

# Electoral Rules, Coalitions, and Price Levels: Evidence from PR Governments

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## 1 Introduction

It is by now a commonplace assertion in the literature on the political determinants of economic policy-making that the rules under which politicians are elected have independent effects on the policies those politicians produce. But the vibrant literature on the effects of electoral rules reveals that there is no consensus on exactly what effects different electoral rules have, nor is there substantial agreement on how these effects are produced. For example, Downs (1957) argues that politicians in two-party majoritarian systems (invariably single member districts) will compete for a hypothetical median voter, while Huber and

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Powell (1994) argue that in fact proportional representation systems (invariably multi-party systems) yield policies that are closer to the median. Carey and Shugart (1995) hypothesize that politicians who run in single member districts will have greater incentives to deliver payoffs like pork and trade protection to their constituents, while Bawn and Rosenbluth (2002) argue that such particularistic policies are actually a hallmark of PR, where they are used to cement multi-party coalition governments. The same author can even disagree with himself: Rogowski (1987) has argued that parties operating under proportional representation systems with large district magnitudes are less beholden to special interests, while Rogowski and Kayser (2004) argue that single member districts are superior in their ability to ensure a government's fidelity to the electorate (as evidenced by lower prices for consumer goods).

Though the essays cited above appear to endogenize different phenomena/outcomes to electoral rules, they actually address a common (if unstated) question: does the way in which votes are cast and aggregated affect the degree to which that government will serve the interests of the voters? The dependent variables in each of the cited works—tariffs, pork, congruence with some median voter, consumer prices—are actually (imperfect) proxies for a government's tendency to serve voters' interests. When we think about the essays in this way, Rogowski (1987), Carey and Shugart (1995), and Huber and Powell (1994) can be thought of as arguing that PR governments are more faithful to voters, while Bawn and Rosenbluth (2002) and Rogowski et al. (2004) can be thought of as arguing the opposite. Further complicating matters is that most of the arguments seem to rest on solid empirical foundations, making it difficult to adjudicate among the conclusions that they reach.

This essay attempts to expand on one recent, robust empirical observation that has

appeared in the literature on the electoral foundations of economic policy: Rogowski and Kayser's (2002) observation that consumer prices are systematically lower in majoritarian systems than in PR ones. Building on recent work on the effects of coalitions in PR systems, we examine variation in price levels *within* PR governments, arguing that the number of parties in government is a significant determinant of national price levels. We subject this analysis to rigorous statistical testing, showing results that confirm our theory. A final section discusses future extensions and the how this finding can help us think about the findings in Rogowski et al. (2004).

## 2 Electoral Rules and Public Goods

Downs' (1957) hypothesis that two parties in electoral competition will converge in their policies, promises, and ideologies on some median position, while multiple parties will stake out distinct positions, remains the starting point for much analysis of electoral rules. Since bipartism typically emerges under single member districts and multipartism under the multi-member districts of proportional representation (Duverger 1954), we may restate Downs' claim in terms of electoral rules: parties under single member districts attempt to capture a majority of voters by targeting the median, while parties under proportional representation tend to their core constituencies. Downs' work suggests that parties operating under single member districts will be more public goods oriented (because they must cultivate a majority) than those operating under proportional representation. To the extent that low prices reflect some median preference (assuming a skewed income distribution as per Meltzer and Richard 1981), we should see reliably low prices under SMD, while under PR, prices will depend on

the partisan nature of the governing coalition (on a left right dimension).

Huber and Powell (1994) take issue with Downs' reasoning. They argue that it is premised on an unrealistic understanding of how policy is made—i.e., it assumes that the party in power makes policy unfettered by the opposition. In reality, they tell us, the opposition always has some non-negligible influence in policymaking, at the very least by virtue of its ability to bring up subjects for parliamentary debate, raising citizen awareness and compelling government action. Once we account for an opposition role in policymaking, we expect different results. In a majoritarian system, the incumbent government is assumed to represent most closely the preferences of the citizens, but to the extent that it must bargain over policy with the losing party (which, presumably, lost because of preferences incongruent to those of the populace), policy will be pulled away from the median voter. In contrast, multiple parties under proportional representation may each be distant from the median voter, but policy bargaining (between the governing coalition and the opposition) can result in median outcomes. Thus, on a left-right continuum, policies under SMD will lie either to the right or the left of the median (depending on the partisan orientation of the opposition), while policies under PR should be squarely in the center. The prediction for consumer prices here is ambiguous. Under SMD, leftist oppositions (assuming a median government) mean that policies to uphold price levels (and profits) will be disfavored, while rightist oppositions mean that price supports will be enacted. PR systems in contrast should exhibit a stable, relatively low level of prices.

