Chapter 5.

Empirically Testing A Socio-Institutional Theory of Redistribution

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5.1 Introduction

Before proceeding to the empirical analysis, let me recap where we have come thus far. The dissertation began asking why some developing democracies are better than others at providing health and education to their citizens. Broadening out, I linked my motivating question to a long-standing theoretical puzzle in Political Science: whether the nature of constituencies to which politicians respond affects the types of public policies they implement. I argued that confining our conceptualization of constituency breadth to institutional features (e.g. electoral rules) fails to capture well the true calculations politicians make in the electoral and policymaking processes. Indeed, a constituency=institutions approach ignores the theoretical role ascribed to institutions in the first place: as filters of social preferences. Thus, turning to sociological explanations of redistribution, I began with an ethnic characterization of social preferences. This rich literature argues that more ethnically-diverse societies find it harder to agree on the provision of broadly-redistributive, quasi-public goods (BRQPG) provision, such as education and health. However, ethnic diversity, I argued, implies more than simply the number of ethnic groups, which is the measure of *ethnic fractionalization* commonly used in this literature. Indeed, to characterize ethnic-group preferences for allocation (spending)

breadth[1], we need to know something about how ethnic groups in a society are distributed across socio-economic groups.

I thus returned once more to the political sociology literature that pre-dated the Institutional Revolution in Political Science, and resurrected a concept known as *cross-cuttingness*, the degree to which two (or more) social cleavages (such as ethnicity and socio-economic class) relate. Chapter 2 surveyed the cross-cuttingness literature, challenged past attempts at measuring the concept, presented a more intuitive and better measure of cross-cuttingness, and introduced several new cross-country indices of cross-cuttingness, one of which, ethnic-income cross-cuttingness, I use in this dissertation. In the preceding chapter, I formally modeled how these two characteristics of social structure—ethnic-income cross-cuttingness and ethnic fractionalization—interact with electoral rules to shape redistributive outcomes. The model left us with three testable hypotheses regarding how institutional and sociological features of constituency breadth (which together I label *effective constituency breadth,* see Chapter 3) relate to redistribution. I now test these hypotheses in relation to a number of empirical proxies for allocation breadth, including spending on social security, education and health and actual education and health outcomes.

The major finding of this chapter is that *effective* constituency breadth, i.e. an interactive institutional and sociological conceptualization, is positively related to three of four health and education outcomes. Specifically, the marginal effect of electoral-system breadth[2] on literacy, life expectancy, and infant mortality is positive when ethnic

[1] Surveying the literature and comparing it with the political science institutional literature, I fine-tuned the term public goods to "broadly-redistributive quasi public goods", a term which basically refers to how broad a section of society government spending benefits. I noted my preference for the pithier term allocation breadth.
[2] I use this term to refer to the influence of institutions, i.e. electoral rules, on the size of constituencies. In the past, it has been referred to simply as "constituency breadth." I use electoral-system breadth to avoid confusion with *effective* constituency breadth, which entails the interaction of institutions with social structure.

fractionalization is low, but negative when ethnic fractionalization is high. Further, these effects diminish as ethnic-income cross-cuttingness (EIC) increases. Nevertheless, the logic behind both these results is that certain combinations of social structure and institutions result in effectively broader constituencies.

This chapter proceeds as follows. First, as a premise to discussing measures for my dependent variable and to place this analysis and the results in better context, I extensively review the past empirical literature. I then discuss empirical strategies for measuring the breadth of resource allocation (hereafter allocation breadth) in the absence of precise measures, and offer justification for the use of health and education outcomes, namely literacy, general enrollment ratio, infant mortality and life expectancy, as reasonable proxies for allocation breadth. Next, I discuss the empirical specification used to test the three hypotheses derived from my model in the previous chapter. Finally, I test my theory in a time-series cross-sectional (TSCS) dataset of 50-odd developing democracies between 1970-2000.

