995 to 2000. An additional check on the robustness of their results is to use a different period which we did by choosing the period from 2000 to 2005. This period has the additional advantage of being available for a larger number of countries. In a number of estimates, the presidential variable now reaches conventional significance levels. The correlation is, however,

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[9]   Ghana was already contained in the PT sample but no data were inserted.

not robust to the extension of the country sample (columns 3, 6 and 7). The proportion of individually elected candidates (PIND) as well as the size of electoral districts (MAGN) is, however, very robust.

Table 6: Rent Seeking (CPI0005)

Column Number	1	2	3	4	5	6	7
Sample	85	85	116	85	85	116	116
Pres-Variable	PT	PT	PT	PT	GO	PT	GO
Description	original	replication	extended	-	golder	-	goldext
PRES	n. a.	-0.82*	0.16	-1.02**	-1.23**	-0.09	-0.06
		(0.46)	(0.39)	(0.44)	(0.48)	(0.36)	(0.38)
PIND	n. a.	-2.91***	-2.03**	-3.32***	-3.24***	-1.56**	-1.53**
		(0.79)	(0.78)	(0.84)	(0.81)	(0.76)	(0.75)
MAGN	n. a.	3.69***	2.37**	4.18***	4.28***	2.04**	2.03**
		(0.91)	(0.90)	(0.99)	(0.98)	(0.89)	(0.89)
Observations	n. a.	79	87	68	68	76	76
Adj. R²		0.94	0.93	0.95	0.96	0.95	0.95
J.-B. Test		0.35	0.32	0.39	0.21	1.49	1.76

These WLS-regressions are a modification of Persson/Tabellini 2003 (table 7.1, p. 193), i.e. they all include the following controls, not shown in the table: LYP, GASTIL, AGE, TRADE, LPOP, EDUGER, FEDERAL, OECD, AVELF, PROT80, CATHO80, CONFU, AFRICA, ASIAE, LAAM, COL_UKA, COL_ESPA, COL_OTHA. The numbers in parentheses are White heteroscedasticity-consistent standard errors. '***', '**' or '*' show that the estimated parameter is significantly different from zero on the 1, 5, or 10 percent level, respectively. J.–B. is the value of the Jarque-Bera-test on normality of the residuals. PT refers to the PRES-Variable originally used by Persson and Tabellini, GO is a newly created PRES-Variable based on the coding of Golder 2005.

In sum, the form of government does not have a robust effect on political rents. Although the electoral rule (majoritarian vs. proportional) becomes significant in a number of extensions, it is not significant in all equations. What seems to have the most important effect is the size of the electoral districts: the smaller it is, the higher the predicted level of graft or corruption.[10]

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[10]   It seems noteworthy that the two single most important predictors for low political rents are (1) a high per capita income (in log form) and (2) OECD membership.

4.4 Productivity

The last dependent variable analyzed by PT is the effect of their constitutional institutions on labor as well as total factor productivity. The data they use for the two productivity measures are taken from Hall and Jones (1999) who calculated them for the year 1988. They find that both presidential as well as majoritarian systems are harmful to both measures, albeit in an insignificant way. We extend PT's findings in two directions here: first, we ask whether we find the same effects of the constitutional variables on productivity using the larger dataset. Second, we recalculate both productivity measures for the year 2000 and compare the coefficients with those obtained from the other regressions.

Output Per Worker

In line with our previous results on fiscal policy and government effectiveness, the presidential variable is not significantly robust for explaining differences in output per worker (LOGYL) either (table 7). This is also the case with regard to MAJ for the extended sample (column 3) as well as the modified coding of the presidential variable (columns 5 and 6). As soon as the more recent data for output per worker are used, MAJ regains the same level of significance as in the PT estimates. What is striking – and this is why it is explicitly reported in the table – is the very high level of significance that the age-variable (defined as the age of democracy; with the US as the oldest democracy coded as 1) has for explaining differences in per capita output. This means that the longer a country has been democratic, the higher the output per worker. The economic effect is huge: if a young democracy switched to being 200 years old (i.e. roughly the age of the U.S.), this would imply a threefold higher output per worker. This finding is at odds with Olson (1982) as PT also note (216).

Table 7: Output per Worker (LOGYL, LOGYL2000)

Column No.	1	2	3	4	5	6	7	8
Sample	85	85	116	85	85	116	85	116
Pres-Variable	PT	PT	PT	PT	GO	GO	PT	PT
Description	original	replication	extended	-	golder	goldext	logyl2000	logyl2000
PRES	-0.29*	-0.29*	-0.15	-0.24	-0.28	-0.10	-0.43*	-0.30
	(0.16)	(0.16)	(0.16)	(0.19)	(0.23)	(0.18)	(0.23)	(0.23)
MAJ	-0.29*	-0.29*	-0.24	-0.30*	-0.27	-0.22	-0.32*	-0.31*
	(0.15)	(0.15)	(0.14)	(0.18)	(0.17)	(0.16)	(0.19)	(0.18)
AGE	1.05***	1.05***	1.24***	0.99**	0.96**	1.18***	1.21***	1.26***
	(0.38)	(0.38)	(0.39)	(0.38)	(0.37)	(0.38)	(0.42)	(0.43)
Observations	74	74	84	63	63	73	73	79
Adj. R²	0.73	0.73	0.75	0.67	0.67	0.73	0.68	0.71
J.-B. Test		3.47	0.49	4.24	3.68	0.12	0.97	0.50