Lijphart (1984) has argued that the ease with which minority views can gain representation under PR renders such systems more representative of the entire population (he calls them “consensual”) and thus more likely to produce policies to benefit broad rather than

narrow constituencies. Birchfield and Crepaz (1998) liken proportional representation to an extension of the voting franchise. Small groups whose members would not bother to form parties or vote under majoritarian systems have an incentive to organize politically under PR. To the extent that groups under-represented in SMD are also those that are economically disadvantaged, PR has the effect of increasing the political power of those who would be most in favor of universalistic policies. Persson and Tabellini (2002) argue that the disproportionality of single member district systems means that governments need to win a smaller percentage of the popular vote (theoretically only 50 percent of 50 percent of the districts, or 25 percent of the total) than they would under PR, and thus have no need to cater to broad constituencies. We may extend the arguments of Lijphart, Birchfield and Crepaz, and Persson and Tabellini to demonstrate that we should see unambiguously lower prices under PR than SMD.

Persson and Tabellini also argue that the national districts of PR systems (in which the entire nation is an electoral district of magnitude  $P$ , where  $P$  is the number of seats in parliament) have the effect of lessening the influence of particular groups, and force politicians to forge broad support coalitions. In contrast, the multiple districts of SMD systems mean that politicians try to get ahead in their districts by offering targeted, particularistic policies. Carey and Shugart (1995) argue that closed-list PR systems, in which the party has control over who runs for office under the party banner and their rank on the ballots, is the most effective at mitigating the politician's propensity to cultivate a personal vote through pork and other particularistic policies. Again, the implication for price levels is that SMD systems will sport higher prices (on account of the protectionism doled out to special interests) than PR systems.

Rogowski (1987) applies these insights about PR and SMD systems to the arena of international trade. The strong parties of PR, he argues, mean that individual politicians are immune to influence from special interests, and the large districts mean that those special interests have less power anyway (since the larger the district, the less chance any one group has of dominating). The result is that PR is most conducive to small, trade-dependent economies where demands for trade protections must be resisted in the interests of remaining internationally competitive. Though the link between electoral rules and prices is unstated here, as it is in all of the works cited, it is fairly direct: since trade protection has the effect of increasing prices, PR systems, with their supposed absence of protection, should feature lower prices for traded goods.

Thus, with only minor extension, most arguments proclaiming the superiority of PR over SMD in representativeness, public goods provision, or favorability to trade, yield clear predictions about the level of prices in PR systems. All else equal, they suggest that we should observe lower consumer prices in PR systems than we do in SMD systems. Yet the impressive evidence marshaled by Rogowski and Kayser (2002) and Rogowski et al. (2004) shows those predictions are incorrect.

### **3 Seats-Votes Elasticity and Prices**

Rogowski and his co-authors analyze consumer goods prices in the OECD countries over the course of 3 decades. They find that, controlling for other confounding influences (wealth, factor endowments, exchange rate volatility, market size, and openness to trade), prices for consumer goods are systematically lower under SMD than PR systems. Given open

economies, price differentials between countries should be quickly arbitrated away (known as the “Law of One Price”). Drawing on the Stigler-Peltzman analysis of regulation (Stigler 1971, Peltzman 1976), Rogowski and Kayser (2002) argue that the presence of barriers to arbitrage (which keep prices artificially high) signals the power of producers (who desire higher profits), while the absence of such barriers (which allows prices to settle to the “world level”) signals the power of consumers (who want to maximize their purchasing ability). Thus, they conclude that political systems that favor producers should show higher prices.