5.2 Measuring Allocation Breadth

5.2.1 Past Empirical Literature

There is a wealth of literature that has sought to explain allocation breadth from separate institutional or sociological perspectives. Unfortunately, almost as much variation infects the precise terminology associated with the dependent variable. In general, the existing literature uses three sets of terms that are closely related to my concept of allocation breadth: public vs. private goods, redistribution vs. distribution, and broad vs. narrow

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Electoral-system breadth is measured by PPP (the Proportion of Population per Politician) and by district magnitude. See Chapter 3.

targeting. These three sets of terms are somewhat fuzzy, i.e. while the different names suggest they each capture a different concept, empirically they rely on many of the same proxies. Moreover, often the terms are used somewhat casually to refer to my concept of allocation breadth. Incorporating language from all three of these sets of terms we get, at one pole, governments providing broadly-redistributive, quasi-public goods – i.e. goods that benefit "broad swaths of the population";[3] while at the other pole, governments provide quasi-private, narrowly distributive goods[4] – i.e. goods that benefit narrow segments of society. This imprecision in terms is addressed more fully in the introductory chapter. In short, while I personally use the term *allocation breadth*, as I review the empirical literature below, I take care to use the terms each author(s) use(s).

Both sociological and institutional empirical literatures are relatively young, with the earliest studies appearing in the late 1990's. Nevertheless, two findings are generally robust: increasing electoral-system breadth leads to broader allocation, while increasing ethnic fractionalization leads to narrower allocation. Few studies have incorporated both variables, even additively so, and I have found only one study to date, on economic growth, which explicitly interacts social structure with political institutions.

5.2.2 The Effect of Electoral Institutions on Allocation Breadth

Electoral-system breadth has been captured empirically by four main measures: majoritarianism vs. PR, proportionality, district magnitude, and incentives to cultivate a personal vote (ICPV).[5] Persson and Tabellini (P&T) have produced a number of studies

[3] The closest term to this is Shugart's (1999) "national collective goods". See Cornes, Richard, and Todd Sandler. 1996. "The Theory of Externalities, Public Goods, and Club Goods." Cambridge University Press for an excellent discussion on the evolution of these terms.
[4] Other terms include pork, pork-barreling, and particularism. Another vein of literature stresses the geographical nature of this narrow targeting.
[5] See Chapter 3 for a discussion on how these concepts are related to constituency breadth.

that evaluate the effect of majoritarian vs. PR systems on what they term *public goods*. In an early study using a cross-section of about 50 countries from the early 1990s, P&T present "weak evidence" that countries with PR rules tend to spend more on expenditure categories with a high (a priori) public-good content (1999). For their dependent variable they use a summary measure of spending on education, transportation and order and safety. Transportation, especially, is seen as a narrowly-targetable budget item in the political science literature, which perhaps explains the weakness of the results. More recently (2004), P&T find that social security/welfare spending is higher in countries with PR rules.[6] P&T use social security spending to measure the "composition of public spending towards programs benefiting large groups in the population", which sounds very much like allocation breadth. The conclusions of their 2004 piece rely on a larger number of countries (80) and include panel data for the 1990-1998 period. They also find similar results in a subset of 60 democracies, where panel data are available for a longer period.[7]

In contrast to P&T's dichotomous institutional variable, Milesi-Ferretti et al. (1999, 2002) use a nuanced measure of proportionality to evaluate the effect of electoral institutions on the "purchases of goods and services (public goods), which are easier to target geographically, and transfers, which are easier to target across social groups." Again, this distinction is similar to my concept of allocation breadth. However, unlike P&T, who refer to public goods (e.g. education) as a broad type of spending, Milesi-Ferretti et al.

