Majoritarian Electoral Systems and Consumer Power: Price-Level Evidence from the OECD Countries

Ronald Rogowski University of California, Los Angeles
Mark Andreas Kayser University of Rochester

A straightforward extension of the standard Stigler-Peltzman model of regulation, coupled with a Taagepera-Shugart analysis of electoral-system effects, suggests: (a) that the greater seat-vote elasticities of majoritarian electoral systems will tilt policy in favor of consumers, while proportional systems should strengthen producers; and (b) that the pro-consumer bias of majoritarian systems should be manifested in systematically lower prices. Empirical tests, controlling for the structural determinants of national price levels established in the earlier "law of one price" literature, establish majoritarian electoral systems as a significant and robust predictor, lowering national price levels in the mean OECD country by approximately ten percent.

Students of political economy have investigated the political and economic effects of electoral systems since at least the 1860s, and research in recent decades has established a broad array of significant regularities.[1] This article suggests a previously unnoticed and (we believe) equally important effect, namely that systems of proportional representation (PR) systematically advantage producers and disadvantage consumers. We pursue twin insights from the pioneering work on regulation of Stigler (1971) and Peltzman (1976): (a) that what matters most for policy is politicians' *marginal rate of substitution* between producers' and consumers' support; and (b) that *prices*—or, more precisely, departures from competitive prices—reliably indicate that trade-off. We first develop and analyze a simple model of political support that faithfully incorporates the Stigler-Peltzman story. Along with more predictable comparative statics, this model leads to the implication that PR systems (a) consistently tilt policy toward producer interests and (b) entail, as one aspect of that bias, higher prices. We then test that implication against price data for the OECD countries, with appropriate controls from the extensive literature on the "Law of One Price" (LOP). The clear finding is that—controlling for virtually every other relevant influence—prices of goods and services are systematically higher in PR countries.

Ronald Rogowski is Professor of Political Science, University of California, Los Angeles (rogowski@polisci.ucla.edu). Mark Andreas Kayser is Assistant Professor of Political Science, University of Rochester (mark.kayser@rochester.edu) and Postdoctoral Prize Research Fellow, Nuffield College, Oxford.

Research was supported in part by NSF grant 9819307. For helpful comments and discussions, we are indebted to (in alphabetical order) Kathleen Bawn, Eric Chang, Daniel Diermeier, Jeffry Frieden, David Karol, John Londregan, Edward Leamer, Ross Schaap, and Michael Thies; to three anonymous referees; and to participants in the Research Group on Political Institutions and Economic Policy (PIEP) at Harvard University, 17 November 2001. The PIEP group is supported financially and institutionally by the Weatherhead Center for International Affairs and the Center for Basic Research in the Social Sciences, both at Harvard. We claim sole responsibility for any remaining errors.

[1]Among the most significant recent empirical works are Powell (1982), Lijphart (1984 and 1999), Roubini and Sachs (1989), Cox (1997), Birchfield and Crepaz (1998), and Persson and Tabellini (2000b). From these and other sources, we now know with reasonable certainty that proportional (as opposed to majoritarian) methods of election are associated with: (a) higher voter turnout, (b) less strategic voting; (c) less political violence, (d) greater cabinet instability and shorter-lived governments, (e) higher governmental expenditures and budgetary deficits, (f) more welfare spending, (g) greater dependence on trade, and (h) greater equality of incomes.

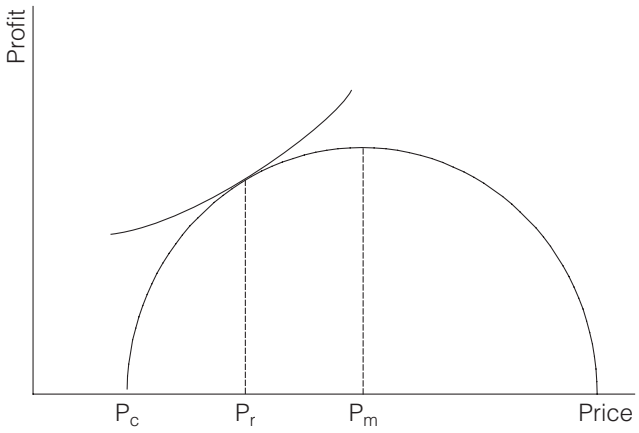
American Journal of Political Science, Vol. 46, No. 3, July 2002, Pp. 526–539

 ISSN 0092-5853

The Stigler-Peltzman Framework

The essential insight of the Stigler-Peltzman (S-P) analysis of regulation can be conveyed by a single, widely familiar, diagram (Figure 1). Suppose that the price of a given industry's product is represented on the horizontal axis, its profits on the vertical one. Then at the perfectly competitive price p_c, profits will be zero. To the extent that regulation in any of its familiar forms—licensure schemes that artificially restrict supply, regulatory boards that set minimum prices, impediments to efficient retailing, tariffs, quotas, and so on—can raise price above this competitive level, total industry profits begin to rise,[2] until price reaches the level that a monopoly would impose (when, of course, marginal cost just equals marginal revenue and industry profit is maximized); this is denoted as p_m. If regulation becomes so restrictive of supply as to push price even beyond this monopolistic level, industry profits again decline, returning eventually to zero as the price becomes prohibitive.

FIGURE 1 Stigler-Peltzman Regulation



Producers in the sector of course pursue p_m; consumers, p_c. Politicians, in the S-P framework, simply want to maximize support. They therefore consider the marginal rate of substitution between producer and consumer support, represented by a set of iso-support curves I_s. We depict in Figure 1 only the relevant member of this family, namely the highest one tangent to the price-profit "hump." The S-P prediction is, of course, that government will bring price (and hence profits) to precisely the level indicated by the point of tangency, denoted here as p_r, the "regulated" price.

Now consider the iso-support curves (and the prices they yield) more closely. If producers are quite powerful relative to consumers in a given sector, the I_s curves will be nearly flat: for a politician to gain enough consumer support to compensate for even a slight decrease in industry profits, the price would have to decrease by some quite large amount. Conversely, if consumers greatly outweigh producers in a given sector, the I_s curves will be almost vertical: to compensate for the ire that even a slight price increase would arouse among consumers, profits would have to rise hugely. In the former case, logically enough, regulators impose almost exactly the monopoly price p_m; in the latter, they depart very little from the competitive price p_c. In this precise sense, price—or, more exactly, departure from competitive price—indicates almost perfectly the balance of consumer-producer political power in the given industry.[3]

Modeling the Stigler-Peltzman Support Function

As presented, the Stigler-Peltzman isosupport curves are little more than descriptions: a "steeper" curve simply says that politicians attend more to consumers, a "flatter" one, that producers' views matter more. To move beyond description, we develop a simple model of political support, formalizing the Stigler-Peltzman analysis, and examine its comparative statics. Suppose that the incumbent government, and the opposition, care about two things: (a) *legislative*, or parliamentary, support and (b) campaign funds, or more generally *money*.[4] Let L denote the former, M the latter; then, consistent with

[2]Absent barriers to entry, these profits of course will be competed away; but the same political power that imposes higher prices is usually clever enough to restrict entry.

[3]Two exceptions, neither of them (we believe) significant in the long run, occur to us. First, government may be pressured by a powerful industry simply to apply a subsidy and let price seek its own level (e.g., the "Brannan Plan" of unsavory memory in U.S. agriculture). Second, government may impose "sin taxes," e.g., on tobacco and alcohol, whose professed intent is to suppress consumption, thus moving (possibly) even above p_m.