The causal mechanism rests on the concept of seats-votes elasticity—that is, the degree of disproportionality in translating a party’s share of the vote into its share of legislative seats. A perfectly proportional representation system would have a seats-votes elasticity of one: one percent of the vote translates into one percent of the seats in the legislature. In majoritarian systems, however, each seat goes to the winner of a straight majority (or plurality) of votes cast. A party that loses 49 to 51 in every district in which it runs will occupy 49 percent of the seats under PR but none of the seats under a majoritarian, SMD framework. As a result, the marginal value of each additional vote under SMD (assuming two evenly matched parties) is higher than under PR, and thus parties in such majoritarian systems have a greater incentive to maximize their vote share. This renders parties under SMD more accountable to voters, and thus we should observe policies that favor voters over organized interests in countries with SMD systems.

Rogowski et al.’s argument harkens back to Powell and Whitten’s (1993) analysis of economic voting. Constitutional and electoral institutions determine the degree to which voters can hold politicians accountable for policies. In parliamentary systems, the one-party government that emerges under SMD is highly visible as the source of policy, and so will be

the focus of voter anger if its policies produce negative outcomes. In contrast, PR tends to produce coalition governments, which allow each party in a coalition to plausibly lay responsibility for certain policies on the shoulders of other parties. The result is that politicians under SMD must be far more faithful to the voters, because of the greater probability of punishment, than their counterparts under PR. Though these authors do not explicitly address price levels, a natural implication of their argument is that we should observe lower prices under majoritarian, SMD systems, if low prices signal fidelity to median voters, “consumers,” etc.

We find no explicit reason to suppose, however, that PR systems yield policies that are more beholden to producers than consumers. The theoretical justification for this claim is Rogowski and Kayser’s (2002) model of producer and consumer behavior. A crucial, proof-generating assumption in this model is that consumers are unable to give money to politicians. This is not an asymptotic property of their model, as we demonstrate in the Appendix. Call the amount that consumers contribute to parties  $M_c$ . Their result does not hold for any value of  $M_c$  other than exactly zero, which they implicitly assume its value to be. With even an infinitesimally small value of  $M_c$ , producers lose their institutional advantage, and competition reverts to a more standard model of interest group competition.<sup>1</sup>

Of course, it is the case that consumers should be less responsive to changes in prices than producers will be to changes in profits, since consumers are a large, dispersed group and producers are a small concentrated one (see Olson 1982; Becker 1983). But it is just as plausible to assume, however, that since there are many more consumers than producers,

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<sup>1</sup>Consumer interest groups, including the Consumer Federation of America, contribute substantial sums to election campaigns at all levels.

their ability to respond with votes will be far greater than that of producers. The point is that the link between electoral rules and price levels depends on the interactions of a number of different influences: the comparative weight that a government places on monetary versus legislative support, the absolute levels of money and votes that each interest group will give to the government, and the comparative responsiveness in money and votes of each interest group to changes in consumer prices and producer profits.

But even if we were to acquiesce in the authors' explicit assumptions about the relative responsiveness of consumers and producers to prices and profits, and of governments to money and votes, there is an additional, implicit, and not easily justified assumption at the heart of their model. In order for the argument to work, there must be a degree of homogeneity across districts. If districts are heterogeneous, we might expect to observe a number of parties at the national level instead of the two-party competition assumed by Rogowski et al., rendering the translation of seats to votes more proportional and less elastic (Cox 1997). India offers a good example of this. India's electoral constituencies are all single member districts, yet instead of two parties at the national level, there are six or seven big parties and a number of small ones. Duvergerian two-party competition obtains within each district, but the identity of the two competitors differs across the districts. In one district the Congress Party may battle the Bharatiya Janata Party, while in another district the two major players might be the Communists and some regional party. If a country with SMD is highly fragmented along ethnic, social, or other lines, we will observe lower "effective" seats-votes elasticity (that is, a higher degree of proportionality, due to the inability of national parties to appeal across constituencies; see Rogowski and Kayser (2002)). The authors might alleviate this problem by controlling for ethnic and/or social heterogeneity, but they do not

do so.