[6] P&T also find that government size, revenues and deficits are all higher in PR systems.
[7] Most recently, P&T (2007) have investigated the possibility of electoral rules affecting government policy *indirectly* by PR rules increasing the number of parties. This connection has a number of supportive empirical studies. See Bumba Mukherjee. Political Parties and the Size of Government in Multiparty Legislatures: Examining Cross-Country and Panel Data Evidence. *Comparative Political Studies*, Vol. 36, No. 6, 699-728 (2003). Kathleen Bawn, Frances Rosenbluth (2006) Short versus Long Coalitions: Electoral Accountability and the Size of the Public Sector. *American Journal of Political Science* 50 (2), 251–265. Carlos G. Scartascini, and W. Mark Crain. 2002. The Size and Composition of Government Spending in Multi-Party Systems† James Buchanan Center - Working Paper Series. See also the huge Veto Players literature.

use the term public goods to refer to the narrow type of spending.[8] Nevertheless, Milesi-Ferretti et al.'s findings in terms of allocation breadth concord with P&T's. Using transfer payments (as a share of GDP) as the dependent variable, the authors find that they are higher under PR rules in a sample of 20 OECD and 20 Latin American countries[9], robust to three different measures of proportionality. Specifically, the authors test two variants of district magnitude and an ex-post measure of proportionality derived from actual election results.

Several other studies have relied on district magnitude as the dependent variable. Rickard (2005) explicitly measures the effect of district magnitude on distributive transfers. In a study of 18 OECD countries, she finds that countries with higher district magnitude tend to spend more on social welfare programs.[10] Franzese and Nooruddin (2004), in their study of 19 OECD countries, also find a positive relationship between district magnitude and "social benefits and other transfers", but only within countries with "strong interest representation".[11] More recently, Edwards and Thames (2007) argue that the estimated effect of district magnitude in past studies is inaccurate unless other features of the electoral system are controlled for. In their study of 77 democracies between 1970 and 2000, they find that increases in district magnitude in party-centered electoral systems lead to "a higher demand for public goods spending" (measured by education spending), while increases in magnitude in candidate-centered electoral systems lead to lower public goods spending.[12] Edwards and Thames use the term public goods to refer to "spending that

[8] More troubling in terms of consistency, however, is that narrow targeting, measured by the sum of government consumption and government investment (net of depreciation), is higher in majoritarian countries. This proxy is more akin to P&T's measure of government size, which P&T find to be higher in PR countries.
[9] Note: the evidence is weaker in the Latin American sample.
[10] In a more recent article (2006), Rickard finds, however, that countries with higher district magnitude are also more responsive to increases in voter demand for narrow transfers.
[11] Affected by such variables as party unity, competitiveness of elections, etc.
[12] Chang and Golden (2007) also look at the interaction between district magnitude and one electoral-system feature that affects incentives to cultivate a personal vote (ICPV). In their study of "40-odd contemporary

benefits large groups of voters", which we can again take to be simply allocation breadth. Most recently, Hicken and Simmons (2008) show that the candidate-centeredness of the electoral system, while not affecting the actual amount spent on education, determines the *efficiency* of the spending. The authors offer an interesting empirical strategy, regressing the actual good, i.e. "education"—measured by illiteracy rates, on education spending interacted with candidate-centeredness, or incentives to cultivate a personal vote (ICPV). They conclude that education spending has a positive and significant effect on literacy only in countries where incentives to cultivate a personal vote are low.

This literature review would be incomplete without a discussion of Bueno de Mesquita et al.'s (2003) influential work on public goods. As covered extensively in Chapter 3, the authors conceive of a new institutional measure of constituency breadth that is comparable across democracies and autocracies—the size of the winning coalition (W), or the subset of the population whose support is essential for the leader to maintain power.[13] The measure of W is constructed from four dummy variables derived from three components of the Polity score, (competitiveness of executive recruitment, openness of executive recruitment, and competitiveness of participation) plus a measure of the civilian character of the regime taken from Arthur Banks' data.[14] Bueno de Mesquita et al. find that W improves the following health and education outcomes, just some of a wide range of measures for what they term "general public goods": Education Spending, Years of Education, Female Secondary Education, Illiteracy, Infant Mortality, Life Expectancy,

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democratic nations," they find that political corruption gets more severe as district magnitude increases under open-list PR systems. Corruption may be a good measure of very narrow resource allocation, i.e. rent-seeking.