These OLS-regressions are a replication (and modification) of Persson/Tabellini 2003 (table 7.4, p. 204), i.e. they all include the following controls, not shown in the table: LAT01, FRANKROM, ENGFRAC, EURFRAC, FEDERAL, AFRICA, ASIAE, LAAM, COL_UKA, COL_ESPA, COL_OTHA. The numbers in parentheses are White heteroscedasticity-consistent standard errors. '***', '**' or '*' show that the estimated parameter is significantly different from zero on the 1, 5, or 10 percent level, respectively. J.–B. is the value of the Jarque-Bera-test on normality of the residuals. PT refers to the PRES-Variable originally used by Persson and Tabellini, GO is a newly created PRES-Variable based on the coding of Golder 2005.

Above, we saw that it was often the details of the electoral systems that proved to be the most significant explanatory variables. This is why we substitute PIND and MAGN for MAJ to see if this is also true with regard to output per worker (table 8). And indeed, the results of PT prove to be extremely robust.[11] It seems noteworthy that after having increased the size of the sample and used more recent data for output per worker, the size of the coefficients for both PIND and MAGN markedly increases. We can, hence, be fairly confident that the details of the electoral system have a systematic impact on output per worker.

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[11] We were, however, unable to identify the reasons for the differences between colums 1 and 2 as we are here dealing with an exact replication of PT's estimate.

Table 8: Output per Worker (LOGYL, LOGYL2000), PIND and MAGN instead of MAJ

Column No.	1	2	3	4	5	6	7	8
Sample	85	85	116	85	85	116	85	116
Pres-Variable	PT	PT	PT	PT	GO	GO	PT	PT
Description	original	replication	Extended	-	Golder	goldext	logyl2000	logyl2000
PRES	-0.09	-0.12	-0.04	-0.05	-0.12	-0.04	-0.16	-0.12
	(0.17)	(0.17)	(0.16)	(0.19)	(0.23)	(0.19)	(0.25)	(0.24)
PIND	0.78***	0.67**	0.81***	0.50*	0.48**	0.67**	0.96***	1.09***
	(0.28)	(0.25)	(0.26)	(0.25)	(0.23)	(0.26)	(0.26)	(0.26)
MAGN	-1.18***	-1.08***	-1.10***	-0.85**	-0.81**	-0.92**	-1.48***	-1.53***
	(0.34)	(0.33)	(0.34)	(0,39)	(0.37)	(0.37)	(0.36)	(0.33)
AGE	0.83**	0.85**	1.04***	0.85**	0.87**	1.07***	0.93**	0.98***
	(0.35)	(0.35)	(0.36)	(0.35)	(0.35)	(0.37)	(0.35)	(0.36)
Observations	73	73	83	62	62	72	72	78
Adj. R²	0.76	0.76	0.78	0.69	0.69	0.76	0.73	0.77
J.-B. Test		2.38	0.25	3.01	3.31	0.01	0.27	0.86

These OLS-regressions are a replication (and modification) of Persson/Tabellini 2003 (table 7.4, p. 204), i.e. they all include the following controls, not shown in the table: LAT01, FRANKROM, ENGFRAC, EURFRAC, FEDERAL, AFRICA, ASIAE, LAAM, COL_UKA, COL_ESPA, COL_OTHA. The numbers in parentheses are White heteroscedasticity-consistent standard errors. '***', '**' or '*' show that the estimated parameter is significantly different from zero on the 1, 5, or 10 percent level, respectively. J.–B. is the value of the Jarque-Bera-test on normality of the residuals. PT refers to the PRES-Variable originally used by Persson and Tabellini, GO is a newly created PRES-Variable based on the coding of Golder 2005.

Total Factor Productivity

Analyzing total factor productivity yields somewhat different results: A first look at table 9 shows that MAJ never reaches conventional significance levels when used to explain differences in total factor productivity. Neither an extension of the sample nor using more recent total factor productivity estimates changes anything here. Columns 7 and 8 contain a surprise, at least *prima facie*: in many of the results presented until now, the PRES variable did not reach conventional levels of significance, here, it becomes significant, the negative sign indicating that presidential regimes tend to be connected to <u>lower</u> levels of total factor productivity. In the estimates of PT, presidential regimes were correlated with both sounder fiscal policies and lower levels of political rents. In most of our replications, we did not find the PRES variable to have significant effects on these two groups of variables. Based on these results,

one could have predicted that presidential regimes should not have any significant effect on total factor productivity either. Yet, in our theoretical section, a number of arguments were presented according to which presidential regimes could be problematic, e.g. because the likelihood that a presidential regime becomes unconstitutional was predicted to be higher than the corresponding likelihood of a parliamentary regime. This reduces the degree of predictability of a regime and could have a number of effects that are detrimental to the development of total factor productivity.

