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Constitutional Rules and Agricultural Policy Outcomes

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Abstract

This paper deals with the effect of constitutional rules on agricultural policy outcomes in a panel of observations for more than 70 developing and developed countries in the 1955-2005 period. Testable hypotheses are drawn from recent developments in the comparative politics literature that see political institutions as key elements in shaping public policies. Using differences-in-differences regressions we find a positive effect of a transition into democracy on agricultural protection. However, this average effect masks substantial heterogeneities across different forms of democracy. Indeed, what matters are transitions to proportional (as opposed to majoritarian) democracies, as well as to permanent (as opposed to temporary) democracies. Moreover, while we do not detect significant differences across alternative forms of government (presidential *versus* parliamentary systems), there is some evidence that the effect of proportional election is exacerbated under parliamentary regimes, and diminished under presidential ones.

Keywords: Comparative Political Economics, Agricultural Distortions, Constitutional Rules

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Constitutional Rules and Agricultural Policy Outcomes

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The literature concerning political and economic determinants of agricultural protection tends to ignore the role that constitutional rules play in shaping agricultural policies. In contrast, the newly emerging field of comparative political economics places growing emphasis on the effect of political institutions on public policy outcomes. The inclusion of political institutions – such as electoral rules and forms of government – in formal political economy models has produced several testable hypotheses firmly motivated by theory. One of the most influential lines of research in this area is by Persson and Tabellini (2000, 2003), who look at how constitutional rules shape policy outcomes. Other recent contributions along the same research line are those by Grossman and Helpman (2005), who studied the effect of 'party discipline' on trade policy, and by Persson (2005), Persson and Tabellini (2006, 2008), Besley and Persson (2008) and Acemoglu and Robinson (2000, 2008) who, among others, look at the economic and political effects of different forms of democracy and the origins of 'State Capacity'.

Evidence that links political institutions to agricultural policy outcomes (e.g. Beghin and Kherallah 1994, Swinnen, Banerjee and de Gorter 2001, Henning, Krause and Struve 2002, Olper 2001, Thiesse and Porsche 2007) provides a weak link with this 'new generation' of political economy models, lessening our understanding of the mechanism in place and, consequently, its policy implications. Some contributions have tried to go further, closing the gap between theory and evidence (see Henning 2004, Olper and Raimondi 2004). However, questions still remain regarding the robustness and generalization of existing empirical findings. First, the low within-country variation in political institutions forces the researcher to look especially at the cross-country variation in the data, rendering the robustness of the inferences questionable. Second, actual evidence often refers to a broad definition of institutions, such as proxies for the degree of democracy or composite indices for institutions quality. Third, Glaeser et al. (2004) claim that it is hard to find rules-based measures of institutions systematically correlated with structural policies. To address this last point,

conceptual studies and more recent empirical evidence stress that democratic details matter (see Persson 2005, Acemoglu 2005).

Starting from these considerations, the objective of this chapter is to find robust empirical regularity that maps constitutional rules into agricultural policy outcomes. The analysis takes advantage of the database on agricultural policy distortions developed by the World Bank (Anderson and Valenzuela 2008), covering a sample of more than 70 countries in the period 1955-2005. By exploiting the panel dimensions of the dataset we investigate the effect of regime changes – autocracy vs. democracy – on agricultural price distortions, as well as whether details of these forms of democracy, such as the nature of electoral rules and government types, systematically affect the extent of agricultural distortions.

From a methodological point of view, we follow the recent tendency of including democracies as well as non-democracies in the sample, to overcome the fact that established democracies do not display sufficient (time) variation in their constitutional features. This gives us the possibility of using a more robust empirical approach that can exploit the within-country variation in the data (see Papaioannou and Siourounis 2008, Giavazzi and Tabellini 2005).

The main results can be summarized as follows. First, we find a robust positive effect of transition into democracy on the level of agricultural protection: a shift from autocracy to democracy induces an increase in agricultural protection (or a reduction in taxation) of about 3-4 percent points. Secondly, this average effect masks substantial heterogeneities across different forms of democracy. Indeed, what matters are transitions to proportional (as opposed to majoritarian) democracies, as well as to permanent (as opposed to temporary) democracies. Moreover, while we do not detect significant differences across alternative forms of government (presidential versus parliamentary), there is evidence that the effect of proportional systems is exacerbated under parliamentary regimes, but dampened under presidential ones.

Previous evidence

The first attempt to systematically study the effect of political institutions on agricultural protection in a broad context is that of Beghin and Kherallah (1994).[1] They look at how different political systems (no-party, one-party, dominant party and multiparty systems) and civil liberties (Gastil index) affect the protection structure in 25 developing and developed countries. The results show that political institutions matter, and that their effect is non-monotonic: protection peaks with dominant party systems, and then becomes non-increasing despite further democratization.

A non-monotonic relationship between democracy and protection in a larger cross section of countries can also be found in Swinnen et al. (2000). Using the Gastil index of political rights, they found that moving from low to medium political rights reduces protection, but that any further increase in democratization does not necessarily result in substantial effects on agricultural protection. Clearly, this non-linear behavior goes in the opposite direction to the previous one. Indeed, Beghin and Kherallah (1994) find an inverted U-shaped relation between democracy and agricultural protection, whereas Swinnen et al. (2000) find a U-shaped relation.

Motivated by this early evidence, and by the growing literature linking institutions to economic growth and development (e.g. North 1990, Hall and Jones 1999, Acemoglu, Johnson and Robinson 2001), Olper (2001) uses alternative indices of democracy and composite indices measuring the quality of institutions that protect and enforce property rights.[2] The objective was to identify, and separate, the potential effects of these 'different' institutional dimensions since, as suggested by several authors, focusing only on the level of democracy might be too simple to explain differences in performance and governance. The results strongly support this last prediction: democracy displays a positive linear effect on protection, but it is not the level of democracy *per se* that seems to matter. Rather, that study shows that the quality of institutions matters: protection increases with institution quality at low levels of this dimension, but the relationship turns negative once a moderate amount of institutional quality has been achieved.

The previous evidence relies largely on cross-section variation in the data. To date, the only study that uses a long time-series is that of Swinnen, Banerjee and de Gorter (2001),

[1] Important precursors of this kind of analyses can be found in the works of Bates (1983, 1989) on agrarian development in African countries. Moreover, the relationship between democracy and agricultural protection was first highlighted by Lindert (1991), who in a cross-country analysis found a positive relationship when democracy was associated with rapid agricultural decline.

[2] These composite indices come from two private international investment risk services: International Country Risk Guide (ICRG) and Business Environmental Risk Intelligence (BERI), and was first introduced in the growth literature by Knack and Keefer (1995).

who looks at the agricultural protection patterns in Belgium between 1877 and 1990. This paper, exploiting the within-country variation in protection, shows that only those political reforms that determine a significant shift in the political balance towards agricultural interests – e.g. the extension of voting rights to small farmers in the early 20th century – induce an increase in agricultural protection. This result is important, first because it gives a logical interpretation to the democracy-protection non-linearity discussed above, and secondly because it highlights the importance of drawing inferences from regime changes to more carefully capture the effect of democratization on protection (Swinnen 2010).

A major limitation of this first thread of evidence lies in its weak link with comparative political economy models. First attempts to link theory and evidence more closely were made by Henning Krause and Struve (2002)[3] and Olper and Raimondi (2004). The former authors focus on the specific organization of legislative decision-making, building on the political exchange model of Weingast and Marshall (1988) and on political science literature (Lijphart 1990). They show that agrarian interests are better represented in bicameralism systems, due to the bias of the second chamber towards rural districts, and in the proportional electoral systems, due to the bias of this system towards particular interest in organized minorities. Cross-country evidence on ten countries of Central and Eastern Europe supports these predictions.