[13] Bueno de Mesquita et al. also divide W by the subgroup of the population that has a more-or-less formalized role in expressing preferences over possible leaders—the selectorate (S). Their empirical results are similar using W or W/S.

[14] These four variables are summed, the result is normalized to (0, 1), and the resulting variable takes five possible values. A maximum value indicates that a government is not a military regime, that the executive is not selected in unopposed elections and is not hereditary, and that there are stable political groups that compete for influence.

Measles, Immunity, Death Rate, DPT Immunity, Health Spending, Social Security Spending, # of Doctors, # of Beds, and Low Birth Weight.

While the theory is intuitive and attractive, several authors have criticized the operationalization of *W*, and the resulting conclusions regarding public goods. Clarke and Stone (2006) not only question the noisiness of the operationalization of *W*, but show that, when controlling for democracy rather than *democratic residuals* (the residuals from an auxiliary regression of democracy on *W*), very few of the results hold. Interestingly, Clarke and Stone find that the coefficients on health and education measures are the most resilient of all Bueno de Mesquita et al.'s dependent variables, remaining significant though severely attenuated in magnitude. However, using what Clarke and Stone believe is a "direct measure of coalition size[15]"—a variable that measures the proportion of the electorate that voted for parties that subsequently joined the governing coalition taken from Powell (2000)—they find virtually no support for *W* having a significant effect on public goods provision, in the direction predicted by Bueno de Mesquita et al.

Due to the disagreement regarding the original operationalization of *W*, and the fact that Clarke and Stone's "better" measure only exists for twenty developed democracies, I do not attempt to run robustness checks using *W* as a substitute for PPP (the Proportion of Population per Politician), my main institutional variable.

In sum, empirical findings in the institutional literature to date strongly suggest that higher electoral-system breadth (PR over majoritarian, higher proportionality, larger district magnitude, and lower incentives to cultivate a personal vote) are correlated with higher social security/welfare spending and better literacy rates, while the evidence on education spending is unclear.

[15] More accurately, they state that it is a direct measure of *W/S* (p.30).

5.2.3 The Effect of Social Structure on Allocation Breadth

Social structure has a wealth of corroborating quantitative empirical evidence linking it to public goods provision. As in the previous section, I use this review to highlight precise terminology, empirical proxies, scope of the study and findings. The seminal article beginning this vein of literature is Easterly and Levine (1997), who find that ethnic fractionalization is negatively related to economic growth through an indirect dampening effect on the quality of public policies, which include public goods provision (education and national infrastructure). Their final evidence, while not entirely consistent for their four measures of ethnic diversity and the various public policies they include, suggests (among other things) that ethnic diversity reduces the level of public goods provision.[16]

Since 1997, a number of studies directly test the effect of ethnic diversity on "public goods" provision. La Porta et al. (1999), looking at both democracies and non-democracies, find that ethno-linguistic fractionalization hampers infant mortality, illiteracy, school attainment and infrastructure quality. In addition, the authors find that ethnic fractionalization increases the number of state-owned enterprises, which they argue is a prime source of patronage. In contrast, they find that ethnic fractionalization does not explain the size of government transfers (social security), government employment, or corruption.

Kujis (2000) also looks at health and education dependent variables to assess public goods provision. He finds evidence that ethnic diversity lowers spending on health, but has no significant effect on education spending. However, he does find that more ethnically

[16] A more recent study by Linzer (2003) re-ran E&L's study using more recently developed measures of ethnic fragmentation (Fearon's Ethno-linguistic index and Posner's PREG). With a number of methodological tweaks as well, Linzer finds strong evidence to suggest that ethnic fragmentation still has a strong direct negative effect on economic growth after controlling for public policies.

diverse countries are less efficient in their provision of the actual good, measured using infant mortality, illiteracy, schooling, life expectancy and immunizations[17]. One can detect somewhat of a constituency-breadth logic in Kujis. He states:

> "In heterogeneous societies, those working in the public health and education systems may identify themselves less with the typical "consumer" of the systems than in homogeneous societies and . . . are more likely to be subject to patronage and competitive rentseeking behavior" (p.6).

