

From the Ballot to the Blackboard?

Partisan and Institutional Effects on Education Policy in the OECD

Abstract

Most policymakers and economists agree that the quality of a nation's human capital stock is a chief determinant of economic growth. However, public spending on education also has serious implications for the future distribution of resources in society. This study examines how these distributional concerns are realized in the arena of party politics. Three key questions are explored. Firstly, whether left-wing parties spend absolutely greater amounts on public education than do right-wing parties. Secondly, whether left-wing parties also spend a greater relative proportion of the government budget on education. And thirdly, how the structure of electoral institutions impacts such partisan patterns. Using a panel dataset of OECD countries from 1960 to 2000 the study finds that not only do left-wing parties spend both absolutely and relatively larger amounts on public education but also that this pattern is amplified in majoritarian electoral systems, which produce volatile swings in education spending.

1. Introduction

Education should be a politically uncontroversial subject. Rare is the politician who plays the ‘anti-education’ card. The recent emphasis on education by both Presidential candidates in the U.S. elections of 2004 is just one case among many where the rhetoric of right and left has converged toward a pro-education line.¹ Yet, underneath the bipartisan platitudes about education lie some critical trade-offs that lead to de facto partisan divergence in education policy. Just as all politicians favor higher employment or broader health coverage as goods in themselves, all parties claim to value public education. However, as with all public services, trade-offs must be made between this publicly financed good and the tax revenues required to fund it. Left-wing parties tend to tip the scales towards increasing taxation and, thus, the provision of public goods and transfers. Right-wing parties, at the margin, favor market provision. This partisan pattern can be seen in a variety of policies: unemployment benefits, macroeconomic policy, the level of taxation, amongst others (Hibbs, 1977; Bradley et al. 2003). However, the degree to which policies reflect partisan preferences is mediated by the electoral institutions in which parties must operate. This article examines how partisan preferences are manifested in the realm of public education spending and how they become dampened or amplified by the structure of electoral institutions.

This work builds on a number of recent studies in the political economy literature examining the supposed impact of partisanship on a variety of social spending indicators.

¹ Moreover, there is a large degree of consensus among economists that the level of education provision is strongly related to economic growth (for an excellent survey of the literature see Van Reenen and Sianesi 2003), although some dissenters remain, in particular Wolf (2003).

In particular, Carles Boix (1998) has stressed a strong effect of partisanship on the ‘supply-side’ of the economy - that is, tax policy and public investment, including that in education – with socialist control of government seemingly correlated with higher investment in education. However, Boix’s work relies on a fairly limited set of data, especially as regards his analysis of investment in education. Because of data availability, he was only able to use three cross-sectional analysis of eighteen OECD states,² with mixed results in terms of statistical significance. This study benefits from a more complete time-series dataset on public education spending as well as more refined measure of partisanship than that used by Boix.³ Thomas Cusack and Lutz Engelhardt (2002) have developed a comprehensive country-year dataset measuring partisanship within countries’ cabinets, lower house, and upper house across twenty-three states. This dataset allows a much more nuanced analysis of the effects of government partisanship on public spending.⁴

Although partisan preferences are a key determinant of resulting policy, parties do not operate in an institutional vacuum. The structure of electoral institutions has a critical impact in channeling these preferences. An important recent literature in political economy has devoted considerable energy to ascertaining what effects such institutions -

² One cross-sectional analysis is undertaken for 1970, one analysis for the change in education spending between 1970 and 1979, and a further analysis for the change in education spending from 1980 to 1990.

³ Boix uses the proportion of posts in cabinet held by socialist or communist parties, which is a rather blunt instrument for measuring partisanship, considering that it fails to distinguish, for example, right wing parties from centrist ones.

⁴ In particular, because the Cusack-Englehardt dataset is derived from a set of comparative manifesto scores, it is possible to actually measure how the partisanship of particular parties changes over time.

for example, the difference between proportional representation and majoritarianism – might have on government spending (Austen-Smith, 2000; Lizzeri and Persico, 2001; Persson and Tabellini, 2003). Yet the focus, to this point, of the literature has largely been on current redistribution, through tax and transfer policies, or social insurance like unemployment benefits and pensions. Missing so far is an analysis of how political institutions might affect *future redistribution* – that is, investment now in human capital, which produces returns at a later point. Moreover, there has been little analysis of whether partisanship might differ in its effects on social spending under a variety of political institutions.⁵ This paper attempts to remedy this neglect by examining how the partisan effect on education varies under majoritarianism and proportional representation.

This article develops these intuitions using a formal model of human capital investment, which examines how education spending is influenced by partisan preferences and how these preferences are channeled by electoral institutions and voting patterns. Section Two presents this formal model of how partisan preferences determine the equilibrium rate of education spending and presents a series of testable hypotheses derived from the model. Section Three tests these claims on a cross-national dataset of OECD states from 1960 to 2000 with a variety of statistical techniques, examining the effects of partisanship on education spending, the composition of overall government expenditure, and the interaction of institutions and voting patterns with partisanship. Section Four concludes and suggests a variety of possible extensions.

⁵ Most studies, including the well-known empirical work by Persson and Tabellini (2003) assume that the impact of electoral institutions on policy outcomes is *independent*. This study, in contrast, assumes that the impact of institutions operates only through the manner in which they constrain the range of potential partisanship.

2. A Simple Model of Partisan Preferences over Education Spending

Despite the voluminous recent literature on the political economy of redistributive expenditure (e.g., Persson and Tabellini, 2000; Wallerstein and Moene, 2001; Iversen and Soskice, 2001), there is a general absence of models examining the political economy of education spending. This neglect is partly a reflection of the modeling techniques generally used by labor economists to examine education. The economics of education originated in Gary Becker's (1964) pioneering work on how individuals trade off the internal rate of return to education against the discounted cost of engaging in it. Later important work by Spence (1974) disputed that human capital was acquired for purely productive purposes and demonstrated how it might instead serve to signal ability. Much recent work focuses on the determinants of the returns to education, again assuming that labor supply is the product only of individual choices to undertake education in response to incentives (e.g., Card and Lemieux, 1994; Dearden et al, 2002). The crucial commonality among these studies is that they broadly assume that education is a private investment, for which costs and benefits accrue individually.