In a similar vein, Olper and Raimondi (2004) test the prediction from recent political economy models that show how different electoral rules and forms of government systematically affect the level and composition of government spending (see also Persson and Tabellini 2000). In a sample of 29 OECD countries they show that, on average, presidential systems and majoritarian electoral rules are associated with smaller protection for the dairy industry (about 6-7 percent) than are parliamentary and proportional systems. However, this under-protectionist bias of presidential-majoritarian systems tends to reverse in countries where there is a strong geographical concentration of dairy farming, suggesting that the relationship between electoral rules, forms of government and agricultural protection could be non-monotonic.

A non-linear relationship between agricultural protection and electoral rules in a cross-section of countries was also found recently by Henning (2008). Specifically, building on the probabilistic-voting model of Henning and Struve (2007), the author tests the prediction that in developed countries the relationship between agricultural protection and

[3] See also Henning (2004), where a similar model is used to explain the different levels of protection between the EU and US.

district magnitude would be an inverted U-shape. In other words, agricultural protection first increases and then decreases with district size. Developing countries, however, would have the same relationship reversed, or U-shaped. Empirical evidence from cross-country analysis supports this relationship, especially in developed countries.

Finally, Thies and Porche (2007) 'extended' the previous evidence using a more heuristic approach and a larger set of political institution variables, including proxies for veto players, federalism, party structure and also year of elections. Their econometric results find several of these political dimensions quite robust across different specifications, and in line with expectations.[4] For example, the authors show that having a federal system and higher party fragmentation increases protection. Interestingly, they also show a positive and significant effect of the electoral variable on protection. That result is consistent with the political business cycle literature (Alesina, Roubini and Cohen 1997).[5]

Overall, the empirical evidence summarized above is supportive of the important role political institutions play in shaping agricultural policy. At the same time, however, several shortcomings suggest that many aspects of the interaction between political institutions and agricultural protection remain unclear.

One concern is that, apart from some notable exceptions, the actual evidence is largely derived from a heuristic approach, where the link between political institutions and policy outcomes is not carefully derived from theory, thus reducing our understanding of the mechanism in place and, consequently, their policy implications. Secondly, several studies focus especially on the (cross-country) effect of democracy, adding further compliance to the analysis. This is because the definition of the degree of democracy is obviously a complex issues; furthermore, actual theory offers clear predictions, especially concerning the effects of the forms of democracy rather than the effect of democracy *per se.* Thirdly, and most importantly, several questions still remain with regard to both the identification of the causal effect of institutions on agricultural policies, and the robustness of the empirical evidence. Indeed, given the low variation in political institutions, especially in developed countries, and the short time period involved by the majority of studies, actual inferences are drawn

[4] The authors also conclude that political variables are more robust explanatory variables than traditional structural-economic ones. However, a potential shortcoming of this result is that the specifications do not include, simultaneously, structural variables, such as agricultural labor or value added share, with the level of development, understandably omitted in the Thies and Porche's specifications.

[5] Other relevant institutional dimensions investigated by Olper (2007), are government ideology (left-wing versus right-wing) and land inequality. However, given our focus on constitutional rules, we do not further discuss this line of research. The relationship between ideology, inequality and trade policy is developed by Dutt and Mitra (2002, 2005, 2010).

especially from cross-country variation in the data, limiting the ability of the researcher to control for unobserved characteristics that affect both political institutions and policy outcomes, such as history and culture.

Conceptual framework and testable hypotheses

Before presenting our hypotheses, we first examine further the relationship between democratization and agricultural protection and then the role of different forms of democracy.

Democratization and agricultural protection

One of the most fundamental features of political institutions is related to whether a country is a democracy or not, simply because this status is highly related to the credibility of constitutions (Acemoglu 2005). Thus, the first question that arises is whether democracies have agricultural policies different from autocracies, *ceteris paribus*. Theoretically this relationship is complex, and obviously linked to the more general effect of democracy on public policy.

As stressed by de Haan and Sturm (2003) economic theory does not give a clear answer to this question. Several authors point out that arguments exist for both a positive and a negative relationship (Przeworsky 1991, Banerji and Ghanem 1997). Others suggest that economic policies are, in a first approximation, the outcome of tradeoffs related to efficiency or to conflict among generations or among industries, and thus are not specific to particular institutions (Mulligan, Gill and Sala-i-Martin 2004).

According to Przeworsky (1991), one of the main differences between democratic and authoritarian regimes lies in the level, within the political process, of free participation by independent organizations. Authoritarian regimes abhor independent organizations, and either incorporate them into centralized control or repress them by force. Starting from this consideration, we have two contrasting views about whether agricultural protection is more or less likely to occur under democratic or authoritarian regimes.

One view is that the voices of farmers may be better heard in an electoral democracy (Lindert 1991) where the interest groups are free to compete for political rents. By contrast, authoritarian regimes, which are better able to discourage rent-seeking activities, tax or do

not support their agricultural sectors. These arguments suggest that with democratization agricultural protection could be increasing, a view that fits the more general notion that democratization also induces redistribution (Acemoglu and Robinson 2000, 2008).[6]

Contrasting the above-mentioned view is the probability of governments adopting inefficient policies to benefit specific interest groups or 'insiders', a probability that is actually higher under authoritarian regimes. In a well-functioning democracy, outsiders vote and impose some limits on what narrower interest groups can achieve, while in a less democratic environment the government needs to worry only about groups that have real power (Banerji and Ghanem 1997). Thus it could be suggested that agricultural policy transfers are fewer in democracies, but this argument is also consistent with a non-linear or non-monotonic relationship.

A correlated argument stressed by de Haan and Sturm (2003) suggests that, at the beginning of liberalization, an authoritarian regime could be necessary, as the mass of voters often turn down economic reforms despite the fact that voters can see long-term benefits. Indeed, several policies popular in the long-run are often not implemented in democratic regimes.

From this brief discussion it emerges that, conceptually, the net effect of democracy on agricultural protection appears, at best, of uncertain sign and inconclusive. Thus, to gain some insight from existing literature, we now focus attention on actual evidence linking democracy to public policies and economic development.

In a large sample of developing countries from 1970 to 1999, Milner and Kubota (2005) show that regime change towards democracy is associated with trade liberalization. Since an important component of agricultural distortions in developing countries is indirect and related to import-substituting industrialization policies (Anderson and Valenzuela 2008), this evidence suggests that transitions from autocracy to democracy could be positively related to agricultural protection.

More general evidence on the relationship between regime change and economic (trade) liberalization can be found in Giavazzi and Tabellini (2005) and Persson (2005). The former, using difference-in-differences estimation, shows that a transition to democracy induces a more liberal trade policy. The latter, using a similar estimation strategy, goes a step further and shows that what matters is not the simple dichotomy between democracy and

[6] Acemoglu and Robinson (2000) document how the extension of voting rights in several Western societies in the nineteenth century led to unprecedented redistributive programs. They also argue that these political reforms can be viewed as a strategic decision by the political elite to prevent widespread social unrest and revolution. The last argument is formally developed in Acemoglu and Robinson (2008).

autocracy but the form of democracy. Specifically, Persson shows that the adoption of structural policies that promote long-term economic performance is more frequent in parliamentary-proportional democracies than in presidential-majoritarian ones. Such evidence is important because, by exploiting the within-country variation in the data, it leads to more robust results than cross-country evidence, overcoming the criticism of fragility advanced by several authors (e.g. Glaeser et al. 2004, Acemoglu 2005).