[4]Alternatively, one could think of support purely in legislative terms, taking legislative support as a function of votes and money (i.e., S=L(V,M)). So long as one acknowledged that the seats-votes elasticity was systematically higher in majoritarian electoral systems, the result reported here would continue to obtain—and, indeed, could be demonstrated almost trivially. The form adopted here accepts that money can play an important role between, as well as during, elections, and therefore seems to us to conform better to experience.

Stigler-Peltzman, we stylize political support S as a Cobb-Douglass function[5] of the form

$$S = M^{\alpha}L^{1-\alpha}\Big|\alpha \in (0,1) \qquad (1).$$

Legislative support—the share of seats in parliament that the government can command—is taken as a function of vote share V, i.e., L = L(V), dL/dV > 0.[6] For simplicity we regard producers and consumers as mutually exclusive groups and assume—realistically, we believe—that consumers can contribute only votes, while producers can offer both votes and money.[7] We take it that consumers' support (in votes) will be decreasing in p (the price level), while producers' support (in both money and votes) will be increasing in π, the level of profits.

Slightly more formally, we have

$$M = M(\pi),\ dM/d\pi > 0 \qquad (2)$$

$$\text{and} \quad V = V_p(\pi) + V_c(p),\ dV_p/d\pi > 0,\ dV_c/dp < 0 \qquad (3),$$

where V_p denotes vote share from producers, V_c vote share from consumers.

With appropriate substitution from (2), (3), and the formula for L, we can rewrite (1) wholly in terms of π and p as

$$S = (M(\pi))^{\alpha}\Big[L(V_p(\pi) + V_c(p))\Big]^{1-\alpha} \qquad (4);$$

and from here we can determine the MRS, dπ/dp, according to the conventional formula (or via the Implicit Function Theorem)

$$\frac{d\pi}{dp} = -\frac{\partial S/\partial p}{\partial S/\partial \pi} \qquad (5).$$

[5]Only c.e.s. (constant elasticity of substitution) functions readily generate the nicely tractable convex isosupport curves that the Stigler-Peltzman approach assumes. Of c.e.s functions, the Cobb-Douglass is the standard and simple "workhorse"; hence we employ it here. It is also merely for notational convenience that we take the exponents as summing to unity. As is well known, the marginal rate of substitution—the quantity of theoretical interest here—is invariant to scale effects.

[6]In reality, electoral systems frequently violate even weak monotonicity, i.e., winning more votes may actually yield fewer parliamentary seats; the assumption of strong monotonicity is invoked here only to simplify modeling.

[7]Note that this assumption "stacks the deck" against our claim that electoral system matters for the shape of isosupport curves. If, by analogy to Denzau and Munger (1986, especially 93), we assumed that consumers could contribute only votes, producers only money, the greater steepness of majoritarian isosupport curves would follow almost self-evidently.

Note first that ∂S/∂p =

$$(M(\pi))^{\alpha}(1-\alpha)L^{-\alpha}(dL/dV)(dV_c/dp) \qquad (6),[8]$$

while ∂S/∂π =

$$\alpha(M(\pi))^{\alpha-1}(dM/d\pi)L^{1-\alpha} + (1-\alpha)(M(\pi))^{\alpha}L^{-\alpha}(dL/dV)(dV_p/d\pi) \qquad (7).$$

The MRS can then be stated as dπ/dp =

$$-\frac{dV_c/dp}{\dfrac{\alpha}{1-\alpha}\dfrac{\dfrac{dM/d\pi}{M(\pi)}}{\dfrac{dL/dV}{L(V)}} + \dfrac{dV_p}{d\pi}} \qquad (8).$$

Since by assumption $dV_c/dp < 0$, while all other terms in (8) are positive, the MRS is *positive* (thus producing the upward-sloping Stigler-Peltzman isosupport curves).

The comparative statics revealed by (8) accord for the most part with intuition. The isosupport curves become *steeper* (signifying greater consumer power and, all else equal, lower prices) as:[9]

- consumer votes become more responsive to prices (dV_c/dp grows more negative);
- politicians weight votes (as opposed to money) more heavily (decreasing α, hence increasing 1-α); or
- politicians already have more monetary support (higher M).

Conversely, the curves become *flatter* (implying greater producer power and higher prices) when:

- producers' votes or monetary contributions become more responsive to profits (rising $dM/d\pi$ or $dV_p/d\pi$)
- politicians weight money more heavily (larger α) or
- the government already enjoys higher levels of parliamentary support (L).[10]

Our most important result is not at all intuitively obvious but clear from (8): the isosupport curves become *steeper*, therefore more consumer-friendly, as

[8]Note that, by (3), $\partial V/\partial V_c = \partial V/\partial V_p = 1$; hence we can ignore both terms in applying the chain rule of differentiation.

[9]Whatever decreases the denominator in (8) increases the MRS, i.e., implies steeper curves; whatever increases the denominator decreases the MRS, implying flatter isosupport curves.

[10]Thus, all else equal, countries with entrenched dominant parties—Japan under the LDP, Mexico under the PRI, India under the Congress Party—will disadvantage consumers. We show below (530 and following) that this is particularly the case in majoritarian systems, and that indeed under extreme single-party dominance (what some used to call "one-and-one-half party systems"), PR actually advantages consumers more.

• seats-votes elasticity (dL/dV) increases.[11]

That is, the greater the percentage increase in seats produced by a one percent increase in votes, the more policy will favor consumers and—assuming that the original Stigler-Peltzman analysis is correct—the more closely prices will approximate the competitive level. We therefore focus the next stage of our analysis on the seats-votes elasticity as a property of the electoral system.

To foreshadow our results there, under normally competitive circumstances majoritarian systems exhibit a seats-votes elasticity considerably higher—to be precise, two-and-one-half to eight times higher—than proportional systems. It thus will follow directly that, if our model has accurately captured this aspect of reality, majoritarian systems—or those, at any rate, in which two parties divide the vote not too unequally—will be systematically more pro-consumer in their policies and will have significantly lower prices.

To the best of our knowledge, this hypothesized link between seats-votes elasticity and pro-consumer policies has previously gone unobserved, yet it emerges clearly from our model, from the Stigler-Peltzman approach more generally, and (we shall assert) from a preliminary inspection of the evidence. The intuition behind it will seem paradoxical to most students of politics: if one group can influence policy by both money and votes, another only by votes, then whatever increases the impact of votes shifts policy toward the group that has *only* votes.[12] At a purely mechanical level this is clear enough as one considers (5), (6), and (7) in tandem: any increase in dL/dV multiplies (6), the numerator of (5), by its full amount; yet the same increase is diluted in (7), the denominator of (5), by the unchanged term in the first part of that sum, which represents the marginal effect of money.

At a deeper level, this effect—that advantaging a given factor benefits disproportionately those who command *only* that factor—generalizes and seems less paradoxical. If one group in a society can offer only unskilled labor, another some mix of human capital and labor, we find nothing remarkable in the conclusion that an exogenous increase in the marginal productivity of unskilled labor will leave the unskilled better off.

[11]As dL/dV increases, holding all other terms constant, the overall denominator in (8) *decreases*; hence the MRS *increases*, implying a steeper isosupport curve.

[12]To forestall one possible misinterpetation of these results: it is *not* the case that producers would be better off if they gave no money, or if monetary contributions were outlawed: indeed, it is always the case that the more sharply monetary contributions respond to increased profits, i.e., the higher is $dM/d\pi$, the more pro-producer policy will be (i.e., the flatter the iso-support curves).

The effect outlined here is essentially the same, yet in the political context it raises a variety of interesting and troubling implications. We shall address one in particular in our concluding discussion.