Table 9: Total Factor Productivity (LOGA, LOGA2000)

Column No.	1	2	3	4	5	6	7	8
Sample	85	85	116	85	85	116	85	116
Pres-Variable	PT	PT	PT	PT	GO	GO	PT	PT
Description	original	replication	extended	-	golder	goldext	loga2000	loga2000
PRES	-0.21 (0.15)	-0.21 (0.15)	-0.15 (0.13)	-0.28 (0.19)	-0.36 (0.21)	-0.29* (0.16)	-0.38** (0.17)	-0.34** (0.16)
MAJ	-0.15 (0.11)	-0.15 (0.11)	-0.07 (0.12)	-0.23 (0.15)	-0.20 (0.15)	-0.12 (0.14)	-0.16 (0.11)	-0.05 (0.13)
AGE	0.68** (0.34)	0.68** (0.34)	0.80** (0.34)	0.76** (0.35)	0.74** (0.34)	0.87** (0.35)	0.76** (0.31)	0.80** (0.31)
Observations	73	73	81	62	62	70	73	79
Adj. R²	0.50	0.50	0.54	0.43	0.44	0.52	0.51	0.51
J.-B. Test		3.06	3.21	1.92	2.13	1.70	3.78	2.52

These OLS-regressions are a replication (and modification) of Persson/Tabellini 2003 (table 7.4, p. 204), i.e. they all include the following controls, not shown in the table: LAT01, FRANKROM, ENGFRAC, EURFRAC, FEDERAL, AFRICA, ASIAE, LAAM, COL_UKA, COL_ESPA, COL_OTHA. The numbers in parentheses are White heteroscedasticity-consistent standard errors. '***', '**' or '*' show that the estimated parameter is significantly different from zero on the 1, 5, or 10 percent level, respectively. J.–B. is the value of the Jarque-Bera-test on normality of the residuals. PT refers to the PRES-Variable originally used by Persson and Tabellini, GO is a newly created PRES-Variable based on the coding of Golder 2005. The interaction term between MAJ and PRES never turned out to be significant.

Paralleling the estimation strategy applied to labor productivity, MAJ is, again, substituted for PIND and MAGN (table 10). Here, the significance of PIND crucially depends on the kind of modification carried out. Our attempt to exactly replicate the findings of PT already led to a higher level of significance which was almost maintained after the sample had been broadened by an additional eight observations. As soon as the sample size was reduced (in order to be able to use the Golder variable instead of PT's PRES), PIND does not have additional explanatory power anymore. This changes again as soon as more recent data for total factor productivity are used. Both the coefficient as well as the standard error in columns 2 and 8 are roughly identical. The effect of district magnitude seems to be rather robust. There is one exception though: if Golder's presidential variable is used (column 6), MAGN also loses its significance. The residuals in two of the estimates (columns 3 and 7) are not normally distributed. Guyana and Romania are the outliers in these regressions (2.5 std.dev.).

Table 10: Total Factor Productivity (LOGA, LOGA2000), PIND and MAGN instead of MAJ

Column No.	1	2	3	4	5	6	7	8
Sample	85	85	116	85	85	116	85	116
Pres-Variable	PT	PT	PT	PT	GO	GO	PT	PT
Description	original	replication	extended	-	golder	goldext	loga2000	loga2000
PRES	-0.09	-0.07	-0.09	-0.13	-0.23	-0.26	-0.21	-0.27
	(0.14)	(0.14)	(0.13)	(0.18)	(0.20)	(0.16)	(0.17)	(0.16)
PIND	0.47	0.59**	0.56**	0.49	0.47	0.44	0.67**	0.58**
	(0.29)	(0.24)	(0.24)	(0.31)	(0.30)	(0.30)	(0.26)	(0.28)
MAGN	-0.74**	-0.86***	-0.66*	-0.83*	-0.77*	-0.56	-0.93***	-0.79**
	(0.36)	(0.32)	(0.35)	(0.46)	(0.44)	(0.43)	(0.32)	(0.32)
AGE	0.54	0.53*	0.70**	0.63*	0.64*	0.80**	0.59**	0.67**
	(0.32)	(0.31)	(0.35)	(0.33)	(0.33)	(0.35)	(0.28)	(0.28)
Observations	72	72	80	61	61	69	72	78
Adj. R²	0.52	0.54	0.56	0.44	0.45	0.53	0.55	0.55
J.-B. Test		4.56	6.66**	1.73	2.26	3.45	6.91**	2.99

These OLS-regressions are a replication (and modification) of Persson/Tabellini 2003 (table 7.4, p. 204), i.e. they all include the following controls, not shown in the table: LAT01, FRANKROM, ENGFRAC, EURFRAC, FEDERAL, AFRICA, ASIAE, LAAM, COL_UKA, COL_ESPA, COL_OTHA. The numbers in parentheses are White heteroscedasticity-consistent standard errors. '***', '**' or '*' show that the estimated parameter is significantly different from zero on the 1, 5, or 10 percent level, respectively. J.–B. is the value of the Jarque-Bera-test on normality of the residuals. PT refers to the PRES-Variable originally used by Persson and Tabellini, GO is a newly created PRES-Variable based on the coding of Golder 2005.

In the theoretical section, the possibility that both labor as well as total factor productivity are impacted upon by fiscal policies and government effectiveness is alluded to. To test for this possibility empirically, we have simply included central government expenditure and graft as independent variables into the equations. It turns out that both PRES and MAJ remain insignificant for explaining variation in both labor as well as total factor productivity but that GRAFT is highly significant for explaining differences between countries (on the one percent level for LOGYL and the five percent level for LOGA) whereas central government expenditures do not display a significant influence on productivity. In this specification, the AGE variable is not significant anymore, either.