Finally, also relevant to our discussion are recent papers that study the effect of democracy on economic growth and development. The most robust stylized fact about agricultural protection patterns is the strong positive correlation with economic development (Anderson 1995, Swinnen 1994). The arguments as to why democracy can foster growth are similar to the arguments as to why democracy affects economic liberalization (see de Haan and Sturm 2003).

The relationship between democracy and economic performance, when studied in cross-section regressions, is ambiguous and inconclusive (Barro 1997, Glaeser et al. 2004). However, there is a growing literature exploiting the within-country variation in the data and difference-in-differences methodology (Papaioannou and Siourounis 2008, Rodrik and Wacziarg 2005, Giavazzi and Tabellini 2005, Persson 2005, Persson and Tabellini 2006). This literature, in combination with semi-parametric methods (Persson and Tabellini 2008), shows how the effect of democracy on growth tends to be positive and large in magnitude.[7] Thus, once again, these results appear supportive of a positive relationship between transition to democracy and agricultural protection. However, they also suggest that this positive effect could be conditional to the characteristics of reforming and non-reforming countries, and to the specific form of democracy.

Forms of democracy and agricultural protection

From the previous discussion it emerges that, while theoretically inconclusive, the effect of democracy on agricultural protection may also be related to the characteristics of democratic institutions. Thus, in this section the focus is on two key aspects of any democratic institutions (Persson and Tabellini 2004): the electoral rules, and the forms of government.

Electoral rules and economic policy

[7] On the positive effect of democracy and growth, see also the recent contribution of Aghion, Alesini and Trebbi (2008), which stresses how political rights induce positive growth, especially in more advanced sectors.

There is a growing literature that has formalized how electoral rules influence the level and composition of government spending (Lizzeri and Persico 2001, Persson and Tabellini 2000, Milesi-Ferretti, Perotti and Rostagno 2002), as well as other public policies including trade policy (Hatfield and Hauk 2003, Roelfsema 2004, Grossman and Helpman 2005).

A first prediction from these models is that proportional elections tend to address government spending towards large programs benefiting large groups in the population (such as welfare programs) while majoritarian elections give the politicians a greater incentive to target transfers to geographically smaller constituency groups.

There are two main reasons at the root of these differences (Persson and Tabellini 2000, ch. 8). In proportional elections the legislators are elected from large districts and this gives the politician a strong incentive to get support from large coalitions in the population. By contrast, in majoritarian elections the districts are small, creating a strong incentive for politicians to target policies towards key district constituencies. Furthermore, the electoral formula has a reinforcing effect. In proportional election the voters choose a list of candidates, while in majoritarian elections a single candidate is chosen. Thus, in the former case the implemented policy is likely to reflect what is optimal for the party, often reflecting the national perspective and favouring broad forms of redistribution. The opposite applies in majoritarian systems, where the individual legislator tends to 'look after' the interests of the represented district, thus favouring a more narrow distribution.

Several, but not all, models predict that the electoral rule also affects the level of government spending, with proportional elections normally associated with larger spending. Indeed, while Persson and Tabellini (1999) found greater overall government spending in majoritarian elections, both Milesi-Ferretti, Perotti and Rostagno (2002) and Kontopoulos and Perotti (1999) claim greater spending in proportional systems. The latter prediction was recently supported theoretically and empirically by Persson, Roland and Tabellini (2008), who studied the effect of electoral rules on party and government structure in parliamentary democracies. They stress that proportional elections induce a greater incidence of coalition governments than do majoritarian elections, giving rise to a larger budget spending as minority interests are more represented in the legislature.[8]

A few recent papers have applied this kind of reasoning to trade policy, although the theoretical predictions and the empirical evidence appear mixed. For example, Roelfsema

[8] Persson, Roland and Tabellini (2007) formalize the so-called common pool problem: if different groups have partial control over some component of government, then none of them fully internalizes the fiscal costs. This problem is clearly exacerbated under proportional elections because, as suggested by political science literature (see, e.g., Lijphart 1990), proportional elections make coalition governments more likely.

(2004) and Grossman and Helpman (2005) predict, *ceteris paribus*, higher average rates of protection in countries with majoritarian election, as an effect of the stiffer electoral competition in swing districts. Both Roelfsema (2004) and Persson (2005) find empirical support for the hypothesis that proportional democracies are associated with more open trade policies than majoritarian democracies. By contrast, both Rogowski and Kayser (2002) and Hatfield and Hauk (2003) obtain exactly the opposite result, namely that proportional systems have higher average tariffs than majoritarian systems. Wiberg (2006) tries to reconcile these apparent contradictions by incorporating an export industry producing for foreign markets. He argues and find empirical support for the idea that trade policy is more (less) restrictive under proportional systems if marginal districts are populated by relatively more (less) factory owners with interests in the exporting sector.

Forms of government and economic policy

Few formal models assess the effect of different forms of government on the level and composition of government spending. The classical distinction is between presidential versus parliamentary regimes. In the former, the appointment is direct, through citizen election, while in the latter it is indirect, through a vote of confidence from an elected parliament.

Persson, Roland and Tabellini (1997, 2000) compare these two forms, focusing on different features such as the separation of power over legislation (agenda setting) and the degree of 'legislative cohesion'. In parliamentary regimes the government has stronger powers to initiate legislation than in a presidential regime, and thus it is easier for politicians to collude with each other at the voters' expense, resulting in higher taxes and spending. Moreover, in parliamentary systems the vote of confidence induces more discipline within the government coalition. Thus a stable majority tends to satisfy the broad interests of its constituents.

These models give clear predictions of the level and composition of government spending, thereby mimicking and reinforcing the previous discussion on electoral systems. Specifically, for presidential regimes the prediction is for overall lower spending and taxation than for parliamentary regimes. Moreover, presidential regimes are also associated with target programs, whereas parliamentary systems tend to have broader spending programs (Persson and Tabellini 2000, ch. 10).[9] The empirical evidence strongly supports the prediction of greater public spending and government redistribution in parliamentary regimes

[9] See also Grossman and Helpman (2008), who studied the budget formation in a model of separation of powers, where the ruling coalition in the legislature and the executive serve different constituencies.

than in presidential. However, between these two forms of government, the empirical differences in the composition of government spending – narrow versus broad programs – are, in general, weak (Persson and Tabellini 2004).

Implications and testable hypotheses

The literature summarized above leads us to develop three main hypotheses about the effect of political institutions on agricultural protection.

The link between democratization and agricultural protection, though inconclusive from the theoretical point of view, can be expected to be moderately positive, as several studies highlight a positive effect of democratization on indicators of openness, redistribution, growth and agricultural protection itself. Moreover, in line with previous evidence, the magnitude of this effect is expected to be conditional to the form of democracy. Thus, our first hypothesis can be summarized as follows:

H1. Regime change and agricultural protection: The effect of a democratic transition on agricultural protection is positive, and its magnitude is conditional to the specific form of democracy.

The implications concerning the effect of the different forms of democracy, when translated to agricultural protection, need further qualification. The literature suggests two quite clear predictions about the *level* and the composition of government spending. The prediction about the level of spending could translate directly to agricultural policy, suggesting higher protection and support under parliamentary and proportional democracies than under presidential and majoritarian systems. Differently, the predictions about the composition of government spending (targeted versus broad) is more complex, and could go in either direction depending on the role agricultural voters play relative to other voters.