The Seats-Votes Elasticity: Why the Electoral System Matters

Every electoral system may conveniently be regarded as a method for translating parties', or candidates', shares of the popular vote into shares of offices, typically of seats in parliament. Notationally, where V_i represents the ith party's ($i \in [1,N]$) share of popular vote, L_i its share of parliamentary seats (and of course subject to the constraint $\Sigma V_i = \Sigma L_i = 1$), we characterize an electoral "rule" simply as a function r

$$L_i = r(V_i). \qquad (9).$$

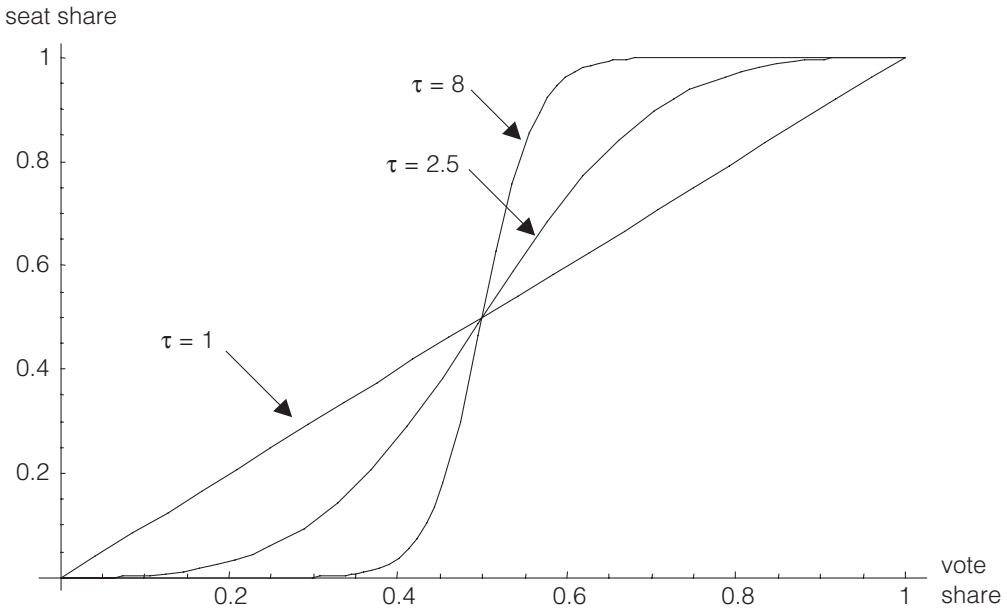
An important insight of recent work on electoral systems has been the observation by Taagepera and Shugart (1989) that virtually every extant electoral "rule" can be approximated[13] by a power function of the form

$$L_i = \frac{V_i^{\tau}}{\sum_1^N V_i^{\tau}} \qquad (10),$$

where V_i is the ith party's vote share and L_i is the same party's share of parliamentary seats. In systems of proportional representation, the exponent τ approximates one by design. According to an observation current even in the early twentieth century (cf. Kendall and Stuart 1950), in plurality single-member district (SMD) systems, as used for example for elections to the British House of Commons or the U.S. House of Representatives, something like a "cube rule" prevails, i.e., $\tau \cong 3$. If, for example, four parties competed and won, respectively, 10, 20, 30, and 40 percent of the vote, a typical SMD system might award them (in the same order) 1, 8, 27, and 64 percent of the seats. In fact, as Taagepera and Shugart show, the typical SMD system exhibits a value of τ closer to 2.5; while the U.S. Electoral College, because of its "winner-take-all" (bloc vote) provision in almost all states, has a historic value of approximately $\tau = 8$.

[13] The fit of actual data to the predicted curve is never perfect, but the essential insight—that more majoritarian systems are characterized by significantly higher seats-votes elasticities in the competitive range—is extremely robust.

Figure 2 Two Party Seat-Vote Functions



Economists and political scientists have long been interested in this class of functions in other contexts. Hirshleifer (1991), for example, following earlier work by Tullock, posits a "contest success function" of exactly this form, which relates "fighting effort" to probability of winning; and he aptly designates the counterpart of the τ parameter as a "decisiveness" factor (Hirshleifer 1991, 181). Even earlier, Theil (1969), from a purely normative standpoint and seemingly in ignorance of any empirical referent, suggested that seats *should* be allocated to parties by such a formula, and that the median voter's preference over the desirable value of τ should be decisive.

A particularly revealing property of (10) is that, for the two-party case when each party captures half the vote ($V_i = .5$), τ expresses exactly the seats-votes elasticity, i.e., the percentage increase in seats to be anticipated from a one percent increase in votes.[14] To put the matter concisely: in the two-party case under PR, moving from 50 to 51 percent of the popular vote raises a party's seat share by precisely the same margin; under SMD, the same increase moves it (give or take) to 52.5 percent of the seats; and in the U.S. Electoral College, such a shift in popular vote yields around 58 percent of the Electors. The relationship between vote share (horizontal axis) and seat share (vertical axis) is plotted in Figure 2 for the three representative cases: PR ($\tau = 1$), SMD ($\tau = 2.5$), and the Electoral College ($\tau = 8$).

The two-party scenario, with each capturing about half the vote, is highly relevant to non-PR systems because (a) the higher the τ, the greater the disincentives to third-party formation (an effect commonly labeled as Duverger's Law); and (b), under two-party competition on a single dominant issue-dimension (Downs 1957), the dominant strategy for both parties is to converge on the position of the median voter and thus to win exactly half the electorate (cf. Persson and Tabellini 2000a, chapter 3). Since in PR systems the seats-votes elasticity is everywhere $\tau = 1$, and since in non-PR systems under normally competitive circumstances (with each of two major parties capturing roughly half the vote) it will closely approximate τ, we can normally take τ in either system as equivalent to the seats-votes elasticity, dL/dV.

The rare cases of majoritarian systems with a highly dominant party—the U.S. under the New Deal, India under the long Congress Party hegemony—provide the exception that tests the rule. Within the class of majoritarian systems, policy should tilt sharply toward producers as politics become less competitive. Moreover, as a rough rule of thumb, whenever a single party captures three-fifths or more of the vote in U.S. Presidential contests, or

[14] In the two-party case, $L_i = \dfrac{V_i^\tau}{V_i^\tau + (1-V_i)^\tau} = \dfrac{1}{1+(\frac{1}{V_i}-1)^\tau}$

hence we have also $\dfrac{dL_i}{dV_i} = \dfrac{\tau(\frac{1}{V_i}-1)^{\tau-1}}{(1+(\frac{1}{V_i}-1)^\tau)^2 V_i^2}$

which self-evidently, for $V_i = 1/2$, reduces to τ.

more than about two-thirds in a single-member district system, a shift to PR will benefit consumers.[15]

For the general case, however, and returning to the model outlined earlier, we can re-write (8) as

$$-\frac{dV_c / dp}{\frac{\alpha}{1-\alpha}\frac{\frac{dM / d\pi}{M(\pi)}}{\frac{\tau}{L(V)}} + \frac{dV_p}{d\pi}} \qquad (8a)$$

and thus see the crucial theoretical prediction: normally, **the more majoritarian the system**, i.e., the higher its τ,

- **the steeper its Stigler-Peltzman iso-support curves**, and therefore
- **the more pro-consumer its policies** and
- **the lower its prices**, i.e., the more closely they approximate p_c, the level that perfect competition would produce.

