The Positive Political Economy of Public Debt: An Empirical Examination of the OECD Postwar Experience

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ABSTRACT: Theoretical literature seeking to explain public-debt accumulation exploded in recent years as debt crises emerged in many nations. Empirical evaluation of political-economy theories has, sadly, lagged that of the standard tax-smoothing/economic-conditions model (0). This paper joins recent work beginning to redress that imbalance, operationalizing and testing nine positive-political-economy-of-public-debt theories, several for the first time. Theories regarding (1a) influence and (1b) veto-actor conceptions of government fractionalization and polarization and delayed stabilization, (2) wealth and age distributions and the inter- and intra-generational transfer functions of debt, (3a) electoral and (3b) partisan political-budget-cycles, (4) strategic debt-manipulation to alter future governments' fiscal policies, (5) distributive politics and multiple constituencies, (6) tax-structure complexity and fiscally-illuded voters, and (7) central bank autonomy and conservatism as a debt-financing constraint, all receive empirical attention. The historical record of 21± developed democracies over 40± years strongly supports 0, 1b, 3a, and 6, unequivocally favoring 1b over 1a. Evidence regarding 3b, 5, and 7 is weaker or more mixed, and 2 and 4 are flatly rejected. In most cases, the results suggest interesting avenues for further theoretical development and refinement. Shared exposure to adverse economic shocks in the seventies and changing policy emphases toward the monetary restraint of inflation in the eighties emerge as especially important in explaining the commonalities across country-times; fractionalized governments were critical in the most extreme examples of exploding debt; and more macro-political institutions like presidentialism and central bank autonomy and conservatism were central to persistent cross-national differences.

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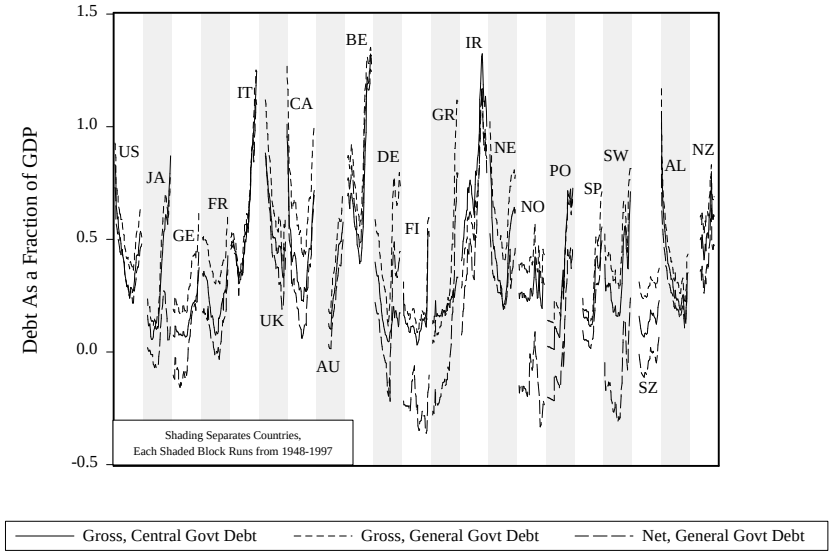
I. Introduction: Motivation, the Explanandum, and a Roadmap

High and/or swiftly rising public-debt-to-GDP ratios (*debts*) have become major political issues in many developed democracies in recent years. As Franzese (2001, ch. II) showed, much of the impetus for this recent common debt-growth originates in the different distributions of political and economic influence in capitalist democracy, which fostered transfer-payments growth, which drove spending-growth more generally, which, finally, governments typically partially debt-financed. Figure 1 plots the historical record of the resulting public-debt accumulation (gross consolidated-central-government debt for 21 OECD countries from 1948-97[1]).

[1] Data, from IMF International Financial Statistics (6/96 CD-ROM), are gross consolidated-central-government debt (i.e., including social security). Where OECD sources or IFS tape or print editions provide data missing in IFS CD-ROM, country-specific fitting regressions using all available other measures extend the data (R^2>90%). The same procedure maximizes available OECD data on gross and net general-government debt (includes sub-national units). Since the IMF data (a) cover a far greater sample before extension, (b) the political variables introduced below mostly refer to central government, and (c) OECD general-government debt data double-count for some countries, IMF data are used. Still, the table and figure reveal the three debt series correlate highly in levels and changes (with net debt most different).

Correlation Matrix	Debt Levels			Change in Debt (i.e., Deficits)		
	IMF Gross, Ctrl	OECD Gross, Gnrl	OECD Net, Gnrl	IMF Gross, Ctrl	OECD Gross, Gnrl	OECD Net, Gnrl
IMF Gross, Ctrl	1	.891	.858	1	.869	.743
OECD Gross, Gnrl	.891	1	.896	.869	1	.838
OECD Net, Gnrl	.858	.896	1	.743	.838	1



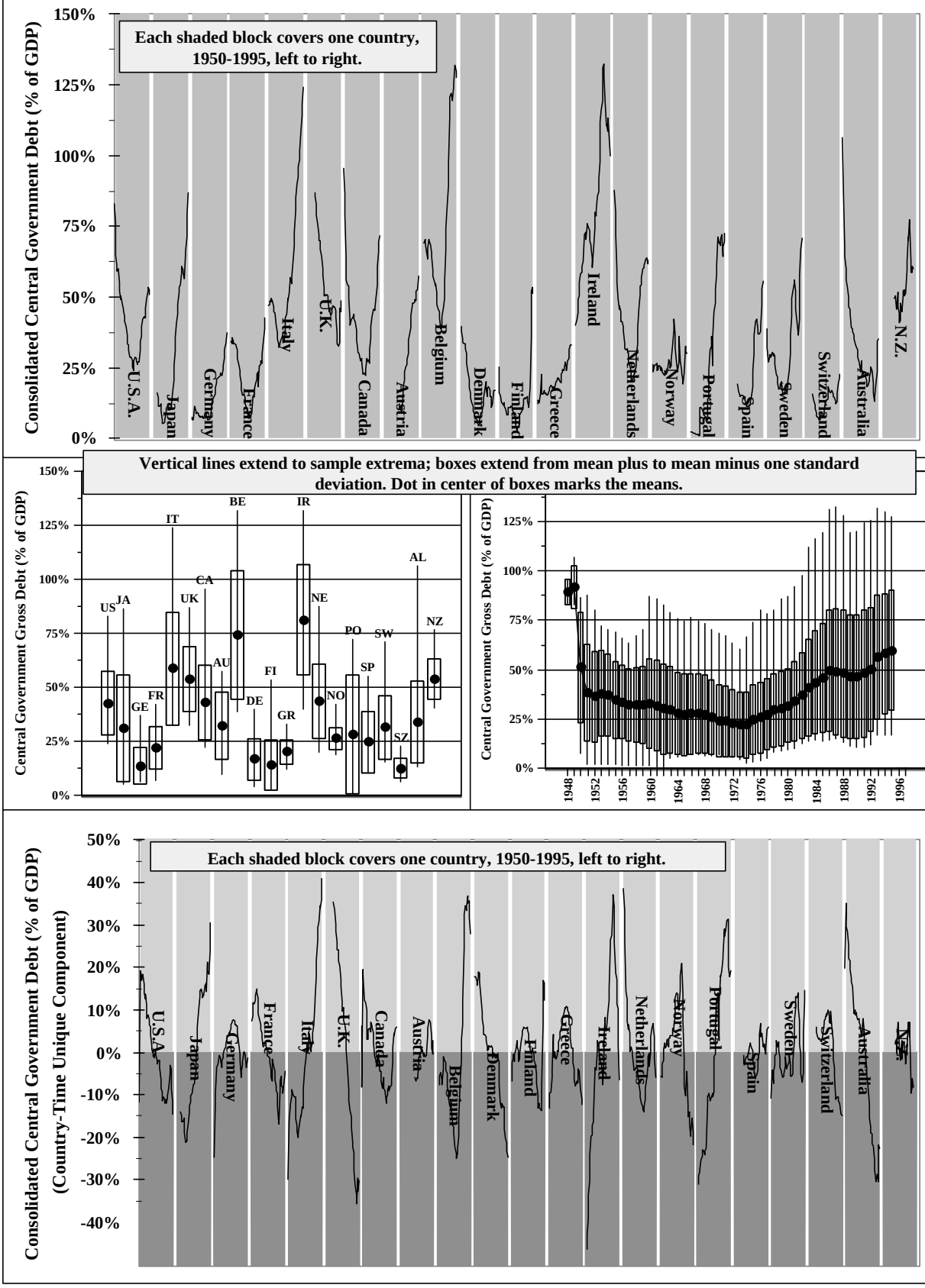


Figure 1: Debt (% of GDP)—Full, By Country, By Year, and Country-Time-Unique Components

The top of Figure 1 reveals the relatively common experience of dramatically declining debt from after World War II through 1972± and the equally dramatic reversal of the trend thereafter. In many countries, debt more than doubled in less than 20 years, and in some it now exceeds 100% of GDP. The widespread and rising public concerns over these trends and levels and the number of theories emerging to explain them are thus hardly surprising. However, beyond these commonalities lie large differences across countries and over time in the level and variation of debt (middle row).

Cross-national differences in postwar-average debt (middle-left) comprise 55±% the total variation in the postwar debt-experiences of developed democracies. Debt in Belgium and Ireland, e.g., averaged over five times German and Swiss debt over this period, and New Zealand and UK debt averaged about twice the Norwegian. Countries' debt-movements also differed greatly over the period, with inter-extrema ranges in Japan, Italy, Canada, Belgium, and Australia, e.g., dwarfing those in, e.g., Germany, France, Denmark, and Switzerland. Likewise, while the middle-right graph highlights the clear common time-path, increasing inter-country variation and skew is as readily apparent, especially since the seventies. As with transfers, the collapse of Bretton Woods and the two oil crises in the seventies seemed to trigger widening differences across countries' macroeconomic policies and outcomes. The shared cross-time variation comprises only 19±% of the total. Thus, much country-time-unique variation, 26±% of the total, remains to explain (bottom). The striking unique experiences are the relative rises in Japan, Italy, Belgium, Ireland, Portugal, especially since the seventies, and the equally dramatic relative declines in the UK and Australia.

The questions for theories purporting to explain public-debt accumulation, then, are "Why have debt levels become inordinately large and/or grown rapidly in some countries and not others?" and "Why have they done so recently and not, in general, before?" (Alesina and Perotti 1994). This paper offers an empirical exploration of the burgeoning theoretical literature that purports to explain

the cross-country variation, the common time-path, and the variations around them shown in Figure 1. How well can current theory, with the additions and amendments to be offered here, explain the common and variant debt experiences of developed democracies in the postwar era?

Excepting the empirical work on the tax-smoothing/economic-conditions model (e.g., Barro 1985, 1986), these theories and questions have been little-examined empirically. The minimal recent empirical attention focuses on theories of weak government and delayed fiscal-stabilization (Roubini and Sachs 1989ab; Edin and Ohlsson 1991; de Haan and Sturm 1994, 1997; Borrelli and Royed 1995; Alesina and Perotti 1995b, de Haan et al. 1998). Von Hagen and colleagues stress institutional rules of budget-making (von Hagen 1992; von Hagen and Harden 1994, 1996; Hallerberg and von Hagen 1996; de Haan et al. 1997). Heller (1998) emphasizes instead bicameralism and partisan differences between legislative chambers. This paper joins them in redressing imbalances between theoretical development and empirical exploration, operationalizing and evaluating many contending explanations of when and where public debt amasses and/or grows rapidly, using the postwar debt experiences of developed democracies as the database. The paper unfolds thus to achieve that end.

Section II builds from the excellent survey of positive political economy theories of debt in Alesina and Perotti (1994) to identify the main arguments, derive testable hypotheses from them, and operationalize them. Theory-building follows from the structure of interests among voters who elect representatives to form governments to make policy, to the dissolution of those governments and their members' return to the electorate, the structure of interests among whom enacted debt-policies may have changed. The section concludes this nearly exhaustive review with summary tables of the theories, the independent variables operationalized therefrom, their expected relationships with deficits and debt, and preliminary empirical indications from their bivariate correlations in levels and changes with deficits and debts. Section III then conducts more sophisticated empirical analyses,

constructing multivariate econometric models, first of the tax-smoothing/economic-controls default and then of the political-economy models, each of which is tested against the economic-controls default (nested-hypotheses F-tests) and against each other (non-nested-hypotheses J-tests). The section concludes, as those tests suggest, with a single regression encompassing all the theories and a thorough substantive exploration of that model's results. Section IV then concludes the paper, evaluating the theories given this new evidence, addressing the empirical questions detailed above, and suggesting directions for future research.

II. The Positive Political Economy of Public Debt: Theory, Measurement, & Stylized Facts

II.A. Tax-Smoothing Theory and Economic Conditions

The standard tax-smoothing argument (Barro 1974, 1979; Lucas and Stokey 1983) notes that a benevolent social planner possessing rational fore-sight and a social loss-function that is quadratic in taxes[2] would attempt to estimate the present value of government spending plus outstanding debt and set that equal to the present value of taxes. Since the loss function is concave in taxes, variations in the tax rate over time are costly. More generally, whatever level of spending governments may actually desire, fixing the time-path of tax rates, barring surprises, would be optimal to finance it, implying that optimizing governments should incur deficits only when there are unanticipated or temporary shocks to revenues or spending. Moreover, if the expected paths of the economy's real growth-rate and the real interest-rate on public debt differ,[3] governments should borrow or save accordingly. E.g., the government should borrow when the expected long-run growth-rate exceeds the expected long-run real-interest-rate because, under those conditions, the expected ability to repay debt is growing faster *via* growth of the tax base than debt would be expected to grow *via* its real-

[2] Strictly, the theory requires only that taxes hinder economic efficiency increasingly as tax rates increase (i.e., social welfare is strictly concave in taxes). A quadratic function satisfies that condition.

[3] Technically, the government's time discount-rate should be added to the expected real-interest-rate in this comparison. The complication is generally ignored, or implicitly all governments' discount rates are assumed equal. The analysis here partially incorporates varying government discount-rates *via* their hazard rate of collapse (see below).

interest burden. The government should reduce debt when the opposite relationship holds.

Previous empirical work on the tax-smoothing hypothesis emphasized atypical government-spending spurts associated with wars (e.g., Barro 1985, 1986). However, since 1945, wars have not been important sources of fluctuations in spending or revenues in developed democracies (possibly excepting the Korean and Vietnam actions); large movements in unemployment, growth rates, and interest rates, contrarily, have been. Also, while tax-smoothing theory was developed and tested primarily within closed-economy frameworks, such closed-economy restrictions dubiously apply to the US and certainly do not apply elsewhere. Luckily, the basic intuition that governments should debt-finance temporary shocks and tax-finance permanent spending requirements extends easily to open economies. Weak (strong) economic performance due to adverse (beneficial) terms-of-trade shocks, if expected to be temporary, should induce governments to increase (decrease) debt. Thus, the relevant empirical implications of tax-smoothing for this sample are that governments' debts respond to movements relative to expected permanent levels in unemployment, growth, debt-service costs, differences between expected real-growth and expected real-interest rates, and terms-of-trade.

Note, though, that any empirical model of public-debt determination should control for these variables and that any theory involving *sticky* tax-rates is virtually indistinguishable empirically from the rational-expectations tax-smoothing theory.[4] The unique aspect of tax-smoothing theory is its distinction between temporary and permanent movements, which models without such heroically fore-sighted policymakers would stress much less. Unfortunately, no commonly-accepted method of empirically distinguishing unexpected and expected-temporary from expected-permanent shocks has been devised. Most empirical work simply implicitly assumes all permanent levels are constant

[4] E.g., democratic governments may find raising taxes costly politically, independent of the expected present value of government spending. Perhaps voters myopically punish incumbents for higher taxes whatever their justification. One difference would be that surpluses would be extremely rare since voters reward tax cuts regardless of their wisdom, implying that beneficial surprises will usually be used to lower taxes or raise spending. Adverse movements, contrarily, would be debt financed more than tax-smoothing theory would predict because governments are reluctant to raise taxes or cut spending even when necessary since the public does not distinguish.

across all sample country-times, thus rendering all movements equally unexpected and temporary. The specification here also follows that practice, so, here as elsewhere, results will not distinguish tax-smoothing from any other model in which this set of economic conditions matters. Instead, tax-smoothing theory is used only to identify the economic variables for which any empirical exploration of public-debt determination should control, and the tax-smoothing/economic-conditions model is taken as the default in the empirical analyses below, accepted by and controlled for in all the others.

In sum, tax-smoothing theory suggests several economic variables for the default model: the unemployment rate (spending shocks), real-GDP growth-rate (revenue shocks), real-interest minus real-growth rates times the outstanding debt level (real debt-service-cost shocks), terms-of-trade shocks (open-economy shocks), and the difference between expected real-interest-rates and the expected growth-rate (reflecting the expected relative trends in ability to pay and debt-service costs).

Unemployment (***UE***) data are internationally comparable rates taken from OECD sources.[5] Real-GDP growth-rates (***) Y***) are the change in the natural log of internationally comparable real-GDP (***Y***) data from *Penn World Tables v.5.6*. Expected growth-rates are estimated by regressing growth on two lags, country dummies, and lagged *per capita* GDP (***y***, also *Penn World Tables*).[6] Inflation rates are for the GDP-deflator, and expected inflation-rates are one-period forecasts from regressions with country dummies and two lags. Trade openness (***OPEN***) is export plus import share of GDP, and terms-of-trade (***ToT***) are the price-ratios of exports and imports. The effect of terms-of-trade shocks should be greater in more open economies, so terms-of-trade times trade openness (***ToT*⊗*OPEN***) will also be included. All price and trade data are from IMF sources.[7]

Interest-rate data are from IMF and OECD sources and proved trickier to compile than the

[5] "OECD sources" are *National Accounts, Volume II: Detailed Tables*, disk (1996), *Economic Outlook and Reference Supplement* #62, disk (1998), and their print editions and those of *Labor Force Statistics* (various issues).

[6] Since lagged GDP *per capita* is used to estimate expected growth, coefficients on it in analyses below do not reflect the debt-impacts of expected "catch-up" growth; those are reflected in ***DXRIG*** as they theoretically should be.

[7] "IMF sources" are *International Financial Statistics*, CD-ROM (6/96), supplemented by print editions.

other economic data. Nominal interest-rates are estimated from long-term-government-bond yields (*LTGBY*), discount, T-bill, deposit, lending, and money-market rates, consumer- and wholesale-price inflation, and short- and medium-term government-bond-yields thus. *LTGBY* is used if available. If not, available *LTGBY* are regressed on the largest available subset of other interest rates to estimate *LTGBY* for country-years in which data for that subset exists.[8] Differences between expected real-interest and growth rates (***DXRIG***) are then simply nominal interest minus *expected* inflation and real-growth, and debt-service costs (interest payments: ***INTPAY***) are the product of *actual* nominal interest minus inflation minus growth ($DRIG_t$) and lagged debt (D_{t-1}): $\boldsymbol{INTPAY=DRIG_t \otimes D_{t-1}}$.

Table 3, which concludes this section, presents descriptive statistics for these and all other variables employed in the analysis along with their correlations with deficits and debts. As it shows, the simple correlations of unemployment with deficits and debts are strongly positive as expected (r . +.33 and r . +.45 respectively). Likewise, correlations of deficits with real-GDP growth (r . -.35), debt-servicing costs (r . +.35), and beneficial terms-of-trade (r . -.23) are all signed as expected and fairly strong. If current trade openness is expected to produce future growth, as much economic theory suggests, then the correlations of trade openness with deficits (r . +.12) and debts (r . +.46) are also as predicted. However, positive correlation would also occur if openness simply reflected easier access to international financial capital.[9] Especially the joint estimation of the impact of openness, terms-of-trade, and their product is critical before interpreting such a result too deeply. Likewise, the odd sign of correlation between expected-real-interest-minus-expected-growth rates (***DXRIG***) and debts and deficits must be interpreted with care in bivariate analysis because ***DXRIG*** correlates highly positively with both unemployment and debt-service costs. Still, preliminary evidence in the

[8] Three considerations allay concerns about this procedure. Theoretically, interest rates should overwhelmingly tend to move together; empirically, they do: R^2 from fitting regressions invariably exceeded 0.8; and the resulting series performs significantly as expected. As concern here is more to control properly for economic conditions when testing other theories than in testing tax-smoothing theory itself, the third is a valid consideration. The resulting data comprise an internationally comparable interest-rate database fully covering 21 countries and 50 years.

[9] Gratitude to Jeff Frieden for emphasizing this point.

table strongly supports the applicability of the economic controls suggested by tax-smoothing theory and, coupled with more sophisticated multivariate analysis in the next section, more than suffices to establish the tax-smoothing/economic-controls model as an appropriate default. The stylized facts are empirically clear (and substantively obvious): adverse growth, terms-of-trade, unemployment, and debt-service-cost shocks are all strongly associated with higher deficits.

II.B. Democracy, Tax-Structure Complexity, and Fiscal Illusion

Moving from economic conditions to the structure of interests in the polity brought to bear on democratic policymakers, Buchanan and Wagner (1977), among others, argue that voters do not fully comprehend and internalize governments' intertemporal budget constraints; instead, they simply reward spending and punish taxing. Specifically, voters do not fully and properly incorporate the relation between current deficits and future taxes—they are *fiscally illuded*—and opportunistic politicians can take advantage, seeking reelection by spending more than they tax. The authors argue further that voters' fiscal illusion should be greater the more complex public revenue-generation because opaque fiscal systems complicate cost-benefit analyses of public economic activities. They conclude that democratic governments will accumulate larger debts pursuing these electoral boons, and that, among democratic governments, especially those with more complicated fiscal systems.

An indicator variable for non-democracy (***DICT***) was created, but its interpretation proved problematic. History provides only three non-democratic cases in the usable sample—Portugal and Spain through the late-seventies, Greece from late-1967 through mid-1974—and only four changes in regime status—three from autocracy to democracy and one the other direction. Thus, comparative leverage was small to begin. Furthermore, other theories required measurement of governments' left-right partisanship and of their *replacement risk* (see below). Even coding non-democracies as most extreme right, accurate replacement risk and partisanship placement relative to democratic parties

is very doubtful. Hope of adequately testing the democracy-*v.*-non-democracy implication of the argument had to be abandoned, and non-democratic periods were excluded from the sample.[10] Thus, only tax-structure complexity remains empirically testable in fiscal-illusion theory.