In developed countries the farm group is small, representing a classic special interest group, whereas in developing countries, where the rural population often is a majority, the farm group represents the broad interests of the population. Thus, strictly speaking, the effect of regime types and electoral rules on agricultural protection should be conditional to the level of development, an hypothesis consistent with the recent model of Henning (2008). Because our objective is to test predictions concerning the potential effect of a regime change into different forms of democracy, a transition that largely happens in developing countries, the above considerations suggest that in our context agricultural protection represents a broad

redistributive programme.[10] The opposite should apply in a consolidated democracy. Keeping this qualification in mind, we put forward the following two hypotheses:

H2. Forms of government and agricultural protection: Reform towards a parliamentary democracy, as opposed to a presidential one, will, on average, result in a greater increase in agricultural protection;

H3. Electoral rules and agricultural protection: Reform towards a proportional democracy, as opposed to a majoritarian one, will, on average, result in a greater increase in agricultural protection.

In what follow, after a description on how democratic reforms are identified and classified, we present our econometric strategy for formally testing the above hypotheses.

Data and basic specification

The sample in Anderson and Valenzuela (2008) refers to 74 countries and comprises yearly estimates of agricultural protection from 1955 to 2007. Not every country is covered for the whole time period, but the average number of years of observation per country to 2005 is 35. Overall, we worked with an unbalanced panel with more than 2500 observations. As in Olper and Raimondi (2004) and other cross-country studies, the European Union countries are considered as separate entities, given their different levels of farm support shown in many studies (Bureau and Kalaitzandonakes 1995, Anderson and Valenzuela 2008).

In classifying democratic reforms and other political institution variables, we follow that done in the preceding literature, particularly Persson and Tabellini (2003), Giavazzi and Tabellini (2005) and Persson (2005). The interested reader should refer to these papers for a deeper description of and justification for using those variables. Here we give only a summary of the key criteria and data sources.

Political institution variables

We classify countries into democracy or autocracy using the Polity2 index of the Polity IV data set. The Polity2 index assigns a value ranging from -10 to +10 to each country and year,

[10] Indeed, in our dataset the average and the median values of the share of agricultural population in countries undergoing transitions in and out of democracy is 55 percent and 57 percent, respectively.

with higher values implying more democracy. Following, Papaionannou and Siourounis (2008) and Giavazzi and Tabellini (2005), we code a country as democratic in each year that the Polity2 index is strictly positive, setting a binary indicator called *democracy* = 1 (0 otherwise). A reform into (or out of) democracy occurs in a country-year when this democracy indicator switches from 0 to 1 or *vice versa*. In order to render the before-after analysis plausible, it is also necessary that the outcome of interest, agricultural protection, be observed for at least two years before and after each reform episode.

Applying these criteria to the dataset, we reach 66 transitions into or out of democracy, of which 41 are transitions into democracy and 25 are into autocracy. About 62 percent of the reforms occurred before 1985. As shown in column 1 of table 1, the distribution of these reforms is not uniform across continents and time: 50 percent of the reforms are in Africa, 24 percent in Asia, 15 percent in Latin America, and 11 percent in high-income and Europe's transition countries.

Following Persson (2005), we define other binary indicators for the forms of democracy. Among democracies, the countries are coded as presidential (*pres* = 1, and *parl* = 0) when the chief executive is not accountable to the legislature through a vote of confidence. In all other situations we have a parliamentary system (*parl* = 1, and *pres* = 0).[11] Note that, following this logic, we have countries with a directly elected president, such as Portugal and France, classified as parliamentary, and countries without a popularly elected president, such as Switzerland, coded as presidential. Moreover, countries are classified as majoritarian if their elections to the lower house rely strictly on plurality rule (*maj* = 1, and *prop* = 0). All the other electoral systems are classified as proportional (*prop* = 1, and *maj* = 0). The primary source for mapping the sample into this classification is the database of Persson and Tabellini (2003), supplemented by the Database on Political Institutions (DPI) of the World Bank (Beck et al. 2001), and the Comparative Data Set on Political Institutions (Lundell and Karvonen 2003).[12]

The number of transitions and their distribution across different forms of democracy is summarized in table 1. Row 2 shows that 83 percent of reforms are in parliamentary

[11] As discussed in Persson and Tabellini (2003), this represents a quite crude classification, especially because the conceptual model also relies on separation of powers in the legislative process. However, using also this dimension to classify countries as presidential or parliamentary systems introduces difficulties that are beyond the scope of this study.

[12] We wish to thank Krister Lundell for kindly providing the relevant variables used in this chapter. For our purposes, the main differences in these two data sets lie in the countries and time period covered. Specifically, the DPI data cover a larger set of countries but it is limited to the 1975-2004 period, while the data set of Lundell and Karvonen (2003) covers only 'democracies' but the data start in 1960, at least for more-consolidated democracies.

democracies, whereas reforms in presidential democracies, and in proportional and majoritarian democracies, are more equally spread before and after 1985.

Some problems emerge with the distribution of reforms across continents. For example, reforms in presidential systems are over-represented in Africa, and reforms in proportional systems are over-represented in Latin America (lower part of table 1). This suggests that the distribution of reforms is not random across continents. Thus the econometric estimation strategy needs to avoid confounding this continent-specific incidence of reforms from continent-specific trends in agricultural protection (Persson 2005).[13]

Dependent variable and structural controls

We test our hypotheses using two different dependent variables: the agricultural nominal rate of assistance (*NRA*) and the relative rate of assistance (*RRA*), both from the World Bank's Distortions to Agricultural Incentives Database (Anderson and Valenzuela 2008, methodological details for which are in Anderson et al. 2008). The *NRA* is measured as the weighted average of the nominal rate of assistance at the product level, using as a weight the industry's value share of each product. Differently the *RRA* to agriculture is calculated as the ratio between the agricultural and non-agricultural *NRA*.[14] One advantage of using also the *RRA* is that, especially in developing countries, one important source of indirect taxation to agriculture comes from protection of manufacturing sectors. Thus, the *RRA* is a more useful indicator in undertaking international comparison over time of the extent to which a country's policy regime has an anti- or pro-agricultural bias (see Anderson et al. 2008).

To simplify the interpretation of the regression coefficients, we express *NRA* (and *RRA*) as a percentage. Thus, the magnitude of the estimated coefficient on our political institution indicators measures the average percentage point changes in agricultural protection implied by a transition into (or out of) democracy.

In the empirical specification we include additional structural controls that are likely to affect the level of agricultural protection, as suggested by many previous studies (e.g. Anderson 1995, Beghin and Kherallah 2004, Swinnen et al. 2000, Olper 2001). Specifically, our basic specification always includes the following structural controls: the level of

[13] All the reform episodes discussed above, and their specific classifications, are listed in part (a) of the Annex to this chapter, while part (b) of that Annex reports the few (eleven) constitutional reforms that happen in permanent democracies.

[14] Specifically, *RRA* is calculated as $[(1 + NRA_{ag})/(1 + NRA_{nonag})-1]$, where NRA_{ag} is the nominal rate of assistance to agricultural tradables and NRA_{nonag} is the average nominal rate of assistance to non-agricultural tradable sectors.

development, measured by the log of real per capita GDP; agricultural employment as a share of total employment; the log of agricultural land per capita; the log of total population; and, finally, given the high persistency of agricultural protection and for reasons discussed below, we always include the lagged dependent variable. All these variables are computed using FAO and World Bank (WDI) sources, or otherwise national statistics.