The most readily observable implication of the model is that about price levels; and we propose to test precisely that hypothesis, namely that **price levels will be systematically lower in majoritarian countries.**

The (Attenuated) Law of One Price

The trick, of course, is to know what p_c might be in an already heavily regulated economy. An intuitively appealing method, frequently invoked in journalistic and policy discussions, is to take "world" prices as a benchmark: that U.S. sugar prices are several times world levels, for example, suggests that U.S. sugar producers wield far more political "clout" than do sugar consumers. Such an approach assumes, however, that the "Law of One Price" prevails—i.e., that absent politically-imposed barriers, any difference in the currency-corrected price of the same item in different countries will quickly be arbitraged away.

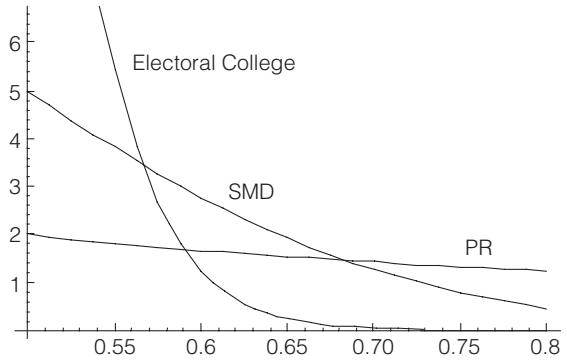
In reality, as a considerable literature shows, the LOP obtains only in highly attenuated form (see, *inter alia*, Kravis and Lipsey 1988; Clague 1986; Bergstrand 1991). Several factors have long been understood, empirically if not theoretically, to make for persistent differences in price levels.

Foremost among these is **wealth**, usually measured as real GDP per capita. Richer countries, independent of other plausible factors, have higher real prices, a result that is robust across virtually every possible specification. Wealth, indeed, consistently emerges as the most important single determinant of national price levels, even when one controls for the two most commonly imputed causes (Bergstrand 1991), namely (a) differences in productivity between traded and nontraded sectors (Belassa 1964; Samuelson 1964) and (b) cross-national differences in capital/labor ratios (Kravis and Lipsey 1983; Bhagwati 1984).[16]

A second factor making for persistent price-level differences might be relative **factor endowments**: not only the capital/labor ratio already mentioned, but endowments (relative to other countries) of land, skill (human capital) and, more narrowly, energy. Abundance of arable land may imply cheaper food by permitting large-farm economies of scale and by avoiding transaction costs on food imports. Abundant human capital, commonly proxied by education, presumably reduces prices in advanced service sectors (e.g., law and banking) but may also—both by its direct effects on marginal productivity of labor and through its extreme complementarity with physical capital—imply high overall wage levels. And domestic energy abundance raises the prospect of "Dutch disease" (Corden 1984), in which high prices in the energy sector spill over into nontraded sectors and induce overvalued exchange rates.

Third, there are the obvious **natural, cultural, and policy barriers** to arbitrage. Our general prior here is that less open economies—whether because of physical isolation, idiosyncratic or xenophobic tastes, or their governments' isolationist tendencies—will be better able to

[15] If one plots (dL/dV)/L(V) under the earlier specification (above, footnote 14) as a function of V under PR ($\tau = 1$), SMD ($\tau = 2.5$), and the Electoral College ($\tau = 8$), one gets the following result:



Note that the "envelope" of highest lines is the most consumer-friendly position. For $V \leq .566$, this is the super-majoritarian Electoral College; for $V \in (.566,.684)$, it is SMD; for $V \geq .684$, it is PR. PR is more pro-consumer than an Electoral College whenever $V > .59$.

[16] Wealthier consumers may also be less price sensitive, allowing for pricing-to-market (Krugman 1987).

maintain prices above world levels. Our measure is simply the deviation of imports/GDP from the level expected in the absence of trade barriers, and we anticipate that—again, all else equal—greater openness lowers prices.

Finally, we conjecture that **market size**, proxied here simply by the country's population, will be inversely related to price because of (a) the specialization a large domestic market permits[17] and (b) simple economies of scale.

Almost needless to say, when all of these variables—and a few more mundane controls explained below—are accounted for, part of the variance in cross-national price differences remains unexplained. We claim that, controlling for all of these variables, a country's electoral system has, as our model would predict, strong and robust effects on price levels: nations with majoritarian methods of election—in particular, with single-member parliamentary districts—have lower prices, while ones with proportional and "mixed" methods of election have higher prices. The next section presents evidence on this score.

Empirical Tests

The Law of One Price, when applied to overall national price levels rather than to a specific good, becomes the principle of Purchasing Power Parity (PPP). Just as the LOP predicts that arbitrage will equalize the prices of a given product in different locations at a given time, PPP predicts the same for *baskets* of identical goods.[18] This theory motivates our dependent variable. If identical baskets cost 100 U.S. dollars and 800 Swedish kronor, the purchasing power of the dollar is eight times that of the krona. Perfect arbitrage would require an exchange rate of eight kronor to the dollar, but suppose the actual exchange rate is 4:1. Then prices in Sweden are two times higher than in the United States, i.e., the same number of kronor will buy twice as much in the U.S. as in Sweden. "Real" prices, thus gauged, are simply the inverse of "real" exchange rates, usually defined as XR/PPP. Interestingly, real exchange rates are also sometimes taken as a measure of relative consumer/producer power (O'Mahony 2001; Blomberg, Frieden, and Stein 2001), since consumers allegedly prefer an overvalued, producers an undervalued, exchange rate.

We test our hypothesis on prices of aggregate GDP and of national-level consumption in a sample of all twenty-four (as of 1990) OECD member countries.[19] Both dependent variables are commonly available in the Penn World Tables (PWT), Mark 5.6, which conveniently presents all PPP data in dollar equivalents cross-nationally indexed to a base value of 100 for the United States. Our independent variables, all measured in 1990, are defined as follows:

CGDP – gross domestic product (GDP) per capita in thousand US dollars, GDP/pop. Source: GDP is calculated as the IMF International Financial Statistics (IFS) GDP figures in local currency divided by IMF IFS exchange rate (rf..zf series); population is from PWT, 5.6.

ΔXR3 – percentage change in NC/USD exchange rate since 1987, i.e. local currency appreciation relative to the US dollar. Source: IMF IFS series rf..zf.

LnAraPop – natural log of 1990 per capita arable hectares of land, Ln((arable/pop)+1). Source: World Development Indicators CD-ROM (1999), ag.lnd.arbl.ha.pc.

LnDM – natural log of electoral district magnitude, the average number of seats per constituency in the lower house. Sources: Lane et al. 1991; Mackie and Rose 1991.

LnEnergy – natural log of domestic energy production/total final energy consumption, in Million metric tonnes of oil equivalent, Ln((production/consumption)+1). Source: OECD 1992 and 1995, Country Tables.

LnPop – natural log of population in million inhabitants. Source: Penn World Tables, Mark 5.6.

Open – trade openness calculated as deviation from the level of import penetration (imports/gdp) expected in the absence of trade barriers. Specifically, Imports/GDP minus Freeop where Freeop = .7081 – .0627Ln(Area) – .0795Ln(distance). Coefficients are first calculated from regression of lmp/GDP on LnArea, LnDist and LnTradetax in 63 country sample for 1990 following method originally developed by Jong Wha Lee (1993). Data source: World Development Indications CDROM.

[17]As Adam Smith (*Wealth of Nations*, I:3) first noted, "The Division of Labour is Limited by the Extent of the Market"; hence in many specializations price will decrease as market size increases.

[18]In practice, international price level comparisons adjust national baskets to account for local tastes, e.g., substituting beer in the German "basket" for wine in the French one. The International Comparisons Project, producers of the Penn World Tables, whose price data we employ, has done just this.