To sum up: presidential systems seem to have a consistent negative impact on both forms of productivity although this result is not highly robust as the PRES variable does not consistently reach conventional levels of significance. Similarly, the MAJ variable always has a negative sign. Different from the PRES variable, it does, however, never reach conventional levels of significance. It is, however, noteworthy that a higher proportion of individually elected candidates (PIND) is robustly linked to higher levels of both labor and total factor productivity. Likewise, large districts implying higher levels of political competition are also linked with higher productivity levels. Additionally, the age of democracy seems to be highly – and positively – correlated with higher levels of productivity.

5 Conclusions and Outlook

In this paper, we have replicated and extended the analysis of Persson and Tabellini (2003). The most important extension was that the sample size was increased from 85 to 116 countries. Other extensions include more recent data for the dependent variable (for graft, the corruption perception index, labor productivity and total factor productivity). Our most important result is that in most regressions, use of the extended dataset makes the variable for presidential regimes insignificant. PT's results with regard to electoral systems are, however, largely confirmed.

These results do not lack a certain irony. The central question was, after all: Do *constitutional* rules matter? It seems that it is the details of the electoral systems that matter most. This is ironic as in many (if not most) countries, these details are not dealt with on the level of the constitution. The result also teaches us that God is in the

details in the sense that it is not the coarse MAJ variable that is most significant but rather the specifics of the electoral system.

If it is the more fine-grained variables that prove most significant with regard to the electoral system, could it not be that something similar is true with regard to forms of government? Potential variables could include aspects such as whether the president is elected directly or indirectly and whether his term is renewable or not. Getting even more fine-grained, one could ask for the exact electoral formula that is used to elect a president (plurality, absolute majority, qualified majority in case of direct elections; composition of the electoral college in case of indirect elections).

In the theoretical section, the possibility that the factual implementation of institutions is not equivalent with their *de jure* status has been mentioned. PT's dataset is, however, largely based on *de jure* institutions. It would seem worthwhile to think up controls to ensure that *de jure* and *de facto* institutions are congruent.

In section 3.1, four possible extensions of the original results are discussed. In this paper, we have largely confined ourselves to one dimension, namely to the sample size and the coding of the explanatory variables. Natural next steps that suggest themselves include the empirical identification of the transmission channels through which the electoral system has such important effects on the three groups of variables. Another extension consists in endogenizing the constitutional variables. This promises to be extremely important as only an endogenization of the relevant variables will get us closer to answering the central question asked by PT, namely do constitutional rules matter? As of now, we cannot exclude that it is not the constitutional institutions that drive the results but rather third variables which might determine both the constitutional variables as well as the economic effects. These could be informal institutions, ideologies, but also the kind of social capital on which societies can rely. In other words: we seem to have some way ahead of us before being able to answer the question if – and to what degree – constitutional rules matter.

Moving to the more mundane, it seems highly desirable to extend the analysis to other constitutional institutions beyond the two institutions explicitly analyzed by PT: The effects of direct democracy as well as of federalism immediately come to mind. Other institutions that may be not as obvious include bicameralism, but also spending limits, term limits, and supreme audit institutions.

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Appendix 1

Table A1: Data on the Electoral Systems of the Added Countries

Country	First Year of Demo-cracy	GAS TIL	MAJ	MIXED	DIS-TRICTS	SEATS	MAGN	LIST	CLIST	PIND	PINDO
Albania	1992	4.1	0	1	110	145	0.76	35	1	0.76	0.76
Andorra	1993	1.1	0	1	7	28	0.25	14	1	0.50	0.50
Antigua	1981	3.3	1	0	17	17	1.00	0	0	1.00	1.00
Armenia	1991	4.1	0	1	113	161	0.70	48	1	0.70	0.70
Benin	1991	2.6	0	0	16	77	0.21	77	1	0.00	0.00
Cape Verde	1991	2.0	0	0	22	76	0.29	76	1	0.00	0.00
Centr. Afric. Republic	1993	4.2	1	0	97	97	1.00	0	0	1.00	1.00
Croatia	1991	3.9	0	1	46	133	0.35	87	1	0.35	0.35
Dominica	1978	1.3	1	0	21	21	1.00	0	0	1.00	1.00
Grenada	1984	1.6	1	0	15	15	1.00	0	0	1.00	1.00
Guyana	1992	2.6	0	0	1	53	0.02	53	1	0.00	0.00
Kiribati	1979	1.2	1	0	23	39	0.59	0	0	1.00	1.00
Kyrgyzstan	1991	4.1	1	0	70	70	1.00	0	0	1.00	1.00
Liechtenstein	1990	1.0	0	0	2	25	0.08	25	1	0.00	0.00
Lithuania	1991	1.8	0	1	71	141	0.50	70	1	0.50	0.50
Macedonia*	1991	3.3	0.5	0.5	103	120	0.85	18	1	0.85	0.85
Madagascar*	1993	3.3	0	0.5	89	149	0.60	108	1	0.28	0.28
Mali	1992	3.2	1	0	55	132	0.42	132	1	0.00	0.00
Marshall Islands	1991	1.0	1	0	24	33	0.73	0	0	1.00	1.00
Micronesia, Federated States of	1991	1.2	1	0	12	12	1.00	0	0	1.00	1.00
Mongolia	1992	2.7	1	0	51	76	0.67	0	0	1.00	1.00
Nauru	1968	1.9	1	0	8	18	0.44	0	0	1.00	1.00
Panama	1989	2.7	0	1	40	71	0.56	45	0	0.37	1.00
San Marino	1992	1.0	0	0	10	60	0.17	60	0	0.00	1.00
Sao Tome and Principe	1991	2.1	0	0	7	55	0.13	55	1	0.00	0.00
Slovenia	1991	1.7	0	0	8	88	0.09	88	0	0.00	1.00
Solomon Islands	1978	1.4	1	0	49	49	1.00	0	0	1.00	1.00
St. Kitts and Nevis	1983	1.4	1	0	11	11	1.00	0	0	1.00	1.00
St. Lucia	1979	1.5	1	0	17	17	1.00	0	0	1.00	1.00
Suriname	1991	3.2	0	0	10	51	0.20	51	0	0.00	1.00
Vanuatu	1980	2.1	1	0	16	49	0.32	0	0	1.00	1.00