OECD sources give data on public revenues by source—direct and indirect taxes and other receipts of general government—and by level of government—central, provincial, local, and separate social-security administrations. Other subdivisions and the last three of these are available for few country-years,[11] so three variables are stressed here: general-government indirect and total taxes as shares of total current revenue (***ITAX***, ***TAX***), and central government total revenue as a share of general government total revenue (***CTAX***).[12] Generally, the true costs of indirect taxes should be more difficult to assess than those of other taxes, and taxes should be easier to assess than other revenue-generating devices (e.g., seigniorage). Similarly, concentration of revenue-generation in one central authority as opposed to many local authorities and/or separate public administrations should facilitate accurate cost-benefit analysis of government endeavors. Therefore, voters' fiscal illusion should be greater in country-years characterized by relatively high indirect taxes and low total taxes as shares of total revenue and low central-government shares of general-government revenue.

These measures should combine to produce reasonably direct evidence on fiscal illusion in democracies for two reasons. First, if voters are not fiscally illuded, and if all taxes have the same effect on long-run growth, deficits and debts will be independent of the tax structure. Second, if, instead, the long-run growth-effects of different taxes vary, tax structure will correlate with debt and deficits even with fully rational and non-illuded voters. In that case, though, opaque tax-structures

[10] Four years before and after autocratic periods were also excluded so the replacement risk measure (see below) would not depend on arbitrary coding for non-democratic periods.

[11] Even direct and indirect taxes, and central- and general-government total-current-revenue had to be extended by careful splicing of data from print editions into the disk series.

[12] Future work should attempt to measure relative opacity of spending and taxing since, with fiscal illusion, government size depends on that relativity (Downs 1960), and deficits are likely proportional to that size. To demonstrate theoretically, suppose democratic policymakers use spending, **G**, taxes, **T**, and deficits, **D / G-T**, to maximize votes, $\mathbf{V=a}\mathit{ln}\mathbf{G-b}\mathit{ln}\mathbf{T-cD^2}$. Then, $\mathbf{G^*/T^*=(a/b)}$, implying $\mathbf{D^*=(1-b/a)G^*=(a/b-1)T^*}$. Thus, deficits are directly (inversely) proportional to size as voters reward spending more (less) than they punish taxing, **a>b** (**a<b**).

should hinder efficiency more, and so expected long-run growth-rates would decline in indirect-tax proportions and increase in total-tax and central-government-revenue proportions. If non-illuded voters think growth responds thus to tax composition, they would demand *less* debt as indirect-tax shares increase and *more* debt as total-tax and central-government-revenue shares increase, directly opposite the fiscal-illusion predictions. One complication does arise though; the debt measure used here is for central government. As less-centrally-concentrated fiscal-systems may tend to hold less of their total public debt at national levels, this could confound the ***CTAX*** results.

Table 3 reveals suggestions of fiscal illusion in the simple correlations of ***ITAX*** and ***TTAX*** with debt (r **.** +.11,-.19) and of ***TTAX*** and ***CTAX*** with deficits (r **.** -.19,-.10), but all correlations with deficits are negative. Worse, ***CTAX*** and debts correlate highly positively (r **.** +.44), perhaps reflecting tendencies for less-centralized systems to have less *central*-government debt. Efforts to control for federalism directly (see below) will therefore be crucial. Plus, the tax-structure variables correlate highly, notably ***CTAX*** with ***ITAX*** (r **.** +.50), so bivariate analyses may be misleading. Conclude now only that the stylized facts may suggest some voter fiscal illusion that depends on tax-complexity.

II.C. Inter- and Intra-Generational Transfers via *Debt*

Focusing more directly on the structure of interests among voters, Cukierman and Meltzer (1989) and Tabellini (1991) note that the tax-smoothing model assumes that perfect capital markets allow poor parents to leave negative bequests. However, people cannot generally borrow from their offsprings' future earnings, let alone from unborn descendants. Governments, contrarily, can borrow from future generations to spend more now. Therefore, they conclude, the relatively poor, old, and especially old-poor, who most desire negative bequests (and usually benefit most from public economic activity), should most favor public borrowing, implying that democracies with poorer and older populations should experience higher/faster-rising debts. Furthermore, they continue, unequal

distributions of economic resources, many poor and middle-class and few wealthy, and more-equal distributions of political resources, one person—one vote, imply that more inegalitarian democracies, having poorer median voters, should also amass greater debt (controlling for aggregate wealth).

However, these authors neglect that governments can also borrow to reduce current taxes rather than to increase current spending. To the degree they do so, wealthier and especially older-wealthier voters may favor public debt since both pay higher tax-rates and the latter are also less likely to bear the future higher taxes or lower spending directly. Moreover, younger polities should borrow for efficiency reasons if youth portends future growth and especially if that expectation relies on current public investment in education (human capital).[13] This should complicate the age, wealth, and age-and-wealth-distribution implications of the theory. The inter-/intra-generational-transfers role of debt still implies that debt will likely correlate with these factors, but how would depend on the relative importance of these opposing considerations.

In measurement, consider the likely views, according to these arguments, of a senior citizen with children and grandchildren, another with children only, and a third without children. The first is most, the second intermediately, and the last least connected to the future where debt-payment burdens will fall, so their preference for debt on those grounds should rank likewise. Similarly, the middle-aged link to their parents and children; the extent to which the former link is more prevalent in the population than the latter should therefore indicate the extent to which the middle-aged favor debt-issuance. Therefore, the ratio of population over 64 to that under 15 appropriately reflects the feature of the age distribution relevant to this aspect of the theory; happily, the same ratio will also reflect the relative efficiency-incentive to borrow for current human-capital investment that voters may expect to produce future growth. Such old-young ratios (***OY***) are computed from OECD data.[14]

[13] Optimal public-finance theory generally suggests borrowing (taxing) to fund investment (consumption).

[14] *OECD Labor Force Statistics* contain annual estimates of population and age breakdowns thereof from 1955 to present in most cases. The data are extended where necessary by linear extrapolation of quinquennial estimates of the breakdowns from *UN Age and Sex Demographics* coupled with annual estimates of total population from IMF sources.

The economy's aggregate wealth is easily measured by the natural log of real GDP *per capita* (***y***) from *Penn World Tables v. 5.6*. Cross-country and cross-time comparably measuring income (*a fortiori*: wealth) distribution, contrarily, is notoriously difficult and produces spotty data at best. To approximate an annual indicator of income distribution comparable across country-times, start with IMF sources, which provide a manufacturing nominal-wage index, equal to 100 in 1986, at annual frequency. The inverse ratio of that to nominal GDP *per capita* (IMF sources), standardized to 100 in 1986, then gives a within-country, across-time comparable measure of the relative real-wage position of manufacturing workers (***RW***). Manufacturing workers' real wage-incomes[15] relative to economy-average income in each country are thus compared to the same income-disparity index in that country in 1986. Data from OECD (1995), which reports several cross-country comparable income-inequality measures for various years, are then leveraged to compare ***RW*** across countries. Multiplying GINI indices for each country, taken as near 1986 as possible and standardized relative to the US 1986, by the country-specific ***RW*** series finally produces a cross-time *and* cross-country comparable index of income disparity. That final ***RW*** series compares each country-year to the US in 1986 where it is 1. Higher (lower) values indicate a higher (lower) income disparity.

Measuring the joint age-and-income distribution is yet more difficult, but an attempt is made nonetheless by multiplying the old-young ratio by the income-disparity index (***OY⊗RW***). This at least distinguishes older populations in high-income-disparity country-years from those in lower ones and, *vice versa*, greater inequality in older polities from that in younger ones.

Table 3 gives the simple correlations of debts and deficits with aggregate income, the old-young ratio, and the income-disparity index. Aggregate wealth correlates negatively as expected with debts (r . -.11) but also moderately positively with deficits (r . +.06). The old-young ratio correlates

Future work should use age-ratios to estimate expected growth and so separate the expected efficiency and tax-burden incentives for debt to correlate with age distribution.

[15] I.e., assuming hours worked are not important parts of income fluctuations: since unemployment is included in all subsequent analyses, this should not be too dangerous an assumption.

little with debts (r . +.01) but positively with deficits (r . +.15), as the original arguments suggested. Income disparity also correlates positively with debts as originally suggested (r . +.25) though weakly negatively with deficits (r . -.03). Finally, the interaction of the old-young ratio and income disparity correlates positively with both debts and deficits (r . +.10), though especially such interactions are perilous to analyze in bivariate analyses. Still, the stylized facts seem, moderately and with some exceptions, to support the original versions of the inter- and intra-generational-transfers theory.

II.D. Multiple Constituencies and Distributive Politics

Moving to electoral institutions through which these potentially fiscally-illuded and wealth- and age-differentiated voters choose their policymaking representatives, Weingast et al. (1981) argue that policymakers who represent subnational districts will tend to overestimate benefits of spending in their districts and underestimate costs of financing them (relative to national optima) because the (a) benefits of "pork-barrel" spending accrue largely within district, (b) tax costs usually spread more equally across the polity, and (c) voters reward/punish their representatives accordingly. If majorities for budgetary legislation are assembled by log-rolling compromises, then overspending on district projects increases with the number of constituencies represented by policymakers.[16]

The formal logic of the argument is simple. Assume for analytic clarity that the benefits (***B***) of a distributive project concentrate entirely in district *i* and increase with the size or cost of the project: $B_i=f(C)$. Diminishing returns from project-size implies $f'>0$ and $f''<0$. Again for analytic clarity, assume costs are distributed perfectly evenly across ***n*** districts: $C_i=C/n$. Then an individual district maximizes utility, $Max_c\ f(C)-C/n$, by setting $f'(C)=1/n$, implying that the optimal project-size from the receiving district's view increases with the number of districts. Now, if legislatures decide by majority rule, absent log-rolling or side payments, all pork-barrel projects lose $n-1$ to 1 because

[16] Careful consideration suggests the argument applies to constituencies, which may concentrate on dimensions other than geography, not electoral districts *per se*. Determining the relative weight of alternative constituencies on democratic policymaking and measuring the effective number of such constituencies comparatively is beyond the present scope, though Franzese and Nooruddin (1999) offer a first cut.

only receiving districts derive net benefits, ***f(C)-C/n***, while the rest pay ***C/n***. With side payments, district ***i*** must buy only ***n/2*** votes to amass a minimum-winning coalition; it will pay and the project passes if net benefits exceed required side payments: ***f(C)-C/n>C/2***. Socially optimally, only projects where ***f(C)>C*** should pass; minimum-winning coalitions instead pass projects capable of covering ***½C*** in side payments plus ***C/n*** for the receiving district. Thus, representative democracies, without further considerations, spend more than optimal on distributive policies, increasingly so the greater ***n***. Moreover, the small costs of each project, ***C/n***, might easily escape non-receiving districts' voters notice, especially if they are rationally ignorant (Downs 1957, 1960), while net benefits in receiving districts, ***f(C)-C/n***, would surely attract those voters' attention. Thus, with imperfectly informed voters, legislators could relatively easily form log-rolling agreements to support each other's pork-barrel requests *via*, e.g., tit-for-tat cooperative-solutions to the iterated prisoners-dilemma they face (Axelrod 1984), especially since they (a) are reasonably few actors, (b) have relatively homogenous interests in this regard, and (c) interact repeatedly and indefinitely. In the limit, such universalist log-rolling passes distributive projects that maximize benefits district by district. Therefore, distributive politics generally and pork-barrel spending specifically increases radically in the number of districts.

Alesina and Perotti (1994) note that overspending need not imply deficits. However, fiscally-illuded voters would tend to induce democratic policymakers to deficit-finance a proportion of their spending (see note 12). Plus, Velasco (1995) shows that, in a dynamic model, multiple constituencies produce common-pool problems that, even absent fiscal illusion, lead democratic policymakers to deficit-finance a proportion of their desired overspending from the static model. The logic essentially is that deficits reallocate the costs of current projects to future districts, where the costs are again divided. The multiple-constituency problem thus operates twice when projects are deficit-financed, suggesting that, indeed, deficits should be the preferred mode of financing distributive overspending.

Thus, log-rolling and/or minimum-winning coalitions implies deficits increase in the number of constituencies, especially if voters are fiscally illuded and/or rationally ignorant.

Calibrating numbers of constituencies comparably across democracies is challenging, even restricting attention to geographically defined constituencies (see note 16). The approach here is to use multiple imperfect measures to triangulate on the underlying concept. A simple ingress begins with the number of regions in effectively federal states (***FED***).[17] However, (a) more than the one constituency ***FED*** implies likely operates in unitary systems, (b) federalism might also foster fiscal-illusion as numbers of fiscal authorities and federal districts correlate highly, and (c) federalism might lower *central-government* debt only by substituting subnational debt. ***FED*** actually usefully controls for this last potentiality, but (a-c) also necessitate other measures of constituency numbers.

Next, a useful empirical regularity of party systems is that ethnic- and agrarian-party electoral support (constituencies) tend to be geographically concentrated, so multiple-constituencies problems should be more evident when such parties share in government. Thus, agrarian- or ethnic-party members' shares of governments (***AE***) also helps calibrate the effective number of constituencies.[18]

Third, presidentialism may diminish multiple-constituencies problems because, as proponents often argue, presidents have national constituencies while legislators represent more localized interests.[19] Accordingly, an indicator equal to 1 for the US, Finland, and the French Vth Republic, and 0 elsewhere (***PRES***) also helps. Again, though, presidentialism may affect debts for other reasons. Political science has long known that policymaking procedures and institutions alter the legislation,

[17] Effectively federal are US (48-50 regions over the sample period), Germany (10; 16 post-unification and out-of-sample), Canada (12), democratic Spain (17), Switzerland (23.9:cantons and half-cantons weighted as such), and Australia (8). The remaining, unitary systems have 1 federal region. Numbers of regions, their natural logs, and a simple indicator distinguishing federal from unitary systems were all considered. Including the number of federal regions and its square performed most consistently across the various empirical specifications (see below).

[18] Lane et al. (1991) classify agrarian and ethnic parties. Belgium's split Christian-Democratic, socialist, liberal, and communist parties are not considered ethnic for these purposes; only its separate and explicitly ethnic parties, RW, FDF, and VU, are. Germany's CSU is assumed ethnic and, crudely, to hold 10% of the CDU's cabinet seats, the crude approximation necessitated because CSU is not distinguished from CDU in all cabinet-composition data. Throughout, presidents and legislatures in Finland, France V, and the US are treated as equal parts of government (see below).

[19] Excepting legislators with one national district of course.

including budgets, that emerge from governments (e.g., Ferejohn and Krehbiel 1987; Ferejohn et al. 1987; Baron and Ferejohn 1989; Baron 1991; Weingast and Marshall 1985 for the US; Wildavsky 1986; Tsebelis 1995 for comparative views). Regarding specifically budgetary legislation, von Hagen (1992), von Hagen and Hallerberg (1997), and de Haan et al. (1997) stress the strength of executives, i.e., prime ministers or presidents, and of finance ministers in intra-government budget negotiations. Deficits, they argue and evidence, are lower where executive leadership sets budget outlines first and holds cabinet and legislature negotiations over sub-elements to that outline rather than the reverse process where overall budgets emerge from less executively constrained, item-by-item, negotiations (cf: Ferejohn and Krehbiel 1987).[20] Thus, negative coefficients on ***PRES*** could equally support multiple-constituencies arguments or presidential-leadership effects on the budgeting process.

Finally, most directly, one can count effective numbers of electoral districts (***ENED***; data from Lijphart 1994).[21] Recall however, that the theory calls for the number of *constituencies* not electoral districts (see note 16). Clearly, e.g., a US representative considers herself much more a representative of her electoral district than does a British MP, who likely considers herself much more a representative of her party. Thus, the 650± electoral districts in the UK probably represent considerably fewer *constituencies* than do the 435± House districts.[22]

[20] They also emphasize budgetary amendment and voting rules, transparency, and implementation flexibility. Unfortunately, Von Hagen and Hallerberg's data on budgetary procedures are limited to EC countries, which would restrict the sample too severely to be included here. Extending coverage remains an important project for the future.

[21] Lijphart's data on numbers of electoral districts potentially varies within country only when electoral systems, as defined therein, change. Within electoral system, numbers of districts average over the years that system is used.

Effective numbers of districts differ from raw numbers because of multiple electoral tiers/rules, implying that weighting by the proportion of government elected by each system is appropriate. Also, effectively presidential and bicameral systems differ from unicameral systems. Several weighting schemes were attempted, ranging from lower-house exclusive to equal weights, but none performed noticeably better or worse across the empirical models than that reported.

Even localized spending will fail to concentrate benefits within very small districts, so ***ENED*** also adjusts for geographic size of electoral districts. If average districts exceed 3600 miles^2, crudely circling an hour maximum commute at 60 m.p.h., then apply no adjustment. If less, then adjust ***ENED*** half-way down to the country square milage divided by 3600. Again, many alternative adjustment schemes were attempted, but none performed noticeably better or worse.

[22] Franzese and Nooruddin (1999) build from this consideration, suggesting weighting ***ENED*** inversely by party unity times ***NoP*** or ***ENoP***, but, lack of comparative measures of cohesion constrains their empirics to the US case. (Janda 1980 indexes party cohesion but refers primarily to the sixties, does not encompass this set of countries, and is time invariant.) Adjusting ***ENED*** by whether electoral rules allow only party-list, list-with-candidate-preference, or direct-candidate voting may also be appropriate if individual voting makes electoral districts more relevant as constituencies.

The combination of ***FED***, ***AE***, ***ENED*** (+), and ***PRES*** (-) will hopefully triangulate on the effective number of geographic *constituencies* emphasized by this theory of debt determination. Table 3 shows the simple correlations of these variables with deficits and debts. Presidentialism correlates negatively with debts (r . -.26) and deficits (r . -.07) as expected, but agrarian- and ethnic-party representation in government actually correlates strongly negatively with debts, contrary to expectations (r . -.33). Effective numbers of electoral districts correlate positively with debt (r . +.08) as expected, but more strongly negatively (r . -.16) with deficits. Finally, numbers of federal regions correlate negatively with debts (r . -.11) and deficits (r . -.06), also contrary to expectations, though this could merely reflect the high empirical correlation of federalism with central-bank independence (r . +.57)[23] or tendencies towards subnational rather than central-government debt in federal systems. In sum, preliminary indications are mixed to unfavorable regarding multiple-constituencies and debt.

Before proceeding, note that both ***FED*** and ***ENED*** have highly outlying countries in their empirical distributions. There are many unitary systems and few federal ones, and the most sub-divided US has more than twice the regions as next-most Switzerland. Similarly, most countries have fewer than 100 effective electoral districts, but plurality systems in the US, the French Vth Republic, the UK, and Canada have 133-329. Given these extreme skews, the ensuing analyses allow non-linear relations between debts and these two variables by including ***FED***, ***ENED***, and their squares.[24]

II.E. Electoral and Partisan Budget-Cycles

Moving now to the electoral and partisan incentives of the governments selected by voters through their democratic institutions, consider the venerable electoral and partisan budget-cycle theories. At least since Nordhaus (1975) and Tufte (1977), political economists have suspected that democratic policymakers attempt to manipulate the economy for electoral purposes, employing more

Preliminary attempts at such adjustments were not entirely satisfactory, leaving more possibilities for future research.

[23] The US, Canada, Germany, and Switzerland are federal and have very or moderately high ***CBI***.

[24] Including a variable and its square more flexibly allows non-linearity than using only the natural log of the variable as sometimes done. Including AE^2 was also considered but empirically rejected.

expansionary policies (here, higher deficits) immediately prior to elections. Incumbents may do so to win votes either (a) because voters are fiscally illuded, rewarding spending and punishing taxes regardless of their economic-efficiency merit or long-run budgetary-consequences (Nordhaus 1975, Tufte 1977), or (b) because voters fully rationally expect policymaker competence to persist over time and interpret increased spending or reduced taxes as a partial signal of the incumbent's actual ability to produce more for less (Rogoff and Sibert 1988, Rogoff 1990). At least since Hibbs (1977), political economists have argued that right and left parties differ in their fiscal priorities. Because their core constituencies favor larger public economies, greater redistribution, and more Keynesian expansion and activism, left-party-dominated governments are expected to run larger deficits than right-party-dominated governments. Recent additions to partisan theory (Alesina 1988b) modify the theoretically expected long-term economic consequences of partisan-differentiated macroeconomic policies,[25] but do not challenge these policy implications.

From Mackie and Rose (1991), supplemented by *European Journal of Political Research Political Data Annuals* for recent years, a variable (***ELE***) summing to one over the year preceding an election[26] was created to operationalize the electoral budget-cycle argument. To examine partisan budget-cycles, a database coding parties from zero at farthest left to ten at farthest right was created using previously published indices from Laver and Hunt (1992), Laver and Schofield (1991), and

[25] See Franzese (2001) for a review.

[26] To be precise, in election year, *t*, ELE_t=M/12+(d/D)/12 with M the number of complete months prior to the election, *d* the day of the incomplete month, and D the number of days in the incomplete month. 1-ELE_{t-1} is allocated to the previous year. If pre-election years overlap, ELE can exceed one (such observations are rare, so capping ELE at 1 instead makes no appreciable difference in the results).

The US, Finland, and French Fifth Republic are somewhat problematic here, being strong presidential systems. The simplifying assumption throughout is that presidents and cabinets in Finland and France V are each ½ government and the US House, Senate, and President are each 1/3. Thus, years preceding presidential elections are allocated ½ in Finland and France V as are years prior to parliamentary elections. In the US, the presidential and house elections each weights 1/3 while, since the Senate elects only 1/3 of its body at a time, each senate election weights only 1/9. All US elections are assumed to occur at the end of the first week of November.