[19] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, New Zealand, Portugal, Spain, Sweden, Switzerland, Turkey, UK, and USA.

Table 1 Prices Including Tax

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
	GDP Price				Consumption Price			
Constant	49.964*** (6.127)	40.804*** (6.862)	64.630*** (5.718)	89.823*** (14.931)	44.551*** (7.452)	36.011*** (8.470)	57.467*** (7.564)	75.879*** (20.226)
Per Capita GDP	3.618*** (0.284)	3.582*** (0.313)	2.899*** (0.277)	2.812*** (0.281)	3.930*** (0.345)	3.917*** (0.386)	3.292*** (0.366)	3.087*** (0.381)
Single Member District	–13.992*** (4.710)		–12.396*** (3.834)	–10.451* (4.955)	–14.974** (5.728)		–13.117** (5.072)	–12.549* (6.712)
Log of District Magnitude		3.400* (1.700)				2.695 (2.099)		
Trade Openness			–53.685** (19.785)	–68.634*** (22.156)			–51.843* (26.172)	–64.377** (30.014)
3 Year Exchange Rate Appreciation			0.137*** (0.042)	0.120** (0.042)			0.112* (0.055)	0.107* (0.057)
Log of Arable Land /Population				1.622 (7.464)				–3.251 (10.111)
Log of Population				–2.675* (1.436)				–1.937 (1.945)
Log of Energy Production/Consumption				2.727 (4.284)				9.010 (5.804)
R^2	0.894	0.873	0.952	0.966	0.870	0.841	0.929	0.947
Adj-R^2	0.884	0.861	0.941	0.949	0.858	0.825	0.912	0.920
F	88.50	72.47	84.68	56.27	70.45	55.37	55.72	35.47
SEE	9.97	10.89	7.27	6.79	12.12	13.44	9.61	9.19
Cook-Weisberg χ^2	0.62	0.19	0.00	0.01	0.08	0.29	0.23	0.02
skewness & kurtosis χ^2	2.39	1.20	0.51	1.55	1.00	0.31	1.69	3.82
RESET F	3.11*	1.82	0.43	1.86	1.62	1.16	0.16	0.27
N. Obs.	24	24	22	22	24	24	22	22

Standard errors in parentheses. *p<.1; **p<.05; ***p<.01.

Regressions including $\Delta XR3$ omit Luxembourg; those including *Open* omit Iceland

SMD – dummy for countries that employed a single member district electoral system in 1990 (Australia, Canada, France, New Zealand, United Kingdom, United States).

We now examine the effect of electoral systems on national price levels with a series of OLS regressions on 1990 cross-national data. The first and most parsimonious model (Table 1, Column One) immediately reveals the predicted strong effect of wealth (*CGDP*) and a weaker but highly significant negative effect of single-member-district electoral formulae. Most remarkably, these two variables alone explain 89.4 percent of the variation in cross-national price levels and fit to the data extremely well (F = 88.5, adj-R^2 = .884). But as strong as these results are, theory and diagnostic tests suggest an expanded specification and alternative measures of electoral arrangements. The residuals show acceptable levels of heteroskedasticity (Cook and Weisberg 1983) and non-normality (skewness and kurtosis; D'Agostino, Balanger, and D'Agostino, Jr. 1990), but Ramsey RESET diagnostics suggest misspecification. We accordingly expand the specification but first consider an alternative measure of electoral arrangements exhibiting less evidence of specification error.

The country dummy for single-member district might of course capture effects other than those of the electoral system. We therefore substitute the log of district magnitude—the average number of members elected to the lower house of the legislature per district—for the SMD variable in model 1.2. Although *LnDM* is clearly weaker than *SMD*, the positive price effect of moving away from majoritarianism reassures us that *SMD* is largely capturing electoral system effects. The weaker effect also matches our priors that there is a discrete difference that separates single member districts

Table 2 Prices Excluding Tax

	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8
	GDP Price				Consumption Price			
Constant	45.557*** (4.714)	38.482*** (5.378)	56.458*** (4.511)	65.351*** (13.343)	40.449*** (6.174)	33.930*** (7.062)	49.722*** (6.660)	51.940** (19.303)
Per Capita GDP	3.466*** (0.219)	3.441*** (0.245)	2.951*** (0.218)	2.902*** (0.251)	3.761*** (0.286)	3.759*** (0.322)	3.323*** (0.322)	3.170*** (0.363)
Single Member District	–11.162*** (3.624)		–10.649*** (3.025)	–10.470** (4.428)	–12.158** (4.747)		–11.396** (4.466)	–12.453* (6.406)
Log of District Magnitude		2.539* (1.333)				1.878 (1.750)		
Trade Openness			–36.008** (15.609)	–44.151** (19.799)			–34.650 (23.045)	–39.959 (28.643)
3 Year Exchange Rate Appreciation			0.108*** (0.033)	0.103** (0.038)			0.084 (0.049)	0.091 (0.054)
Log of Arable Land /Population				2.030 (6.670)				–2.636 (9.650)
Log of Population				–0.963 (1.283)				–0.235 (1.857)
Log of Energy Production/Consumption				1.318 (3.828)				6.975 (5.539)
R^2	0.928	0.910	0.966	0.969	0.898	0.873	0.938	0.945
Adj-R^2	0.921	0.902	0.958	0.953	0.888	0.861	0.924	0.918
F	138.38	106.54	121.25	62.10	92.29	72.11	64.40	34.52
SEE	7.67	8.53	5.73	6.07	10.05	11.20	8.47	8.77
Cook & Weisberg χ^2	2.53	1.05	0.77	0.36	0.01	0.13	0.17	0.00
skewness & kurtosis χ^2	1.11	0.32	0.29	0.47	0.27	0.09	3.37	2.38
RESET F	3.89**	2.00	0.51	1.28	1.22	0.87	0.11	0.28
N. Obs.	24	24	22	22	24	24	22	22

Standard errors in parentheses. *p<.1; **p<.05; ***p<.01.

Regressions including $\Delta XR3$ omit Luxembourg; those including *Open* omit Iceland

from mixed systems and varying forms of proportionality.[20] SMD is more than a single point along a district magnitude continuum. But even strictly within the seat-vote context, the weaker performance of *LnDM* is also unsurprising if one considers that, barring bloc vote arrangements, seat-vote elasticities decline precipitously once district magnitudes exceed one.[21]

[20] Suppose that half of a country's MPs are elected from single-member districts, the other half independently by nationwide PR. Then normally the overall seats-votes elasticity will be exactly the average of what would obtain under SMD (2.5) and under PR (1.0), i.e. 1.75. In the well-known German system, by contrast, the PR result is determinative; hence there the seats-votes elasticity is close to one.

[21] Where dm represents district magnitude, the share of the district vote required to win a seat is approximated by 1/(dm+1). Hence reasonable proportionality—or an approximation of a seats-votes elasticity of one—is achieved quickly as district magnitude rises above one.

Model 1.3 now returns to the single-member district variable and addresses underspecification concerns by adding two new regressors capturing trade openness, *Open,* and currency appreciation, $\Delta XR3$. Openness, defined as the deviation from the gravity model predicted level of imports/GDP absent trade barriers (Lee 1993), offers a measure of trade barriers superior to the more common imports/GDP, a figure that does not account for the largest determinants of trade penetration such as market size and distance from trade partners. As expected, greater trade openness is strongly associated with lower national price levels.

Because price stickiness, the delayed adjustment of domestic prices in response to exchange rate fluctuations, could induce measurement error in cross-sectional data such as ours, we also include $\Delta XR3$, the net appreciation of each country's currency against the U.S. dollar from 1987 to 1990. We expect a strengthening currency,

simply as a matter of definition, to *raise* national price levels[22] and find our priors confirmed with exchange rate appreciation reaching significance at the one percent level.