A preliminary look at the data

Table 2 displays average levels of the nominal rate of assistance in the full sample, and splits the sample across different forms of democracy and over time. Several interesting patterns emerge. First, autocratic countries have, on average, as well as in each time period considered, a negative NRA: agriculture in these countries is taxed at an average rate of –15 percent. The opposite applies in democratic countries, whose farmers are strongly protected at an average rate of 45 percent (although at a decreasing rate starting from the mid-1980s).

Another clear pattern emerges on comparing protection across electoral rules. Majoritarian countries consistently have a lower NRA than proportional ones. While the gap apparently decreases over time, in 2000-05 the relative differences are still stark and close to that of the 1960-64 period. The last two columns of Table 2 contrast presidential and parliamentary democracies. Here the pattern appears less clear: until 1975 presidential democracies had an average NRA very close to parliamentary democracies, then we see a shift with consistently higher NRAs in parliamentary democracies.

Figure 1 displays a more formal test for unconditional differences in average NRAs across constitutional features. This is based on a smoothed non-parametric regression line with its correspondent 95 percent confidence interval. As evident from the figure, for both autocracies and democracies, and across electoral rules, the differences are stark. Consistent with the basic data reported in Table 2, for parliamentary and presidential systems the 95 percent confidence interval of the two line overlaps for about half of the period, suggesting that the difference in the average NRA across forms of government is small.

Generally speaking, these patterns appear not in contradiction with the predictions discussed before. However it is too early to come to any conclusions about the effect of constitutional rules on agricultural protection. This is because our key constitutional dimension, democracy, is also correlated to the level of development, which is itself a fundamental determinant of agricultural protection. Also, as shown above and as explained in

Persson and Tabellini (2003), the forms of democracy are not random but are correlated with other characteristics such as history and the continental location of a country. Thus before any inferences are drawn concerning the effect of constitutions on policy outcomes, we need an econometric approach able to control for both observed and unobserved country characteristics.

Econometric approach and results

Following recent tendencies in the comparative political economy literature (e.g., Rodrik and Wacziarg 2004, Giavazzi and Tabellini 2005, Persson 2005) we estimate the average effect of constitutions on policy outcomes using the difference-in-differences approach. This means running panel regressions with the following specification:

$$y_{i,t} = \beta D_{i,t} + \rho x_{i,t} + \alpha_i + \theta_t + \varepsilon_{i,t} \qquad (1)$$

where $y_{i,t}$ denotes our measure of interest, namely agricultural protection, α_i and θ_t are respectively the country and year fixed effects, $x_{i,t}$ is a set of control variables, and $D_{i,t}$ is a dummy variable taking the value 1 under democracy and 0 otherwise. The parameter β is the difference-in-differences estimate of the reform effect. It is obtained by comparing average protection after a democratic transition, minus protection before the transition in the treated countries, to the change in protection in the control countries over the same period (Persson and Tabellini 2008). Here the control countries are those that do not experience a transition into or out of democracy, thus those that have either $D_{i,t} = 1$ or $D_{i,t} = 0$ over the entire sample period.

We use regression (1) to estimate the average effect of democratization on agricultural protection. Moreover, as we are particularly interested in the (potential) heterogeneous effects induced by different forms of democracy, we follow Persson (2005) using also a multiple treatments specification:

$$y_{i,t} = \sum_{f=1}^{F} \beta^f D_{i,t}^f + \rho x_{i,t} + \alpha_i + \theta_t + \varepsilon_{i,t} \qquad (2)$$

where the $D^f_{i,t}$ is now a binary variable for a sub-set of the different forms of democracy f = 1,...., F, namely majoritarian versus proportional democracy or parliamentary versus presidential democracy. Once again we compare the change in protection before and after the

specific democratic transition with the change in protection of those countries that do not experience a reform over the sample period.

As stressed by Persson (2005), one problem with the interpretation of these specifications is the correct econometric identification. Specifically, the coefficient β^f identifies the causal effect of different democratic reforms only if countries in the various reform groups do not have trends in *y* which are different from those in the control group but unrelated to reforms. As discussed before, the frequency of transitions into democracy (autocracy) and different forms of democracy change quite a lot across continents. Thus, to avoid confounding such non-random incidence with continents-specific trends in agricultural protection, we ensure that the estimates of β^f are robust to the inclusion of a set of continent-time interaction effects.

A final econometric problem arises when the dependent variable displays a strong positive autocorrelation. In that circumstance, Bertrand, Duflo and Mullainathan (2004) show that the estimated standard errors with the difference-in-differences approach are strongly underestimated. To overcome this, we follow the most conservative method of estimating standard errors by clustering at the country level, allowing arbitrary country-specific serial correlation. Moreover, we always add to the specifications the lagged dependent variable. This transforms specifications (1) and (2) into a dynamic panel model where the lagged dependent variable allows for the strong persistence of agricultural protection.

Democracy and protection: econometric results

Table 3 displays the results of specification (1) estimated across different samples. This corresponds to a standard difference-in-differences estimation on yearly data. The specification, other than country and year fixed effects and the controls reported in table 3, always includes the log of country population, the agricultural employment share, the land per capita and the interaction effects between continent and year dummies. We start by making a couple of comments on the sign and significant level of the standard controls. First, and not surprisingly, agricultural protection is positively and significantly associated with the level of development (GDP per capita), and displays strong persistency. In other words, current protection is a very good predictor of future protection. Moreover, protection is positively related to the log of population, and negatively to both land per capita and employment share (results not shown). However, it is important to note that the last variables

are insignificant in several specifications, suggesting that in the previous analyses they especially capture the cross-country variation in protection, here subsumed in the fixed effects.

Turning to the key variable of interest, democracy, and following Persson and Tabellini (2008), the regressions of Table 3 explore different assumptions about the treatments and the control group, testing the effect of a democratic transition on different samples.

Regression (1) imposes the assumption that the effect on protection of a transition to democracy is the same as the negativity of the effect of a transition to autocracy, thus exploiting the full sample. The coefficient on democracy is positive and significant at the 1 percent level, meaning that a transition into democracy induces an increase in agricultural protection of about 4 percent points. Thus the effect is not only statistically significant, but also important from an economic point of view.

Regression (2) estimates only the effect of a transition into democracy, removing reforms to autocracy from the sample, and using as a control group only permanent autocracy. The democracy coefficient is again positive, but drops somewhat in magnitude and it is only barely significant. However, a shortcoming of this regression is that we have only 11 countries that remain permanent autocracies across the sample period, and two of these – Chad and Togo – are somewhat problematic.[15] In regression (3), by adding also permanent democracies to the control group, the coefficient on the democracy dummy increases and turns out to be significant at the 1 percent level. Now the estimate implies that a democratic transition induces a greater NRA, by 4.4 percentage points.

Regression (4) estimates the effect of a transition out of democracy (or into autocracy), using permanent democracies as the control group. Here the democracy coefficient is still positive, suggesting that the effect goes in the expected direction,[16] but it is low in magnitude and statistically not significant. Finally, in regression (5) we allow the coefficient for the lagged dependent variable to take on a different value across constitutional groups, by interacting the democracy dummy with the lagged NRA. The interaction coefficient is positive and significant, showing that democracies display more persistence in agricultural policy than autocracies.