In contrast, examining public education requires a different theoretical framework because it is a political decision about the ratio of national income to devote to public education, which, at least in principle, can be provided in uniform amounts across the population. Since the government is not itself choosing an amount of education that will balance costs with its own 'internal rate of return', the Beckerian calculus cannot be

applied particularly usefully.⁶ In as much as the economic literature does examine optimal levels of state investment in education, it is through the lens of the production of positive externalities, which justify government intervention. While efficiency gains from internalizing externalities are important justifications for public spending on education, such an analysis rather misses the critical redistributive impact of such spending.

In fact, more relevant to the study of public education provision is the political economy literature on the determinants of the size of the public sector (e.g., Meltzer and Richard, 1984; Persson, Roland and Tabellini, 2000; and Iversen and Soskice, 2004). Since public education is by definition funded from the public purse, as long as the tax system is progressive, education is necessarily redistributive.⁷ The key questions for this study are how this redistribution operates and how parties differ in their preferences over the amount of public education supplied by the government. The model starts from a simple baseline of assuming that public education operates like any other form of redistributive subsidy before adapting the model to distinguish education from other government spending by virtue of its impact on income mobility. The role of parties is examined by commencing with a simple two party system before examining the difference between a two-party majoritarian electoral system and a multi-party proportional electoral system.

⁶ One could, in theory, construct such a model with the government acting as a benevolent social optimizer but this would entirely ignore the politics of education spending and moreover would rest on the exiguous task of determining precisely how large are the externalities produced by education.

⁷ The model in this paper assumes a flat tax and lump sum redistribution so as to simplify the model. However, introducing a progressive income tax system, as exists in most OECD states, will in fact accentuate the partisan patterns demonstrated in the model.

We begin by depicting a country with three equal-sized income groups: the poor P , the middle class M , and the high income group H , with total population normalized to unity. This set-up is in line with much established work on the political economy of redistribution but the basic results also carry through in a two-group set-up or using continuous income.⁸ Before examining how parties aggregate the interests of these three groups it is revealing to examine the preferences of these groups over public education provision. We start by assuming that public education is a simple lump sum public good h , which provides individuals with concavely increasing utility ($0 < \alpha < 1$); that is, as with most non-fungible goods, diminishing marginal returns set in with increased education. Individuals receive the same amount of education each and pay a flat tax rate t on their income y – hence the setup of the tax system is progressive. The education subsidy h is funded from the total tax take, which equals the tax rate multiplied by average income. Groups are denoted by J and their utility appears as follows:

$$U_J = (1 - t)y_J + \frac{1}{\alpha} h^\alpha \quad \text{where } h = t\bar{y} = t \left[\frac{y_P + y_M + y_H}{3} \right]$$

In order to derive the optimal level of education for each group we take the derivative of utility with respect to the level of taxation, producing a first order condition. This provides us with education as a function of the ratio of group to average income:

$$h_J^* = \left[\frac{y_J}{\bar{y}} \right]^{\frac{\alpha}{\alpha-1}} \Rightarrow \frac{\partial h_J^*}{\partial [y_J/\bar{y}]} < 0$$

⁸ However, the results on electoral system are reliant on the three group set up by assumption. On uses of the three group set-up see Persson and Tabellini (2000).

Since all individuals receive the same education subsidy but the wealthier groups pay absolutely more, the derivative of the education subsidy with respect to group income is negative as might be expected.⁹ The baseline model thus implies that parties representing the poor will desire higher levels of education spending than those representing the wealthy. The precise manner by which parties aggregate group interests to this end is developed in the next section.

Parties and Basic Public Spending on Education

We begin the analysis of partisan preferences over public education by assuming a simple two-party system with probabilistic voting. Since there are three groups in our economy, there are too few parties for each group to be perfectly represented. In fact, we shall assume that the two parties, L and R , fully represent P and H respectively but that the middle group is split across both parties in terms of representation. That is, each party can be thought of as made up of representatives of either P or H and an unknown proportion of M . For any given election, the leader of the party who will make policy

⁹ The model thus presents a simplified form of the classic Meltzer-Richard (1984) formulation as developed in Persson and Tabellini (2000, pp.48-9). Any use of this framework needs to address the well-known criticism that empirical research has generally failed to support its assertion that inequality will lead to higher redistribution (see Iversen and Soskice, 2004). This paper, however, does not use the framework to determine policy outcomes over a continuum of voters but instead to determine the preferences of discrete groups who are represented by partisan politicians who cannot commit to the median voter's preferences. Thus, the empirical dubiousness of Meltzer-Richard does not undermine the results presented here. In any case, recent work has shown that once measures of household rather than earnings inequality are used, the Meltzer-Richard findings appear to hold up quite well (Kenworthy and Pontusson, 2005).

following election may be a member of M , with probability θ_K , where $K = (L, R)$, or of one of the fully represented groups, with probability $(1 - \theta_K)$. Over repeated elections $\theta_L = \theta_R = \theta$, but in any given election this symmetry may not hold, hence there is uncertainty over which party best represents the middle-class's interests. Once in power the leader of the elected party will make policy according only to their own partisan preferences: that is they cannot commit to any other group's policy, despite the possible vote gains that such a commitment might encourage.¹⁰ Under this probabilistic model, if party L is elected, the preferred education policy of group M will be imposed with probability θ_L , and the preferred policy of P with probability $(1 - \theta_L)$. A symmetric pattern occurs with party R . The key prediction of such a model is that over repeated elections, where $\theta_L = \theta_R = \theta$, the parties will impose the following expected policies:

$$E(h_L^*) = \theta h_M^* + (1 - \theta)h_P^* = \theta \left[\frac{y_M}{\bar{y}} \right]^{\frac{\alpha}{(\alpha-1)}} + (1 - \theta) \left[\frac{y_P}{\bar{y}} \right]^{\frac{\alpha}{(\alpha-1)}}$$

$$E(h_R^*) = \theta h_M^* + (1 - \theta)h_H^* = \theta \left[\frac{y_M}{\bar{y}} \right]^{\frac{\alpha}{(\alpha-1)}} + (1 - \theta) \left[\frac{y_H}{\bar{y}} \right]^{\frac{\alpha}{(\alpha-1)}}$$

This implies that, over repeated elections, the optimal policy for the left party is higher than for the right party since $E(h_L^*) > E(h_R^*)$, producing Hypothesis One:

H1: Left parties will spend higher amounts on public education than right parties.

¹⁰ In particular, this inability to make ex ante policy commitments prevents convergence to the median voter, in this case the middle group's preferences. In a world of perfect commitments, parties would be incentivized to promise the middle group their optimal policy because without doing so they would inevitably lose the election and if they reneged on this commitment they would suffer reputation costs.