* Change in Electoral System

Table A2 Data on Forms of Government

Country	PRES	Comment on Classification
Albania	0	The government of Albania is the „Council of Ministers" which can, according to art. 34 of the Constitution, be displaced by Parliament, hence PRES = 0.
Andorra	0	Constitutional principality; two representatives of the princes serve as heads of state, but a prime minister accountable to Parliament is the representative of the executive, hence PRES = 0.
Antigua	0	The King (Queen) of England is head of state which is represented by a governor which only acts after having been asked to do so by a cabinet which is directly accountable to Parliament; hence PRES = 0.
Armenia	0	Government consists of the prime minister and the other ministers. According to art. 74 of the constitution, Parliament can depose the government, hence PRES = 0.
Benin	1	The President heads the executive and can only be forced to retire after committing crimes or in case of serious illness, hence PRES = 1.
Cape Verde	0	Government consists of the prime minister, ministers and secretaries of state. According to art. 214 of the constitution, Government can be deposed of by Parliament, hence PRES = 0.
Central Afr. Rep.	0	Government consists of the prime minister and the other ministers. According to art. 40 of the constitution, Parliament can depose the government, hence PRES = 0.
Croatia	0	Government consists of the prime minister and the other ministers. According to art. 113 of the constitution, Parliament can depose the government by a vote of no confidence, hence PRES = 0.
Dominica	1	The President heads the executive and can only be forced to retire after committing crimes or in case of serious illness, hence PRES = 1.
Grenada	0	The King (Queen) of England is head of state which is represented by a governor which only acts after having been asked to do so by a cabinet which is directly accountable to Parliament; hence PRES = 0.
Guyana	1	The President heads the executive and can only be forced to retire after committing crimes or in case of serious illness (according to art. 179f. of the constitution), hence PRES = 1.
Kiribati	0	Art. 45 of the constitution states that the cabinet in its entirety is accountable to Parliament, hence PRES = 0.
Kyrgyzstan	0	Although Kyrgyzstan knows a President with numerous powers, the head of government is the prime minister. His government can be forced to step down by way of a vote of no confidence according to art. 71 of the constitution, hence PRES = 0.
Liechtenstein	0	Government needs the confidence of Parliament (art. 78 of the constitution). PRES = 0.
Lithuania	0	Government consists of the prime minister and the other ministers. According to art. 101 of the constitution, Parliament can depose the government by a vote of no confidence, hence PRES = 0.
Macedonia	0	Government consists of the prime minister and the other ministers. According to art. 92 of the constitution, Parliament can depose the government by a vote of no confidence, hence PRES = 0.
Madagascar	0	Government consists of the prime minister and the other ministers. According to arts. 91 and 94 of the constitution, Parliament can depose the government by a vote of no confidence, hence PRES = 0.

Country	PRES	Comment on Classification
Mali	0	Government consists of the prime minister and the other ministers. According to art. 78f of the constitution, Parliament can depose the government by a vote of no confidence, hence PRES = 0.
Marshall Islands	0	According to art. 5 of the constitution, cabinet in its entirety forms the executive and is accountable to Parliament, hence PRES = 0.
Micronesia, Federated States of	1	The President heads the executive and can only be forced to retire after committing crimes or in case of serious illness, hence PRES = 1.
Mongolia	0	According to art. 25 of the constitution, Parliament has the exclusive competence to appoint the government; the deposition of the President is expressly mentioned, hence PRES = 0.
Nauru	0	Art. 24 of the constitution states that in case the President loses Parliament's confidence, the Parliament can depose of the government and call new elections, hence PRES = 0.
Panama	1	No legal basis for the deposition of the President by Parliament, hence PRES = 1.
San Marino	1	The term of office is only 6 months during which Parliament has no influence on the composition of government, hence PRES = 1.
Sao Tome and Principe	0	Government consists of the prime minister and the other ministers. According to art. 117 of the constitution, Parliament can depose the government by a vote of no confidence, hence PRES = 0.
Slovenia	0	Government consists of the prime minister and the other ministers. According to art. 116 of the constitution, Parliament can depose the government by a vote of no confidence, hence PRES = 0.
Solomon Islands	0	The King (Queen) of England is head of state which is represented by a governor which only acts after having been asked to do so by a cabinet which is directly accountable to Parliament; hence PRES = 0.
St. Kitts and Nevis	0	The King (Queen) of England is head of state which is represented by a governor which only acts after having been asked to do so by a cabinet which is directly accountable to Parliament; hence PRES = 0.
St. Lucia	0	The King (Queen) of England is head of state which is represented by a governor which only acts after having been asked to do so by a cabinet which is directly accountable to Parliament; hence PRES = 0.
Suriname	1	The President heads the executive. It is accountable to Parliament according to art. 90 of the constitution but can only be forced to retire after committing crimes or in case of serious illness, hence PRES = 1.
Vanuatu	0	Government consists of the prime minister and the other ministers. According to art. 43 of the constitution, Parliament can depose the government by a vote of no confidence, hence PRES = 0.