Overall, the entire model performs even better than the first (SEE drops; Adj-R^2 rises) and the inclusion of arbitrage and appreciation controls has little effect on majoritarianism's relationship to prices. This occurs despite the loss of four degrees of freedom, two to regressors and two to data problems.[23] Most importantly, majoritarian electoral arrangements remain significant, lowering the average country's GDP price level by an estimated 10.4 percent (119.51 to 107.11) from those expected under PR.

What about factor endowments? Model 1.4 again expands the specification to include measures of relative land to labor abundance (*LnAraPop*) and energy production to consumption (*LnEnergy*). (Physical and human capital, although both strong bivariate predictors of price levels, are excluded due to high collinearity with per capita GDP.) Neither abundant land nor plentiful domestic energy has any noteworthy association with price levels, indicating little initial support for the agricultural economies of scale or the "Dutch disease" hypotheses, respectively.

The other new variable, logged population, does display a markedly negative relationship to prices, however, indicating some, albeit weak, support for specialization and economy of scale effects. It also may be picking up the "home bias" or "border effects" documented by McCallum (1995) and Engel and Rogers (1996), where a strong domestic bias in purchasing patterns undermines cross-border price arbitrage. Given this barrier to international trade, producers in small countries may face less domestic price competition than those in larger markets, thereby raising prices in smaller countries. The new variables have little effect on those already in the previous model 1.3 and the addition of three new variables produces only the smallest improvement of overall fit.

We check the findings of Table 1 by repeating all four regressions on a related but distinct dependent variable, price levels of *national consumption*. Similar trends emerge, albeit with some interesting differences: *SMD*—our primary concern—displays an even stronger effect on consumption price levels; trade openness has a weaker and now only marginally significant negative effect on prices; and currency appreciation drops to significance at only the 10 percent level. That said, the similarities are more noteworthy than the differences: comparing model 1.3 to 1.7 and 1.4 to 1.8 shows that no variable changes sign and wealth remains by far the strongest price predictor. The coefficient for *SMD* actually becomes more negative: in model 1.7, arguably the best specified, majoritarian electoral systems are now associated with a 10.9 percent drop in predicted national price levels (120.00 to 106.88) for the average OECD country.[24]

Overall, *SMD* remains reassuringly robust throughout all four models in which it appears—two for each dependent variable—but the unexpectedly weak performance of several other regressors given our earlier priors motivates us to examine one more variant of the data. Following Clague (1993), we reason that the dominant practice of refunding taxes (most notably the value-added tax, or VAT) on exported goods and services but imposing them on imports distorts the prices predicted by trade and structural determinants; it is national price levels *net of tax* that we seek to explain. Accordingly, we deduct the respective share of national GDP and consumption price levels attributable to such taxes from the Penn World Tables price data used in Table 1 to create two new dependent variables, net of tax.[25]

The results of replicating Table 1's regression on these net-of-tax price data are notable: the standard error of the estimate in all eight models falls even lower than in their Table 1 counterparts, producing remarkably high adjusted R^2s. Although the models fare better overall, most individual regressors—with the exception of per capita income—do not. The deterioration in the performance of trade openness is most dramatic, falling below even the ten percent level of significance for consumption prices. Currency appreciation deteriorates less from a stronger position: $\Delta XR3$ remains a significant predictor of GDP prices but loses significance for consumption. Relative land abundance, population, and energy production to consumption ratio do not even approach significance. Deducting the tax share from GDP

[22] Conventionally, a *depreciating* currency, via its inflationary effect on imported goods, is associated with higher price levels. Recall, however, that prices here are defined as PPP/XR, where XR (the exchange rate) is units of national currency per dollar. An appreciating currency means a *smaller* denominator; which, given any stickiness in PPP, must mean a *higher* price under this definition.

[23] We omit Luxembourg from all specifications including $\Delta XR3$ as its fixed exchange agreement under the Belgium-Luxembourg *Union Economique* disqualifies it as an independent observation; Iceland similarly does not appear in regressions employing the trade openness variable due to missing data.

[24] It is worth noting that one ambiguous case, France, experienced an interlude of PR between 1986 and 1988, interrupting the SMD system that had otherwise prevailed continually since 1958. We nevertheless consider France as an SMD state but note that all regression results are robust to the alternate coding.

[25] We deduct the share of VAT from both the GDP and the Consumption figures using OECD Revenue Statistics (OECD 2000, country tables, tax category 5111, "Value-added taxes").

Table 3 Model 2.3 Diagnostics

	3.1	3.2	3.3
	Turkey dummy	Robust regression	Bootstrapped (1000 reps)
Constant	56.271***	56.319***	56.458***
	(4.290)	(5.569)	(4.511)
Per Capita GDP	2.856***	2.883***	2.951***
	(0.215)	(0.279)	(0.238)
Single Member District	–10.679***	–10.438**	–10.649***
	(2.876)	(3.733)	(3.326)
Trade Openness	–36.418**	–42.406**	–36.008**
	(14.841)	(19.264)	(16.518)
3 Year Exchange Rate Appreciation	0.410**	0.351	0.108
	(0.183)	(0.237)	(.213)
Turkey Dummy	63.494		
	(37.879)		
N. Obs.	22	21	22

Standard errors in parentheses. * p<.1; **p<.05; ***p<.01

and consumption prices casts serious doubt on the efficacy of these measures as predictors of prices. Most important for this investigation, however, is the effect of single-member districts.

Despite its marginally weaker performance, *SMD* remains a robust predictor of national price levels, whether gauged by GDP or consumption, and whether tax is included or excluded. Majoritarian electoral arrangements now lower predicted GDP and consumption (net-of-tax) price levels for the average country by 9.5 and 10.1 percent in the two best performing models, 2.3 and 2.7.

Sensitivity and Robustness

Small samples such as this one inevitably raise concerns that individual observations may exert undue influence. Cases with strong influence over the model's overall estimates, identified as high-leverage observations, deserve greater investigation. Two diagnostic tools, Cook's Distance (D_i) and DFITS , employing thresholds respectively of $D_i > 4/n$ (Bollen and Jackman 1990, 265) and $DFITS > |2*(k/n)^{1/2}|$ (Belsley, Kuh, and Welsch 1980, 28), are commonly used to identify such cases.

Applying these techniques to model 2.3 reveals one country, Turkey, as having influence orders of magnitude greater than the others ($D_{TKY} = 24.013$, $DFITS_{TKY} = 11.526$) and three others as worthy of note: Portugal (0.305, –1.366), Australia (0.234, 1.156), and the United States (0.212, –1.123). Ireland (0.170, 1.007) is a marginal case scoring below the Cook's cut-off (0.182) but above the DFITS' (0.954), respectively.