Schultz (1995) argues that manipulating the economy is costly in terms of lost reputation for sound policy and/or future detrimental economic repercussions and therefore that incumbents would likely employ pre-electoral manipulation only when they deem it most necessary, i.e., when they *foresee* upcoming elections and expect them to be *close*. Thus, an indicator varying with the expected closeness of a foreseen coming election would be more ideal still.

sources cited in the latter to code every party to have been in government in the 21 democracies since 1945. These codes plus the number of cabinet ministers of each party in each government (from Lane et al. 1991 and *European Journal of Political Research Political Data Annuals*) combine to create an average left-right position of each government: the "partisan center of gravity" (***CoG***).[27] For comparative reference: the US Democrats and Republicans are 2.8± ***CoG***-units apart (4.8-7.6±) while UK Labour and Conservatives are 4.9± ***CoG***-units apart (2.8-7.7±).

Table 3 reveals that the simple correlations of deficits and debts with the pre-election-year indicator (r . .00, r . .02) are weak, and those with government partisanship (r . .06, r . .06) are weak and wrongly signed. Weak bivariate correlations are unsurprising since, in zero-order data without controls, the trends observed in Figure 1 would swamp more-cyclical movements. Still, the stylized facts hold little promise for simple, standard electoral and partisan budget-cycle theory.

II.F. Fractionalized and Polarized Governments and Delayed Fiscal Stabilization

Focusing on the fractionalization and polarization of the governments formed to make fiscal policies, Roubini and Sachs (1989ab), Alesina and Drazen (1991), Drazen and Grilli (1993), and Spolaore (1993) develop "war-of-attrition" models of public-debt stabilization in which, given high outstanding debt-levels and/or persistent deficits, parties in government are likely to dispute who will bear the costs of fiscal adjustments even if they agree on their necessity. They argue that single-party governments can relatively easily shift such adjustment costs onto the constituencies of opposition parties. Multiparty governments would also try to shift the costs to outsiders, but policies which neutrally distribute adjustment costs among the partners in government will be more difficult to devise. The more fragmented and polarized the coalition, the more difficult such neutral adjustment plans will be to find. Finally, given some uncertainty among the parties over how long the others will

[27] ***CoG*** in years with more than one government are coded the average, weighted by the fraction of the year in which each held office. Presidents in Finland and France V are *N* ministers, with *N* the number of ministers. US senators are N/100 and presidents *N* representatives, with *N* the number of representatives. Gratitude is due Thomas Cusack for the ***CoG*** term and Duane Swank for sharing a similar database, though the data used here derive from neither.

tolerate steadily rising debt before capitulating to a stabilization plan the distributional consequences of which they dislike,[28] more polarized and fragmented governments will experience deadlock and delay implementation of stabilization plans longer than would more unified governments.

Previous evidence is quite mixed. Roubini and Sachs (1989ab) find that weak governments are associated with higher debts, but they measure government fractionalization only and relatively crudely, categorizing governments 1-4 as single- or multi-party and majority or minority. Splitting this into four separate indicators, Edin and Ohlsson (1991) find that the supportive result stemmed primarily from a positive relationship between debt and minority governments. De Haan and Sturm (1994,1997) and Borrelli and Royed (1995) find not even this support, yet Alesina and Perotti (1995) conclude (in a narrower, more qualitative sample) that coalitions less successfully implement fiscal adjustments than single-party governments. Perhaps more careful operationalization of these theories may help resolve the debate by distinguishing the effects of polarization and fractionalization and between competing veto-actor and influence views of these theoretical concepts and by appropriately modeling, in a wider sample, the retardation of fiscal adjustments rather than the level of debt.

Weak-governments-and-delayed-stabilization arguments stress partisan fractionalization and polarization within governments. The party left-right codes compiled above can therefore be usefully leveraged to calibrate polarization within governments as the standard deviation of the party left-right codes of government members (***SDwiG***). Fractionalization can be measured as is common by the effective number of parties in government (***ENoP***), which weights each party by its share of government. Tsebelis (1995), however, suggests discarding such *weighted-influence* conceptions of policymaking for a *veto-actor* conception, arguing that each member of a governing coalition is a potential veto-actor, their threats of withdrawal being equally effective against the others.[29] From this

[28] If parties had rational expectations and certainty over when each other would capitulate, the loser would cave immediately rather than allow debt to accumulate and (with certainty) have to capitulate later anyway.

[29] Logically, at least one 'essential' member to the coalition's hold on government must prefer a coalition with each of the 'others' to a government without them, else the 'others' would not be in the coalition (n.b., not necessarily

view, ***ENoP*** and ***SDwiG*** inappropriately weight coalition members by the share of the coalition their party represents, embodying an *influence conception* of fractionalization and polarization. A *veto-actor conception* would instead measure the maximum absolute difference between the party scores of coalition parties (***ADwiG***) and the raw number of parties in government (***NoP***) since, by that view, the polarization obstacle to fiscal adjustment is the whole span of member ideologies and since each member adds equally to the fractionalization obstacle.[30]

Table 3 shows debts and deficits correlate weakly and often negatively with polarization and fractionalization in any of their competing conceptions. Given the Roubini-Sachs results and well-known coincidences of high debt and fractionalized, polarized government in Belgium and Italy, the weak correlations are surprising, though they resonate with the de Haan-Sturm and Borrelli-Royed non-findings. However, the weak bivariate relations and the non-findings of some previous studies may stem from a common misconception of the hypotheses. Fractionalized, polarized governments produce large deficits primarily by delaying stabilization where debt is already high. Accordingly, the multivariate analyses below also include $\boldsymbol{ENoP}\boldsymbol{D}_{t-1}$ and $\boldsymbol{SDwiG}\boldsymbol{D}_{t-1}$ or $\boldsymbol{NoP}\boldsymbol{D}_{t-1}$ and $\boldsymbol{ADwiG}\boldsymbol{D}_{t-1}$; weak-governments-and-delayed-stabilization theories more directly predict positive coefficients on these interactions. The terms correlate highly positively with debt and deficits, but that is virtually meaningless in bivariate analysis since lagged debt, $\boldsymbol{D}_{t-1}$, will obviously correlate with debt regardless of whether stabilization is delayed. The stylized facts are therefore wholly inconclusive in this case.

II.G. Central Bank Autonomy and Conservatism as a Debt-Financing Constraint

Moving to the role of non-governmental policymakers, consider whether and how central

the same 'essential' party for each of the 'others'). Thus, every member of the coalition is critical, whether intrinsically or through another party, and so has equal potential veto power.

[30] For ***ENoP*** and ***SDwiG***, Finnish and French presidents count as *N* ministers, with *N* the number of ministers, and they are also members of government for veto-actor purposes. US presidents count as *N* and each senator as *N/100* representatives, with *N* the number of representatives, for ***ENoP*** and ***SDwiG*** purposes. Each house and the president are potential veto actors, so, when the president's party controls both houses, the number of veto actors=***NoP***=1; when it controls one house or neither house, the number of veto-actors=***NoP***=2. When the president's party controls both houses, ***ADwiG*** is 0; otherwise, it is the distance between Democrats and Republicans (2.7887). For country-years with more than one government, the scores are averaged, weighted by the fraction of the year each was in office.

bank autonomy and conservatism might alter the fiscal policies that seem best to these governments. Alesina and Perotti (1994) note that, historically, governments have reduced massive debts largely through inflation. If the central bank is autonomous and conservative, however, this favored escape will be more difficult to implement. Assuming inflationary debt-finance is favored because it carries lower political and/or economic costs than alternatives, prudent governments would likely to avoid accumulating debt in political economies with more autonomous and conservative central banks. In fact, one could add, key indicators of central-bank autonomy and conservatism in several empirical indices are the conditions under which the bank legally can or must buy any government debt that the market will not absorb. Enforced or pressured buying usually produces a *de facto* inflation-subsidy on public-debt interest, so central banks that are relatively free of such obligations and pressures make debt-issuance more costly quite directly. On the other hand, imprudent or recalcitrant governments that issue excessive debt despite facing highly conservative and autonomous central banks, lack the inflation escape. Central bank autonomous conservatism could thus increase debt by constraining governments from cheap inflationary finance of it.[31]

Indices of central bank autonomy and conservatism indices (***CBI***) abound. Rescaling (0-1) and averaging two each from Cukierman (1992) and Grilli *et al.* (1991) and one from Bade and Parkin (1982) capitalizes on the most commonly used, and thus presumably the best, of these to broaden the country-years covered and, under most conditions,[32] to reduce measurement error.

Preliminary empirics (Table 3) reveal a fairly strong negative relationship of ***CBI*** to debt (r . -24) and a moderate negative relationship to deficits (r . -.06), suggesting a dissuasion effect.[33]

[31] Multivariate analyses to follow control directly for debt-financing costs, so estimated coefficients correspond only to dissuasion effects. The estimated debt-service-cost impacts will contain any effects of the counter-argument.

[32] If the individual indices' measurement errors are not too positively correlated, error-variance is lower in the average than the *a priori* error-variance of picking one not knowing their relative quality. Even if one is known best, error-variance in the average will still be lower if the others are not too much worse and error-correlation is not too high.

[33] ***CBI*** changes little within countries in the sample, so weaker correlation with deficits mean little. Cukierman's *LVAU* index and therefore the average index potentially varies by "decade" (1950-9, 1960-71, 1972-79, and 1980-9), but there is very little actual variation within countries over this period. If the indices extended beyond 1990, more within-country variation would emerge. Unfortunately, that has not been done anywhere yet.

II.H. Strategic Manipulation of Debt to Alter Future Governments' Fiscal Incentives

Finally, policymakers can also look forward strategically and alter the conditions under which future policy will be made. Alesina and Tabellini (1990) note, e.g., that incumbent governments can affect the fiscal situation subsequent governments will inherit by accumulating debt and thereby constraining future fiscal options. In the model, the incumbent accumulates more debt the greater the ideological distance, in terms of desired spending composition, to its expected replacements and the more likely or sooner it expects to be so-replaced. Since incumbents dislike what they expect replacements to do with public funds, they endeavor to reduce future public-spending latitude by raising future interest-payment burdens. The more likely or sooner incumbents expect replacement, and the less they expect to value the policies of future governments, the more they would do so.[34] Persson and Svensson (1989) argue similarly in a model where potential governments differ over desired-spending level rather than composition. There, low-spending right (left) governments, when faced with the prospect of replacement, accumulate (reduce) debt to induce that replacement to spend less (more). Again, the more likely or sooner replacement and the more distant the opposing desired-spending levels, the more this counterintuitive incentive operates. In short, these models emphasize strategic use of debt to add or remove constraints on the opposition's conduct of fiscal policy.

Aghion and Bolton (1990), Milesi-Ferretti (1993), and Milesi-Ferretti and Spolaore (1993, 1995) emphasize instead that incumbents can affect their re-election probabilities by using debt to alter the partisan preferences of the population. Specifically, if left parties are known or suspected to be more prone to default (direct or inflationary) than right parties, then right governments can issue (especially nominal) debt, thereby increasing the amount of voter-held debt and thus decreasing electoral support for the suspected default-prone left. The left, being a suspected default risk, should

[34] Tabellini and Alesina (1990) obtain similar results in a model with explicit voting; there the median voter has an interest in accumulating debt to shift future spending-composition in her direction.

reduce (especially nominal) debt to alleviate default-risk concerns about it among the electorate. Again, the strategic uses of debt are emphasized. Unfortunately, both types of models insufficiently explore the conditions under which such counterintuitive incentives for left and right governments would dominate the more familiar incentives emphasized in standard partisan theory.

Both types of argument stress government fractionalization and polarization, as did the war-of-attrition models, but *across* rather than *within* governments: i.e., the expected ideological distance from incumbent to expected-future governments. Measuring such *replacement risk* (***RR***) directly and comparably across 21 democracies with differing electoral and party systems would be very difficult, but again the party left-right codes and government-composition data described above provide useful simplifying leverage. Variations of government partisanship over time, e.g., standard deviations of ***CoG*** across, say, nine years centered on the present, are as comparable as the ***CoG*** index itself and might be taken to measure compactly the typical distance from itself an incumbent might reasonably expect potential replacements to be.[35] To complete the ***RR*** estimate directly requires measuring the incumbent's expected probability of losing office to that replacement. Ideally, such expectations-formation would be modeled explicitly, but doing so comparably across 21 democracies again eludes the discipline. A reasonable, simpler estimate is the inverse of the actual duration of the incumbent in years, i.e., the hazard rate (probability) of losing office in a year, under the assumptions that rates are constant within governments and that the incumbent knows or can estimate them well. Hazard rates times standard deviations of ***CoG*** across governments then emerge as expedient, comparable estimates of the expected deviation of future governments from the current incumbent.[36]

[35] Standard deviations across five, seven, and nine years, centered, present forward and back were considered. None behaved very differently, but the nine-year centered measure gave most-consistent results across the analyses.

[36] The standard deviation of ***CoG*** across governments insufficiently characterizes replacement risk. E.g., it does not distinguish annually alternating governments of ***CoG***=4 and ***CoG***=6 from the same two governments alternating every 4.5 years. Replacement risk is higher in the former situation as incorporating the higher hazard rate will reflect.

Hazard rates for Finland and France V are ½ the president's and ½ the cabinet's. In the US, they are 1/3 each the president's the house's and the senate's, which happens to be constant at 1/[(1/3)4+(1/3)2+(1/3)6]=1/4. Again, ***RR*** weighted-averages across governments in years with more than one government.

However, theories emphasizing replacement risk (***RR***) vary in their expectations of its effects. Alesina and Tabellini (1990) argue that governments of any partisan hue accumulate more debt when facing high replacement risk; ***RR*** alone suffices to explore that argument empirically, expecting a positive correlation with debts. Persson and Svensson (1989) instead expect positive correlations of debt and replacement risk only under right incumbents; negative correlations should prevail under left incumbents. Therefore, ***RR***, ***CoG***, and their interaction, ***RR*****⊗*****CoG**, express that argument, with the expected pattern of coefficients such that increases in ***RR*** raise (lower) debt when the incumbent is sufficiently right (left), and, conversely, that rightward (leftward) shifts in ***CoG*** raise (lower) debt when ***RR*** is sufficiently high. This implies positive and negative coefficients on ***RR*****⊗*****CoG** and ***RR*** respectively, but not knowing when strategic dominate standard partisan incentives precludes greater precision.[37] When the incentives for left and right to deploy debt strategically to exploit or defend against partisan default-reputations dominate standard partisan objectives is also unclear. However, presumably they do so when either (a) weakening opposition electoral-support is especially desirable, which is likely when replacement risk is high, or (b) it is especially feasible, i.e., when incumbent security in office is currently high, which is likely when replacement risk is low. Including ***CoG***, ***RR***, and ***CoG*****⊗*****RR**, therefore, should cover most possibilities and leave it an empirical issue.

Neither ***RR*** nor ***CoG*****⊗*****RR** correlates with debts or deficits (r **.** +.01 to +.02), so the stylized facts favor none of the strategic debt-use theories. However, bivariate analysis is particularly inept at exploring conditional hypotheses like these, so conclusions must await multivariate analyses.

II.I. Summary of Positive Political Economy of Public Debt Theories, Measures, and Stylized Facts

The usable sample is 618 country-years, encompassing US, Germany, France, Italy, Belgium, Denmark, Finland, Ireland, Netherlands, Norway, Sweden, and Australia 1956-90, Japan 1958-90,

[37] Their particular relative size depends on the scaling and sample ranges of ***RR*** and ***CoG***. The expected sign of the coefficient on ***CoG*** is indeterminate (but likely negative) since the theory does not indicate the relative weight of standard partisan incentives (but likely non-zero), which will dominate when ***RR*** is zero. See Franzese et al. (1999).

UK and Switzerland 1963-90, New Zealand 1969-90, Austria 1973-90, Portugal and Spain 1981-90, and Greece 1961-62, 1979-90.[38] In convenient summary, Table 1 defines the variables used in the study; Table 2 lists the theory to which each relates and signs their predicted correlation with debt; and Table 3 gives sample descriptive statistics and simple correlations with deficits and debts.

Table 1: Definitions of the Variables Employed in the Public-Debt Study

VARIABLE	*DEFINITION*[source]
D	gross consolidated-central-government debt as a percent of GDP[1]
UE	(internationally comparable) unemployment rate[2]
)Y	real GDP growth rate[3]
y	natural log of real GDP *per capita*[3]
DXRIG	expected real interest rate minus expected real growth rate[1-3]
OPEN	trade openness (exports plus imports as a fraction of GDP)[1]
ToT	terms of trade (export price index/import price index)[1]
INTPAY	debt-service costs (real interest minus growth times outstanding debt, $DRIG_t \cdot D_{t-1}$)
TTAX	total taxes as a fraction of total current revenue[2]
ITAX	indirect taxes as a fraction of total current revenue[2]
CTAX	total current revenue of central as a fraction of general government[2]
OY	ratio of population 65 and older to population 15 and younger[2,9]
RW	relative real-wage position of manufacturing workers (income-disparity index)[1-2]
PRES	presidential-system indicator
FED	number of federal regions
ENED	effective number of electoral districts[11]
AE	fraction of cabinet seats held by agrarian or ethnic parties[5,6,7]
ELE	pre-election-year indicator[4]
CoG	partisan "center of gravity" of government[5-8]
ENoP	effective number of government parties (fractionalization, influence conception)[5-7]
NoP	raw number of parties in government (fractionalization, veto-actor conception)[5-7]
SDwiG	standard deviation within government (polarization, influence conception)[5-8]
ADwiG	maximum deviation within government (polarization, veto-actor conception)[5-8]
RR	Replacement risk[5-8]
CBI	central bank autonomy and conservatism index[12]

Sources: [1] *IMF Sources*; [2] *OECD Sources*; [3] *Penn World Tables v5.6*; [4] Mackie and Rose (1991); [5] Woldendorp et al. (1991,1998); [6] *European Journal of Political Research Political Data Annuals*; [7] Lane et al. (1991); [8] Laver and Schofield (1991), Laver and Hunt (1992), and sources therein; [9] *UN Age and Sex Demographics*; [11] Lijphart (1994); [12] Cukierman (1992), Grilli et al. (1991), and Bade and Parkin (1982).

[38] Data availability and the need to exclude non-democratic periods restrict the usable sample. All data used in this book are available from the author's web page, currently located at: http://www-personal.umich.edu/~franzese.

Table 2: Variables, Theories, and Hypothesized Signs of their Relationship with Debt

Theory	*Variable*	*Hypothesized Sign*
tax-smoothing \ economic control default model	***UE***	+
	) Y	-
	INTPAY	+
	OPEN	+
	ToT / ToT@OPEN	-
democracy and fiscal illusion	***TTAX***	-
	ITAX	+
	CTAX	-
inter- and intra-generational transfer function of debt	***y***	-
	OY	+
	RWPMW	+
	OY@RWPMW	+
multiple constituencies (PRES / FED may also be executive budgetary leadership / democracy and fiscal illusion)	***FED***	+
	PRES	-
	AE	+
	ENED	+
electoral and partisan budget-cycles	***ELE***	+
	CoG	-
fractionalized and polarized governments and delayed stabilization (influence / veto-actor conceptions)	***SDwiG/ADwiG***	+ or 0
	SDwiG@D/ADwiG@D	+
	ENoP/NoP	+ or 0
	ENoP@D/NoP@D	+
central bank autonomy and conservatism as a debt-financing constraint	***CBI***	-
strategic debt-use	***CoG***	?
strategic debt-use (Alesina and Tabellini)	***RR***	+
strategic debt-use (Persson and Svensson)	***RR***	-
strategic debt-use (to influence electorate interests)	***RR***	?
strategic debt-use (Alesina and Tabellini)	***RR@CoG***	0
strategic debt-use (Persson and Svensson)	***RR@CoG***	+
strategic debt-use (to influence electorate interests)	***RR@CoG***	?

Table 3: Variables, Descriptive Statistics, and Simple Correlations with Deficits and Debts

VARIABLE	*Min*	*Max*	*Mean*	*Std. Dev.*	*Corr. w/ Debt*	*Corr. w/Deficit*
Debt (D)	3.02	132.30	34.96	23.73	1.00	0.22
Deficit ( ) D)	-14.66	15.94	0.35	3.08	0.22	1.00
UE	0.00	20.94	4.53	3.64	0.44	0.33
) Y	-8.72	13.50	3.47	2.78	-0.06	-0.32
DXRIG	-10.54	10.05	-0.97	3.07	0.14	0.17
DRIG	-16.06	10.68	-1.32	4.32	0.15	0.32
(DRIG@D_{t-1})	-825.01	644.32	-34.36	176.86	0.09	0.34
OPEN	0.07	1.40	0.47	0.24	0.43	0.21
ToT	0.70	1.82	1.01	0.15	0.01	-0.29
ToT@OPEN	0.09	1.33	0.47	0.25	0.43	0.14
ENoP	1.00	5.21	1.66	0.79	-0.13	0.01
ENoP@D_{t-1}	4.44	295.36	55.05	44.46	0.80	0.14
SDwiG	0.00	2.51	0.60	0.61	-0.06	0.05
SDwiG@D_{t-1}	0.00	194.06	19.65	29.75	0.54	0.15
NoP	1.00	5.92	2.09	1.21	-0.19	0.02
NoP@D_{t-1}	4.44	480.22	66.74	62.13	0.68	0.14
ADwiG	0.00	5.41	1.34	1.47	-0.09	0.06
ADwiG@D_{t-1}	0.00	400.31	43.22	66.76	0.53	0.16
y	7.75	9.80	9.12	0.37	-0.11	0.06
OY	0.18	1.05	0.52	0.19	0.01	0.15
RW	0.33	1.39	0.80	0.17	0.25	-0.03
OY@RW	0.06	0.97	0.42	0.17	0.10	0.10
ELE	0.00	1.41	0.31	0.34	0.02	0.00
CoG	2.78	9.40	5.54	1.54	0.06	0.06
RR	0.00	2.56	0.27	0.33	0.02	0.01
RR@CoG	0.00	14.83	1.42	1.84	0.02	0.02
PRES	0.00	1.00	0.17	0.37	-0.26	-0.07
CBI	0.15	0.93	0.48	0.20	-0.24	-0.06
FED	1.00	50.00	6.59	12.08	-0.12	-0.06
ENED	1.00	328.93	67.28	87.79	0.08	-0.16
AE	0.00	1.00	0.06	0.17	-0.33	-0.01
TTAX	0.81	0.98	0.91	0.03	-0.19	-0.19
ITAX	0.15	0.71	0.35	0.09	0.11	-0.18
CTAX	0.26	0.89	0.61	0.15	0.44	-0.10

III. Empirical Evaluation of the Theoretical Models

III.A. Multivariate Specifications and Methodology

Public debt exhibits high temporal persistence, strongly suggesting estimating the empirical models in *pseudo-error-correction* format where the dependent variable is the change in debt (ΔD_t) and independent variables include a constant (***C***), two lagged changes in debt (ΔD_{t-1}, ΔD_{t-2}), the

lagged debt-level (D_{t-1}), and the average change in other countries' debt in that sample-year ($\Delta D_{\{\sim i,t\}}$): see Appendix. Begin by grouping independent variables theoretically to facilitate examining whether each political-economic model adds explanatory power to the tax-smoothing/economic-controls default (nested F-tests) and whether each adds explanatory power to each other plus the default (non-nested J-tests). The first group comprises the economic controls suggested by tax-smoothing theory (***UE***, Δ***Y***, ***DXRIG***, ***INTPAY***, ***OPEN***, ***ToT***, and ***ToT*×*OPEN***), in changes and lagged levels to allow both long-run-equilibrium and short-run-deviation relationships. The constant and the temporal- and spatial-correlation controls are also included in this group, which comprises the default model; that economic conditions and the past affect budgetary policies is undisputed. The second group pertains to weak-governments-and-delayed-stabilization theory: ***ENoP***, ***ENoP*×D_{t-1}**, ***SDwiG***, and ***SDwiG*×D_{t-1}** for the *influence*, and ***NoP***, ***NoP*×D_{t-1}**, ***ADwiG***, and ***ADwiG*×D_{t-1}** for the *veto-actor* conception.[39] The third are those from the inter-/intra-generational-transfers arguments y_{t-1}, Δ***OY***, Δ***RW***, Δ***OY*×*RW***, and OY_{t-1}.[40] Group four merges partisan-and-electoral-budget-cycle theory (***ELE***, ELE_{t-1}, ***CoG***)[41] with strategic-debt-use theories (***CoG***, ***RR***, ***RR*×*CoG***) since these are partially theoretically nested.