Table A3: Comparing the Persson/Tabellini dataset with the 31 countries added and the new larger dataset

Variable	Unit	PT Ø	New Ø	All Ø	Category[12]
COUNTRIES	Number	85	31	116	**NUMB**
LAT01	0-1	0.32	0.25	0.30	
AFRICA	%	12.94	19.35	14.66	
ASIAE	%	15.29	3.23	12.07	**GEO**
LAAM	%	27.06	25.81	26.72	
OECD	%	27.06	0.00	19.83	
LPOP	ln	2.23	-0.75	1.44	
PROP1564	%	62.07	60.30	61.60	
PROP65	%	8.45	6.83	8.02	**POP**
EDUGER	%	88.58	85.01	87.94	
AVELF	0-1	0.29	0.35	0.30	
RGDPH	$	6.689	4.744	6.303	
LYP	Ln	8.41	8.12	8.35	
TRADE	[(IMP + EXP)/GDP] x 100	78.77	99.82	83.25	**ECON**
FRANKROM	ln	2.87	3.37	2.94	
LOGYL	ln	9.23	8.08	9.09	
LOGA	ln	8.17	7.42	8.10	
PROT80	% of population	17.46	18.93	17.85	
CATHO80	% of population	40.69	43.65	41.48	**REL**
CONFU	% of countries	7.06	3.23	6.03	
T_INDEP	0-250	120	111	117	
COL_UKA	0-1	0.28	0.29	0.28	
COL_ESPA	0-1	0.06	0.08	0.06	**COL**
COL_OTHA	0-1	0.22	0.36	0.26	
ENGFRAC	0-1	0.14	0.23	0.15	
EURFRAC	0-1	0.40	0.42	0.40	
AGE	0-1	0.21	0.06	0.17	
CON2150	%	10.59	0.00	7.76	
CON5180	%	29.41	12.90	25.00	
CON81	%	49.41	87.10	59.48	
FEDERAL	%	15.66	6.45	13.16	**INST**
GOVEF	10-0	4.21	5.60	4.55	
GRAFT	10-0	4.17	5.56	4.51	
CPI9500	10-0	4.83	6.56	5.01	
CPI9804	10-0	5.02	6.71	5.22	
GASTIL	1-7	2.44	2.32	2.41	

[12] PT = 85 countries of Persson/Tabellini, New = 31 added countries, All = all 116 countries, Categories: NUMB = Number of Countries, GEO = geographical information, POP = population, ECON = economy, REL = religion, COL = colonial history, INST = institutions, FIS = fiscal data, ELEC = election systems, GOV = form of government

Variable	Unit	PT Ø	New Ø	All Ø	
CGEXP	% BIP	28.82	31.32	29.16	
CGREV	% BIP	26.49	26.84	26.54	**FIS**
SPL	% BIP	-2.18	-3.73	-2.42	
MAJ	%	38.82	50.00	41.81	
MIXED	%	10.59	22.58	13.79	
SEATS	Number	215	67	176	
LIST	Number	114	34	93	**ELEC**
PIND	0-1	0.46	0.59	0.49	
PINDO	0-1	0.61	0.71	0.63	
MAGN	0-1	0.47	0.58	0.50	
PRES	%	38.82	22.58	34.48	**GOV**

List of Variables (definitions and sources)

The data describing the 85 countries covered by Persson and Tabellini (PT) taken out of the dataset that they have made available (http://www.igier.uni-bocconi.it/folder.php?vedi=823&tbn=albero&id_folder=180). The additional 31 countries were coded closely following the PT definitions. All variables used in this paper are described here, again closely following PT.

AFRICA:

Regional dummy variable, equal to 1 if a country is in Africa, 0 otherwise; source: CIA (2005)

AGE:

Age of democracy defined as AGE = (2000 – DEM_AGE) / 200, with values varying between 0 und 1.

ASIAE:

Regional dummy variable, equal to 1 if a country is in East Asia, 0 otherwise; source: Golder (2005).

AVELF:

Index of ethnolinguistic fractionalization, ranging from 0 (homogeneous) to 1 (strongly fractionalized) averaging five sources; source: La Porta (1999).

CATHO80:

Percentage of a country's population belonging to the Roman Catholic religion in 1980 (younger states are counted based on their average from 1990 to 1995); source: La Porta (1999) and CIA (2005) for Lithuania, Nauru, Marshall Islands and San Marino.

CGEXP:

Central government expenditures as a percentage of GDP, constructed using the item Government Finance-Expenditures in the IFS, divided by GDP at current prices and multiplied by 100; source: International Monetary Fund (2006): International Financial Statistics Online Service.