[15] A potential problem with these countries, as well as with Benin, Burkina Faso and Mali, is that we only have protection data for one product, cotton. Thus, any specific shock on this sector could substantially affect the protection level of our benchmark in that regression. Note however that all these countries are not considered in the *RRA* sample.

[16] Remember that we are measuring the *negative* protection effect of a transition away from democracy.

Columns (6) to (10), replicate the same battery of regressions using RRA as the dependent variable. As can be seen, the results are very similar: only a slightly lower democracy effect is detected. Once again, the democracy coefficient is always positive, and significantly different from zero when the treatment measures transitions toward democracy, and the control group also includes the permanent democracies, just as it is positive but insignificant when the treatment measures transition out of democracy, or the control group includes only permanent autocracies.[17]

Summarizing, this preliminary evidence suggests that the effect of transition to democracy induces an increase in agricultural protection of about 3-4 percentage points. Thus, agriculture, which is discriminated against and taxed in an autocratic country, will take advantage of a redistribution process after a democratic transition. This result is in line with the evidence reported in Acemoglu and Robinson (2000) and Swinnen, Banerjee and de Gorter (2001). Moreover, the fact that the same relation does not hold for transition out of democracy appears consistent with several stylized facts suggesting that, once implemented, agricultural policies tend to persist for some time, even if changes in (external) factors make them 'inefficient' or not politically justifiable (Olper and Swinnen 2008)

Forms of democracy and protection: econometric results

Table 4 tests Hypotheses 2 and 3, namely that forms of democracy should matter. This is done by interacting our democracy dummy with the respective dummies for government types and electoral rules, in order to disentangle their (potential) differentiated effect. Regression (1) of table 4 contrasts parliamentary and presidential regimes. Contrary to our expectation, a reform to presidential democracy induces growth in agricultural protection that is slightly higher than a reform to proportional democracy, from 4.2 to 3.7 percent points, respectively. However, the two coefficients are not significantly different from each other. Thus this preliminary evidence does not support the idea that reform into parliamentary democracy induces a higher NRA than reform to a presidential democracy.

Regression (3) of table 4 contrasts the effect of reform to proportional democracy with reform to majoritarian democracy. Now the estimated differences are stark and in line with the prediction. The average protection effect of a transition towards a proportional democracy is 6.8 percentage points, thus about three time higher than a shift toward a majoritarian

[17] Note that by using *RRA*, we lose 5 countries from the full sample, as well as several observations as the *RRA* coverage is lower than *NRA*.

democracy, where the estimated coefficient is also barely significant. Not surprisingly, the F-statistic for the equality of electoral coefficients is strongly significant (results not shown), implying that what matters for democratic reform appears to be the choice of electoral rule.

Next, in regressions (2) and (4) of table 4, we allow the coefficient for the lagged dependent variable to take on a different value across different constitutional features. Parliamentary and presidential democracies do not display differences in persistence. At the level of electoral rules, the differences are important, with proportional democracies showing higher persistence in agricultural protection than majoritarian democracies. Finally, regression (5) considers the distinction between permanent and temporary reforms. Not surprisingly, permanent democratization strongly increases the probability of a higher NRA, whereas temporary reforms have a lower and only slightly significant effect.

Table 5 replicates the same regressions using the *RRA* as the dependent variable. As we can see, all the qualitative and quantitative results discussed above remain substantially unchanged, suggesting that they are quite robust to small change in the sample size and country coverage, and in the definition of the dependent variable.

Finally, table 6 considers a more defined characterization of the forms of democracy, splitting the constitutional variables into the following four categories: *parl-prop*, *pres-prop*, *parl-maj*, and *pres-maj*. If the parliamentary-presidential distinction is independent of the proportional-majoritarian distinction, then the effects of the form of government and the electoral rule should be additive (Persson 2005). The evidence supports this hypothesis weakly, and only for reforms into parliamentary-proportional democracy, where the respective estimated coefficients for *NRA* regressions, with values ranging from 8.4 to 9.6, are not far from the sum of the respective individual coefficients reported in table 4. That is, there is some evidence that the effect of proportional election is dampened under presidential systems.

Summing up, in line with theoretical predictions we find heterogeneity in the protection effect induced by different constitutional rules. Transition toward a parliamentary-proportional democracy increases a country's agricultural NRA by about 8 percentage points, and by about 5 percentage points for a presidential-proportional democracy. Instead the protectionism bias of a transition toward a parliamentary- or a presidential-majoritarian democracy is virtually zero. This evidence suggests that agricultural protection is affected more by constitutional differences in electoral rules than by differences in the form of government. This evidence is in line with the predictions summarized in the theory section above, and are qualitatively similar to results obtained at a more aggregate level by Persson

(2005) and Persson and Tabellini (2006), with the important qualification that at the aggregated level the form of government appears to matter quantitatively more than electoral rules.

Conclusions

Motivated by recent developments in political economy theory about the effect of rule-based political institutions on public policy outcomes, we have investigated how transitions into democracy affect agricultural protection. The empirical results highlight the important role played by the form of democracy in affecting agricultural policy distortions. In particular, using panel data and difference-in-differences estimation, we first documented a significant positive effect of a democratic transition on agricultural protection. We then showed that this average effect masks important heterogeneities across different forms of democracy. Indeed, what matters are transitions to proportional (as opposed to majoritarian) democracies, as well as to permanent (as opposed to temporary) democracies. Moreover, while we do not detect significant differences across alternative forms of government, there is evidence that the effect of proportional systems is exacerbated under parliamentary regimes, but dampened under presidential ones. Finally, we find indications that different constitutional rules affect the dynamic adjustment of agricultural protection. Overall, these results support the notion that rules-based institutions do matter in affecting the adoption of structural policies.

Several further improvements should be made to better understand the interaction between institutions and agricultural policy distortions. For example, this analysis has assumed that electoral rules directly affect political incentives. However, there is evidence that electoral rules shape public policy only indirectly, through their effect on party and government structure (Persson, Roland and Tabellini 2008). At the same time, the partial evidence detected concerning the differentiated effect exerted by different forms of government could simply suggest that other regime features, such as a separation of powers, should matter. Extensions into these and other directions could improve our understanding of the interlink between constitutions and public policies

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Annex: National policy reform episodes, 1955 to 2005