Finally, putting aside all quibbles with the model's assumptions, the theory's shortcomings make themselves apparent when we attempt to tease out implications of the argument in addition to its predictions about price levels. If the greater seats-votes elasticities of SMD systems render governments more faithful to voters, this increased fidelity should reflect itself in other ways than just lower prices for consumer goods. Governments that have a heightened fear of being punished for failing to serve voter interests should provide a higher level of public goods, including more social spending, than governments that operate without this fear. But just as existing theories about PR's superiority at producing publicly-minded governments are unable to cope with the reality of lower consumer prices in SMD systems, so too is Rogowski et al.'s explanation for why consumer prices are lower in SMD systems also unable to account for the fact that public goods provision in such supposedly "consumer-friendly" countries is also low—it is no coincidence that the minimalistic "liberal" welfare states in Esping-Andersen (1990) exist in SMD systems, while the expansive, "social democratic" ones emerge in PR systems. We need a theory that can account for both observations: high prices and high government social spending in PR, low prices and low government social spending in SMD.

## **4 Coalition Size, Prices, and Public Goods**

We contend that the correlation between electoral rules and price levels found by Rogowski et al. is a spurious one, that electoral rules are correlated with something else that is the real determinant of price levels. Bawn and Rosenbluth (2002) offer us the beginnings of

an explanation for the correlation between electoral systems and consumer prices. They also provide clear insights into why higher consumer prices and more public goods (or lower prices and fewer public goods) should go together. PR produces coalition governments, and these coalitions must be cemented by logrolls. In their model, coalition governments can arise that include business-oriented parties and labor-oriented ones—such governments would introduce price supports as well as social programs like unemployment insurance. The model is related to Laver and Shepsle’s (1996) model of ministerial government, in which ministries are apportioned to high demanders in the coalition who are then given *carte blanche* over that ministry’s policy.

If coalition logrolling explains how we can observe both high prices and high public goods provision in PR systems, it also explains why we see low prices and low public goods in SMD systems (which, after all, are typically one-party governments). The absence of coalition logrolling means that government in such systems will be smaller, and that we should observe fewer interventions across an entire range of policies. That means welfare state policies as much as it means price supports. This should also be true of one-party governments (majority or minority) under PR.

But with coalition government (either in PR or in some heterogeneous SMD system), as more parties are included in the ruling coalition, more logrolls must be enacted (i.e. more tariffs, protections, regulations, price supports), the costs of which are necessarily externalized onto unorganized interests. Thus, larger coalitions (in terms of the number of parties included) should yield higher prices. We can that this argument in terms of a hypothesis about the relationship between the number of parties in government and national prices.

H<sub>1</sub>: The larger the number of parties in government, the higher the degree of logrolling and externalization of costs to unorganized interests, and hence the higher national prices.

What determines the number of parties in government? We assume that the number of parties in government depends in large part on the number of parties in a political system—since, intuitively, the more parties there are in a system, the more parties a putative government will need to cobble together to form a majority. The most classic statement is Duverger (1954), which ascribes the number of parties in a political system to the electoral rule. He tells us that single member districts tends toward two party competition—since multiple parties competing for a single seat will find it more efficient to coalesce in order to have a better chance of winning an absolute majority, and those that do not will find themselves unsupported by strategic voters who do not want to waste their suffrages. Thus, under SMD, voters will coordinate on the two parties that have a shot at securing majority support. Under the multi-member districts of proportional representation, however, parties do not need to gain a majority to earn representation, they need only surpass some threshold that allows them to earn a seat. According to Cox (1997) the number of parties in a particular district can thus be given by the formula  $M + 1$ , where  $M$  is the district magnitude. In district magnitude of one, voters coordinate on two parties, while in district magnitude of four, voters coordinate on the five parties that have a reasonable chance of capturing one of the slots.

But, as Cox points out, the  $M + 1$  rule constitutes an upper bound on the number of parties—often there are significantly fewer. Consider Germany, which runs elections for the lower house, the Bundestag, in a national district of more than 496 members. According

to  $M + 1$  we should observe 497 parties, but this of course is not the case. The number of meaningful political cleavages—social, economic, ethnic, or otherwise—should also determine the number of parties, since, according to Lipsett and Rokkan (1967), it is around such cleavages that parties coalesce in the first place. Furthermore, even if  $M + 1$  applies perfectly within districts (in systems with multiple districts), it does not mean that we should observe  $M + 1$  parties at the national level. Ethnic, social, and economic heterogeneity across districts, such as exists in the Indian case discussed above, can lead to multiple parties at the national level even in a system of single member districts (if the gains to be had from coalescing into a majority party are outweighed by the costs of forging a majority party out of such disparate interests). The upshot is that the number of parties is determined only in part by the electoral rule. If our hypothesis is correct, we should observe price differences not only between SMD and PR systems, but also between PR systems based on the number of parties in government. Furthermore, given the vicissitudes of coalition formation in PR governments, we should observe change over time within countries in the number of parties in the governing coalition, and attendant changes in price levels.