The Composition of Government Spending

The baseline model above presents a simplified view of education as redistribution. While, it is clear that public education is more likely to be preferred by the poor in as much as it amounts to a uniform subsidy to all citizens, it should also be obvious that education is not a simple public good like libraries or parks, which the poor prefer to be provided publicly and the rich might prefer to pay for privately. Education, in fact, presents a much more serious challenge to members of the elite than a mere tax and transfer system because it threatens their privileged position in the future distribution of income. In this section we adapt the model to represent this potential effect.

Instead of the earlier setup, which occurred in just one period, the adapted model now operates over two periods (denoted zero and one), which can be thought of as representing parents and children. The future period is discounted by δ , which can be thought of either as a traditional discount factor representing preference for utility in the present or as reflecting a dilution of pure altruism between generations.¹¹ In this set-up tax revenues can be split between a simple round zero redistribution, g , (which, for simplicity, is linear in utility) and an investment in education, h , which is redeemed in round one. This education investment increases the probability $p(h)$ of changing groups – in essence, we can think of it as increasing the degree to which income becomes meritocratically distributed, on the proviso that ability is evenly distributed. There is a 1/3 chance of joining any of the groups under full meritocracy. Utility now looks as follows:

¹¹ This assumption is standard in the few formal works that examine human capital preferences (Persson and Tabellini, 2000) and could also be made if we assumed that households, rather than individuals, are the key agents in the model, although this raises questions about whether there is a one-to-one relationship between households and voters.

$$U_J = (1 - t)y_J + g + \delta \left[p(h) \frac{1}{3} (y_H + y_M + y_P) + (1 - p(h))y_J \right]$$

In order to examine the relative trade off between education spending and other government spending we need first to examine the derivatives for each group, with respect to education spending:

$$\frac{\partial U_P}{\partial h} = \delta \frac{\partial p}{\partial h} \left[\frac{1}{3} (y_H + y_M + y_P) - y_P \right] - \left[1 + \frac{y_P}{\bar{y}} \right]$$

$$\frac{\partial U_M}{\partial h} = \delta \frac{\partial p}{\partial h} \left[\frac{1}{3} (y_H + y_M + y_P) - y_M \right] - \left[1 + \frac{y_M}{\bar{y}} \right]$$

$$\frac{\partial U_H}{\partial h} = \delta \frac{\partial p}{\partial h} \left[\frac{1}{3} (y_H + y_M + y_P) - y_H \right] - \left[1 + \frac{y_H}{\bar{y}} \right]$$

As before, it should be clear that the poor prefer education spending to the middle income group, who prefer it to the high income group. But how does education spending compare to the round zero lump sum subsidy g ? The derivative of utility with respect to g is:

$$\frac{\partial U_J}{\partial g} = 1 - \frac{y_J}{\bar{y}} - \delta \frac{\partial p}{\partial h} \left[\frac{1}{3} (y_H + y_M + y_P) - y_J \right]$$

Which implies that education spending h is preferred over the lump sum g if:

$$\delta \frac{\partial p}{\partial h} \left[\frac{1}{3} (y_H + y_M + y_P) - y_J \right] > 1$$

This equation is clearly more likely to hold as we move from the high income group to the middle income group to the low income group. Note that under this setup education is always less preferable for the high income group than would be a lump-sum subsidy: it is always in the interests of the rich that the government ‘bribe’ the poor rather

than spend money on education.¹² Poorer groups, including the middle class, have a higher relative preference for education spending vis-à-vis straight redistribution, provided that education has a strong enough effect on promoting meritocracy and dependent on the relative income of the high income group vis-à-vis the middle class and the poor. In as far as groups' preferences are represented by parties in a manner similar to that outlined in the previous section, Hypothesis Two will hold:

H2: Left wing parties will prefer the composition of government spending to be slanted toward education spending vis-à-vis other government spending.

Electoral Institutions and Partisanship:

The final extension of the model examines how electoral systems alter the partisan effect on education spending. As noted earlier, a multitude of authors have examined the effects of electoral systems on various forms of public spending. However, they have used a variety of different models in order to elucidate the mechanism by which electoral systems are supposed to impact on spending. Typically, most authors suggest that electoral systems have an independent effect on the level of spending. Persson and Tabellini (2002), for example, provide extensive empirical evidence claiming that welfare states are systematically smaller in states with majoritarian electoral systems. Their work is informed by theoretical priors developed by Lizzeri and Persico

¹² There is a potential analog here with Acemoglu and Robinson's (2004) depiction of whether elites will try to bribe the poor with redistribution rather than face full democratization, although their model obviously does not take place in a democratic party system like that presented in this paper.

(2001), who suggest that the attention paid to ‘non-pivotal’ voters under proportional systems means these systems have higher spending than swing-voter oriented majoritarian systems, and by Austen-Smith (2000), who notes that the greater number of parties under proportional systems leads to coalitional bargains that ante up public spending. Rogowski and Kayser (2001), although ostensibly interested in the determinants of the price level rather than public spending per se, derive a similar answer: majoritarian systems are more swing-voter-attuned than proportional ones and are likely to favor consumers over producers accordingly.

Iversen and Soskice (2004) suggest that it is not the electoral institutions themselves that directly affect spending but their influence on which party is more likely to obtain office: they suggest that proportional systems favor center-left parties. In proportional systems, the middle class do better by entering into coalition with working class parties than by joining a coalition with the wealthy since in a left-middle coalition both members can ‘plunder’ the wealthy, whereas the working class offer little booty for a middle-wealthy alliance. Conversely, majoritarian systems favor center-right parties because in this case voters in the middle class can only choose between two parties, center-left and center-right, with the former likely to be dominated by the working class, who will plunder both the wealthy *and* the middle class: the middle class thus tends to vote center-right. Thus public spending is directly determined by party preferences but the likelihood of parties gaining office is determined by electoral institutions.

This study takes Iversen and Soskice’s intuition one stage further and examines whether electoral institutions not only affect the likelihood of particular parties coming to power but how partisan they will be once in office. I adapt Iversen and Soskice’s model

and concentrate on the *range* of partisanship likely under PR versus majoritarianism. The previous sections have shown that education spending is a particularly redistributive form of government expenditure. Hence, we should expect tax and transfer regimes for education to be highly progressive. Following Iversen and Soskice's assumptions, let us concentrate solely on the taxation and provision of education and abstract away from concerns about the composition of government spending outlined in earlier sections. Using our three groups P , M , and H , we assume, following Iversen and Soskice, that because of proportionality the maximum tax takes from each group are θ , T_M , and T_H , and that all taxes will provide education funding.¹³ We shall concentrate solely on changes in the aggregate tax take under different electoral systems, and in particular on the potential *range* of tax take.