CGREV:

Central government revenues as a percentage of GDP, constructed using the item Government Finance-Revenues in the IFS, divided by GDP at current prices and multiplied by 100; source: *International Monetary Fund (2006): International Financial Statistics Online Service.*

CLIST:

Dummy variable for closed party lists taking on 0 if the list is open and 1 if it is closed. Sources are constitutions, electoral laws, election reports and other internet sources.

COL_ESP:

Dummy variable equal to 1 if the country is a former colony of Spain or Portugal, 0 otherwise; source: CIA (2005).

COL_ESPA:

Spanish colonial origin, discounted by the number of years since independence (*T_INDEP*) and defined as *COL_ESPA = COL_ESP* * (250 – *T_INDEP*) / 250.

COL_OTH:

Dummy variable, equal to 1 if the country is a former colony of a country other than Spain, Portugal or the United Kingdom, 0 otherwise; source: CIA (2005).

COL_OTHA:

Defined as *COL_OTHA = COL_OTH* * (250 – *T_INDEP*) / 250; see also *COL_ESPA*.

COL_UK:

Dummy variable, equal to 1 if the country is a former U.K. colony, 0 otherwise, source: CIA (2005).

COL_UKA:

Defined as *COL_UKA = COL_UK* * (250 – *T_INDEP*) / 250; see also *COL_ESPA*.

CONFU:

Dummy variable for the religious tradition in a country, equal to 1 if the majority of the country's population is Confucian/Buddhist/Zen, 0 otherwise; source: CIA (2000).

CPI0005:

Corruption Perception Index measuring perceptions of abuse of power by public officials. Average over 2000 – 2005. Index values between 0 and 10, lower values meaning lower levels of corruption (recoded from the original version); source: Transparency International and Internet Center for Corruption Research (http://www.icgg.org/).

CPI0005_WT:

Weighted CPI0005. Weight is 1/(Std. Dev. of single surveys within CPI0005).

CPI9500:

Like *CPI0005* but average for the period 1995 – 2000; source: Transparency International and Internet Center for Corruption Research (http://www.icgg.org/).

CPI9500_WT:

Weighted CPI9500. Weight is 1/(Std. Dev. of single surveys within CPI9500).

DATASET:

Dummy variable with 0 for countries covered in PT, 1 for all additional countries.

DEM_AGE:

First year of democratic rule in a country, corresponding to the first year of a string of positive yearly values of the variable POLITY for that country that continues uninterrupted until the end of the sample, given that the country was also an independent nation during the entire time period. Does not count foreign occupation during WW II as an interruption of democracy; source: additions on the basis of the variable NEWDEM (Golder 2005) that identifies the year of a first democractic election in that country.

DISTRICTS:

Number of electoral districts in a country; source: Variable DISCTRICTS from Golder (2005).

EDUGER:

Total enrollment in primary and secondary education as a percentage of the relevant age group in the country's population; source: UNESCO (2006): Education statistics.

ENGFRAC:

Fraction of a country's population that speaks English as a native language; source: Hall & Jones (1999).

EURFRAC:
Fraction of a country's population that speaks one of the major languages of Western Europe: English, French, German, Portuguese, or Spanisch; source: Hall & Jones (1999).

FEDERAL:
Dummy variable equal to 1 if a country has a federal political structure, 0 otherwise; source: Forum of Federations (2002): List of Federal Countries.

FRANKROM:
Natural log of tradeshare forecasted by Frankel and Romer's gravity model of international trade which takes both a country's population and its geographical location into account; source: Hall & Jones (1999).

GASTIL:
Average of indexes for civil liberties and political rights, each index is measured on a 1-to-7 scale with 1 representing the highest dgree of freedom. Countries whose averages are between 1 and 2.5 are called "free", those between 3 and 5.5 "partially free" and those between 5.5 and 7 as "not free"; source: Freedom House (2005).

GOL_MAJPAR:
MAJPAR with PRES according to Golder 2005.

GOL_MAJPRES:
MAJPRES with PRES according to Golder 2005.

GOL_PRESBAD:
PRESBAD with PRES according to Golder 2005.

GOL_PROPRES:
PROPRES with PRES according to Golder 2005.

GOVEF:
Government effectiveness according to the Governance Indicators of the World Bank. Combines perceptions of the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies into a single indicator. Values between 0 and 10, where lower values signal higher effectiveness; source: Kaufmann et al. (1999).

GOVEF9604:
Government effectiveness according to Kaufmann; average values for the years 1996, 1998 and 2000; source: Kaufmann, D., Worldbank (2005): Governance Indicators: 1996-2004.

GOVEF9604_WT:
Weight for GOVEF9604. Weight is 1/(Std. Dev. of single surveys within GOVEF9604).
source: see GOVEF9604.

GRAFT:
Graft according to the Governance Indicators of the World Bank focusing on perceptions of corruption. Values between 0 and 10, where lower values signal higher effectiveness; source: Kaufmann et al. (1999).

GRAFT9604:
Graft according to the Governance Indicators of the World Bank; average values for 1996, 1998 and 2000; source: Kaufmann, D., Worldbank (2005): Governance Indicators: 1996-2004.