The remaining variables separate less distinctly into theoretical groups. One coherent division would distinguish tax-complexity-and-fiscal-illusion variables ($TTAX_{t-1}$, $ITAX_{t-1}$, $CTAX_{t-1}$, ***FED***, FED^2) from macro-institutional factors (***CBI***, ***PRES***, ***FED***, FED^2, ***ENED***, $ENED^2$) from multiple-constituency factors (***PRES***, ***FED***, FED^2, ***ENED***, $ENED^2$, ***AE***). However, this categorization will highlight some difficulties in specifying these theories: e.g., the strong empirical correlation between federalism and CBI will complicate interpretation of the coefficients on ***FED*** and FED^2 in the first and last group; ambiguity remains over whether presidentialism pertains more directly to multiple-

[39] Variables without a *t-1* subscript are measured simultaneously with the dependent variable.

[40] The data show only short-run relationships between income disparity, separately or in interaction with age distributions, and debt. A long-run relationship between debt and age distributions, which did not depend on income disparity, was evidenced, so OY_{t-1} is included.

[41] As in Chapter II, in exploring the pseudo-error-correction format for these variables, the years before and after elections were both found to correlate with fiscal expansions.

constituencies or budgetary-institutions arguments; etc. These problems, and the fact that the groups are nearly coterminous anyway, suggest creating a final, residual set that merges all ten factors; call it the nested tax-structure-institutions-and-multiple-constituencies model.

Ensuing subsections will demonstrate how a set of J- and F-tests of these theoretical groups provides empirical leverage to evaluate each of the theories; to anticipate, the multivariate analyses find evidence that at least minimally supports each of the political-economy theories. I.e., both sets of tests lead to the conclusion that a regression encompassing all the theories is warranted. To that end, the section concludes by estimating the following encompassing equation:

$$\begin{aligned}\Delta D_t = {} & b_0 + b_1^{+}\Delta D_{t-1} + b_2^{+}\Delta D_{t-2} + b_3^{-} D_{i-1} + b_4^{+}\Delta D_{\sim i,t} + b_5^{+}\Delta INTPAY_t + b_6^{+} INTPAY_{t-1} \\ & + b_7^{+}\Delta UE_t + b_8^{+} UE_{t-1} + b_9^{-}\Delta(\Delta Y)_t + b_{10}^{-}\Delta Y_{t-1} + b_{11}^{-}\Delta DXRIG_t + b_{12}^{-} DXRIG_{t-1} \\ & + b_{13}^{?}\Delta OPEN_t + b_{14}^{?} OPEN_{t-1} + b_{15}^{?}\Delta ToT_t + b_{16}^{?} ToT_{t-1} + b_{17}^{+}\Delta(ToT \cdot OPEN)_t + b_{18}^{+}(ToT \cdot OPEN)_{t-1} \\ & + b_{19}^{?} NoP_t + b_{20}^{+} NoP_t \cdot D_{t-1} + b_{21}^{?} ADwiG_t + b_{20}^{+} ADwiG_t \cdot D_{t-1} \\ & + b_{23}^{+} ELE_t + b_{24}^{+} ELE_{t-1} + b_{25}^{?} CoG_t + b_{26}^{?} RR_t + b_{27}^{?}(CoG \cdot RR)_{i,t} \\ & + b_{28}^{-} y_{t-2} + b_{29}^{+}\Delta OY_t + b_{30}^{+}\Delta RW_t + b_{31}^{+}(\Delta RW \cdot \Delta OY)_t + b_{32}^{+} OY_{t-1} \\ & + b_{33}^{-} TTAX_{t-1} + b_{34}^{+} ITAX_{t-1} + b_{35}^{-} CTAX_{t-1} + b_{36}^{?} FED_t + b_{37}^{?} FED_t^2 \\ & + b_{38}^{?} ENED_t + b_{39}^{?} ENED_t^2 + b_{40}^{+} AE_t + b_{41}^{-} PRES_t + b_{42}^{-} CBI_t + e_t\end{aligned} \quad \textbf{(1)}$$

Where unambiguous, coefficients' hypothesized-signs are superscripted (see Table 2). The main theoretical ambiguities regard the strategic-debt-use variables and the impacts of federalism as noted above. Other ambiguities are less theoretical; e.g., the multiple-constituency model expects effective numbers of electoral districts to relate positively to debt, but different coefficients on ***ENED*** and its square could produce that. Similarly, the open-economy extension of the economic-conditions model and the weak-governments model are unambiguous regarding debt-effects of openness and terms-of-trade shocks and fractionalization and polarization respectively, but that determines only the sign of the coefficient on the respective interaction terms (on which, see Franzese et al. 1999).

III.B. Examining the Political-Economy Models Against the Economic-Conditions Default

Table 4 reports the default model of time-serial components and the economic-conditions suggested by tax-smoothing theory. Substantive analysis of estimated effects is deferred here and below until the encompassing regression for which the ensuing tests will argue. The default model performs remarkably well: all but one of its variables (growth) being jointly significant in changes and levels and several being individually significant in both changes and levels. Every coefficient is signed according to expectations, and, together, economic conditions and time-serial components explain an adjusted 43% of the total variance in developed democracies' postwar debt experiences (59.5% of the weighted data). No other model performs near as well with the time-serial components alone, serving further to justify the economic-conditions model as the default in subsequent analyses.

Table 4: The Tax-Smoothing/Economic-Conditions Default-Model

Independent Variables	Coefficients	Standard Errors	p-Levels
C	+.2056	.9647	.8313
) D_{t-1}	+.4511	.0545	.0000
) D_{t-2}	+.6567	.0460	.0109
D_{t-1}	-.0047	.0048	.3289
) $D_{\sim i,t}$	+.2057	.0562	.0003
(1)) $INTPAY_t$	+.0056	.0008	.0000
(2) $INTPAY_{t-1}$	+.0047	.0009	.0000
(3)) UE_t	+.6104	.1000	.0000
(4) UE_{t-1}	+.0310	.0244	.2046
(5))( ) $Y)_t$	-.0396	.0351	.2592
(6)) Y_{t-1}	-.0045	.0399	.9109
(7)) $DXRIG_t$	-.0358	.0449	.4249
(8) $DXRIG_{t-1}$	-.1400	.0344	.0001
(9)) $OPEN_t$	+13.36	5.950	.0251
(10) $OPEN_{t-1}$	+2.343	2.919	.4225
(12)) ToT_t	+4.156	2.267	.0673
(13) ToT_{t-1}	-.3543	.8785	.6868
(14))(ToT_t**@**$OPEN_t$**)**	-15.29	6.107	.0125
(15) ToT_{t-1}**@**$OPEN_{t-1}$	-2.064	2.781	.4583
N (° Free)	618 (599)	**s.e.e.**	2.328
Adjusted R^2	.430	**Durbin-Watson**	1.995
Omit (1) through (15):	p(P^2) . .0000	**Omit (5) and (6):**	p(P^2) . .3558
Omit (1) and (2):	p(P^2) . .0000	**Omit (7) and (8):**	p(P^2) . .0001
Omit (3) and (4):	p(P^2) . .0000	**Omit (9) through (15):**	p(P^2) . .0429

NOTES: Dependent variable is change in debt ( ) D). Panel-weighted least squares (PWLS) regression with

panel-corrected standard-errors (PCSE). p-Level is probability of false rejection from a two-sided t-test. s.e.e. is standard error of the estimate (it and Adjusted R^2 are from the unweighted data); Durbin-Watson is from the weighted data. $p(\chi^2)$ are the results of a Wald test of the joint significance tests identified to their left.

Table 5 examines whether each of the political-economy theories reviewed above adds any statistically significant explanatory power to the economic-conditions default. In each case, the Wald test reported is from a regression adding the independent variables of that political-economy theory to the economic-conditions default-model just reported in Table 4, thereby testing the default model as a restriction on each of the others. In every case, the evidence rejects that restriction (at p . .05), and thereby suggests adding the variables of the political-economy model. The question remains, though, which alternative(s) to add. Are any of these models redundant, adding explanatory power that some other political-economic considerations wholly encompass?

Table 5: Tests of Political-Economy Models as Additions to Economic-Conditions Model

Theory	Variables Added to Default Model	P-level
(1a) Weak Governments, Influence Conception	$ENoP_t$, $ENoP@D_{t-1}$, $SDwiG_t$, $SDwiG@D_{t-1}$	$p(\chi^2)$ . .0462
(1b) Weak Governments, Veto-Actor Conception	NoP_t, $NoP@D_{t-1}$, $ADwiG_t$, $ADwiG@D_{t-1}$	$p(\chi^2)$ . .0038
(2) Inter- and Intra-Generational Transfers	y_{t-1}, $)OY_t$, $)RW_t$, $)(OY@RW)_t$, OY_{t-1}	$p(\chi^2)$ . .0071
(3 & 4) Electoral and Partisan Budget-Cycles + Strategic	ELE_t, ELE_{t-1}, CoG_t, RR_t, $(RR@CoG)_t$	$p(\chi^2)$ . .0018
(5) Distributive Politics and Multiple Constituencies	$PRES_t$, FED_t, FED_t^2, $ENED_t$, $ENED_t^2$, AE_t	$p(\chi^2)$ . .0008
(6) Tax-Structure and Fiscal Illusion	FED_t, $FED_t{}^2$, $TTAX_{t-1}$, $ITAX_{t-1}$, $CTAX_{t-1}$	$p(\chi^2)$ . .0469
(7) Central Bank Autonomy and Conservatism and Other Macro-Institutions	CBI_t, $PRES_t$, FED_t, FED_t^2, $ENED_t$, $ENED_t^2$	$p(\chi^2)$ . .0007
(8) Nested Multiple-Constituency, Fiscal Illusion, and Macro-Institutions Model	CBI_t, $PRES_t$, FED_t, FED_t^2, $ENED_t$, $ENED_t^2$, AE_t, $TTAX_{t-1}$, $ITAX_{t-1}$, $CTAX_{t-1}$	$p(\chi^2)$ . .0001

NOTES: As in Table 4. p-Level is from Wald test that the coefficients on all added variables are jointly zero.

III.C. Examining the Political-Economy Models Against Each Other

The political-economic models are non-nested; i.e., they cannot be expressed as restrictions

on each other simply by fixing some coefficients (to zero). Davidson and MacKinnon's (1981) *J-tests* facilitate direct comparisons of such non-nested linear-models; they compare competing, non-nested models of the sort $Y=f(X,\beta)$ and $Y=g(Z,\beta)$ thus. First, estimate the $Y=f(X,\beta)$ model and save its predictions, $\hat{\imath}$; then, estimate the $Y=g(Z,\beta)$ model, but adding $\hat{\imath}$ as a regressor. If the coefficient on $\hat{\imath}$ is significant, then $Y=f(X,\beta)$ rejects $Y=g(Z,\beta)$. Reversing the procedure treats $Y=f(X,\beta)$ as default and determines whether $Y=g(Z,\beta)$ can reject it. J-tests thus examine whether the null *encompasses* the alternative model, significant coefficients on $\hat{\imath}$ indicating the alternative contains some empirical information not completely covered by the null. One unfortunate property of J-tests, though, is that rejection of $f(X,\beta)$ does not always (or even frequently) imply non-rejection of $g(Z,\beta)$ and *vice-versa*. Failure to reject either is also possible. Conclusiveness that one model encompasses the other obtains only when $f(X,\beta)$ rejects $g(Z,\beta)$ but $g(Z,\beta)$ fails to reject $f(X,\beta)$ or *vice versa*. However, one permissible and reasonable conclusion when $f(X,\beta)$ rejects $g(Z,\beta)$ and $g(X,\beta)$ rejects $f(Z,\beta)$, as quite-often happens, is that neither model encompasses the other and therefore each adds distinct valuable information.

Table 6 presents J-tests of each political-economy model against every other. The reported p-levels give the significance at which to reject the null that the column model encompasses the row model. Read the table thus: "Does the null (column) model encompass the alternative (row) model?" Significant p-levels answer negatively; insignificant results leave open the possibility that the null encompasses the alternative. Most of the results can be summarized quite succinctly: nearly every political-economy model rejects each of the others, often overwhelmingly. I.e., the data insist that each of the theories adds explanatory power to any of the others with three strong exceptions.

First, and most theoretically interesting, the data do *not* reject that the veto-actor conception of the weak-government model encompasses the influence conception; conversely, the data easily reject that the influence conception encompasses the veto-actor. Moreover, reading across the first

two rows, the veto-actor conception more strongly rejects being encompassed by any others while, reading down the first two columns, it is less strongly rejected as encompassing them. Tsebelis' (1995) veto-actor conception of fractionalization and polarization thus clearly dominates. The other exceptions are that, unsurprisingly since each contains only one unique variable, macro-institutional and multiple-constituency models each cannot reject being encompassed by the other. Strict failures to reject in the upper-right of Table 6 are too marginal to merit emphasis. In short, Table 6 strongly suggests artificially nesting all the models, i.e., compiling their regressors into one large equation, excepting that the veto-actor model has emerged as clearly dominant over the influence model.

Table 6: Pairwise Comparisons of the Political-Economy Theories

Null „ Alternative	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
(1) Weak Governments (Influence)	XXX	.8056	.0039	.0008	.0017	.1421	.2076	.0470
(2) Weak Governments (Veto-Actor)	.0136	XXX	.0003	.0000	.0001	.0845	.1092	.0292
(3) Inter-/Intra-Generational Transfers	.0002	.0003	XXX	.0000	.0000	.0000	.0001	.0000
(4) Political Bdgt-Cycles and Commitment	.0000	.0000	.0000	XXX	.0000	.0012	.0017	.0006
(5) Fiscal Illusion and Tax Structure	.0011	.0010	.0000	.0012	XXX	.0038	.0103	XX (1.0)
(6) Macro-Institutional Model	.0004	.0016	.0000	.0001	.0000	XXX	.5348	XX (1.0)
(7) Multiple-Constituency Model	.0004	.0013	.0000	.0001	.0000	.6441	XXX	XX (1.0)
(8) Institutions, Constituencies, and Tax-Struct.	.0000	.0000	.0000	.0000	.0001	.0010	.0008	XXX

NOTES: As in Table 4. Cells contain the probability of a false rejection of the null model using a two-sided test. The artificially nested **(8)** encompasses **(5)**, **(6)**, and **(7)** by construction.

III.D. Estimating and Evaluating the Encompassing Model

Table 7: Encompassing Model of the Political Economy of Public Debt

Theory / Theories	Independent Variables	Coefficients	Std. Errors	p-Levels
Tax-Smoothing / Economic-Conditions	D_{t-1}	-.0321	.0086	.0002
	ΔUE_t	+.5335	.1005	.0000
	UE_{t-1}	+.0570	.0261	.0294
	$\Delta(\Delta Y)_t$	-.0592	.0394	.1330
	ΔY_{t-1}	-.0730	.0487	.1346
	$\Delta DXRIG_t$	-.0314	.0458	.4931
	$DXRIG_{t-1}$	-.1082	.0467	.0207
	$\Delta INTPAY_t$	+.0046	.0007	.0000
	$INTPAY_{t-1}$	+.0039	.0009	.0000
	$\Delta OPEN_t$	+22.49	5.597	.0001
	$OPEN_{t-1}$	+10.83	3.316	.0012
	ΔToT_t	+6.749	1.888	.0004
	ToT_{t-1}	+1.387	.9579	.1480
	$\Delta(ToT \times OPEN)_t$	-23.12	5.598	.0000
	$ToT_{t-1} \times OPEN_{t-1}$	-9.599	3.125	.0022
Weak Governments and Delayed Stabilization	$ADwiG_t$	+.1122	.1275	.3794
	$ADwiG_t \times D_{t-1}$	-.0025	.0039	.5151
	NoP_t	-.3043	.1698	.0736
	$NoP_t \times D_{t-1}$	+.0129	.0045	.0046
Inter- and Intra-Generational-Transfers Role of Debt	Y_{t-1}	+.5506	.3628	.1296
	ΔOY_t	-46.48	10.94	.0000
	ΔRW_t	-27.01	5.931	.0000
	$\Delta(RW \times OY)_t$	+47.63	11.52	.0000
	OY_{t-1}	-1.905	.6468	.0034
Electoral and Partisan Budget-Cycles Plus Strategic Debt-Use	ELE_t	+.4425	.1707	.0098
	ELE_{t-1}	+.5080	.1750	.0038
	CoG_t	+.1273	.0606	.0360
	RR_t	+.9741	.7151	.1737
	$RR_t \times CoG_t$	-.1990	.1201	.0982
Macro-Institutions	CBI_t	-1.277	.6793	.0607
Macro-Institutions and Multiple Constituencies	PRES	-1.333	.4472	.0030
	$ENED_t$	+.0064	.0070	.3608
	$ENED_t^2$	$-2.2e^{-5}$	$2.0e^{-5}$	.2696
Multiple Constituencies	AE_t	+.8158	.5089	.1094
Institutions, Constituencies, and Fiscal Illusion	FED_t	-.1013	.0347	.0037
	FED_t^2	+.0022	.0006	.0003
Fiscal Illusion	$TTAX_{t-1}$	-3.913	3.072	.2032
	$ITAX_{t-1}$	+3.987	1.824	.0292
	$CTAX_{t-1}$	-4.859	1.033	.0000
Summary Statistics	N (° Free)	618 (575)	s.e.e.	2.252
	Adjusted R^2	.466	Durbin-Watson	2.001
Joint Hypothesis Tests	Weak Governments	$p(P^2)$ . .0047	Mult. Constits.	$p(P^2)$ . .0046
	Inter-/Intra-Gen Trans	$p(P^2)$ . .0000	Institutions	$p(P^2)$ . .0008
	Elect and Part Bdgt C +	$p(P^2)$ . .0038	Fiscal Illusion	$p(P^2)$ . .0000

NOTES: As in Table 4.

Table 7 presents the results for that encompassing model, using the veto-actor conception of fractionalization and polarization that has emerged superior.[42] Figure 1 can provide scale for the substantive magnitudes of the estimated effects discussed below. Table 8, which begins the next section, also facilitates discussion, listing immediate-deficit and long-run-dept impacts of permanent, standard-deviation increases in the independent variables.

Note first that debt adjusts very slowly and at rates that depend critically on real-interest-net-of-growth rates (***DRIG***), government fractionalization (***NoP***) and, less so, polarization (***ADwiG***). At sample means (-1.3, +2.1,+1.3), the estimates imply that long-run debt-effects of permanent shocks[43] are 75± times their immediate deficit-impacts and that such permanent shocks require 50± years for even half of their long-run effect to manifest. Unless otherwise noted, all discussion and figures below assume ***DRIG***, ***NoP***, and ***ADwiG*** at sample means, debt initially stable, and all else constant.

III.D.1. Tax Smoothing and Economic Conditions

The coefficient on every tax-smoothing/economic-conditions variable is signed as expected, and most are highly significant, even controlling for all other variables in this 43-variable regression. Changes in unemployment (***) UE***) relate very tightly to deficits (p∩.01), and unemployment levels (***UE***) also relate positively to long-run debt (p . .03). Substantively, a one-standard deviation increase in unemployment, +3.6%, which also happens to be about the OECD-average increase since the seventies, produces a 2±% of GDP immediate increase in deficits. Most of the debt-effect would have faded within five years if ***UE*** had returned to its original level, but, if permanent, the estimated effect will cumulate to 15±% of GDP greater debt in the long-run. Thus, the dramatic increase in unemployment since the seventies in these countries, given their democratic commitments to social-insurance and the tendency to deficit-finance a portion of expenditures, played a large and central

[42] The results for the other variables are little different if the influence conception is employed instead.

[43] *Permanent shocks* are increases or decreases in the independent variables that persist rather than reverting to their pre-shock level. *Temporary shocks*, contrarily, are one-time increases that revert to previous levels.

role in the OECD-shared time-path of public-debt evolution. Figure 2 illustrates, plotting estimated debt-responses to permanent and temporary changes in unemployment (and growth).