Under majoritarianism, there are two parties L and R , with the former being led by a member of P with probability $2/3$ and by a member of M with probability $1/3$; the latter by a member of H with a probability of $2/3$ and by a member of M with probability $1/3$.¹⁴ These probabilities emerge from the equal size of each group and can be thought of as representing voters' uncertainty about the ideology leaders of each party during a campaign. Each party will attempt to maximize the optimal policy of its members,¹⁵ which amounts to, for P , M , and H , respectively: $(T_H + T_M)$, T_H , and θ . Thus the expected tax revenue ρ of the L and R parties, and the potential range of policy, are:

¹³ The poor group is assumed to pay no taxes so as to simplify the model. However, the results carry through provided they pay less than T_M .

¹⁴ This corresponds to our earlier probabilistic partisan set-up where $\theta_L = \theta_R = \theta$,

¹⁵ That is, the optimal amount of taxes they can expropriate from the other groups without violating the progressivity of the tax system.

$$E(\rho_L) = \frac{2}{3}[T_H + T_M] + \frac{1}{3}T_H$$

$$E(\rho_R) = \frac{1}{3}T_H$$

$$E(\text{Range}_{MAJ}) = E(\rho_L) - E(\rho_R) = \frac{2}{3}[T_H + T_M]$$

Under PR, there are three parties, L , C , and R , representing P , M , and H . If each group votes for its representative party, policy will be developed through coalitional bargaining in the post-election period. We assume, following Iversen and Soskice, that each party has an equivalent chance of being made *fondateur*. We assume that once a coalition is formed, Rubenstein bargaining takes place and the final tax revenue therefore lies halfway between the optimal points of each party. We abstract away from the possibility of renegeing on bargains.¹⁶ As might be expected, in terms of ascertaining the potential range of tax revenue, the key instances we want to look at are when L or R , are made *fondateur*. If L is chosen they choose between C and R as partner:

$$L \text{ Chooses } C \Rightarrow E(\rho_{LC}) = \frac{1}{2}[T_H + T_M] + \frac{1}{2}T_H$$

$$L \text{ Chooses } R \Rightarrow E(\rho_{LH}) = \frac{1}{2}[T_H + T_M]$$

Unsurprisingly, L will therefore choose to bargain with C , who can offer them a higher tax take. If R is chosen as *fondateur*, they will likewise choose to bargain with C and this coalition produces the simple total tax revenue of $\frac{1}{2} T_H$. Thus, to calculate the potential range of tax revenue we need to look at the difference between the tax revenue of the LC coalition and that of the CR coalition:

¹⁶ This possibility is dealt with at length by Iversen and Soskice, who show that their results still obtain, provided no group can make credible commitments to under-exploit their bargaining power.

$$E(\text{Range}_{PR}) = E(\rho_{LC}) - E(\rho_{CR}) = \frac{1}{2}[T_H + T_M] + \frac{1}{2}T_H - \frac{1}{2}T_H = \frac{1}{2}[T_H + T_M]$$

Thus, the range of partisanship under PR is significantly smaller than that under majoritarianism. This result obtains largely because of the increased bargaining power of the middle group, with its commensurately more moderate policy preferences, under the PR system, where it counts for half of the post-election governing coalition. Under majoritarianism, the two-party system squeezes the middle class into only a third of either of the two parties. Thus, we should expect the partisan effect to be stronger under majoritarianism, leading to Hypothesis Three:

H3: Majoritarian electoral systems will accentuate the partisan effects outlined in Hypothesis One and Hypothesis Two.

3. Empirical Evidence for the Effect of Partisanship

The models developed in Section Two suggest a variety of relationships between partisanship and education spending that could be subjected to empirical testing. However, in order to examine how partisanship affects education spending we need to develop clear measures of these variables. Education spending is, of course, a multifaceted concept but this paper focuses primarily on aggregate expenditure since the distributional consequences of changes in aggregate spending are generally more significant than changes in the composition of education spending. The first dependent variable used is *public expenditure on education as a percentage of GDP*, taken from the World Development Indicators database (World Bank, 2004). This measure has a number of important advantages as a dependent variable in the context of this study. Firstly, it has

been used in previous studies of party effects on education spending (Boix, 1998; Brown and Hunter, 2004). Secondly, because it is a ratio it is comparable across states of different sizes and levels of wealth. Thirdly, it has the best data availability of all the potential measures for education spending.

The second dependent variable is the *composition of government expenditure*: public education spending as a percentage of all government spending. This variable permits us to examine the *priority* that governments place on education spending within a given public budget. It could be, for example, that fiscal contraction forces governments to reduce education spending but proportionately less so than other expenditures. In this case, *public expenditure on education as a percentage of GDP*, would show a negative change, whereas the *composition of government expenditure* would show a positive change. If the model outlined above holds, we should expect that composition should show partisan swings because education is more redistributive than most other forms of government spending due to its effect on the future distribution of income.

The key independent variable used throughout the analysis is the *cabinet partisanship* variable, available from the Cusack / Engelhardt dataset (2002). This center of political gravity variable is constructed using the following formula: $CPG = \sum_{i=1}^n T_i C_i$, where T_i is party i 's decimal share of seats in cabinet and C_i is party i 's position on the ideological dimension where left-wing parties score less than zero and right-wing parties score higher than zero. These measures of ideology are taken as an average of three sets of expert codings: those of Castles and Mair (1984), Laver and Hunt (1992) and Huber and Inglehardt (1995).

Table Two examines the impact of electoral institutions on partisanship in education policy. Three particular scores measuring proportionality are used. Firstly, a measure of whether a state is a non-single-member-district system taken from Huber et al (2004): states with single-member districts are coded zero, those without are coded one and those with mixed systems are coded as one half.¹⁷ Secondly, Laasko and Taagepera's (1979) 'effective number of parties' index, which is calculated as one divided by the sum of the square roots of the shares of seats held by the different parties in parliament. Thirdly, Iversen and Soskice's (2004) measure of the proportionality of electoral systems which they construct as a composite index of Lijphart's (1994) measure of the effective threshold of representation and Gallagher's measure of the disproportionality between votes and seats. This index has been constructed to run from zero to one, where one is the most proportional system.