The Turkish case demands closer examination. As its remarkable influence could be exerted through any of model 2.3's variables, we turn to a DFBETA diagnostic to measure the influence of individual observations on each covariate. DFBETA systematically removes each observation from the regression to gauge the effect of its omission on the parameter estimates; a $|DFBETA_i|$ of one is understood to have shifted the coefficient by at least one standard error (Bollen and Jackman 1990). Of the twenty-two observations used in model 2.3 only one, if omitted, shifts a parameter estimate by a full standard error: removing Turkey greatly alters the estimated effect of exchange rate appreciation on price levels. This shows Turkey's influence on the overall estimates to come primarily via its extraordinarily high exchange rate depreciation; Turkish $\Delta XR3$ is four-and-a-half standard deviations below the mean. No other observation displays a notable effect on coefficient estimates.[26]

How much does Turkey's influence affect the model's parameter estimates? The magnitude of Turkey's leverage exposed by our diagnostics suggests the need for additional estimation. Table 3 displays three such robustness checks. First, model 3.1 reruns model 2.3 with the inclusion of a Turkish dummy variable. As the DFBETA results suggested, the inclusion of a Turkish dummy radically alters the magnitude of the exchange rate coefficient,

[26]A stricter standard of $|DFBETA_i| > \frac{1}{2}*n^{1/2}$ proposed by Belsley, Kuh, and Welsch (1980, 28) identifies the same for countries as DFITS, however.

increasing it nearly four-fold, but has little effect on the other coefficients. Standard errors shift a little more: that of $\Delta XR3$ increases nearly six-fold, reducing it to significance at only the 5 percent level, but those of *SMD* and *Open* actually drop, increasing their significance.[27]

As a second check, we employ a robust regression technique intended to generate unbiased parameter estimates even when the data slightly violate OLS normality assumptions. The robust regression iterative procedure we follow calculates Huber weights, and then biweights, from the absolute value of residuals, continuing with weighted least squares regression until the change in weights drops below 0.01. Observations with Cook's distance > 1 are removed before estimation, so Turkey is omitted. Sweden, New Zealand, and the Netherlands receive the greatest weights and Ireland, Australia, and Germany the smallest. Interestingly, the coefficient estimates for openness and, of course, exchange rate appreciation shift the most; but per capita GDP and *SMD* remain largely unaffected, although an increase in standard error drops *SMD* to significance at only the 5 percent level.

Finally, we also recalculate the confidence intervals around the parameter estimates with a bootstrap technique. Bootstrapping effectively treats the sample as a population, sampling from it with replacement. The residuals of the thousand samples that we took generate the standard errors presented in model 3.3, which we then use to calculate 95 percent confidence intervals.[28] As the confidence intervals for per capita GDP, *SMD,* and openness exclude zero we remain confident of model 2.3's results for them. We cannot, however, reject the null hypothesis as regards exchange rate appreciation: regardless of the earlier OLS results, appreciation should not be considered a significant predictor of GDP price levels net of taxes.

Although the sensitivity analysis presented here focuses on GDP price levels and the extraordinary leverage of the Turkish case, the results largely generalize to consumption prices and the larger set of influential observations initially identified above. The primary difference is that Turkey has markedly less influence on consumption price estimates than on GDP price estimates. The openness and exchange rate appreciation results in model 2.7 are also not robust to the inclusion of influential case dummies. Of greatest importance, however, is the performance of the regressor central to our argument: single-member district electoral institutions remain a strong and statistically robust predictor of lower national price levels—whether of GDP or of consumption—in all specifications and through all sensitivity diagnostics.

[27]Although diagnostics identify the United States as a less influential case than Turkey (or Portugal or Australia), familiarity begets curiosity. Similarly dummying out the United States weakens the coefficient estimates for SMD but does not alter it as a significant predictor of both GDP and consumption price levels.

[28]Percentile and bias-corrected confidence intervals support the same conclusions.

Implications and Discussion

In this article we show, in a simple extension of the standard Stigler-Peltzman model of regulation, that the greater seat-vote elasticities of majoritarian electoral systems should bias policy in favor of consumers. Drawing on a second major insight of Stigler-Peltzman, namely that the relative balance of consumer-producer power is reflected in prices, we then hypothesize that, *ceteris paribus*, majoritarian systems will be associated with lower national price levels.

Empirical results of considerable robustness accord with these priors. Controlling for the relevant determinants of national price levels established in earlier economic literature, we find a dummy for majoritarian electoral systems to be a consistently negative and significant predictor of national price levels. These results have clear substantive meaning. For example, considering net-of-tax price levels, majoritarian electoral arrangements are associated with a 10.1 percent drop in the consumption price for the average OECD country. This is equivalent to the price effect of a reduction of $3575 (or, for the mean OECD country, eighteen percent) in per capita income. A more continuous proxy for proportionality of electoral system, namely logged electoral district magnitude, produces a uniformly positive (if not always statistically significant) coefficient and thus reassures us that the *SMD* dummy is indeed picking up economically salient differences in electoral systems.

Our results raise intriguing implications for other areas of research on comparative electoral systems. Most striking is the complementarity with empirical research on fiscal policy (see, *inter alia,* Persson and Tabellini 2000b). Majoritarian systems have been found to generate lower levels of taxation, less government spending, and less redistribution than more proportional arrangements. Our mechanism, the greater marginal impact of votes, might also contribute to an explanation of these patterns in fiscal policy.

Of course, the choice of electoral system is itself ultimately endogenous; and we believe our perspective sheds new light on the controversies that have attended the recent shifts toward SMD in Italy and Japan (see, respectively, Katz 1996, especially page 37; Rosenbluth 1996; Ramseyer and Rosenbluth 1997) and ongoing

Table 4 Summary Statistics

	N. Obs	Mean	St. Dev.	Min	Max
$Price_{GDP}$	24	117.539	29.247	43.06	162.56
$Price_{Cons.}$	24	118.008	32.166	41.81	168.71
$Price_{GDP}$, no tax	24	110.849	27.225	41.48	162.56
$Price_{Cons.}$, no tax	24	111.292	30.034	40.27	166.64
CGDP	24	19.643	7.335	2.69	34.03
SMD	24	.208	0.415	0	1.00
LnDM	24	1.878	1.350	0	5.01
Open	23	.024	0.118	–.17	.34
ΔXR3	24	–4.328	44.703	–204.36	17.45
LnAraPop	24	.333	0.303	.03	1.34
LnPop	24	9.448	1.647	5.54	12.43
LnEnergy	24	.581	0.427	.01	2.04

Correlations (obs=23)

	Price GDP	Price Cons.	Price Price GDP, no tax	Price Cons., no tax	CGDP	SMD	LnDM	Open	ΔXR3	LnAra Pop	LnPop	LnEnergy
$Price_{GDP}$	1.000											
$Price_{C}$	0.985	1.000										
P_{GDP}, no tax	0.991	0.980	1.000									
P_{C}, no tax	0.973	0.992	0.985	1.000								
CGDP	0.922	0.914	0.945	0.932	1.000							
SMD	–0.300	–0.303	–0.261	–0.266	–0.078	1.000						
LnDM	0.291	0.247	0.263	0.220	0.147	–0.730	1.000					
Open	–0.464	–0.480	–0.434	–0.451	–0.281	0.315	–0.179	1.000				
ΔXR3	0.597	0.558	0.593	0.553	0.536	0.102	0.034	–0.072	1.000			
LnAraPop	–0.273	–0.288	–0.248	–0.266	–0.098	0.644	–0.532	0.564	0.011	1.000		
LnPop	–0.224	–0.176	–0.176	–0.130	–0.132	0.248	–0.259	–0.355	–0.209	–0.092	1.000	
LnEnergy	0.099	0.164	0.097	0.159	0.168	0.449	–0.314	0.015	0.064	0.347	0.050	1.000

debates over the electoral system in other countries (Germany, France, the United Kingdom, New Zealand). On the one hand, in all democracies organized producer interests—including both capital and labor—will normally favor PR, while weakly organized consumers will prefer majoritarian methods of election. (In this sense, a country's electoral system must itself be a fairly reliable barometer of its long-term balance of producer versus consumer power.) On the other hand, countries' increasing openness to international competition makes ever more costly the higher prices and uncompetitive structures that producer power and PR underpin, thus pushing some political entrepreneurs toward majoritarian systems.[29]

[29]In both Italy and Japan, a more majoritarian electoral system was seen, and often advocated, as part of an overall push to deregulate the economy. The tension between entrenched producer interests and international competitiveness emerges, predictably enough, with particular force among the member states of the European Union: cf. Rogowski and Kayser (1999).