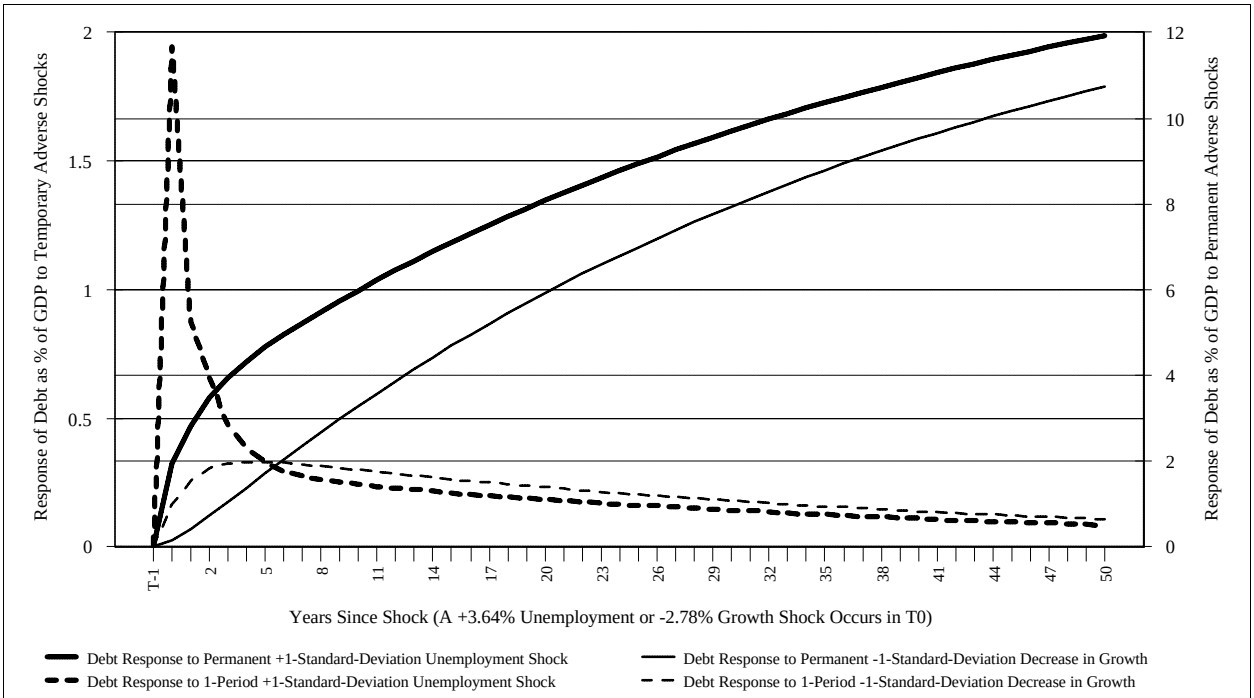


Figure 2: Estimated Debt-Impact of Adverse Unemployment and Real GDP-Growth Shocks

Changes in and levels of the real GDP-growth rate also reduce deficits and debt as expected, though not as significantly so (p . .13 in each case). Recall, however, that growth also reduces debt-service costs, and note that this effect is highly significant substantively and statistically (see below). Even excluding the effect of increased debt-service-costs, though, the slowing of real GDP-growth since the seventies may have made substantively important contribution to the dramatic reversal of the OECD-average debt path since the seventies. A standard-deviation decline in the growth rate (-2.8±%) produces a small (.16±% of GDP) immediate deficit-increase, but cumulates, if permanent, to a long-run debt-impact of +15±%, equal to the long-run impact of a standard-deviation adverse unemployment-shock (though the growth estimates are less trustworthy: joint significance p . .28). OECD-average unemployment and growth 1973-90 each worsened just under one sample-standard-deviation compared to the prior period's average. Reading the debt impacts of that lower growth and

higher unemployment after 18 years from Figure 2 suggests that about half the OECD-average rise in debt from 1973-90 (about 24% of GDP, see Figure 1) can be attributed directly to the increased unemployment and slower growth prevailing in the post-1972 era.

No such secularly adverse trend in terms-of-trade (***ToT***) covers the entire post-OPEC period; rather, the OECD average of about 1.1 falls to a low of .93 in 1981 and rises back to about 1.0 by 1988. The statistically and substantively significant impacts of ***ToT*** shocks, therefore, are primarily relevant for fluctuations in debt, especially in more-open economies. A standard-deviation adverse ***ToT*** shock (-.15±), produces an immediate deficit-response of +.6±% of GDP in economies of average openness, and as much as +1.5±% or more in more open economies. To illustrate, Figure 3 plots the estimated responses of debt to hypothetical temporary (one-year), standard-deviation adverse shocks at three levels of trade openness: the sample mean (.47), the mean minus one standard-deviation (.22), and the mean plus one standard-deviation (.71). As shown, standard-deviation ***ToT*** shocks have negligible deficit-effects in less-open economies, but appreciable effects in average-openness economies, and adds fairly large impetus to deficits in very-open economies.

If a standard-deviation adverse ***ToT*** shock were permanent, it would induce +8±% of GDP long-run debt at low-openness, +34±% at average-openness, and+60±% (!) at high-openness, but ***ToT*** shocks (like, e.g., OPEC I and II) tend to be temporary. Figure 3 therefore gauges the longer-term impact by tracking debt responses at these three openness levels to the actual path of OECD-average ***ToT***. As shown, the debt-impact of worsening ***ToT*** in the OPEC era is especially apparent in more open economies where the series of shocks produced an estimated +8.5±% of GDP debt-increase from 1974 to 1985. In principle, the effects could be even larger in very open economies, like high-debt Belgium whose experience is also plotted. However, although Belgium's ***ToT*** difficulties began as early as the mid-sixties, their peak-effect on debt was only +4.6±% of GDP in

1979 and has since been reversed. While this peak effect is non-negligible, it pales compared to the over 80±% of GDP total rise in debt in Belgium over that period. In sum, ***ToT*** shocks *per se* were at most, i.e., in the more-open economies, half as important as the unemployment increases and growth reductions they partially caused, the impacts of which were already incorporated therein.

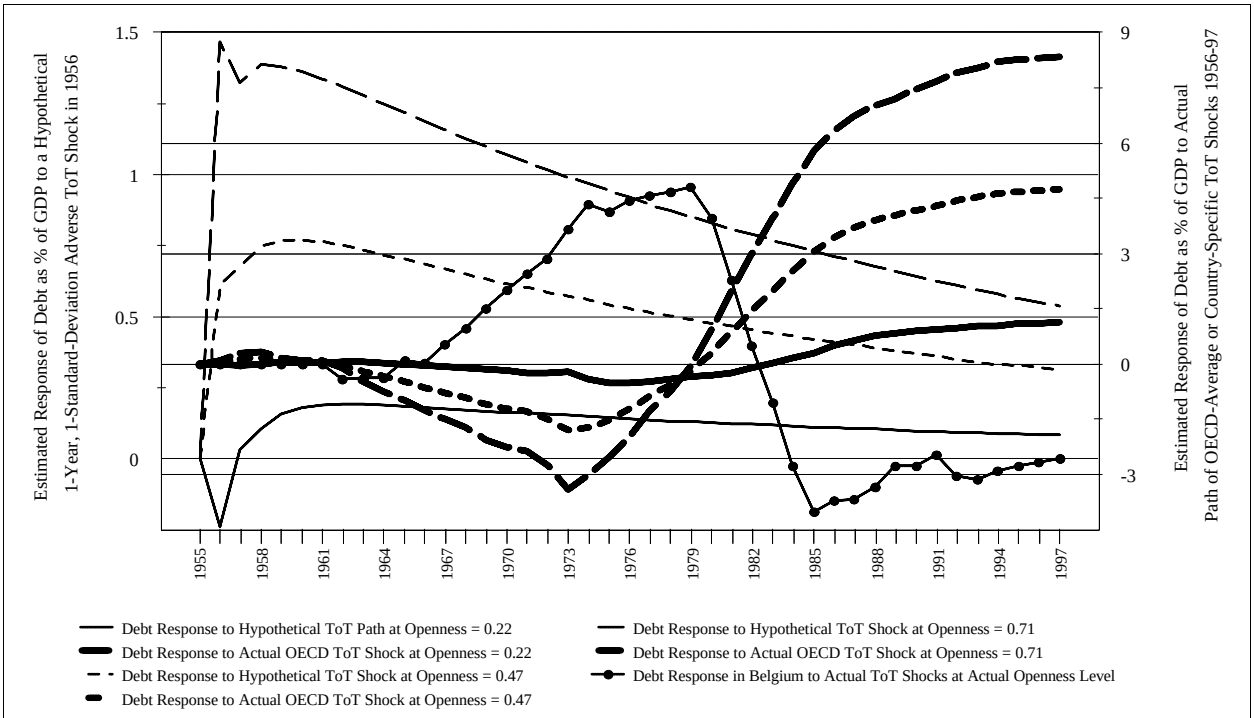


Figure 3: Estimated Debt-Impact of Adverse Terms-of-Trade Shocks at Various Levels of Trade Openness

Trade openness *per se* also had measurable impact. Calculated at ***ToT***=1, about the sample average (and, in the intention of those measuring the price-indexes, the long-run sustainable level), the deficit-impact of a standard-deviation increase in ***OPEN*** (+.25±) is negligible (-.07±%), but the long-run debt-impact is substantively appreciable (+22±%) and statistically significant. The neo-classical explanation is that more-open economies produce (expectations of) higher future growth, which, by the tax-smoothing argument, implies an incentive toward higher deficits now. However, more simply, open economies may just find borrowing in international capital-markets easier at any given interest rate, implying that democratic governments, or benevolent social democrats for that matter, will deficit-finance more of any given expenditure, *ceteris paribus*.[44]

[44] The openness result is less strong omitting Belgium as a potential outlier but remains easily significant. Future

Recall that if governments expect real-interest-rates to exceed real-growth-rates (i.e., ***DXRIG*** positive), they expect debt-servicing costs (real interest) to rise faster than the ability to repay debt (GDP, i.e., the tax base). Thus, they should issue (retire) more debt as ***DXRIG*** decreases, and indeed the evidence supports a substantively large and statistically strong (p . .02) negative long-run debt-relationship, even controlling for actual, current debt-service costs (***INTPAY=DRIG$_t$◊D$_{t-1}$***) and even given the crude expectations-formation model underlying ***DXRIG***'s measurment. A one-standard deviation increase in expected real-interest relative to real-growth rates (+3.1±%) is estimated to induce governments to reduce deficits only an insignificant (p . .49) -.1±% of GDP, but over the long-run, to reduce debt 24.4±% of GDP. Figure 4 plots the estimated smooth accumulation of debt in response to a hypothetical, permanent, standard-deviation increase in ***DXRIG*** and also the estimated debt-response to actual OECD-average ***DXRIG*** rates from 1955-95.

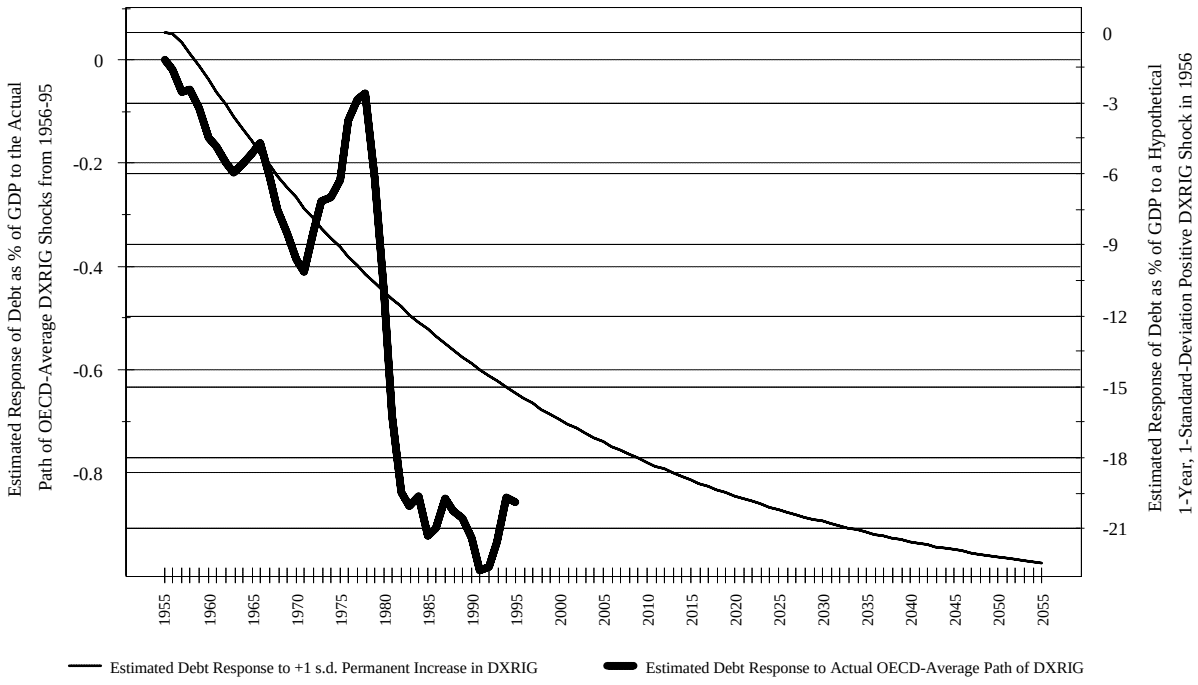


Figure 4: Estimated Debt-Responses to a Hypothetical, Permanent Increase in the Difference Between Expected Real-Interest and Growth Rates and to the Actual OECD-Average Path

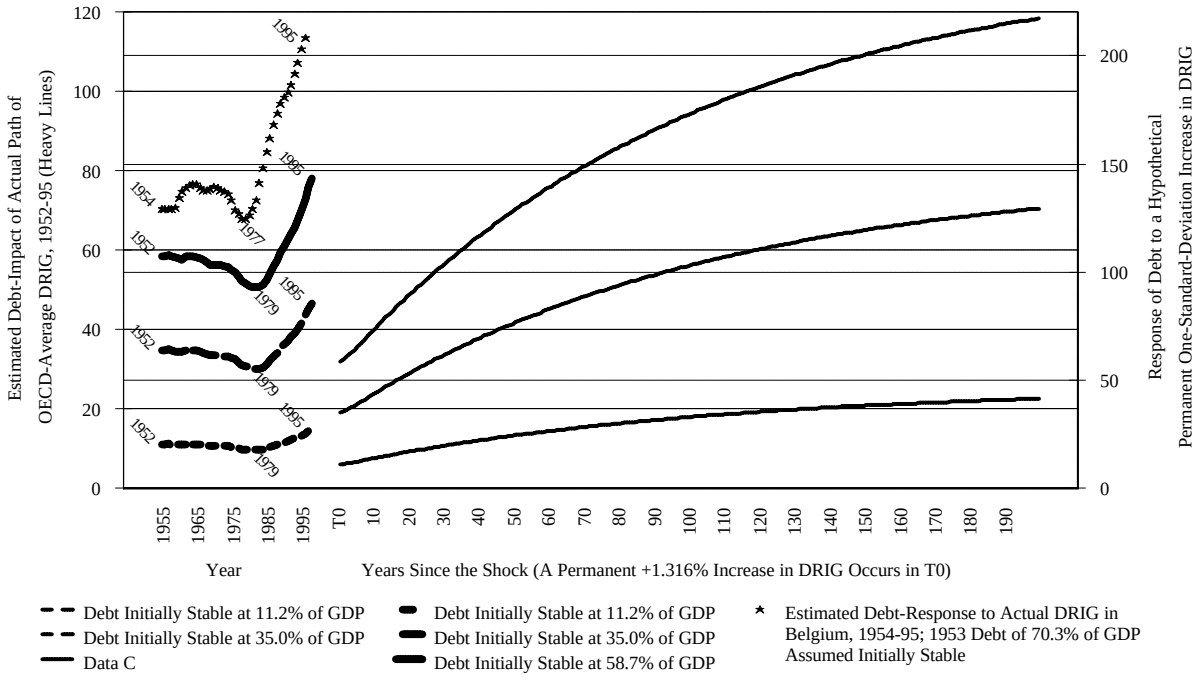
The ***DXRIG*** pattern over the turbulent seventies was upward (-2.7±% to -1.9±%) in 1972-74

research can attempt to distinguish these possibilities by including openness in the equation estimating expected growth.

after Bretton Woods and during OPEC I, returning to lower levels (under -3%) from 1975-77 as expected inflation and growth both grew, and, beginning in 1978, a generally secular rise to historically high levels(from -3.6±% in 1977 to +2.9±% in 1990). In the late sixties there had also been a rough upward progression (from -3.6±% in 1965 to -1±% in 1970). Prior to that, ***DXRIG*** fluctuated between -2.7±% and -3.5±%. As shown in Figure 4, the impact of these turbulent expected real-interest-net-of-growth rates has been generally, though modestly, toward reducing debt (about -1±% of GDP at peak). Although a notable reversal of this trend did occur from 1971-78, the period in which postwar debt-reductions were halted, it too was modest, accounting for only +0.4±% of GDP in debt. Thus, the rational responses of democratic governments to their *expected, future* interest-payment burdens and abilities, while appreciable and statistically significant, do not account for a very sizable substantive share of OECD postwar public-debt experiences.

Conversely, the most statistically and substantively significant debt-impacts among economic variables came from changes in the actual interest-/growth-rate differential (***DRIG***) and the actual changes in debt-servicing costs they implied. The impact was critical in the long run especially since changes in ***DRIG*** speed or slow the adjustment rate of the debt and therefore help determine the geometric multiplier applying to *all* long-run, permanent changes. The debt-effects of ***DRIG*** shocks thus depend on the outstanding debt-levels to which they apply. At sample-mean debt minus one standard-deviation (11±% of GDP: *low debt*), a standard-deviation increase in ***DRIG*** (+4.32±%) centered on its mean (i.e., from -3.5±% to +.85±%) immediately increases deficits only .23±% of GDP but produce a sizable +36±% long-run debt if the increase were permanent. At sample-mean debt (35±%: *average debt*), the same increase in ***DRIG*** would yield 0.7±% greater immediate deficit and+111±% long-run debt (to 146% of GDP!) if the shock were permanent. Starting at the sample mean plus one standard-deviation (59±%: *high debt*), the same standard-deviation shock in ***DRIG***

would be devastating, causing an appreciable +1.2±% immediate deficit and, if permanent, a whopping long-run +136±% of GDP debt-increase (to almost 200% of GDP!!).



<u>Figure 5</u>: Estimated Debt-Responses to Hypothetical, Permanent Adverse Shocks to Debt-Servicing Costs, to their Actual OECD-Average Path, and to their Actual Path in Belgium.

As Figure 5 clearly demonstrates, the actual historical sequence of large real-interest-net-of-growth increases in the eighties following adverse terms-of-trade, growth, and unemployment shocks in the seventies was almost as nasty a combination. While debt-servicing-cost increases were tolerably weathered in places with relatively low debt to start the period, the long-run debt impacts of the actual slowdown in growth relative to interest rates in countries with average and above-average debts are striking in both their duration and magnitude. Figure 5 shows, e.g., that debt which was initially stable in 1952 at the postwar OECD-average (35±%), would have risen to 47±% by 1995 in response to actual OECD-average ***DRIG*** changes. A country starting at stable 59±% of GDP debt and facing the same ***DRIG*** sequence would have debt rise to 78±% over the same period. Importantly, the real-interest-net-of-growth adversity begins around 1978, just as stagflation was

reaching its worst depths. Nor are these magnitudes merely hypothetical. In high-debt countries like Belgium, the impact in the eighties through mid-nineties was truly astounding. Assuming Belgium's 70±% of GDP debt in 1953 was initially stable, and its actual sequence of ***DRIG*** shocks alone would have driven debt to 114±% of GDP by 1995, not far from its actual 132±% peak in fact.

Summarizing, economic conditions alone account for much, though not all, of the postwar debt-experiences of OECD countries. Quite simply, the sequence in the seventies of adverse terms-of-trade shocks, triggering worsening unemployment and growth shocks, arrested then reversed the downward debt-trend prevailing in most countries. Then, as governments turned to combat inflation, real interest rates rose and high unemployment and slow growth persisted, causing the initial effects of stagflation not only to persist but also to multiply exponentially with the rising net debt-servicing costs. The effects were especially pronounced in those countries entering the period with average-to-high debt-outstanding already. Countervailing effects of the improving terms-of-trade and of rising expected real-interest net of expected real-growth in the eighties were swamped.

As impressively simple-but-powerful as the pure economic-conditions explanation is, the statistical evidence above conclusively establishes a political side to the story as well. Furthermore, the temporal-and-spatial-correlation controls alone can explain an adjusted (unweighted) .333 of the total variance; the tax-smoothing/economic-conditions model increases that to 29% to .430; the encompassing model instead increases explained-variance by 39% to .466 of total-variance. Thus, crudely, simple temporal and spatial correlation tells 1/3 of the story; the combined economic and political-economic model tells almost half the story with, at most, 3/4 of the increase coming from the economic factors and at least 1/4 from the political-economic.[45]

III.D.2. Tax-Structure Complexity and Fiscal Illusion

[45] The *worst-case* division of explained-variance just described attributes all shared covariance of economic and political variables with debt to the economic variables. The *best-case*, attributing all shared covariance to political variables, attributes almost half the gain from the baseline to each.

Proceeding empirically now through the political-economic cycle from structure of interests to strategic governments, begin with fiscal-structure complexity, which democratic policymakers may employ to hinder citizen efforts to evaluate the public fisc, fostering popular fiscal illusion that facilitates deficit finance of public economic activity. The strong evidence of a relationship between tax-structure complexity and debt suggests that voters are indeed fiscally illuded. If voters had rational expectations and were not fiscally illuded, then either (a) debt would be independent of tax structure or (b), assuming simpler tax-structures are more efficient economically, simpler fiscs would increase current deficits because they lead to expectations of higher future growth. Contrarily, as fiscal-illusion theories expect, the measures of fiscal simplicity—total-tax share of total revenue (***TTAX***) and central-government share of total revenue (***CTAX***)—receive negative coefficients (p **.** .20, p **.** .00), and of fiscal complexity—indirect-tax share of total revenue (***ITAX***)—receives a positive coefficient (p **.** .03). Jointly, the effect of tax-structure complexity on government debts is highly significant statistically (p **.** .00) and substantively. While a standard-deviation increase in the total-tax share of revenues (***TTAX*** +2.9% holding ***ITAX*** fixed) reduces deficits by a relatively small and statistically insignificant -.11±% and, if parmanent, long-run debts by 8.3±% of GDP, a standard-deviation shift in tax-proportions from direct to indirect taxes (***ITAX*** +9.1% holding ***TTAX*** fixed) increases deficits by .36±% and, if permanent, long-run debt by 26.6±% of GDP. Most dramatically, a standard-deviation increase in central-government share of total revenue (***CTAX*** +15%) decreases deficits by .73±% of GDP and, if permanent, long-run debt by 53.6±% of GDP.