A variety of potentially important control variables is also included in all the analyses.¹⁸ Firstly, I include a variable measuring the percentage of the *population under the age of fifteen* so as to control for the importance of demographic changes in determining the need to invest in education. I include both *logged national income*, and the *square* of this variable, to measure both the difference between richer and poorer OECD states and the impact of within-country economic growth I also include the *log of population* to see if economies of scale permit larger countries to spend proportionately less on education and to measure the impact of population growth. The models all also include a *linear time trend* to capture the secular increase in education spending since

¹⁷ The mixed systems are Australia until 1995, France, Italy from 1995, and Japan.

¹⁸ All taken from the *World Development Indicators* database (World Bank, 2004)

1960. Finally, in all the models, save those where the *composition of government expenditure* is the dependent variable, a measure for *government expenditure except public education* is controlled for, so as to capture spending on education distinct from general rises and falls in public spending.

The data analysis uses two different cross-sectional time-series models in order to test the robustness of the suggested relationship between partisanship and education spending. The first test, used in Table One, uses the Beck-Katz panel corrected standard error (PCSE) technique. The PCSE technique essentially adapts standard OLS regression to take account of the within-state temporal autocorrelation and cross-national contemporary correlation that bedevil panel data. By adapting the error term of the OLS regression to allow for contemporaneous correlation between states, the PCSE method permits standard OLS regression to be utilized. The basic model is $Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 X_{i,t} + \gamma Z_{i,t} + e_{i,t}$, where Y is the dependent variable, $Y_{(t-1)}$ is a one-period lag of the dependent variable, X is the key independent variable of interest (*Cabinet Partisanship*), Z is a vector of control variables, and e_{it} is an error term where $Cov(e_{it}, e_{it-1})$ may differ from zero. The PCSE method then adjusts the resulting standard errors for contemporaneous correlation. The advantage of this method is that it enables the analyst to account for the whole range of temporal and cross-national variation in the dataset, while adjusting for contemporary correlation, for example a fiscal shock that hits all states' budgets simultaneously.

The second test is the fixed effects panel data method – another standard approach for cross-country analyses of this type. Unlike PCSE regression, fixed effects models permit each state to have a different time-invariant error term (or, put differently, a

different constant in the regression). This method thus controls for the fact that all time periods for one state share the same value on one measure – they belong to a specific state with possibly idiosyncratic educational expenditure. The model used is thus: $Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 X_{i,t} + \gamma Z_{i,t} + u_i + e_{i,t}$, where the key difference from before is that the regression equation now includes a country-specific error term. The downside of fixed effects regressions is that because of the country-specific intercepts, they essentially measure deviations from group means, rather than the differences between group means – that is, they are within-groups estimators rather than between-groups estimators. This means that while fixed effects regression is an effective way to examine how changes in partisanship affect educational expenditure in a given state, cross-sectional differences are brushed over between those states that tend to elect left-wing parties more often than those with a tradition of right-wing control of government.¹⁹

Effects of Partisanship on Public Education Spending and the Composition of Government Spending

Table One applies both statistical methods to examine the effect of partisanship on both *public expenditure on education as a percentage of GDP* and the *composition of*

¹⁹ However, in choosing between fixed effects methods and pooling techniques like the Beck-Katz model, one should be aware of the potential that omitting fixed effects may lead to serious omitted variable bias if the fixed effects are, in fact, correlated with the other covariates (as indeed, they are in these regressions, at a level of -.723). The debate between Green, Kim, and Yoon (2001) and Beck and Katz (2001) about whether such a possibility totally undermines pooled regression or whether it remains salvageable still rages but this author's conservative preference is for the results obtained via fixed effects despite the loss of cross-sectional validity.

public spending. Models One and Two examine the PCSE and fixed effects regressions of *public expenditure on education as a percentage of GDP*. The models used, despite their different statistical derivations, both demonstrate a statistically significant estimated effect of partisanship, with a similar magnitude. The coefficient on partisanship is estimated to be between -.005 and -.007 in size. In order to ascertain what kind of substantive effect is implied by this range of coefficients, I estimate both short and long run effects of moving across the mean range of partisanship across the 23 countries in the dataset (fifty points on the Cusack / Engelhardt scale). Short run effects thus simply amount to the coefficient on *cabinet partisanship* multiplied by fifty, which is associated with a reduction in education spending of a between a quarter and a third of a percentage point of national income. This amounts to a five to seven percent decrease in average educational expenditure across the dataset.

<Table One About Here>

Long run effects are calculated using the following expression: $(50*\beta)(1+\gamma+\gamma^2+\gamma^3)$, where β is the coefficient on *cabinet partisanship*, and γ is the coefficient on the lagged dependent variable. This measures the four year effect of a change in partisanship and is intended to represent a standard electoral cycle.²⁰ The long-run effect is estimated to be a reduction in spending of just over three quarters of a percentage point of national income, or a reduction in spending of sixteen percent of the average expenditure on education across the dataset. Clearly, a party that won multiple terms would see an even

²⁰ It is clear that the average electoral cycle varies significantly across the countries in the dataset, so this four-year cycle is intended to be representative of a likely electoral term rather than specific to any state.

greater change in education expenditure in the long-run, albeit with a falling marginal change for each extra year.

Figure One depicts two hypothetical electoral terms using coefficients from the fixed effects model,²¹ starting from the average level of education spending across the dataset and examining a switch from right to left of the average range across the states in the dataset. Two hypothetical situations are constructed: firstly, a switch from a right party to a left party for two periods; and secondly, a switch from right to left in the first term and then back again to the right party in the second term. As can be seen from the curvature of the predicted paths of education spending, the impact of changes in partisan control is immediate but tails off rather rapidly, due to the relatively low value of the lagged dependent variable coefficient (0.673). This implies that consistent partisan control of government will indeed lead to divergence in education policy but, even in the long run, is unlikely to lead to changes of much greater than one percent of GDP in education spending. Since the within-country standard deviation of education spending since 1990 (that is, once all the states in the dataset had reached high levels of income) is 0.46, this likely range of partisan change seems quite plausible.

<Figure One About Here>

Models Three and Four of Table One use PCSE and fixed effects models to examine the effect of partisanship on the *composition of government spending*. In both of the models, *cabinet partisanship* is again a significant predictor of the composition of government spending. The predicted four year electoral term effect of changing from the average left-wing to the average right-wing party in the dataset is a reduction of between 2.5 and 3 percentage points in the percentage of government spending devoted to

²¹ This is more appropriate than the Beck-Katz model since it deals solely with within state change.

education. Given that the average percentage of government spending devoted to education across the dataset is 28.7%, this would amount to around a ten percent decline in the proportion of government spending taken by education. This implies that although left-wing governments do tend to increase absolute education spending (for a fixed level of national income), they may be doing so at the expense of other government spending. Equally, right-wing governments that trim education spending may not be doing so as an overall strategy of cutting back public spending but may simply be channeling spending toward other favored projects or constituencies.