## 5 Empirical Analysis

Our empirical discussion, in the same fashion as Rogowski and Kayser (2002) and Rogowski et al. (2004), will focus on the relationship between purchasing power parity and exchange rates across states. The “Law of One Price” predicts that bargaining, trade, and currency arbitrage should lead to an equalization of the average purchasing power of a national currency for a representative bundle of goods throughout the world. Repeating the example of Rogowski

and Kayser (2002), if one hundred US dollars and eight hundred Swedish kronor can purchase the same bundle of goods in the United States and Sweden, then the Law of One Price predicts that the exchange rate should be one dollar to eight kronor. However, the Law of One Price does not normally obtain in the real world, for reasons discussed below. Here, we repeat the list of independent variables that Rogowski and Kayser (2002) and Rogowski et al. (2004) employ as control variables in their study of the determinants of purchasing power parity.

First, a country's aggregate real per capita GDP is known to be positively correlated with higher prices across countries because of the association between wealth and higher prices. Second, at least in the short term, currency depreciations should be associated with lower prices, while currency appreciations should be associated with higher prices. Third, the amount of arable land and the prevalence of domestic energy production, both proxies for a country's factor endowments, may affect price levels. Fourth, a larger population, a proxy for the size of a country's market, should be associated with lower prices. Fifth, barriers to trade and currency arbitrage should increase prices within a state. Following the examples of previous studies, we include these factors as independent variables in our analysis.

Though we attempt to hew closely to the authors' empirical analysis, we note some concern regarding their attempt to control for what they call "natural, cultural, and policy barriers to arbitrage" that allow governments to maintain prices above competitive world levels. Open economies, measured in terms of imports as a share of GDP, should have lower prices. But according to Rogowski (1987), and Rogowski and Kayser (2002), the level of tariffs is not independent of the electoral system. If trade protections are one policy instrument by which governments can serve producer interests, it does not make sense to control

for their influence on prices. We have strong theoretical reasons to suspect that not only might the electoral system or the number of parties in the governing coalition affect price levels directly, but also through affecting another independent variable, the amount of openness. This is a problem that prevents us from assessing the total impact of one independent variable on the dependent variable, for we have controlled for one of the consequences of the independent variable. For now, however, we leave this question aside, and focus on our reconceptualization of the work of Rogowski et al. (2004).

Where we depart from previous studies is in our specification of the political determinants of national price levels. Following our critique of the electoral system model of political institutions and price levels and our hypotheses regarding the importance of inter-party bargaining in ruling coalitions, we replace the dummy variable for majoritarian-vs.-PR with a variable measuring the number of parties the governing coalition, per year, in each state. In cases where there is more than one government in power in a country in a given year, we employ the time-weighted average of the number of parties in government.

Consonant with studies that admit the important of parties' ideologies in the policy choices of governments in power (cf. Garrett 1998), we also include a measure of the cumulative ideological position of the parties in power. We have two competing theoretical expectations regarding ideology. According to Iversen and Soskice (2003), SMD systems more often give rise to center-right governments while PR systems give rise to center-left governments. (They ascribe this to the peculiarity of coalition formation in PR systems, but a simpler explanation is simply that labor is more easily represented under PR.) They point out that in a sample of 14 Western democracies between 1945 and 1998, 75 percent of governments under SMD were center-right, whereas in PR, 70 percent of governments were

center-left. To the extent that we expect leftist governments to pursue inflationary policies to lower unemployment and rightist governments to be committed to controlling inflation (Hibbs 1977), we might expect to see lower prices in right governments and higher prices under left ones. The correlation that Rogowski et al. find between electoral rules and prices may thus be a function of the partisan predisposition of each system and not seats-votes elasticity. An alternative theoretical expectation is simply that leftist governments, by virtue of the socio-economic makeup of their constituencies, will attend to consumers with low prices, while rightist governments will favor producers with high prices. Our statistical analysis should help us to adjudicate between these claims. Again, we create weighted averages of ideological scores in cases where there are multiple governments in power in a given year.