My read of this is that public health and education decision-makers are responding to narrower constituencies.

Keefer (2003) analyzes the effect of ethnic fractionalization in "young democracies". He finds that ethnic fractionalization does *not* explain why these countries underprovide non-targeted (broad/public) goods, overprovide targeted transfers to narrow groups of voters, and engage in excessive rent seeking. Keefer uses several measures of "non-targeted" spending, which he also refers to as public goods, including gross secondary school enrollment, and several measures of "targeted" spending, such as corruption (to capture rent-seeking), government wage bill as a fraction of GDP (to capture patronage), and public investment spending as a fraction of GDP (to capture pork).

More recently, a couple of studies have investigated the pro-poor nature of health and education spending. Addison and Rahman (2001) find that ethnolinguistic fractionalization tends to reduce the relative share of primary to tertiary education spending. The authors argue that primary education is a pro-poor public good, which is underprovided in ethnically heterogeneous societies. Tandon (2007) finds that ethno-linguistic heterogeneity affects the share of government expenditure benefiting the poorest

[17] Kujis does not interact education spending and ethnic heterogeneity. Hicken and Simmons (2008) argue that the more appropriate specification for this question would be multiplicative.

quintile, as well as the ratio of utilization at public facilities for diarrhea and acute respiratory infections by the poorest versus richest quintiles in just under 50 democracies.[18]

Moving beyond ethnic fractionalization measures, Montalvo and Reynal-Querol (2005) explore the effect of religious fractionalization and religious and ethnic polarization on the size of government (ratio of real government consumption to GDP) and investment levels (ratio of real domestic investment to GDP) in 138 countries between 1960 and 1989.[19] The authors usefully take us beyond ethnic fractionalization, but the variables they analyze do not tell us much about the breadth of government spending, which is our focus. The same is true of Yang (2003), who attempts to measure the effect of ethnic fragmentation and ethno-economic cross-cuttingness (what he calls *inter-ethnic inequality*) on fiscal policy in the United States. Using census data in over 1,000 US cities, he finds that both characteristics of social structure increase total government expenditures, but decrease budget surpluses. Yang indicates that his proxies for public good provision are actually quasi-private in nature, making his definition of public goods closer to Milesi-Ferretti. A final departure from ethno-linguistic fractionalization is Desmet et al. (2005), who combine cultural diversity with ethnic fragmentation to explain government transfers in 56 countries between 1985-1995. They find that both reduce the level of transfers when entered into separate regressions, but that ethnic fragmentation dominates when entered together additively.

In sum, then, the sociological empirical literature with few exceptions has tended to confine itself to a single proxy of social structure: ethno-linguistic fractionalization. The

[18] Tandon is unclear as to the exact year (or years) to which his dependent variable refers.
[19] When entered into the model separately (as proxies for cultural/social diversity), MRQ conclude that religious and ethnic polarization increase the investment rate and decrease government consumption, whereas religious fractionalization has the opposite effect on both outcomes. Ethnic fractionalization is found to have no significant effect on these outcomes. However, when all are entered in the same model (additively), only ethnic polarization is a significant determinant of the investment rate, whereas religious polarization and fractionalization are significant determinants of government consumption, all with the same signs as above.

majority of studies find that ethno-linguistic fractionalization reduces the provision of broadly-redistributive public goods. The proxies for the dependent variable include both spending variables and health and education outcomes. However, less evidence emerges that ethno-linguistic fractionalization affects public goods spending.