Those conjectures to one side, we contend simply that any adequate account of cross-national price differences, and of the balance of consumer-producer power, must include a crucial political variable: the given country's electoral system.

References

Belassa, Bela. 1964. The Purchasing Power Parity Doctrine: a Reappraisal. *Journal of Political Economy* 72:584–596.

Belsley, David A., Edwin Kuh, and Roy E. Welsch. 1980. *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity*. New York: John Wiley.

Bergstrand, Jeffrey H. 1991. Structural Determinants of Real Exchange Rates and National Price Levels: Some Empirical Evidence. *The American Economic Review* 81:325–334.

Bhagwati, Jagdish. 1984. Why are Services Cheaper in Poor Counties? *Economic Journal* 94:279–286.

Birchfield, Vicki, and Mardu L. Crepaz. 1998. The Impact of Constitutional Structures and Collective and Competitive Veto Points on Income Inequality in Industrialized Democracies. *European Journal of Political Research* 34:175–200.

Blomberg, S. Brock, Jeffry Frieden, and Ernesto Stein. 2001. Sustaining Fixed Rates: The Political Economy of Currency Pegs in Latin America. Presented at the Annual Meeting of the American Political Science Association, San Francisco, CA.

Bollen, Kenneth, and Robert Jackman. 1990. Regression Diagnostics: An Expository Treatment of Outliers and Influential Cases." In *Modern Methods of Data Analysis*, ed. John Fox and J. Scott Long. Newbury Park, Calif.: Sage.

Clague, Christopher. 1986. Determinants of the National Price Level: Some Empirical Results. *Review of Economics and Statistics* 86:320–323.

Clague, Christopher. 1993. Why are Prices So Low in America? *The World Economy* 16:601–610.

Cook, R. Dennis, and Sanford Weisberg. 1983. Diagnostics for Heteroskedasticity in Regression. *Biometrika* 70:1–10.

Corden, M. 1984. Booming Sector and Dutch Disease Economics: Survey and Consolidation. *Oxford Economic Papers.*

Cox, Gary W. 1997. *Making Votes Count: Strategic Co-ordination in the World's Electoral Systems.* Cambridge: Cambridge University Press.

D'Agostino, R. B., A. Balanger, and R. B. D'Agostino, Jr. 1990. A Suggestion for Using Powerful and Informative Tests of Normality. *The American Statistician* 44:316–321.

Denzau, Arthur T., and Michael C. Munger. 1986. Legislators and Interest Groups: How Unorganized Interests get Represented. *American Political Science Review*, 80:89–106.

Downs, Anthony. 1957. *An Economic Theory of Democracy*. New York: Harper & Row.

Engel, Charles, and John H. Rogers. 1996. How Wide is the Border? *The American Economic Review* 86:1112–1125.

Hirshleifer, Jack. 1991. The Paradox of Power. *Economics and Politics* 3:177–200.

Katz, Richard S. 1996. Electoral Reform and the Transformation of Party Politics in Italy. *Party Politics* 2:31–53.

Kendall, M. G., and A. Stuart. 1950. Cubic Proportion in Electoral Results. *British Journal of Sociology* 1:183–197.

Kravis, Irving B., and Robert E. Lipsey. 1983. Toward an Explanation of National Price Levels In *Princeton Studies in International Finance*, No. 52. Princeton: Princeton University Press.

Kravis, Irving B., and Robert E. Lipsey. 1988. National Price Levels of Tradables and Nontradables. *American Economic Review* 78:474–478.

Krugman, Paul. 1987. Pricing to Market When the Exchange Rate Changes. In *Real-Financial Linkages among Open Economies*, ed. Sven W. Arndt and J. David Richardson. Cambridge: MIT Press.

Lane, Jan-Erik, David McKay, and Kenneth Newton, ed. 1991. *Political Data Handbook : OECD Countries.* New York: Oxford University Press.

Lee, Jong-Wha. 1993. International Trade, Distortions, and Long-run Economic Growth. *IMF Staff Papers* 40:299–328.

Lijphart, Arend. 1984. *Democracies: Patterns of Majoritarian and Consensus Government in Twenty-One Countries.* New Haven and London: Yale University Press.

Lijphart, Arend. 1999. *Patterns of Democracy: Government Forms and Performance in Thirty-Six Countries.* New Haven and London: Yale University Press.

Mackie, Thomas T., and Richard Rose. 1991, 1997. *The International Almanac of Electoral History.* Washington, D.C.: Congressional Quarterly Inc.

McCallum, John. 1995. National Borders Matter: Canada-U.S. Regional Trade Patterns. *American Economic Review* 85:615–623.

O'Mahony, Angela. 2001. Determinants of Monetary Regimes: The Interrelated Choices of Monetary Policy, Exchange Rates and Capital Restrictions. Presented at the Annual Meeting of the American Political Science Association, San Francisco, CA.

Organization for Economic Co-Operation and Development (OECD). 1992. *Energy Balances of OECD Countries: 1989–90.* Paris. International Energy Agency.

Organization for Economic Co-Operation and Development (OECD). 1995. *Energy Balances of OECD Countries: 1992–93.* Paris. International Energy Agency.

Organization for Economic Co-Operation and Development (OECD). 2000. *OECD Revenue Statistics: 1965–1999.* Paris: OECD.

Peltzman, Sam. 1976. Toward a More General Theory of Regulation. *Journal of Law and Economics* 19:211–240.

Persson, Torsten, and Guido Tabellini. 2000a. *Political Economics: Explaining Economic Policy.* Cambridge: MIT Press.

Persson, Torsten, and Guido Tabellini. 2000b. Political Institutions and Policy Outcomes: What are the Stylized Facts? Working paper, available at http://www.iies.su.se/data/home/perssont/workpap.htm

Powell, Bingham. 1982. *Contemporary Democracies.* Cambridge and London: Harvard University Press.

Ramseyer, J. Mark, and Frances McCall Rosenbluth. 1997. *Japan's Political Marketplace*; with a new preface. Cambridge and London: Harvard University Press.

Rogowski, Ronald, and Mark Andreas Kayser. 1999. Effects of European Economic Integration on the Timing, Mode, and Distortionary Effects of Domestic Elections. Presented at Conference on European Integration and Italian Politics, Georgetown University.

Rosenbluth, Frances McCall. 1996. Internationalization and Electoral Politics in Japan. In *Internationalization and Domestic Politics,* ed. Robert O. Keohane and Helen V. Milner. Cambridge: Cambridge University Press.

Roubini, Nuriel, and Jeffrey D. Sachs. 1989. Political and Economic Determinants of Budget Deficits in the Industrial Democracies. *European Economic Review* 33:903–933.

Samuelson, Paul. 1964. Theoretical Notes on Trade Problems. *Review of Economics and Statistics* 46:145–154.

Stigler, George J. 1971. The Theory of Economic Regulation. *Bell Journal of Economics and Management Science* 2; reprinted in Stigler, *The Citizen and the State: Essays on Regulation.* Chicago: University of Chicago Press.

Taagepera, Rein, and Matthew Soberg Shugart. 1989. *Seats and Votes: The Effects and Determinants of Electoral Systems.* New Haven and London: Yale University Press.

Theil, Henri. 1969. The Desired Political Entropy. *American Political Science Review* 63:521–525.