Our analysis focuses on variation across time and space in only PR governments. Our sample includes the 14 PR governments in the OECD from the years 1970 to 1998. Table 1 lists the variables employed in our analysis, as well as their sources. We test our model's predictions using two specifications of the dependent variable: aggregate prices in terms of GDP, and aggregate prices in terms of national consumption.

Our analysis takes the form of a cross-sectional time-series regression with the following functional form in equation (1).

$$ppp_{i,t} = \beta_0 + \beta_{1,i,t} \dots \beta_{k,i,t} * X_{1,i,t} \dots X_{k,i,t} + \beta_{k+1} * P_{i,t} + \beta_{k+2} * I_{i,t} + \beta_{k+3} * P_{i,t} * I_{i,t} + \epsilon_{i,t} \quad (1)$$

Here,  $P$  represents the variable *parties*,  $I$  represents the variable *ideology*, and  $P * I$  represents their interaction. The dependent variable  $ppp$  represents either of the measures of

Variable	Definition	Source
<i>ppp-gdp</i>	Purchasing power parity expressed as prices of aggregate GDP	Source
<i>ppp-nc</i>	Purchasing power parity expressed as prices of national consumption	Source
<i>per_capita_gdp</i>	Real GDP divided by the population	Source
<i>apprec_1</i>	$\frac{[(\text{units of national currency per US dollar})_t - (\text{units of national currency per US dollar})_{t-1}]}{(\text{units of national currency per US dollar})_{t-1}}$ , with exchange rate based on stock measurements	Source
<i>apprec_2</i>	Same as <i>apprec_1</i> , but now the exchange rate is based on average measurements	Source
<i>ln_pc_arable</i>	$\text{Ln}[(\text{Acres of Arable Land})/\text{Population}] + 1$	Source
<i>ln_energy</i>	$\text{Ln}(\text{domestic energy production, as a percentage of total commercial energy consumption} + 10)$	Source
<i>ln_population</i>	$\text{Ln}(\text{population})$ , in millions	Source
<i>openness</i>	Sum of imports and exports divided by Real GDP	Source
<i>parties</i>	The number of parties in the governing coalition (weighted average for years where there are two or more governments)	Source

Table 1: Variables

national prices employed as the dependent variable in our analysis (either prices of aggregate GDP or prices of national consumption), while the variables  $X_1 \dots X_k$  comprise a  $k$ -vector of control variables indexed at year  $t$  and country  $i$ . The parameters  $\beta_0 \dots \beta_{k+3}$  represent parameter estimates, while  $\epsilon$  is an error term. We estimate our model employing fixed country effects  $D$  (not reported).<sup>2</sup>

The results of our analysis appear in Table 2. They demonstrate robust empirical support for our hypothesis that an increase number of parties in a governing coalition has a positive effect on the price level within that state.

As expected, *per\_capita\_gdp*, *ln\_population*, and *openness* are all statistically significant predictors of price levels across time and space, in the expected direction. We find that only the second measure of currency appreciation significantly predicts price levels, but it does so at a high level of significance. We also find mixed support for the importance of factor endowments in determining national price levels: only *ln\_pc\_arable* is never statistically significant, and *ln\_energy* is only statistically significant in regressions where prices in terms of national consumption are the dependent variable. Turning now to our variables of interest, we find strong support for our expectations of the effect of coalition size on price levels, and mixed results for our expectations of the effects of coalition ideology scores on prices. The coefficients on parties demonstrate, on average, that an increase of one party in the size of the governing coalition leads to an increase of from 1.53 to 1.86 dollars in the purchasing power parity of a country's national currency, depending on the specification. This effect is statistically significant at the 5% level in all four specifications. The coefficients on coalition

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<sup>2</sup>Hausman's test of exogeneity cannot reject the null hypothesis that the efficiency gains from a pooled specification do not outweigh the inconsistency of pooled estimates.