In principle, then, the opacity of fiscal systems importantly influences popular demand for (tolerance of) public debt. However, as related proportions, ***TTAX***, ***ITAX***, and ***CTAX*** will tend to move together somewhat, so, to evaluate their substantive impact more fully, consider Figure 6, which plots the estimated cumulative debt-response to the actual path of OECD-averages of these

tax-structural variables from 1951-1990. As shown there, on average across developed democracies, fiscal illusion contributed importantly and continually to debt-accumulation since 1950, accounting for a 13±% of GDP secular increase as the debt-inducing combination of declining reliance on taxes for public revenues and, more importantly, of declining central-government shares of fiscal activity swamped the debt-reducing impacts of declining reliance on indirect taxes for public revenues.

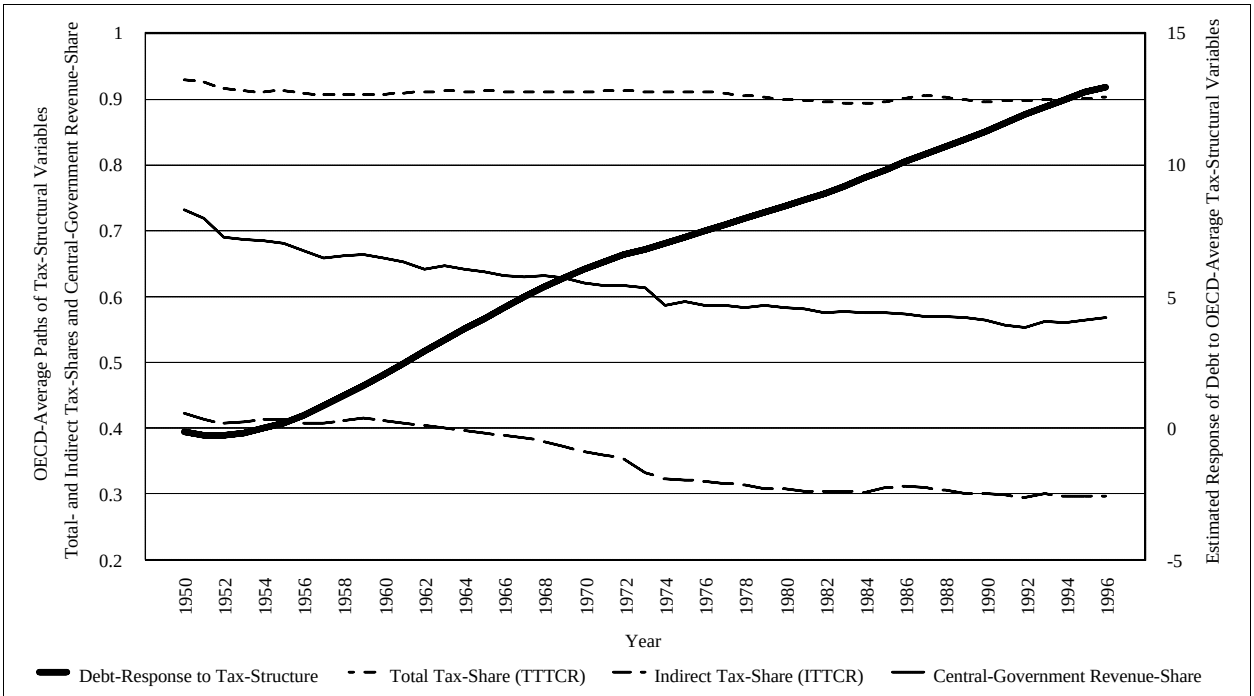
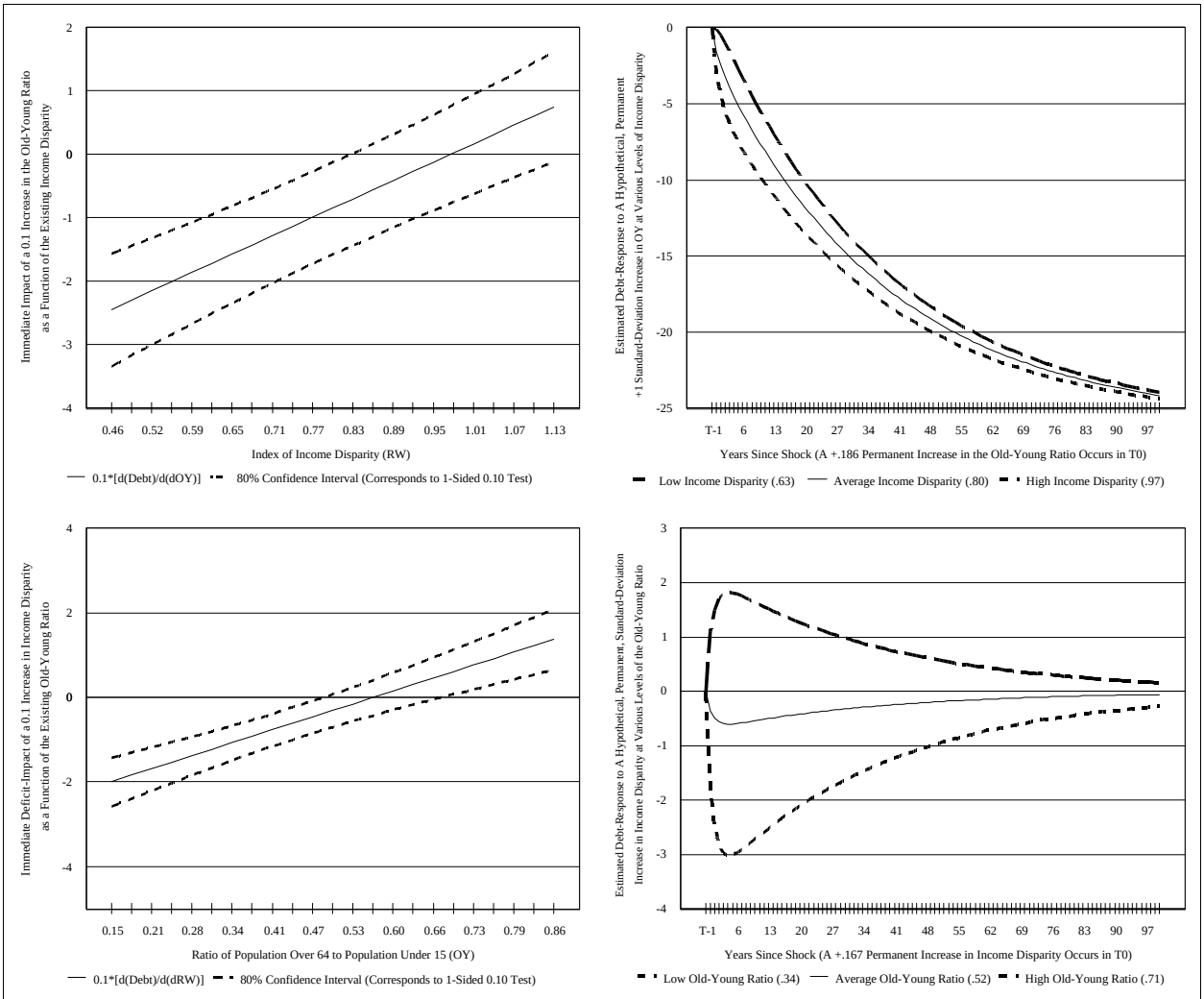


Figure 6: Estimated Debt-Responses to OECD-Averages of Tax-Structure Complexity

III.D.3. Inter- and Intra-Generational Transfers

Next, staying withing the structure of interests among voters, consider the age and income distributions of the polity and its wealth. Here, the historical record gives little support to versions of the inter-/intra-generational transfers theory of debt that predict wealthier, younger, and more egalitarian democracies will accumulate less debt. The coefficient on aggregate wealth is incorrectly signed and nearly significant (p . .13). Coefficients on changes in the age and income distributions and their product are highly significant (p . .0001 for each), but estimated effects do not correspond with those predictions, nor do the estimated long-run effects of the age distribution on debt.



<u>Figure 7</u>: Estimated Immediate-Deficit and Long-Run-Debt Responses to Increases in the Old-Young Ratio and the Income-Disparity Index, as Functions of the Level of the Other

Again, the estimated effects are best seen graphically. Figure 7's bottom-left plots estimated immediate deficit-responses to +0.1 change in the income disparity index, $\partial RW=.1$, over a relevant sample-range of the old-young ratio (mean ±2 s.d.). As seen, the prediction that governments in more inegalitarian economies run higher deficits holds only in older polities; in average-to-young polities, more than half the sample, governments *decrease* deficits in response to increases in income-disparity. Worse for the basic theory, the top-left of Figure 7 shows that, over most the sample-range of income disparity, estimated deficit-impacts of aging societies are negative. Both conditional effect-lines do slope in the predicted direction though, so, in the oldest and most unequal polities at

least, increases in income-disparity and population-age tend to produce higher deficits as predicted.

Graphs of longer-run hypotheticals provide an even clearer, and less optimistic, picture. The top-right of Figure 7 plots estimated long-run debt-responses to a permanent, standard-deviation (+.19±) increase in the old-young ratio at high, average, and low income-disparity levels. Generally, the debt response-path does not depend much on the income distribution relative to the long-run equilibrium impact. That long-run impact is sizable (about -26±% of GDP), negative, and significant. Conversely, the bottom-right of Figure 7 plots estimated debt-responses to a permanent standard-deviation (+.17±) increase in the income-disparity index at high, average, and low old-young ratios. Despite their temporary nature, the effects of income distribution are also appreciable: +2±% of GDP at high ***OY*** and -3% of GDP at low ***OY***, peaking 3-4 years after the shock and fading slowly to zero.

What do these results imply for the inter-/intra-generational-transfers theory of debt? First, the inability to measure the joint distribution of age and income is unlikely to underlie the anomalies as omitting the interaction term from the specification leaves only a long-run *negative* relationship between ***OY*** and debts significant. Instead, the problems with the age-distributional and the income-distributional hypotheses may be two-fold and distinct to age and to income.

Regarding the income distribution, the argument neglects that the wealthy typically have political resources beyond their numbers. Thus, even if more numerous poor within a given country-year does imply that a majority favors higher deficits, as Franzese (2001, ch. II) demonstrates, the concentration of wealth among the relatively politically active, in general, partially offsets and, in particular, offsets more in more participatory democracies. Moreover, that small groups find it easier to mobilize for political effect (Olson 1965) also suggests that the relationship between numbers of poor and wealthy and their relative political weight could be quite non-linear or even non-monotonic. In extremely inegalitarian economies, the wealthy may be a small group in Olsonian terms, and the

very wealthy usually are Olsonian-small *and* have highly means of political participation.

Similar Olsonian logic could explain the age-distribution results, but other considerations likely dominate since the old do not comprise a particularly small group and do not necessarily have financial advantages in participation. Perhaps, the basic theory simply wrongly attributes a taste for debt-issuance to older generations in this sample. Sociological considerations suggest the contrary; namely: depression survivors tended to develop a strong distaste for indebtedness, their own and, by analogy, public. Alternatively, reasoning from the denominator in ***OY***, citizens and policymakers in countries with relatively large youth populations should be able to expect greater future growth in any well-functioning capitalist economy. Even assuming no productivity-growth, a relatively large number of young today implies a relatively large number working tomorrow and thus greater future output with which to finance any debt. Furthermore, educational and other current investments may be necessary to realize that future potential fully, and debt-finance of such investments is actually usually optimal. These considerations were ignored in the models from which the expectation of greater debt in older countries derived; future empirical and theoretical work would likely benefit by introducing an expected-growth effect of currently youthful populations.

III.D.4. Distributive Politics and Multiple Constituencies

Moving now to electoral institutions that structure the interests among voters into electoral pressures on democratic policymakers, consider results for the multiple-consituencies argument. Although the variables derived from that argument are highly significant jointly (p . .005), their substantive impacts do not support the theory as strongly as that alone might suggest. The strongest statistical relationship (p . .003) regards presidential systems, which average an estimated 1.3±% of GDP per year lower deficits than pure parliamentary systems. However, this sizable estimate relies on only three presidential systems: US, Finland, and French Vth Republic, and, as noted above, the

estimate could instead reflect presidential leadership in the budgetary process. Thus, presidentialism results are best viewed as tentatively favorable, especially given other less-promising results.

For example, excepting the extreme UK case where the impact is negligible, greater effective numbers of electoral districts appear positively related deficits as the multiple-constituency argument predicts, but not significantly so (p . .33 for ***ENED*** and $\boldsymbol{ENED^2}$ jointly). The estimated effect could be sizable—increasing ***ENED*** from its median (27: Italy's 1958-90 level±) to a standard deviation above the mean (115: just under France V's level) is estimated to increase deficits by .3±% and long-run debt by 21±% of GDP—but the standard errors are too large to offer much confidence. The top of Figure 8 illustrates, plotting the estimated total impact of the number of electoral districts (i.e., of ***ENED*** and $\boldsymbol{ENED^2}$) from sample minimum, 1 in the Netherlands, to maximum, 329 in the UK along with an 80% confidence interval, which corresponds to a one-sided .10 *t*-test. The graph clearly demonstrates that, at most, ***ENED*** produces some small impetus toward greater deficits in the lower half of the sample range, but nowhere are these effects statistically significant.

Worse, as the bottom of Figure 8 shows, excepting the extreme US case where the impact is negligible, the number of federal districts is significantly negatively related to deficits (p . .0004 for ***FED*** and $\boldsymbol{FED^2}$), opposite the theory's expectations.[46] The estimated effects, expected or not, can be substantively sizable: increasing the number of federal regions from 1 (the median) to 12 (Canada, and roughly the median plus a standard deviation) reduces central-government deficits by .79±% and long-run debt by 58±% of GDP. The likeliest explanation for this result is that effectively federal systems simply transfer fiscal onus to subnational governments where perhaps greater debts occur. Indeed, that estimated effects of tax centralization, ***CTAX*** (Figure 6), and federal regionalization, ***FED***, were both negative and significant strengthens the interpretation of the former as influencing voters' fiscal illusion and the latter as inducing fiscal transference to subnational governments.

[46] The results do not depend on Switzerland alone as re-estimation including a Swiss indicator-variable verifies.

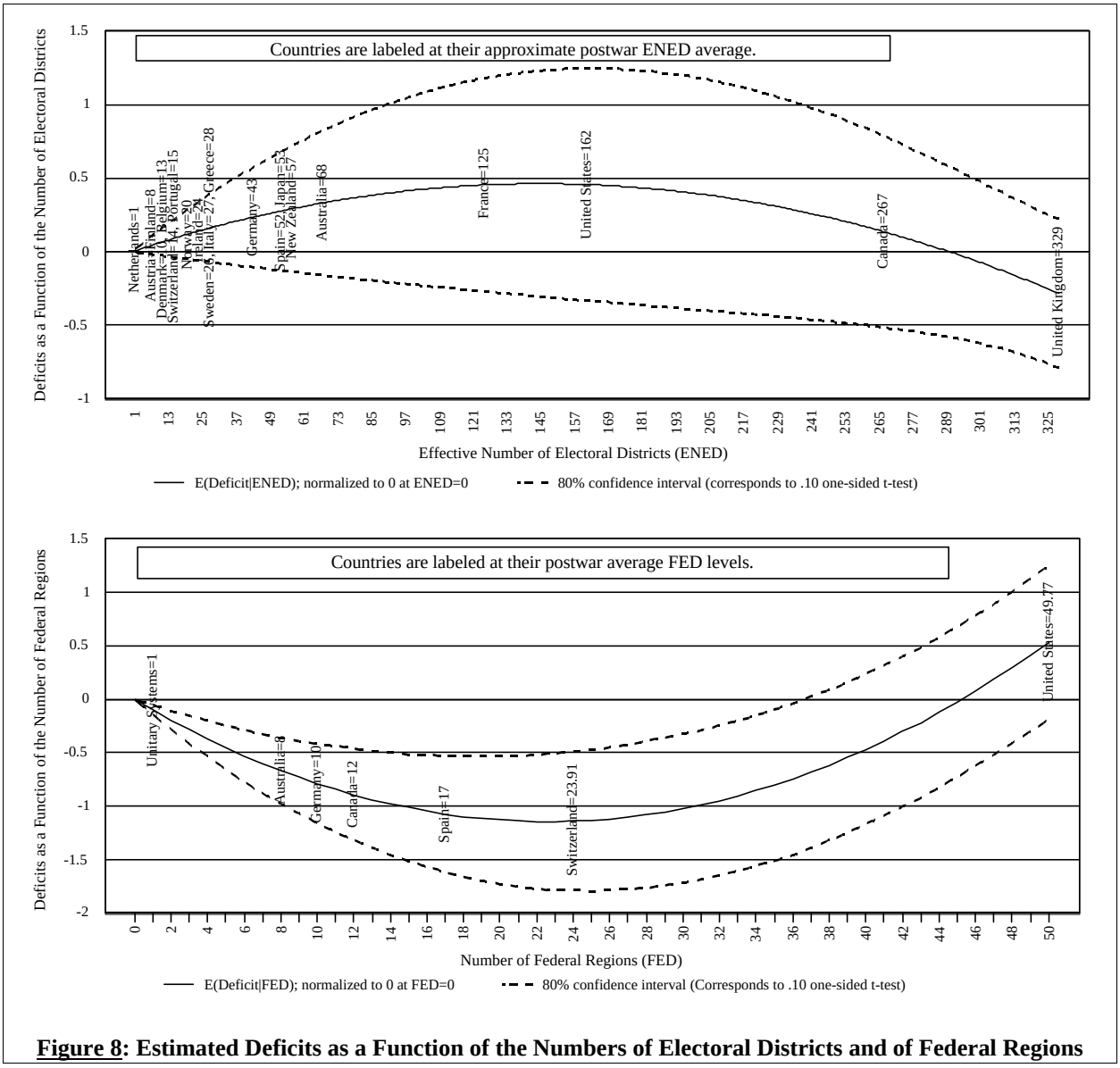


Figure 8: Estimated Deficits as a Function of the Numbers of Electoral Districts and of Federal Regions

The most trustworthily favorable result for the multiple-constituencies argument, then, is that regarding agrarian-and-ethnic-party representation in government (***AE***), which is weakly positively associated with deficits (p . .11). If that estimate is reliable, a standard-deviation increase in ***AE*** (+17±%) produces 1.4±% of GDP higher deficits per year.

In sum, the evidence regarding the multiple-constituencies problem as it pertains to debt is mixed at best. However, macro-institutions are clearly central to the explanation of persistent cross-national differences in postwar-average debt-levels. Presidentialism and federalism strongly decrease

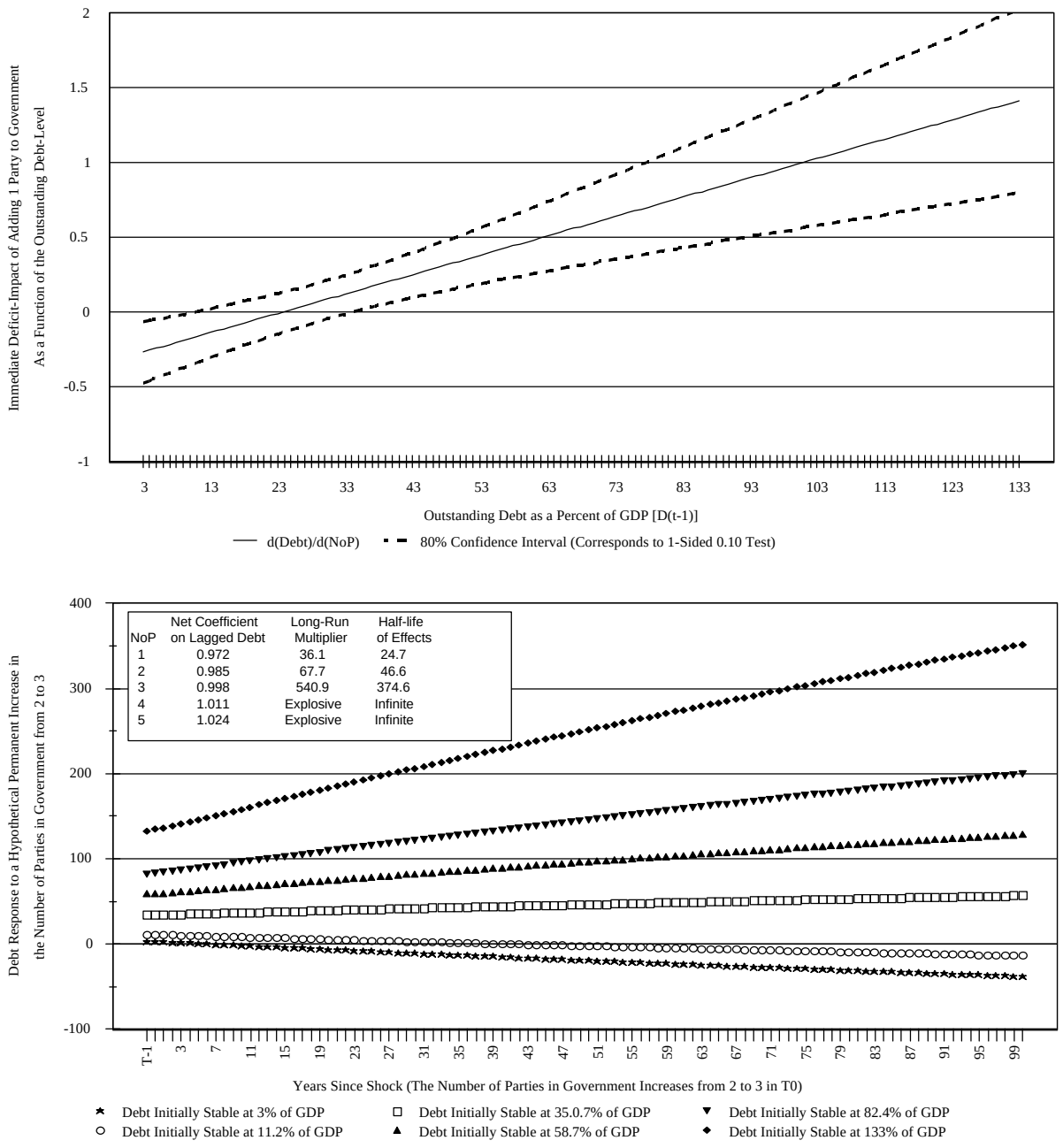
long-run central-government debt (though the relation of the latter to total public-debt is unknown), and geographically concentrated partisan support strongly increases it. The multiple-constituencies model was also the most difficult to operationalize empirically, so perhaps empirical leverage on the theory was just too indirect and weak. The main obstacle to both theoretical and empirical progress is likely the under-explored link between the theoretical concept of *constituencies* and the empirical observations of *districts*, *regions*, and *parties*. The first step for future research must be to bridge this currently wide gap as Franzese and Nooruddin (1999) have begun.