(a) Exits and entries in different forms of democracy

Country	*Year*	*Into or Out of Democracy*	*Form of government*	*Forms of elections*
Argentina	1973	Into	Presidential	Proportional
Argentina	1976	Out	Presidential	Proportional
Argentina	1983	Into	Presidential	Proportional
Benin	1991	Into	Presidential	Proportional
Burkinafaso	1977	Into	Presidential	Proportional
Burkinafaso	1980	Out	Presidential	Proportional
Bangladesh	1991	Into	Parlamentary	Majoritarian
Brazil	1985	Into	Presidential	Proportional
Chile	1973	Out	Presidential	Majoritarian
Chile	1989	Into	Presidential	Majoritarian
Cote d'Ivoire	2000	Into	Presidential	Majoritarian
Cote d'Ivoire	2002	Out	Presidential	Majoritarian
Dominican Rep.	1978	Into	Presidential	Proportional
Ecuador	1968	Into	Presidential	Proportional
Ecuador	1970	Out	Presidential	Proportional
Ecuador	1979	Into	Presidential	Proportional
Spain	1976	Into	Parlamentary	Proportional
Ethiopia	1994	Into	Parlamentary	Majoritarian
Ghana	1970	Into	Parlamentary	Majoritarian
Ghana	1972	Out	Parlamentary	Majoritarian
Ghana	1979	Into	Presidential	Majoritarian
Ghana	1981	Out	Presidential	Majoritarian
Ghana	1996	Into	Presidential	Majoritarian
Indonesia	1999	Into	Presidential	Proportional
Kenya	1966	Out	Parlamentary	Majoritarian
Kenya	2002	Into	Presidential	Majoritarian
Korea	1963	Into	Presidential	Majoritarian
Korea	1972	Out	Presidential	Majoritarian
Korea	1987	Into	Presidential	Proportional
Madagascar	1991	Into	Presidential	Proportional
Mexico	1994	Into	Presidential	Proportional
Mali	1992	Into	Presidential	Majoritarian
Mozambique	1994	Into	Presidential	Proportional
Nigeria	1966	Out	Presidential	Majoritarian
Nigeria	1979	Into	Presidential	Majoritarian
Nigeria	1984	Out	Presidential	Majoritarian
Nigeria	1999	Into	Presidential	Majoritarian
Pakistan	1970	Out	Presidential	Majoritarian
Pakistan	1972	Into	Presidential	Majoritarian
Pakistan	1977	Out	Presidential	Majoritarian
Pakistan	1988	Into	Presidential	Majoritarian
Pakistan	1999	Out	Presidential	Majoritarian
Philippines	1972	Out	Presidential	Majoritarian
Philippines	1986	Into	Presidential	Majoritarian

Portugal	1975	Into	Parlamentary	Proportional
Sudan[a]	1958	Out		
Sudan	1965	Into	Parlamentary	Majoritarian
Sudan	1970	Out	Parlamentary	Majoritarian
Sudan	1986	Into	Presidential	Majoritarian
Sudan	1989	Out	Presidential	Majoritarian
Senegal	2000	Into	Presidential	Proportional
Thailand	1974	Into	Parlamentary	Majoritarian
Thailand	1976	Out	Parlamentary	Majoritarian
Thailand	1978	Into	Parlamentary	Majoritarian
Turkey	1971	Out	Parlamentary	Proportional
Turkey	1973	Into	Parlamentary	Proportional
Turkey	1980	Out	Parlamentary	Proportional
Turkey	1983	Into	Parlamentary	Proportional
Taiwan	1992	Into	Parlamentary	Proportional
Tanzania	2000	Into	Presidential	Majoritarian
Uganda	1966	Out	Parlamentary	Majoritarian
Uganda	1980	Into	Presidential	Majoritarian
Uganda	1985	Out	Presidential	Majoritarian
Zambia	1968	Out	Presidential	Majoritarian
Zambia	1991	Into	Presidential	Majoritarian
Zimbabwe	1987	Out	Presidential	Majoritarian

(b) Reforms in existing democracies

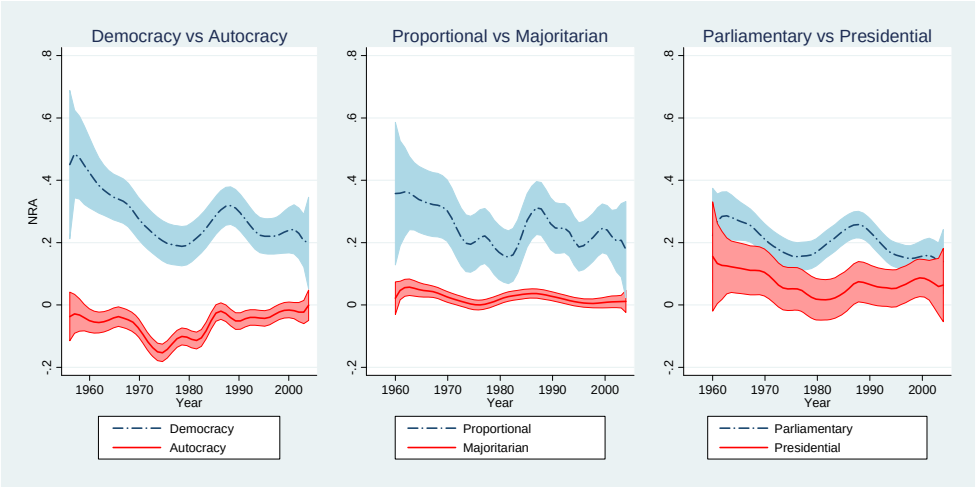
Country	*Reform*	*Type of reform*
Bangladesh	1991	Government: presidential to parliamentary
France	1986	Election: majoritarian to proportional
France	1988	Election: proportional to majoritarian
New Zealand	1996	Election: majoritarian to proportional
Philippines	1998	Election: majoritarian to proportional
Philippines	2001	Election: proportional to majoritarian
South Africa	1994	Election: majoritarian to proportional
Sri Lanka	1979	Government: parliamentary to presidential
Sri Lanka	1989	Election: majoritarian to proportional
Taiwan	1996	Government: parliamentary to presidential
Ukraine	1998	Election: majoritarian to proportional

[a] Sudan's reform in 1958 is unclassifiable.

Source: See text.

Figure 1: Average nominal rate of assistance to the agricultural sector over constitutional features,[a] 1956 to 2005

(percent)



Source: see text.

[a] The figures show the evolution of the (smoothed) average *NRAs*, and their 95 percent confidence interval (computed using Stata's *lpolyci* using bandwith 3 and degree 4), calculated across democratic and autocratic regimes and across different forms of government. A country in a given year is classified as a democracy if variable Polity2 in the Polity IV data set is greater than zero (see text).

Table 1: Number of policy reforms and their distribution under different forms of democracy,[a] 1956 to 2005

(percent)

	All	*Into*	*Out*	*PARL*	*PRES*	*PROP*	*MAJ*
Number of transitions	66	41	25	18	47	24	41
Share (%) of all transitions pre-1985	62	49	84	83	53	67	59
Regional shares (%) of all transitions:							
Latin America	15	17	12	0	21	33	5
Africa	50	46	56	39	53	25	63
Asia	24	24	24	28	23	13	32
Other countries	11	13	12	33	3	29	0
TOTAL	100	100	100	100	100	100	100

Source: see text.

[a] Number of democratic transitions classified by forms of democracy and their relative distribution across time and continents (see text). The sum across different forms of government does not give the total number of transitions because one transition (Sudan in 1958) is unclassifiable.

Table 2: Average nominal rates of assistance to the agricultural sector over political regimes,[a] 1956 to 2005

	Full sample	*Autocracy*	*Democracy*	*MAJ*	*PROP*	*PRES*	*PARL*
1956-59	0.41	-0.13	0.66	n.a.	n.a.	n.a.	n.a.
1960-64	0.28	-0.16	0.54	0.13	0.98	0.73	0.49
1965-69	0.27	-0.13	0.51	0.10	1.02	0.53	0.51
1970-74	0.10	-0.24	0.46	0.04	0.90	0.48	0.45
1975-79	0.10	-0.23	0.44	0.04	0.75	0.37	0.48
1980-84	0.09	-0.22	0.38	0.12	0.60	0.12	0.51
1985-89	0.29	-0.06	0.59	0.16	0.85	0.30	0.75
1990-94	0.23	-0.14	0.41	0.09	0.59	0.24	0.53
1995-99	0.19	-0.13	0.28	0.03	0.38	0.21	0.33
2000-05	0.20	-0.08	0.26	0.04	0.35	0.20	0.31
All years	0.21	-0.15	0.45	0.08	0.71	0.35	0.48
Number of countries	74	39	67	28	46	35	40

Source: Authors' estimations

[a] The figures report simple average of *NRA* across constitutional features and sub-periods. The number of countries refers to 'total presences' in each category in 1956-2005 (1960-2005 for forms of government), and changes over time due to entry and exit.