Independent Variables	Model 1	Model 2	Model 3	Model 4
<i>constant</i>	90.92244 *** (14.31598)	109.8068 *** (14.13696)	97.14831 *** (14.00986)	115.7036 *** (13.82146)
<i>per_capita_gdp</i>	0.002191 *** (0.000156)	0.00222 *** (0.000155)	0.002131 *** (0.000153)	0.002162 *** (0.000151)
<i>apprec_1</i>	2.680684 (7.444857)	0.69439 (7.351761)		
<i>apprec_2</i>			-32.7941 *** (8.060784)	-32.9226 *** (7.952387)
<i>ln_pc_arable</i>	1.833639 (9.522007)	3.553186 (9.402937)	-1.19818 (9.302529)	0.722202 (9.177433)
<i>ln_energy</i>	-7.55284 (5.592859)	-12.8141 ** (5.522922)	-8.22725 (5.469802)	-13.4628 ** (5.396247)
<i>ln_population</i>	-8.49575 *** (2.623983)	-12.1539 *** (2.59117)	-9.32659 *** (2.567374)	-12.9428 *** (2.53285)
<i>openness</i>	-15.4091 *** (3.743905)	-20.1651 *** (3.697089)	-16.7921 *** (3.653654)	-21.4491 *** (3.604521)
<i>parties</i>	1.550783 ** (0.756007)	1.855785 ** (0.746554)	1.531615 ** (0.738944)	1.841967 ** (0.729007)
<i>ideology</i>	-0.09044 * (0.054496)	-0.05787 (0.053815)	-0.05354 (0.05331)	-0.02306 (0.052593)

Table 2: Results

ideology all suggest that more leftist governments seem to be associated lower price levels—but this effect is only marginally statistically significant in the first regression. These mixed results may suggest that both expectations regarding ideology are correct: that is, rightist governments favor consumers but also want to lower inflation, while leftist governments must balance lowering unemployment with keeping prices low. Taken together, the combination of ideological preferences over national inflation and price levels for key constituents seems to yield ambiguous predictions regarding the relationship between ideology and price level.

## 6 Conclusion

By employing the number of parties in government as our explanatory factor instead of a binary classification of electoral rule, we are able to offer a fuller explanation of price variation between countries, and within countries over time. And though the fact that the electoral rule is correlated with the number of parties forces us to be humble about our ability to conclusively challenge Rogowski et al.'s analysis, we have demonstrated that there is considerable cause—theoretical and empirical—to be doubtful of their conclusions.

Since our specification takes the subset of OECD countries that have PR governments (save Germany) as its sample, we cannot definitively dismiss the argument that there is a systematic difference between PR and SMD systems. This fact reflects the unfortunate lack of Party Manifesto scores for Canada, the United States, Japan, Australia, and New Zealand (before 1996), just the five countries that (in addition to the United Kingdom and France) comprise the population of OECD countries with majoritarian electoral systems.

But the restricted sample does allow us to distinguish differences in national price level

*within* PR systems. We expect that inclusion of SMD cases to further support our hypothesis: SMD countries in our sample of OECD countries have one-party governments, and hence will be expected to display lower price levels because of the absence of costly coalitional logrolling. This result will explain the findings of Rogowski et al. (2004), but with more satisfactory theoretical underpinnings that will provide us with a richer set of predictions than their binary electoral classification. For example, Rogowski et al. predict lower price levels in all SMD systems, but our model allows us to distinguish between heterogeneous SMD systems (with multiple parties in government, i.e. India) and homogenous ones (i.e. Australia, the United Kingdom).

Further study might also address some of the methodological questions that we raised above. First among these is the problem of independent variables that we addressed earlier, where openness, itself a function of the consumer-friendliness of the government, has an effect on price levels. This complex causal mechanism renders interpretation of the effects of openness difficult. We also plan to study the effects of constitutional structure, party discipline, and the presence of marginal districts. McGillivray (1997) explores the effects of party discipline in majoritarian (two party) systems on tariffs. In a system of high party discipline (typically parliamentary systems with dissoluble legislatures), parties are expected to compete for the marginal districts, offering them pork and protection in an effort to secure a majority of districts. This is not possible with low party discipline—the individual legislator, and not the party, is the primary actor. Legislators want to deliver pork to their districts, but in order to do so, they must engage in logrolling with legislators from other districts. Legislators from marginal districts are unattractive trading partners, since their precarious electoral status means they may be voted out of office before being able to deliver

on their side of any bargain. As a result, in systems of low party discipline, legislators from safe districts contract to secure pork and protection for each other, while marginal districts receive nothing.