III.D.5. Weak Governments and Delayed Stabilization

Moving next to the characteristics of the governments that form from elected representatives to make policy, the data strongly support the fractionalization half of weak-governments theories in the encompassing model. The positive and highly significant coefficient (p . .0046) on $\boldsymbol{NoP\Delta D_{t-1}}$ establishes that fractionalized governments hinder implementation of fiscal adjustments to high debt as argued. However, when debt is below 30±% of GDP, more fractionalized governments actually *reduce* deficits. Partisan polarization within government (***ADwiG***), contrarily, may increase deficits in some ranges, but not statistically significantly (p . .3794), and polarization hardly appears to alter fiscal-adjustment rates (the $\boldsymbol{ADwiG\Delta D_{t-1}}$ coefficient is substantively near zero and has large standard error). Nor are the two polarization variables jointly significant (p . .67).[47] The two fractionalization variables, contrarily, are jointly significant (p . .012) as are the two interaction terms (p<.005) or their sum[48] (p<.005). Thus, the evidence establishes with considerable certainty that fractionalized governments slow debt-adjustment rates, although, controlling for that, partisan polarization of those governments seems less relevant.

[47] The opposite signs on fractionalization and polarization effects may suggest that they are imperfect, correlated measures of a single underlying factor, perhaps "propensity to deadlock". Achen (1983) discusses sign reversal in such cases, showing that the more-reliable measure attains correctly signed significance and the other reverses signs.

[48] The sum reflects, e.g., adding 1 party 1-***CoG***-unit away from a single-party government to form a coalition.



<u>Figure 9</u>: Estimated Deficit- and Debt-Responses to Hypothetical Increases in Government Fractionalization at Various Initially Stable Outstanding-Debt Levels

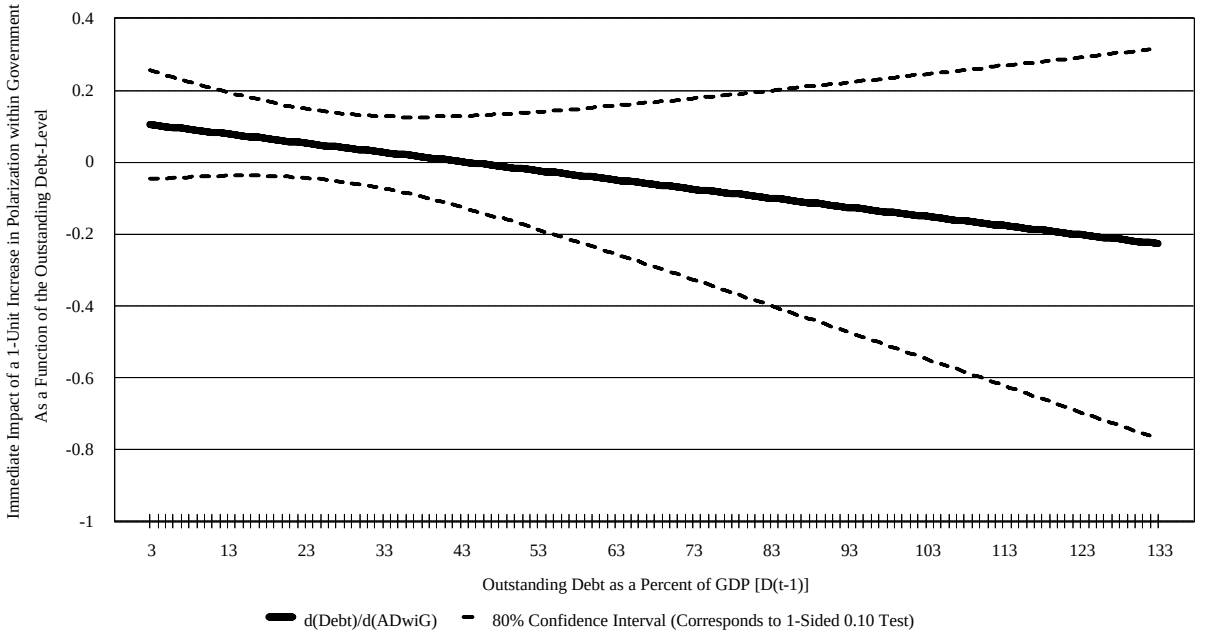
The top of Figure 9 depicts the estimated deficit-effect, as a function of outstanding debt-levels, of adding one party to government, plotted over the sample range of debt, 3-133% of GDP. Fractionalization, controlling for polarization, reduces deficits when debt is very low but increases them even at moderate debt-levels and does so considerably when outstanding debt is high. This

accords with the revised weak-goverments argument suggested above; namely that fractionalization produces *inaction*. Inaction prevents needed fiscal adjustments when large debts requiring reduction already exist as previously argued, but it likely also prevents the introduction of new deficit-financed programs when debt is currently low. As seen, at sample-average debt, a standard-deviation increase in fractionalization (+1.2± parties) centered on the mean (i.e., from 1.5 to 2.7 parties) increases deficits .18±% of GDP, but the same ***NoP*** increase produces a .19±% of GDP deficit *reduction* at low debt and a .55±% of GDP increase at moderately high debt. For very-high debt, the immediate effects are still more noticeable; e.g., in Belgium, Ireland, and Italy in the late eighties and nineties (when debt topped 100% of GDP), an additional party in government is estimated to have produced +1±% of GDP or more in deficits *each year*.

Indeed, if fractionalization persists, its long-run effects can be as dramatic as those of debt-servicing costs. The bottom of Figure 9 plots debt-responses to a hypothetical permanent increase in the number of parties in government from two to three at six initially stable outstanding debt-levels: 3% (sample minimum), 11% (low), 35% (average), 59% (high), 82% (very high), and 133% (sample maximum). As shown there, if fractionalization were to increase by one permanently in any country in which debt were currently high, the effects on long-run equilibrium debt are nearly explosive. In 100 years, if nothing were done to redress the situation, average debt will have become high, high would have reached the prior sample maximum, and very-high debt would have reached 200±% of GDP and would still be growing at almost 1% per year!

As the table in the middle-left clarifies, these dramatic effects, like those of ***DRIG***, operate *via* the impact of fractionalization-slowed debt-adjustment rates on the long-run multiplier. Thus, the long-run debt-effects of *all* other public-determinants are many times larger in democracies with more fractionalized governments than in democracies with fewer because the number of parties in

government retards adjustment rates, which geometrically increases the long-run multiplier on the effects of permanent changes in *any* public-debt determinant. E.g., while single-party governments in the UK more-easily shifted adjustment costs to oppositions and so weathered the stagflationary seventies and stagnant eighties and nineties without massive public-debt accumulation, the parties to fractionalized Italian and Belgian governments were less-able to find fiscal-adjustment plans that distributed costs acceptably within the governing coalition and so allowed their debts to skyrocket, waiting each other out. Indeed, permanent fractionalization in excess of three parties in government were estimated to produce explosive debt-paths in this sample (i.e., *ceteris paribus*, and ***DRIG*** and ***ADwiG*** at sample means). Clearly, then, fractionalization of government, specifically the number of partisan veto-actors, is a critical determinant of debt-adjustment paths and thereby plays a central large role in any explanation of postwar OECD debt experiences.



<u>Figure 10</u>: Estimated Deficit-Impact of a Hypothetical Increase in Government Polarization as a Function of the Outstanding Debt-Level

Government polarization, contrarily, is not nearly as important. However, interaction terms, even apparently insignificant ones like these, are difficult to interpret fully without graphs, so Figure

10 plots the estimated deficit-responses to a one-unit increase in polarization within government[49] as a function of the outstanding debt-level, along with a confidence interval. Note that the confidence interval widens drastically beyond moderate levels of debt. This is not because such observations are few, so it could be because the *effect* of polarization is itself quite variant. Perhaps, e.g., "grand-coalition" governments, which are highly polarized by nature, often form when debt is high for the express purpose of reducing it. If they typically fail but occasionally dramatically succeed in reducing debt, Figure 10 would follow; the conjecture may warrant future empirical exploration.

III.D.6. Electoral and Partisan Budget-Cycles

Focusing now on governments' electoral and partisan incentives to manipulate fiscal policy, both the year before (p . .0098) and the year after (p . .0038) an election are significantly positively associated with deficits (p . .0026 jointly). Over these two years, democratic governments add 1±% of GDP to debt. Because debt adjusts so slowly and exhibits such strong short-term momentum, the effect actually grows to a maximum +1.56% five years after the election. Even this one-time effect is noticeable, but all these democracies have elections minimally every 5 years, so the debt-impact of one election is still accumulating when another election-year arrives. Figure 11 plots the estimated debt response-paths to electoral politics in 3-, 4-, and 5-year-cycle countries, whose elections begin in year T0, and the estimated response to a one-time election. As shown, democracies that averaged an election every three years would, *ceteris paribus*, have long-run debt about 5.8±% of GDP higher than those that averaged one every four years, which, in turn accumulate long-run debt 3.5±% higher than those that averaged one every five years. Thus, the electoral "costs of democracy" (Keech 1996), at least the debt costs, are variable. Note also that electoral-cycle oscilation is most visible in five-year-cycle countries and more muted in higher-frequency cycles. The estimated temporal

[49] Controlling for the number of parties implies the hypothetical considered is a shift in the ideology of a party already in a coalition government or the replacement of one with another extending the ideological range of the coalition.

dynamics produce this effect, and it suggests that casual modeling of temporal dynamics may have masked existing electoral policy-cycles in some previous empirical work.

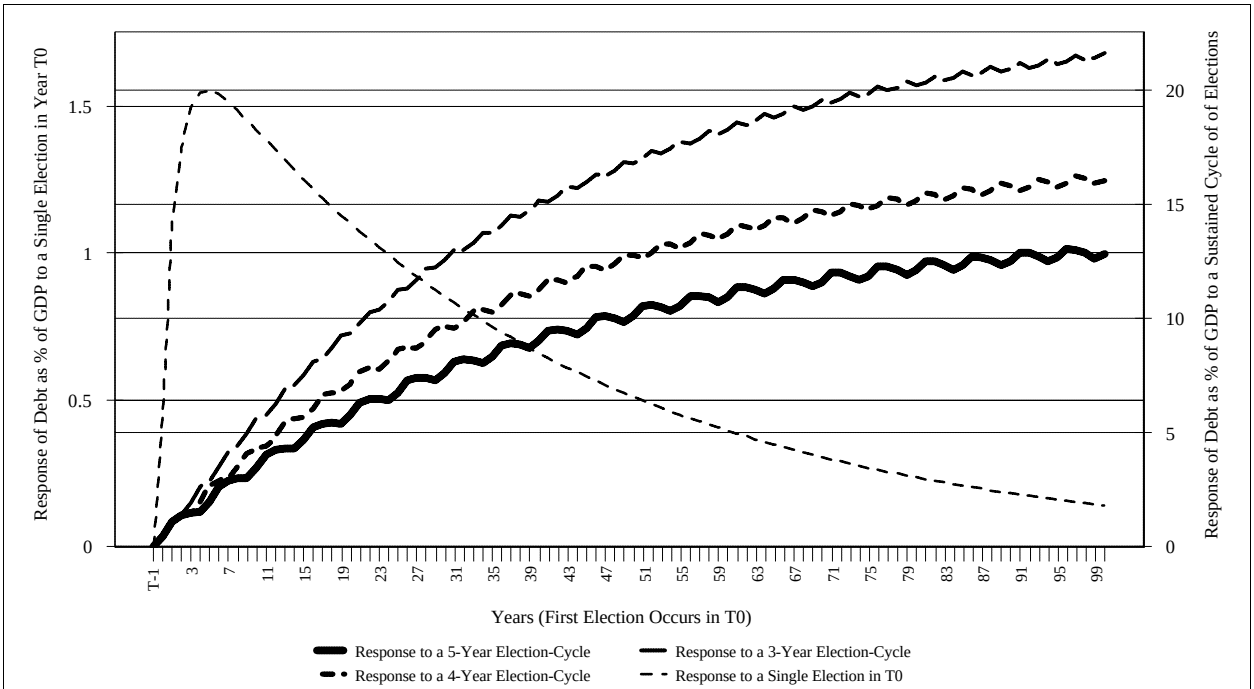


Figure 11: Estimated Debt-Responses to 3-, 4-, and 5-Year Electoral-Cycles and to a Single Election

Finding similar pre- and post-electoral transfers cycles, Franzese (2001, ch. 2) notes that "reports of the empirical demise of electoral-cycle theories may have been grossly exaggerated." He suggests three possible explanations. First, these results may simply reflect lingering differences between calendar-year measured ***ELE*** and fiscal-year measured policies. Second, almost as simply, they may just reflect the slow adjustment of policies, with pre-electoral policy changes producing continuing fiscal stimulus post-election before the next government can retract the changes. Third, most interestingly, the results may reflect differences in the pool of pre- and post-electoral policy-makers. If policymakers promise largesse to win elections, and if policymakers must fulfill pre-electoral promises (and evidence indicates they generally do: Klingemann et al. 19XX, Gallagher et al. 19XX), then pre-electoral pools of policymakers will contain some incumbents who promised too little and lost while post-electoral pools will more-consistently contain those promising sufficient

largesse. Note that this more interesting interpretation would explain both the (conditional) higher mean and the lower variance of the estimated post-electoral stimulus.

Government partisanship also influences deficits, in a way that depends on the replacement risk that the incumbent faces: coefficients on ***CoG*** and ***CoG@RR*** are significant individually (p . .04, p . .10) and jointly (p . .09). The top of Figure 12 shows that, at moderate to high replacement risk, the effect of a 1-***CoG***-unit rightward shift in partisanship is in the traditional, lower-deficit direction and can be appreciable, -.38±% of GDP at sample maximum of ***RR*** (2.55±), though large standard errors imply only marginal significance in this range. Conversely, right governments are significantly (p<.1 one-sided) associated with moderately *higher* deficits when replacement risk is below 0.32± (e.g., a 25% chance of replacement by a government 1.28 ***CoG***-units to the left), which occurs in almost 70±% of the sample. Thus, partisan effects are usually relatively small and *opposite* simple partisan-theory expectations. The replacement-risk-contingent nature of partisan debt-effects is more clearly seen *via* variations in replacement risk, so further discussion of partisan debt-cycles follows.

III.D.7. Strategic Partisan Fiscal Policy

Strategic-debt-use theories as originally argued receive little support in the evidence from the encompassing model.[50] While replacement risk (***RR***) and its product with partisanship (***RR@CoG***) are marginally significant individually (p . .17, p . .10), they are less so jointly (p . .225). ***CoG*** and ***RR@CoG***, contrarily are marginally significant (p . .09), suggesting that replacement risk does alter the partisan objectives that strategic democratic governments pursue in debt-policy manipulation, but the pattern of effects estimated is inconsistent with strategic debt use to constrain ideolofically distant oppositions. The bottom of Figure 12 shows that increases in replacement risk induce *left* governments to increase and *right* governments to reduce deficits, opposite the Persson-Svensson (1989) model. The Alesina-Tabellini (199) model instead expects ***RR*** to induce both left and right

[50] Lambertini (1999) also finds no support in a different sample with different operationalization.

governments to raise deficits, yet positive relationships are never quite significant in the sample-range of ***CoG*** and hold only for incumbents left of ***CoG*** **.** 5, which comprise 38±% of the sample. Conversely, replacement-risk induces *lower* deficits over 62±% and, at least marginally significantly ($p<.1$ one-sided), over 18.5±% of the sample: CoG **/** 6.8. Thus, ***RR*** conditions strategic-fiscal-policy, but not by enticing democratic governments to manipulate debt to constrain expected oppositions.[51] The evidence instead suggests that replacement risk induces both left and right governments to pursue standard partisan objectives, the left (right) running higher (lower) deficits, but that, absent replacement risk, *right* governments allow higher deficits and *left* governments curtail them.[52]

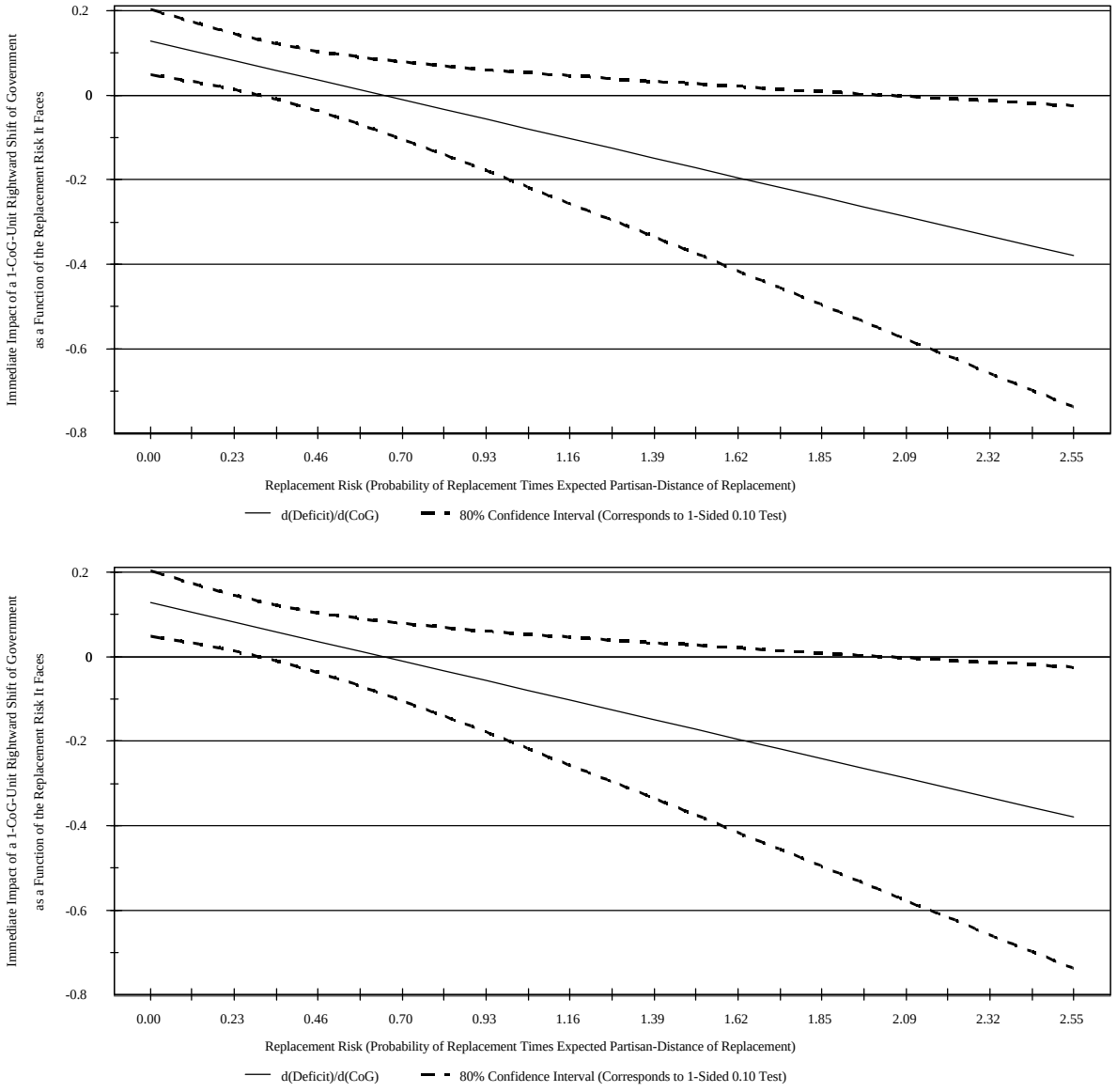
Substantively, replacement-risk effects on partisan debt-cycles can be appreciable, especially toward the extreme right. A standard-deviation increase in replacement risk (+.33±) would cause the relatively far-right Japanese LDP (***CoG***=8.9) to reduce the deficit 0.8±% of GDP. The same increase would cause the left-most incumbent (Britain's Labour: ***CoG***=2.78) to increase the deficit 0.42±% of GDP. At sample-mean, ***CoG***=5.54 (typical of Democratic-president-led US governments), the effect is small and insignificantly negative at -.13±%. Thus, the partisan-cycle effect of replacement risk clearly dominates whatever debt-as-constraint effects it might have.

Figure 13 illustrates these replacement-risk-augmented partisan-budget-cycles most clearly, plotting estimated deficits or surpluses as government partisanship oscillates regularly from ***CoG***=4 to ***CoG***=7 (mean±1-standard-deviation) at frequencies of one to five years (sample range of hazard-rate is 0.4-5±). Only when government partisanship changes very frequently, each holding office for less than three years, do partisans behave according to standard partisan theory, otherwise, when

[51] These models were developed primarily to explain the, presumed exceptional, cases of right governments increasing and/or left partisans reducing debt. By nature, regressions covering 600+ country-years swamp exceptional cirumstances, *but* these results are almost significantly opposite of expectations, suggesting minimally that these theories are insufficient to explain these (not so exceptional as it happens) circumstances.