Table 3: Democracy and nominal rates of assistance to the agricultural sector,[a] difference-in-differences estimates

Regression number:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	***NRA***	***NRA***	***NRA***	***NRA***	***NRA***	***RRA***	***RRA***	***RRA***	***RRA***	***RRA***
Democracy	4.10***	3.20*	4.41***	2.31	5.38***	3.47***	2.73	3.70***	1.39	4.91***
	(1.24)	*(1.86)*	*(1.44)*	*(1.62)*	*(1.48)*	*(1.20)*	*(1.67)*	*(1.38)*	*(1.87)*	*(1.48)*
Lagged NRA (RRA)	0.77***	0.67***	0.78***	0.79***	0.68***	0.77***	0.70***	0.79***	0.77***	0.73***
	(0.03)	*(0.05)*	*(0.03)*	*(0.03)*	*(0.04)*	*(0.03)*	*(0.06)*	*(0.02)*	*(0.04)*	*(0.04)*
*Dem*lagged NRA (RRA)*					0.11***					0.06**
					(0.04)					*(0.03)*
Log GDP per capita	14.45***	15.12***	15.66***	16.79**	15.16***	11.71***	10.99**	12.79***	18.42***	12.32***
	(3.45)	*(5.08)*	*(4.16)*	*(7.14)*	*(3.67)*	*(3.19)*	*(5.16)*	*(3.92)*	*(6.76)*	*(3.49)*
Treatment (transition to)	*Democracy autocracy*	*Democracy*	*Democracy*	*Autocracy*	*Democracy autocracy*	*Democracy autocracy*	*Democracy*	*Democracy*	*Autocracy*	*Democracy autocracy*
Control group (permanent)	*Autocracy democracy*	*Autocracy*	*Autocracy democracy*	*Democracy*	*Autocracy democracy*	*Autocracy democracy*	*Autocracy*	*Autocracy democracy*	*Democracy*	*Autocracy democracy*
Continent-year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2568	1191	2291	1517	2568	2314	1002	2064	1449	2314
Number of countries	74	38	73	52	74	69	33	68	51	69
R^2 (within)	0.73	0.77	0.75	0.74	0.73	0.74	0.78	0.75	0.72	0.74

Source: Authors' estimations

[a] Robust standard errors clustered by country in parentheses. All regressions include: log of population, agricultural employment share, land per capita, year and country fixed effects, and interaction effects between continents (Africa, Asia, and Latin America) and year dummies (see text).

***$p < .01$, **$p < .05$, *$p < .10$.

Table 4: Forms of democracy and nominal rates of assistance to the agricultural sector,[a] difference-in-differences estimates

Regression number:	(1)	(2)	(3)	(4)	(5)
Dependent variable	***NRA***	***NRA***	***NRA***	***NRA***	***NRA***
PARL	3.69**	4.98***			
	(1.85)	*(1.85)*			
PRES	4.22***	5.66***			
	(1.39)	*(1.83)*			
PROP			6.76***	6.77***	
			(1.61)	*(1.71)*	
MAJ			2.38*	2.69	
			(1.42)	*(1.80)*	
Permanent					5.53***
					(1.40)
Temporary					2.96*
					(1.65)
Lagged NRA	0.77***	0.68***	0.77***	0.66***	0.77***
	(0.03)	*(0.04)*	*(0.03)*	*(0.04)*	*(0.03)*
*PARL * Lagged NRA*		0.11**			
		(0.05)			
*PRES * Lagged NRA*		0.12***			
		(0.04)			
*PROP * Lagged NRA*				0.14***	
				(0.04)	
*MAJ * Lagged NRA*				-0.04	
				(0.06)	
Observations	2511	2511	2511	2511	2568
Number of countries	74	74	74	74	74
Within R^2	0.73	0.73	0.73	0.74	0.73

Source: Authors' estimations

[a] Robust standard errors clustered by country in parentheses. All regressions include: log GDP per capita, log of population, agricultural employment share, agricultural land per capita, years and country fixed effects, and interaction effects between continents (Africa, Asia, and Latin America) and years dummies (see text).

****p < .01, **p < .05, *p < .10.*

Table 5: Forms of democracy and relative rates of assistance,[a] difference-in-difference estimates

Regression number:	(1)	(2)	(3)	(4)	(5)
Dependent variable	***RRA***	***RRA***	***RRA***	***RRA***	***RRA***
PARL	3.10*	5.13**			
	(1.92)	*(2.17)*			
PRES	3.64***	5.10***			
	(1.36)	*(1.74)*			
PROP			5.52***	6.40***	
			(1.68)	*(2.08)*	
MAJ			2.27	1.61	
			(1.49)	*(2.08)*	
Permanent					4.96***
					(1.39)
Temporary					2.49
					(1.69)
Lagged RRA	0.77***	0.71***	0.77***	0.69***	0.77***
	(0.03)	*(0.05)*	*(0.03)*	*(0.05)*	*(0.03)*
*PARL * Lagged RRA*		0.08*			
		(0.05)			
*PRES * Lagged RRA*		0.06**			
		(0.03)			
*PROP * Lagged RRA*				0.12**	
				(0.05)	
*MAJ * Lagged RRA*				-0.05	
				(0.05)	
Observations	2273	2273	2273	2273	2314
Number of countries	69	69	69	69	69
Within R^2	0.74	0.74	0.74	0.74	0.74

Source: Authors' estimations

[a] Robust standard errors clustered by country in parentheses. All regressions include: log GDP per capita, log of population, agricultural employment share, agricultural land per capita, years and country fixed effects, and interaction effects between continents (Africa, Asia, and Latin America) and years dummies (see text).

****p < .01, **p < .05, *p < .10.*

Table 6: Forms of democracy and nominal and relative rates of assistance, with alternative constitutional groups[a]

Regression number:	(1)	(2)	(3)	(4)
Dependent variable	***NRA***	***NRA***	***RRA***	***RRA***
PARL_PROP	9.64***	8.43***	7.50***	5.68**
	(2.48)	*(2.20)*	*(2.51)*	*(2.74)*
PRES_PROP	6.01***	5.39***	5.19***	4.66**
	(1.92)	*(1.68)*	*(1.83)*	*(1.83)*
PARL_MAJ	0.38	0.83	1.83	1.50
	(1.86)	*(1.71)*	*(2.09)*	*(1.92)*
PRES_MAJ	2.76	2.33	1.98	1.98
	(1.61)	*(1.56)*	*(1.66)*	*(1.68)*
Lagged NRA	0.76***	0.77***	0.76***	0.77***
	(0.02)	*(0.03)*	*(0.03)*	*(0.03)*
Log GDP per capita	13.45***	14.90***	11.29***	11.42***
	(3.43)	*(3.77)*	*(3.11)*	*(3.39)*
Continent-year dummies	No	Yes	No	Yes
Observations	2505	2505	2273	2273
Number of countries	74	74	69	69
Within R^2	0.69	0.73	0.70	0.74

Source: Authors' estimations

[a] Robust standard errors clustered by country in parentheses. All regressions include: log of population, employment share, land per capita, year and country fixed effects. Interaction between years and continent dummies (Africa, Asia, and Latin America) included as indicated (see text).

****p < .01, **p < .05, *p < .10.*