We expect marginal districts in PR systems to be similarly neglected. All of the OECD countries with PR systems are also parliamentary ones, so party discipline can be assumed to be high (Cox and Rosenbluth 1995). In PR systems, voters do not know how their votes will translate into policies because they cannot perfectly predict which parties will make it into the governing coalition. Voters in a marginal district will thus have little incentive to respond to a party's promises of pork, since they cannot know what the makeup of the government will be and whether the coalition will be able to follow through on the promise. Since voters in marginal districts don't respond to promises of pork, parties won't make such promises to them. Thus, once in office, parties in PR systems with high party discipline should tend to their core constituencies (i.e. safe districts) and largely ignore marginal ones. The implication for price levels is that increasing (decreasing) the number of marginal districts should mean increasing (decreasing) prices in SMD with disciplined parties, and decreasing (increasing) prices in SMD with undisciplined parties and proportional representation. Clearly there is much work left to be done. It is our hope that the preceding analysis offers a promising beginning.

## A Appendix

Rogowski and Kayser model the utility  $S$  of the government as a Cobb-Douglas function of money  $M$  and legislative support  $L$ .

$$S = M^\alpha L^{1-\alpha} \quad (2)$$

$M$  and  $L$  are assumed to depend on the contributions of two groups within society, producers and consumers. Producers respond favorably to increases in consumer prices, which have the effect of increasing their profits, while consumers respond favorably to decreases in consumer prices. The number of votes that the government receives determines its legislative support. By construction, consumers only contribute votes, but producers can contribute both money and votes. We can therefore write  $L$  as an additive function of votes  $V_c$  from consumers, which in turn is a function of prices  $p$ , and votes  $V_p$  from producers, which is in turn a function of profits  $\pi$ .  $M$  is a function of  $\pi$  only, as consumers cannot contribute money to the government.

Substituting for (2), we get

$$S = [M(\pi)]^\alpha [L(V_p(p) + V_c(p))]^{1-\alpha} \quad (3)$$

If we solve (3) for the marginal rate of substitution between prices and profits, we obtain

$$\frac{d\pi}{dp} = - \frac{dV_c/dp}{\frac{\alpha}{1-\alpha} \frac{M(\pi)}{L(V)} + \frac{dV_p}{d\pi}}, \quad (4)$$

where  $\tau = dL/dV$ . Their argument for price level differences across electoral systems rests on the observation that in (4), the marginal rate of substitution of profits to prices is decreasing in  $\tau$ , the seats-votes elasticity. *Ceteris paribus*, the higher the seats-votes elasticity, the lower the consumer prices.

If we allow that voters can contribute money, however, the same predictions do not obtain. Consider now (3) with the stipulation that  $M$  is a function of both consumer responsiveness to prices ( $M_c(p)$ ) and producer responsiveness to profits ( $M_p(\pi)$ ), as in (5).

$$S = [M_p(\pi) + M_c(p)]^\alpha [L(V_p(p) + V_c(p))]^{1-\alpha} \quad (5)$$

Following the same procedure for obtaining the marginal rate of substitution of profits to prices, we obtain a more awkward equation.

$$\frac{d\pi}{dp} = - \frac{-\alpha[M_p(\pi) + M_c(p)]^{\alpha-1} \frac{dM_c}{dp} L^{1-\alpha} + (1-\alpha)L^{-\alpha}[M_p(\pi) + M_c(p)]^\alpha \left[ \frac{dL}{dV} \frac{dV_c}{dp} \right] L^{-\alpha}}{-\alpha[M_p(\pi) + M_c(p)]^{\alpha-1} \frac{dM_p}{d\pi} L^{1-\alpha} + (1-\alpha)L^{-\alpha}[M_p(\pi) + M_c(p)]^\alpha \left[ \frac{dL}{dV} \frac{dV_p}{d\pi} \right] L^{-\alpha}} \quad (6)$$

We do not, however, believe that this complexity is unwarranted. This equation does not reduce to (4) except for in the case where  $M_c(p) = 0$ , which we argue is insufficient grounds for ignoring the findings in (6).

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