The control variables, by and large, demonstrate their expected effects across the four models. The *population under fifteen* variable is positively related to public education spending and the composition of government spending, with a one standard deviation change in the percentage of population under fifteen associated with an increase in spending on education of around one third of a percent point of GDP. The income effect is positive but with diminishing marginal returns, reaching significance only in Models One and Two. As countries grow wealthier they tend to spend more on education but this relationship is concave in income and flattens out as they get wealthier. The effect of population is negative and significant in Models One and Three, which incorporate between effects, suggesting economies of scale may exist in education provision as large countries can spend proportionately smaller amounts. However, population is statistically insignificant in the fixed effects models. Finally, there is slim evidence that non-education government spending may have a positive effect on education spending in Model One, but this reverses direction and loses significance in Model Two (and is removed from the analysis in the further models).

The Role of Electoral Institutions

The final section of empirical analysis examines whether electoral institutions affect partisan policy, as suggested in Section Two of the paper. The formal model implied that proportional representation systems should see a smaller range of partisan policy because the coalitional dynamics generated in these systems force parties to bargain over policy and give greater bargaining power to centrist groups. Table Five explores this proposition using three variables: a dummy variable for whether an electoral system does not use single member districts; the effective number of parties in the legislature; and the Iversen-Soskice index of proportionality. In each case, the variable is interacted with cabinet partisanship. There are two key reasons for doing this. Firstly, electoral systems are largely constant within states across time, hence in a fixed effects model they essentially drop out into the country-specific error term. Secondly, we are interested in the manner through which electoral systems channel partisanship, hence we care about partisanship *conditional* on electoral system.

Models One through Three use public education as a percentage of GDP as the dependent variable. In all three models, the measures of proportionality of electoral system are both positive and statistically significant, albeit more so in the measure of party number and the proportionality index. In all cases, the impact of proportionality is to dampen down the partisan effect estimated by the coefficient on the cabinet partisanship variable. The coefficients on cabinet partisanship appear higher than in Table One, being estimated to lie between -.014 and -.021, depending on the model, as compared to the earlier estimates of -.005 to -.007. However, once we examine the estimated coefficients on the interaction term, we find that increased proportionality

actually moderates this partisan effect. In each case, the coefficient on the interaction term is positive and statistically significant at the five percent level, implying that as proportionality increases the partisan effect is reduced. When we combine the two terms we find that proportional systems have significantly reduced partisan effects on education spending as compared to our estimates from Table One.

Figures Two through Four demonstrate this pattern graphically. Figure Two shows the difference in the partisan effect between single-member district (SMD) electoral systems and those without single-member districts (non-SMD). The SMD effect on partisanship is far steeper than that for non-SMDs: a move of fifty points on the partisan index is associated with a drop in education spending of 0.3% of GDP in non-SMD systems versus around 0.8% in SMD systems. Figure Three compares the average effective number of parties in proportional systems (3.9) to those in majoritarian systems (2.5), where the fifty point partisanship increase is respectively associated with a drop of 0.2% of GDP versus 0.5%. Finally, Figure Four compares the effect of partisanship for a state scoring one on the proportional index (less than 0.1% of GDP) versus a state scoring zero on the proportional index (0.7% of GDP). There is clearly a very significant moderating of partisan policies in proportional electoral systems, however measured. It appears that the increased bargaining power of centrist groups, as outlined in the model, dampens any pull to the extremes.

Models Four, Five, and Six repeat the empirical exercise using the composition of government spending as the dependent variable. The estimation produces positive coefficients on the interaction term, suggesting that proportional electoral systems also moderate partisanship over the composition of government spending between education

and other spending. However, the results are a little weaker in these estimates, especially in Model Six, which uses the proportionality index and fails to achieve statistical significance at the ten percent level. Nonetheless, Models Four and Five do show a very similar effect to that graphed in Figures Two through Four. The partisan effect on government composition of spending is very much moderated by increases in proportionality. Not only then do proportional electoral systems lead to a dampening of partisan patterns over absolute levels of education spending but they also lead to a moderation of partisan effects on relative government spending. The results imply that proportional systems produce strongly consensual education policy.

<Table Two About Here>

4. In Conclusion

The results above suggest that, when it comes to education spending, parties do indeed matter. But the strategic environment in which parties operate determines how much they matter. A simple test of partisanship estimated that the average shift from left to right across the dataset of OECD countries from 1960 to 2000 would lead to a long-run reduction in public education spending of around three quarters of a percent point of national income. This amounts to a monetary effect of quite enormous magnitude: depending on the partisan range within a state and its average level of education spending in the 1990s this could, all else equal, amount to a per capita decrease of \$50 to around \$450 in spending. Education, in fact, appears to be a particularly partisan area of public spending. This study suggests there is a substantively and statistically significant effect of partisanship on the composition of government spending itself, with left-wing parties favoring education spending over other expenditures. This study argues that this

preference for education over other policies is because education has the unique capacity to change individuals' position in the income distribution.

Electoral institutions also affect party behavior in that they change the incentive to engage in post-electoral bargaining. In a proportional representation system the necessity of coalition formation requires negotiating with other parties and thus moderates the partisan effect on education policy. Majoritarian systems conversely allow parties more room for maneuver. This study predicts that we should see the most precipitous shifts following changes in government in a majoritarian system, for example the vacillation between Labour and the Conservatives in the United Kingdom in the 1970s, during which time education policy was in constant flux (Chitty, 2004).

While this study provides the first full cross-sectional panel data analysis of the effects of partisanship and political institutions on public education spending, it does so at a relatively aggregated level. The next step forward in the study of the political determinants of education spending should examine the composition of such spending between various levels of education,²² between salaries, capital expenses, and other running costs, and between general and vocational education. Such work is, of course, bedeviled by much poorer data availability, at least across the range of time and countries covered by this study. This perhaps explains why the field of education spending has been sorely neglected in comparative political economy, yet it offers a fertile and substantively crucial opportunity for research.

²² In as much as access to different levels of education is uneven across income groups, this could lead to de facto targeting of education spending to richer groups: thus the wealthy should have an incentive to promote spending on tertiary education at the expense of primary education.