GRAFT9604_WT:
Weight for GRAFT9604. Weight is 1/(Std. Dev. of single surveys within GRAFT9604).
source: see GRAFT9604.

INIT_DEBT:
Initial endebtment of a country as a share of its GDP in the first year for which data was available (*INIT_DEBT* = (Domestic Debt + Foreign Debt)/GDP); source: International Monetary Fund (2006): International Financial Statistics Online Service.

LAAM:

Regional dummy variable, equal to 1 if a country is in Latin America, Central America, or the Caribbean, 0 otherwise; source: CIA (2005).

LAT01:

Rescaled variable for latitude, defined as the absolute value of *LATITUDE* divided by 90 and taking on values between 0 and 1; source: CIA (2005).

LATITUDE:

Distance from the equator (in degrees), ranging between -90° and +90°, source: CIA (2005).

LIST:

Number of lower-house legislators elected through party list systems; sources: constitutions, electoral laws, election reports and other internet sources.

LOGA:

Natural logarithm of total factor productivity, measured in 1988, source: Hall & Jones (1999).

LOGA 2000:

Natural logarithm of total factor productivity, own calculation for 2000 based on Hall & Jones (1999).

LOGYL:

Natural logarithm of output per worker, measured in 1988, source: Hall & Jones (1999).

LOGYL 2000:

Natural logarithm of output per worker, own calculation for 2000 based on Hall & Jones (1999).

LPOP:

Natural logarithm of total population (in millions); sources: Penn World Tables, Center for International Comparisons at the University of Pennsylvania/ CICUP (2006) and CIA (2005).

LYP:

Natural logarithm of real GDP per capita in constant dollars (chain index) expressed in international prices, base year 1985; average for the years 1990 – 1999; source: Column RGDPCH Penn World Tables, Center for International Comparisons at the University of Pennsylvania/ CICUP (2006).

MAGN:

Inverse of district magnitude, defined as DISTRICTS / SEATS. MAGN is a measure for the degree of political competition and can take on values between 0 and 1. Small values of MAGN indicate a high degree of political competition.

MAJ:

Dummy variable for electoral systems, equal to 1 if all the lower house in a country is elected under plurality rule, 0 otherwise. Only legislative elections (lower house) are considered. Macedonia switched during the observation period from MAJ to a mixed system and was coded MAJ = 0.5 and MIXED = 0.5; sources: variable *ELECSYSTEM_TYPE* from Golder (2005) as well as constitutions, electoral rules, election reports and other internet sources.

MAJPAR:

= MAJ * (1 – PRES)

MAJPRES:

= MAJ * PRES

MIXED:

Dummy variable for electoral systems, equal to 1 if the electoral formula for electing the lower house in a country is neither strict plurality rule nor strict proportionality, 0 otherwise. Semiproportional (or mixed) electoral rule identifies those electoral systems characterized by both proportional and first-past-the-post representation for allocating seats. Madagascar changed in the observation period from a proportional system (MAJ = 0 und MIXED = 0) to a mixed system and was coded MIXED = 0,5 (and MAJ = 0); sources: variable *ELECSYSTEM_TYPE* from Golder (2005) as well as constitutions, electoral rules, election reports and other internet sources.

OECD:

Dummy variable, equal to 1 for all countries that were members of the OECD; source: OECD (2006).

PIND:

Computed as 1 – LIST / SEATS; can take on values between 0 and 1. PIND indicates the proportion of individually elected candidates (i.e. those not on a party list).

PINDO:

Computed as 1 – LIST / SEATS * CLIST (CLIST indicating close lists with 1 or open lists with 0); can take on values between 0 and 1. PINDO indicates the proportion of directly elected candidates plus those elected via open lists.

PRES:

Dummy variable for government forms, equal to 1 in presidential regimes, 0 otherwise. Only regimes in which the confidence of the assembly is not necessary for the executive to stay in power (even if an elected president is not chief executive, or if there is no elected president) are included among presidential regimes. Most semipresidential and premier-presidential systems are classified as parliamentary source: constitutions and electoral laws.

LRES_GOL:

PRES according to Golder 2005.

PRESBAD:

= PRES * GASTIL

PROP1564:

Percentage of a country's population between 15 and 64 years old among entire population; source: CIA (2000).

PROP65:

Percentage of a country's population over the age of 65 in the total population; source: CIA (2000).

PROPRES:

= (1 – MAJ) * PRES

PROT80:

Percentage of the population in a country professing the Protestant religion in 1980 (younger states are counted based on their average from 1990 to 1995); source: La Porta (1999) and CIA (2005) for Lithuania, Nauru, Marshall Islands und San Marino.

SEATS:

Number of seats in lower or single chamber for the latest legislature of a country. Average for 90ies; source: the variable SEATS from Golder (2005).

SPL:

Central government budget surplus (if positive) or deficit (if negative) as a percentage of GDP, based on „DEFICIT (-) OR SURPLUS" as share of GDP average for 1990-1999; source: International Monetary Fund (2006): International Financial Statistics Online Service.

T_INDEP:

Number of years since indepence; *T_INDEP* = 2000 – year of independence; source: CIA (2005).

TOTEXP:

Total Government Expenditure as percentage of BIP; source: Heston et al. (2002).

TRADE:

Sum of exports plus imports of goods and services measured as a share of GDP; source: Worldbank (2005).

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