[52] Joining nicely to Schultz's (1995) finding that incumbents engage in electoral manipulation especially when expecting close elections, this suggests that right and left governments must face stiff partisan competition to manipulate debt as their core constituencies desire. Sitting comfortably or facing less opposition threat, they are less solicitous and perhaps more cavalier about economic efficiency. Powell (1982: ch. 5) argues similarly that partisan differences in policy would only be apparent where regular left-right alternations in government occur.

governments retain office for longer, the right runs deficits and the left surpluses, contrary to simple partisan theory. However, opposite the Persson-Svensson model, the *greater* the replacement risk the *more* the left and right act according to standard partisan theory, running deficits and surpluses respectively. Thus, the results suggest that both venerable partisan-budget-cycle and newer strategic-debt-use theories may need revision; perhaps the theories might usefully merge as follows.



<u>Figure 12</u>: Estimated Deficit-Impacts of 1-Unit Changes in Government Partisanship and Replacement Risk as Functions of the Levels of the Other

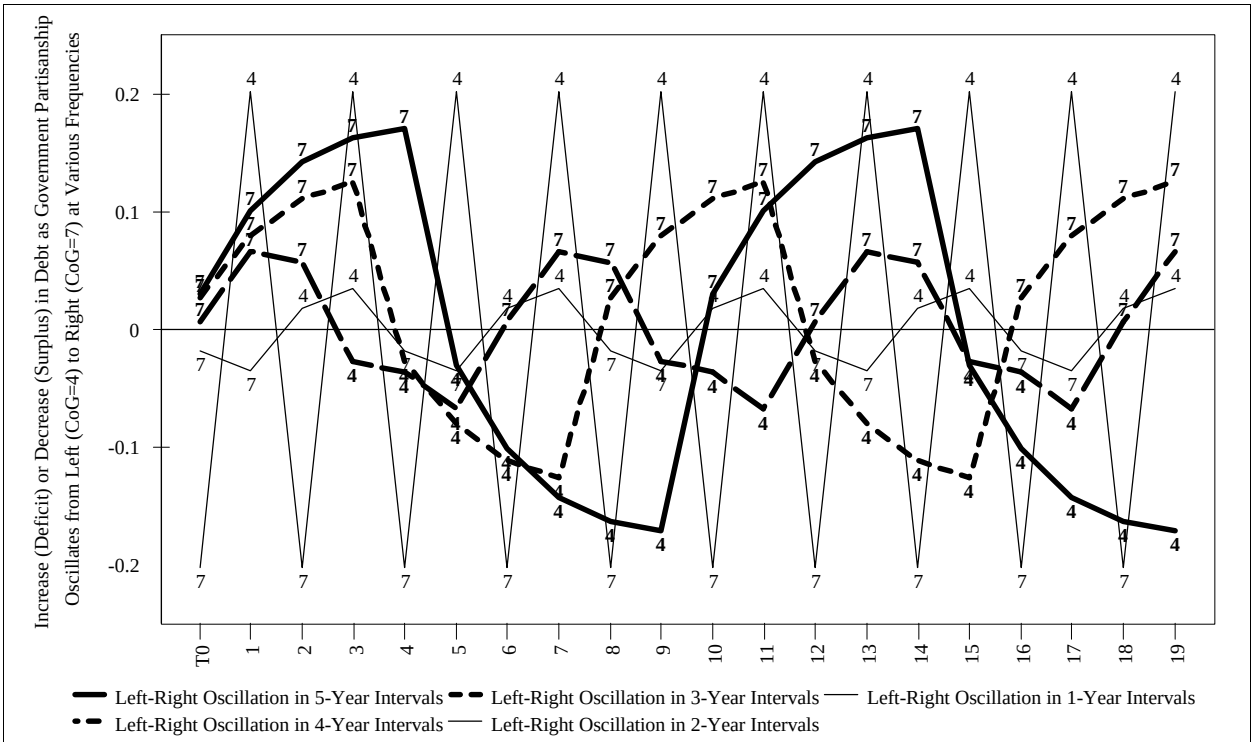


Figure 13: Deficits or Surpluses as Governments of Differing Partisanship Oscillate at Different Frequencies

Strategic-debt-use-to-constrain-oppositions theories seem to underestimate the persistence of debt and to ignore the logical connection between replacement risk and the frequency of partisan oscillation. Given extremely slow debt-adjustment, right incumbents who expect frequent oscillation in government between themselves and the left might be unwilling to increase debt to constrain their opposition because they expect to hold office again in the near future when that debt will still mostly exist to constrain them. Only if they expect less-frequent government oscillation will expected time between stints in office suffice to begin considering strategic debt-manipulation. Moreover, relatively secure right governments might also think to sieze upon their current security to increase voter-held debt, risking core-consituency support in an attempt to augment the electorate's inflation aversion, thereby altering voters' partisan preferences to help the party cause in future elections. If, conversely, the left expected to hold office durably, it might wish to retain more fiscal maneuvering-room precisely because its core partisan interests favor fiscal responsiveness. Thus, when both are secure,

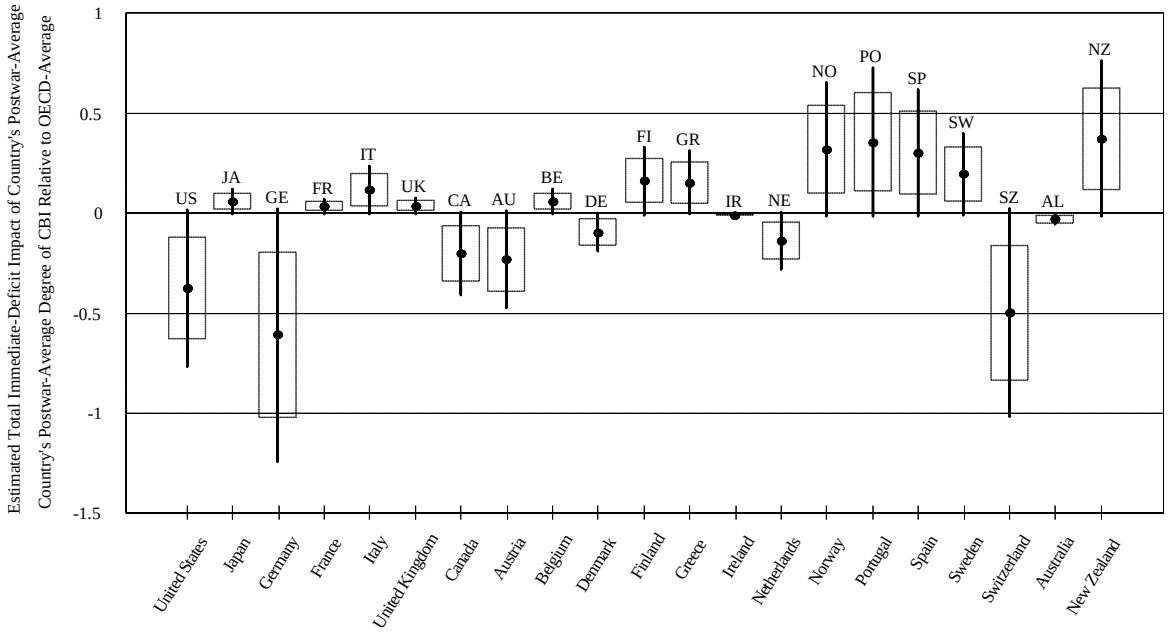
the left may be less likely than the right to tolerate structural deficits because it must retain fiscal maneuverability to respond any economic difficulties that may arise in the future. Additionally, a temporarily secure left may attempt to bolster that security by maintaining voter-held debt at low levels, ameliorating inflation-default concerns about it among the electorate. An insecure left, finally, must respond more quickly even to relatively small economic downturns because it cannot risk its core-constituency support and because it expects that the right will not react sufficiently (by left standards) to the downturn, which will likely persist into the right's quite imminent term.

This replacement-risk-augmented-partisan-budget-cycle theory accords with the findings here and with some stylized facts about capitalist democracies' postwar debt experiences. E.g., Sweden's long-secure left kept debt relatively low while it was in power while Italy's equally long-secure center-right tolerated unrestrained structural deficits. Meanwhile, the left was more associated with deficits and the right more with surpluses in countries like the UK where left and right oscillated with greater regularity. While evidence for or against this reconsideration and broadening of partisan theory should not be drawn from the sample used to derive the argument, these findings certainly recommend further theoretical development and empirical evaluation of the conjecture.

III.D.8. Central Bank Autonomy and Conservatism

Finally, central bank autonomy and conservatism (***CBI***), by reducing options for inflationary finance of debt, does seem to persuade governments to refrain from accumulating debt (p . .06). As the political-economy cycle suggests, democratic governments' debt-policies depend on ***CBI*** and, indeed, other macro-political institutions like presidentialism, federalism, and electoral districting because these institutions modify the policy options available to governments and/or the relations between policies and outcomes. As a set, these macro political-economic institutions add significant explanatory power to the encompassing model (p . .0008). All but ***CBI***, have been discussed above.

To complete the empirical tour: a standard-deviation increase (0.2±) in CBI, about the gap from the Dutch bank to the US Federal Reserve and from the Fed to the *Bundesbank*, yields about .26±% of GDP lower deficits and 19±% lower long-run debt. ***CBI*** exhibits little cross-time variation, so its impact is best seen by comparing the estimated deficit-impacts of central-banking institutions across countries. As Figure 14 reveals, ***CBI*** has been an important obstacle to debt accumulation in some democracies. (Recall that, assuming average adjustment-rates and that ***CBI*** is constant, long-run debt-effects are 75± times the immediate deficit-impacts shown in Figure 14.)



<u>Figure 14</u>: Estimated Deficit-Impact of Countries' Central Bank Autonomy and Conservatism (*CBI*) Relative to Postwar OECD-Average *CBI*

IV. Discussion and Conclusions

Table 8 lists estimated immediate-deficit and long-run-debt effects of standard-deviation increases in each independent variable, helping calibrate the importance of each in explaining debt variation across developed democracies over the postwar era. Two prominent facts merit re-emphasis. First, though economic conditions were clearly central to shared postwar experiences of declining debt-to-GDP ratios through the seventies and rising ratios thereafter, institutional and other

political factors were often as important. Second, high real-interest-net-of-growth-rates (***DRIG***) and highly fractionalized governments (***NoP***) in particular had disastrous long-run consequences when left unaddressed. Table 8 also reinforces several conclusions from the above discussion.

Table 8: Estimated Deficit and Long-Run Debt Effects of 1-Std.-Dev. Permanent Shocks

Independent Variable (Standard Deviation)	Immediate Deficit-Effect of + 1 Std. Dev. Shock	Long-Run Debt-Effect + 1 Std. Dev. Shock
UE **(3.64%)**	+0.94*	+15.26*
Y **(2.78%)**	-0.16	-14.91
DXRIG **(3.07%)**	-0.10	-24.44*
DRIG **(4.32%) at mean(*D*)-s.d.**	+0.23*	+35.56*
DRIG **(4.32%) at mean(*D*)**	+0.70*	+110.75*
DRIG **(4.32%) at mean(*D*)+s.d.**	+1.18*	+185.94*
ToT **(.151) at mean(*OPEN*)-s.d.**	+0.24*	-8.39*
ToT **(.151) at mean(*OPEN*)**	-0.61*	-34.37*
ToT **(.151) at mean(*OPEN*)+s.d.**	-1.47*	-60.34*
OPEN **(.245) at *ToT*=1**	-0.07*	+22.05*
ADwiG **(1.47) at mean(*D*)-s.d.**	+0.12	+7.93
ADwiG **(1.47) at mean(*D*)**	+0.03	+2.19
ADwiG **(1.47) at mean(*D*)+s.d.**	-0.05	-3.55
NoP **(1.21) at mean(*D*)-s.d.**	-0.19	-32.95
NoP **(1.21) at mean(*D*)**	+0.18*	+30.59*
NoP **(1.21) at mean(*D*)+s.d.**	+0.55*	+94.12*
y **(.372)**	+0.20	+15.03
OY **(.186) at mean(*RW*)-s.d.**	-3.05*	-25.98*
OY **(.186) at mean(*RW*)**	-1.57*	-25.98*
OY **(.186) at mean(*RW*)+s.d.**	-0.10	-25.98*
RW **(.167) at mean(*OY*)-s.d.**	-1.84*	Long-run effects of income-disparity are zero by construction.
RW **(.167) at mean(*OY*)**	-0.37	
RW **(.167) at mean(*OY*)+s.d.**	+1.11*	
ELE **(1)**	+0.95*	+21.35*
CoG **(1.54) at mean(*RR*)-s.d.**	+0.20*	+14.39*
CoG **(1.54) at mean(*RR*)**	+0.11	+8.33
CoG **(1.54) at mean(*RR*)+s.d.**	+0.01	+0.82
RR **(.334) at mean(*CoG*)-s.d.**	+0.06	+4.36
RR **(.334) at mean(*CoG*)**	-0.04	-3.15
RR **(.334) at mean(*CoG*)+s.d.**	-0.15	-10.66
PRES **(.372)**	-0.50*	-36.38*
CBI **(.202)**	-0.26*	-18.90*
FED **(from 1 to 12)**	-0.79*	-58.30*
ENED **(from 27 to 115)**	+0.29	+21.08
AE **(.171)**	+0.14	+10.24
TTAX **(2.90%)**	-0.11	-8.33
ITAX **(9.07%)**	+0.36*	+26.55*
CTAX **(15.0%)**	-0.73*	-53.61*

NOTES: Long-run effects calculated for permanent 1-standard-deviation increases in independent variables except: ***FED*** and ***ENED*** effects are for standard-deviation increases from their medians; immediate effect of ***ELE*** sums 2-year effect

of 1 election; long-run effect is for increasing mean ***ELE*** from .2 to .5 (i.e., shifting from elections every 5 to 2 years). All long-run effects calculated at sample-means of ***DRIG***, ***NoP***, and ***ADwiG***, excepting movements in these variables themselves for which long-run calculations are for standard-deviation increases centered on their means. * = p . .10.

(1) Fractionalization and (less so) polarization of governments, the political factors receiving most prior empirical attention, are often no more important than other political-institutional factors considered here. Fractionalization is indeed critical when it occurs at extreme debt-levels and delays their stabilization, but it has more-moderate influence near average debt and even hinders deficits when debt is low. Its importance, like that of ***DRIG***, dominates at high debt where it magnifies debt-impacts of all factors, including itself, dramatically. Elsewhere, macro-institutions like central bank autonomy and conservatism or presidentialism play key roles in explaining cross-country variance.

(2) While the evidence clearly rejects previous inter-/intra-generational-transfers theories of debt-determination, it equally clearly demonstrates the substantive importance of age-demographics to short-run deficits and long-run debts and of income-distribution to short-run deficits.

(3) Election-year politics are important both in that there is a statistically strong pre-*and-post*-electoral deficit-cycle, and in that increasing electoral-cycle frequency from, e.g., five to two years between elections has a sizable *long-run* impact (+21.35% of GDP) on debt.

(4) Partisan budget-cycles, contrarily, are of rather less importance in explaining post-war debt-experiences of developed democracies, especially near sample means, and usually run opposite of common wisdom. Governments' strategic use of debt seems to focus on altering the inflationary preferences of voters to secure future partisan electoral advantages, which induces counter-intuitive left/right deficit-cycles where incumbents are at least moderately secure in office. Political systems with frequent, regular, and clear shifts in government partisanship, however, can have appreciable partisan-budget-cycles that accord with conventional wisdom.

(5) Macro-institutional changes, i.e., in presidentialism/parliamentarism (***PRES***, -), in central bank autonomy and conservatism (***CBI***, -), in federalism (***FED***, -), and in electoral districting

(***ENED***, +) have small-to-moderate immediate deficit-impacts but, because they are usually long-lived if not permanent, and so can have very large long-run debt-effects. Thus, they are little relevant to cross-time variation but tend to be central to explaining cross-country variation.

(6) Finally, fiscal-illusion effects, as captured by debt-responses to tax-structural-complexity, are not only statistically significantly present but also among the substantively most important. Thus, increasing the ease with which voters can evaluate tax burdens that fund public goods and services would seem one simple (technically, perhaps not politically) but effective reform for reducing debt.

In short, the evidence demands eclecticism in explaining developed democracies' postwar debt experiences. The data support most of the arguments proposed in the literature, and all of the variables suggested can have substantively important impacts on debt under the right (or wrong) conditions. Thankfully, the analysis also demonstrated the utility of the cycle of political economy as a framework for organizing such an eclectic approach.

The pattern of answers to Alesina and Perotti's (1994) two questions—"Why more in some countries and less in others?" and "Why now and not before"—are now clear. The answer to the second is, mainly, that economic conditions worsened as stagflation in the seventies continued into the eighties, driving democratic governments, given their commitments to social-insurance, public-good, and macroeconomic-management provision, into debt. Then, as these governments shifted to monetary contraction to control inflation, real interest-rates rose relative to the continued slow real-growth, exacerbating the problems by increasing interest rates on the newly accumulating debt. This had especially dramatic impacts in countries that entered the period having reduced war-time debt insufficiently in the prosperous fifties and sixties, and the problems were magnified again in some high-debt countries by fractionalized governments delaying necessary stabilization plans. Thus, e.g., Belgium, Italy, and the UK entered the seventies with similar debt levels, but the UK's single-party

governments were better able to shift fiscal-adjustment costs onto their opposition's constituencies, while fractionalized governments in Belgium and Italy were unable to find adjustment plans that would distribute costs acceptably among coalition partners. Therefore, debt was mostly contained in the UK but skyrocketed in Belgium and Italy: see Figures 1, 5, and 9.

Another key part of the answer to "why in some countries and not others?" lies in persistent differences in macro-institutions (presidentialism, federalism, central-bank autonomy, etc.) and in fiscal complexity, both of which had small but persistent deficit effects that accumulated to wide debt-level disparities across developed democracies over the postwar era. Election-year politics and electoral frequency played a subsidiary role but a larger one in explaining both short-run fluctuations and long-run differences across democracies than has generally been appreciated in the literature. Demographics, income, and their distributions also seemed to play some role, but one that requires theoretical revisit. Partisanship, polarization of governments, and replacement risk seemed to play lesser roles, but there too the evidence suggested theoretical revisions. Even with all this, though, the encompassing model still explains only about half (53±%, unweighted) of the total variation in developed-democracies' debt-experiences from 1956-90, so another half of Alesina and Perotti's two questions remains an unanswered challenge to political economists.

Methodological Notes

In choosing a template specification of the models considered, several auxiliary regressions and preliminary tests were conducted. First, Augmented Dickey-Fuller tests on all variables revealed potential unit roots (null hypothesis of unit roots cannot be rejected) in ***D***, ***UE***, ***OPEN***, ***ToT*⇑*OPEN***, ***OY***, and ***OY*⇑*RW***, but residuals of debt regressed on various permutations of this set always potentially retained the unit root. Beck (1992) suggests a simple version of error-correction in cases like these with several possible cointegrating or near-cointegrating factors among the regressors. Accordingly, ***)D*** was regressed on its lagged level and two lagged differences, the economic conditions and ***OY*** in both levels and changes since only these were significant with any consistency across the models considered, and other variables only in levels, excepting ***RW*** and ***OY*⇑*RW***, which were consistently significant only in changes. In the encompassing model (Table 7), the coefficient on lagged debt has a t-stat of -3.7±, which would likely satisfy an ADF test, so inferences should be safe with respect to any lingering unit-root concerns.

This specification also survives LaGrange Multiplier tests for autocorrelated residuals up to 6 lags and Ljeung-Box tests (any lag-length). Thus, the two lagged differences and one lagged level satisfies all autocorrelation concerns.

Third, though a linear trend or a trend that differ from pre- topost-1973 were individually and jointly significant in every specification considered, including them makes little substantive difference to other coefficient estimates, so, since they interfere with the goal of examining theoretical explanations for postwar debt-experiences, they are excluded.

Fourth, residuals from the encompassing model were regressed on all country indicators to explore whether omitting fixed effects was warranted. The F-test of that auxiliary regression was not even remotely significant. This test, as compared to a Wald-test of equal coefficients on a set of country indicators directly included in the model, gives pride of place to the substantive specification. This is wholly as should be, but the more skeptical may note that the one-stage test did, in some specifications (but notably *not* in the encompassing model), reject in favor of country fixed-effects. There were two notable differences in the fixed-effects model. The macro-institutional variables were generally signed as reported but more-marginally or in-significant (as expected since they have little temporal variance), and the general shape of the results on replacement-risk-augmented partisan-budget-cycles were unchanged but became much more significant (see Franzese 1999b). Other differences were minor; full details available from the author.

Fifth, time-period fixed-effects were weakly supported by analogous tests, but rather than include 34 atheoretical indicators for time-periods, a variable equal to average deficit in each year for the other countries in the sample (***)D*$_{\sim i,t}$) was created. Using ***)D*$_{\sim i,t}$, time-indicators were always rejected. Replacing time-indicators with)D$_{\sim i,t}$ had little effect on any substantive result. One exception: real-GDP-*per*-capita is marginally significantly negative with time indicators.

Sixth, OLS residuals from each model were squared and regressed on the set of country-indicators. The F-statistic of that auxiliary regression, which tests panel heteroskedasticity against a homoskedastic null, was invariably high ($p<.0001$). The Durbin-Watson from this auxiliary regression tests first-order autoregressive-conditional-heteroskedasticity, ARCH, against a panel-heteroskedasticity null. DW>1.84 in all models, so panel-heteroskedasticity suffices. All regressions also employ panel-corrected standard-errors (PCSEs): Beck and Katz (1995, 1997). GAUSS code to implement PCSE's in samples, like the present, which are non-rectangular and/or contain missing data is available from the author's homepage (Franzese 1996a).

Thus, reported regressions were estimated: (1) run OLS, saving the residuals, (2) regress squared residuals on country indicators, saving fitted values, (3) inverse the square root of those fitted values as panel weights for WLS, (4) run WLS and compute PCSE's based on the weighted residuals. Gauss code to implement all this available on request.