Table One – The Effects of Partisanship on Educational Expenditure

	MODEL 1	MODEL 2	MODEL 3	MODEL 4
	PUBED / GDP PCSE	PUBED / GDP FIXED EFFECTS	PUBED / GOV PCSE	PUBED / GOV FIXED EFFECTS
LAGGED D.V.	.843 (.037)***	.673 (.034)***	.842 (.035)***	.643 (.034)***
PARTISANSHIP	-.005 (.001)***	-.007 (.002)***	-.016 (.006)***	-.027 (.008)***
POPULATION<15	.042 (.014)***	.043 (.024)*	.192 (.066)***	.147 (.111)
LOG (GDP)	1.578 (.631)**	2.689 (1.404)*	4.473 (3.181)	10.213 (6.423)
LOG (GDP) SQ	-.024 (.011)**	-.072 (.027)***	-.060 (.055)	-.358 (.126)***
LOG (POP)	-.312 (.104)***	.144 (.895)	-1.171 (.484)***	4.795 (4.205)
GOVEX/GDP	.016 (.010)*	-.023 (.020)		
YEAR	-.017 (.006)***	.033 (.012)***	-.041 (.030)	.187 (.055)***
CONSTANT	14.600 (16.53)	-22.908 (22.409)	24.827 (81.919)	-464.763 (123.331)***
OBSERVATIONS	389	389	388	388
COUNTRIES	23	23	23	23
R-SQUARED	.850	.867	.824	.846
Short Run Effect of Mean Party Range	-.250	-.350	-.900	-1.35
Four Year Effect of Mean Part Range	-.788	-.851	-2.52	-3.132

Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Table Two – The Partisan Effect Under Different Electoral Institutions

	MODEL 1 PUBED / GDP	MODEL 2 PUBED / GDP	MODEL 3 PUBED / GDP	MODEL 4 PUBED / GOV	MODEL 5 PUBED / GOV	MODEL 6 PUBED / GOV
LAGGED D.V.	.627 (.039)***	.619 (.040)***	.618 (.040)***	.558 (.040)***	.584 (.039)***	.581 (.040)***
CABINET COG	-.014 (.004)***	-.021 (.006)***	-.013 (.004)***	-.052 (.018)***	-.083 (.028)***	-.041 (.018)**
CAB * NONSMD	.011 (.005)**			.044 (.022)**		
CAB * PARTIES		.005 (.002)***			.018 (.008)**	
CAB * PROPORT			.012 (.006)**			.031 (.026)
POPULATION<15	.124 (.027)***	.123 (0.028)***	.123 (.028)***	.488 (.127)**	.467 (.129)***	.469 (.131)***
LOG GDP	3.185 (2.146)	2.991 (2.106)	3.273 (2.112)	23.898 (9.392)**	23.673 (9.303)**	25.012 (9.346)***
LOG GDP SQ.	-.078 (.039)**	-.072 (.039)*	-.078 (.039)**	-.582 (.174)***	-.595 (.171)***	-.621 (.173)***
LOG POPULATION	1.617 (.963)*	.460 (.926)	.721 (.931)	12.466 (4.326)***	8.657 (4.233)**	9.552 (4.265)**
GOVEX/GDP	.006 (.021)	-.002 (.021)	-.003 (.021)			
Year	.037 (.012)***	.041 (.013)***	.038 (.013)***	0.157 (0.056)***	.218 (.058)***	.210 (.059)***
Constant	-129.188 (35.817)***	-117.643 (35.780)***	-119.441 (35.921)***	-739.658 (154.371)***	-783.452 (154.827)***	-797.634 (155.735)***
Observations	293	293	293	282	292	292
Number of States	18	17	17	18	17	17
R-squared	.834	.834	.832	.859	.821	.818

All regressions use panel fixed effects.
Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Figure One: Predicted Electoral Effects on Education Spending

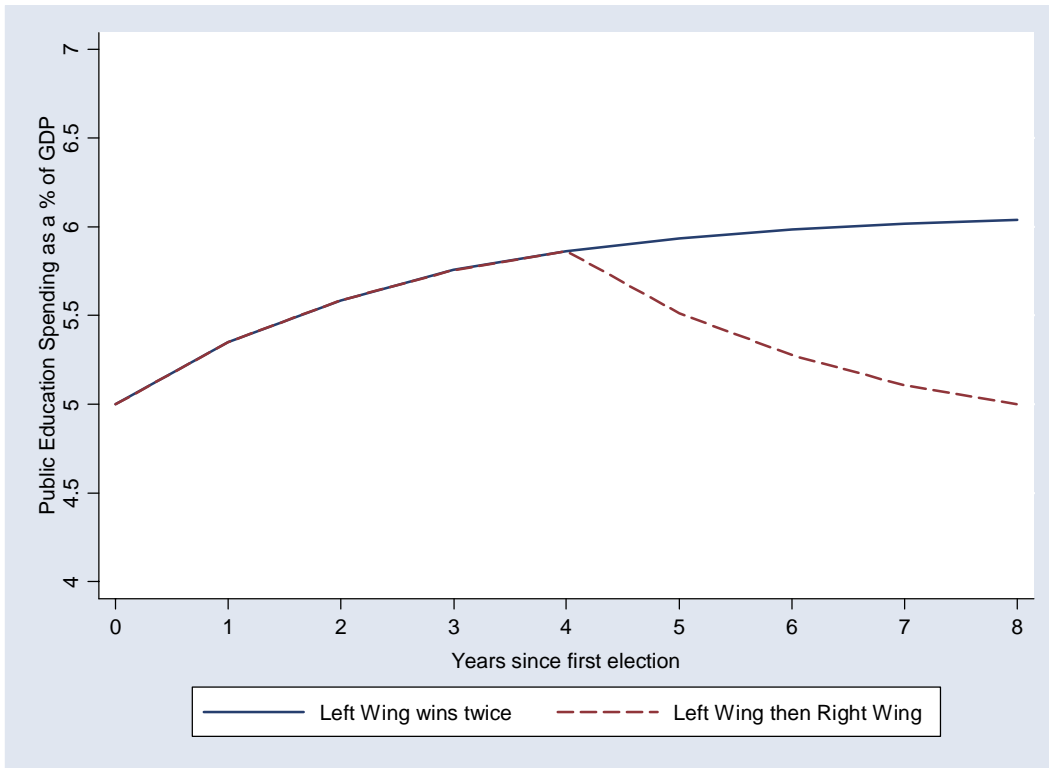


Figure Two: Single Member Districts and the Partisan Effect

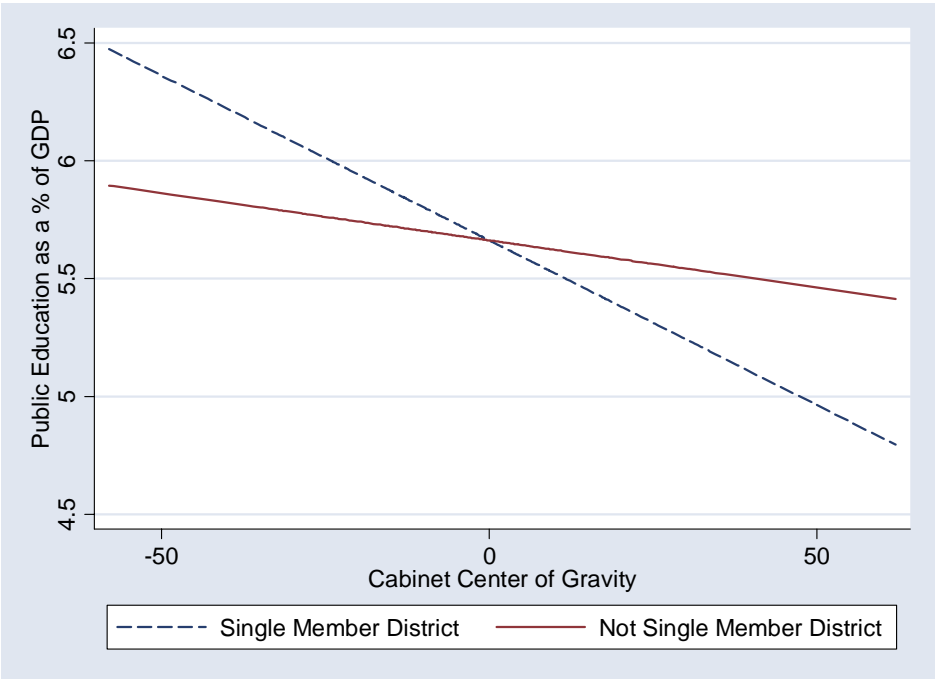


Figure Three: The Effective Number of Parties and the Partisan Effect

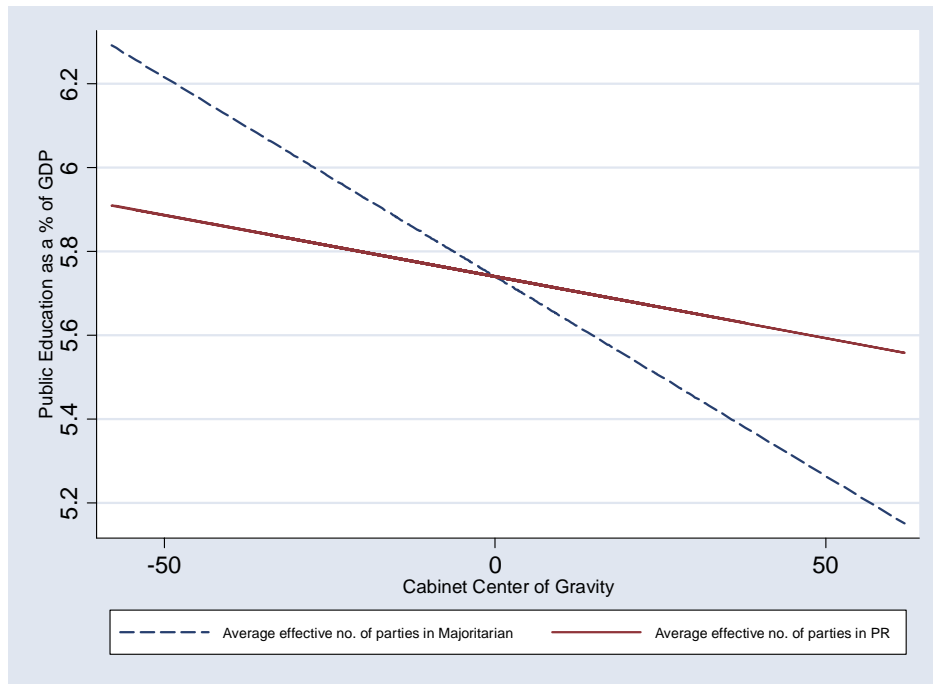
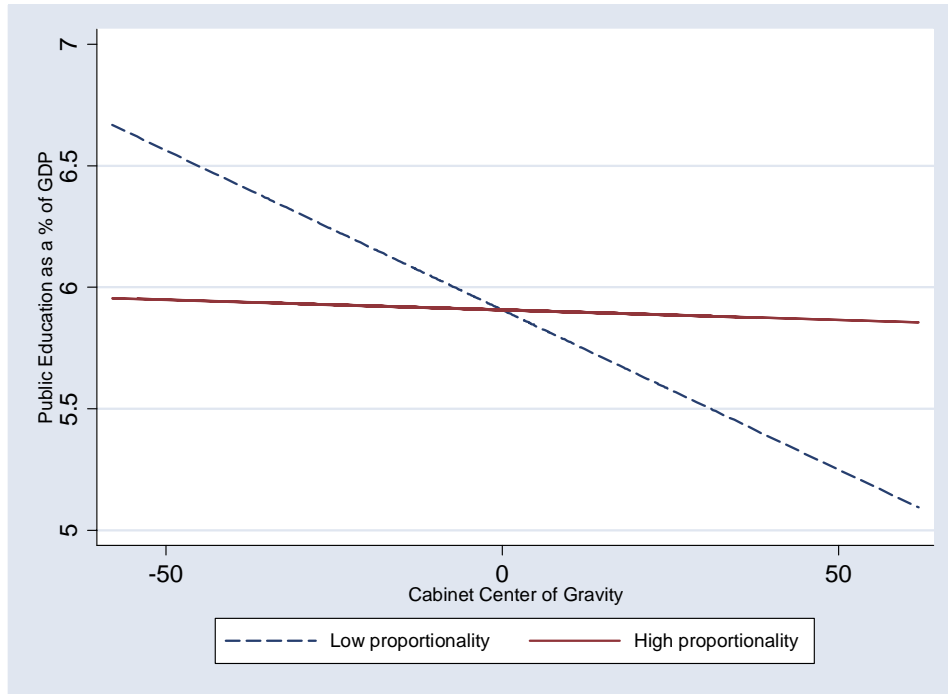


Figure Four: Proportionality and the Partisan Effect



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