5.2.4 Models with both Electoral Institutions and Social Structure

Several studies, some of which I have already mentioned in the institutions section above, control for ethno-linguistic fractionalization in their analyses. Both Persson and Tabellini (2004) and Milesi-Ferretti et al. (2001) report that their results are robust to the inclusion of ELF, but that ELF itself is not significant. Gerring and Thacker (2001), who use infant mortality as their proxy for broadly-redistributive quasi-public goods, come to the same conclusions as Persson and Tabellini and Milesi-Ferretti et al. All three studies, however, specify an additive model, ignoring the fact that institutions interact with social structure by filtering preferences into policy outcomes. Only one study mildly linked to allocation breadth explicitly interacts electoral rules and ethnolinguistic fractionalization. Morrison (2006) concludes that ELF decreases economic growth and increases inequality, but that PR systems diminish these effects. Unfortunately, Morrisson does not calculate the marginal effect of either electoral rules or ethnolinguistic fractionalization in his study.

We are thus left with a gap in the empirical literature in terms of the interactive effect of electoral rules and social structure on the provision of broadly-redistributive quasi public goods. My empirical analysis seeks to fill this gap in several ways: first, by enriching our conceptualization and measurement of social structure; second, by considering a variety of spending and outcome proxies; third, by implementing a multiplicative specification with partial derivatives used to calculate and plot marginal effects; and fourth, by distinguishing

between the amount spent on health and education from *how* it is spent. I address this last extension in the next chapter.

5.2.4 Two Approaches to Measuring Allocation Breadth

Measuring allocation breadth is a notoriously hard empirical problem. Unfortunately, governments do not readily categorize their budgets on a scale of 0-1 based on the breadth of the population benefiting from programs and projects, nor would it be easy to dissect a country's central budget so as to compile such a nice statistic.[20] We have seen from the literature review above, that there are two common approaches to this dilemma. One method is to select budget categories with a presumed high BRQPG[21] content, taking the amount of spending for that category as a % of GDP (or of total government expenditures) as the dependent variable. Cox and McCubbins indirectly challenge this approach, arguing that governments can "morselize" (see next chapter for full definition of this term) even so-called "broad" budget categories, allocating them to narrow constituencies at will. Thus, even if we find an empirical relationship between constituency breadth and spending, it is not clear what this tells us. The only category for which this might be a good proxy is social security spending, since it involves direct transfers of money (pensions and unemployment insurance) rather than programs and projects, which are much easier to target towards narrow geographic constituencies. Indeed, in the next chapter, I present findings that constituency breadth, while positively affecting social security spending does *not* consistently affect education or health spending.

[20] Indeed, there has been only one attempt, to the author's knowledge, thus far, by Levitt and Snyder (1995) who measure allocation breadth in the United States by categorizing the Federal Domestic Assistance Program into average annual outlay per district, and categorizing programs into ones that are narrowly targeted and broadly targeted by dividing the standard deviation by the mean. See their footnote 10 for more information.
[21] My short-hand for Broadly-Redistributive Quasi-Public Goods (BRQPG)

A second approach is to use actual outcomes, such as literacy for education or life expectancy for health, as the dependent variables. Using such outcomes captures something about the quality of public policies and how broadly they are able to effect the entire population. Nevertheless, this approach means that, since we do not explicitly include spending in the model, we can only *assume* spending is the intervening mechanism. In the next chapter, I try examine both this intervening mechanism and the outcomes of interest by regressing the health and education outcomes introduced in this chapter on spending *modified* by effective constituency breadth. I find that the marginal effect of spending on literacy, infant mortality and life expectancy is positive and significant *only* when effective constituency breadth is sufficiently broad. Ultimately, this tells us only that health and education funds are spent more effectively in broad-constituency democracies, and not about whether these democracies spend more or less overall. What we do know, however, is that more of the population is benefited by spending in broad-constituency democracies. Indeed, since the outcomes I use are expressed as ratios, every single member of society matters in the final score a country receives. Consistent neglect of a particular region or ethnic group, for example, will mean that rates will not be able to surpass a given level. Additionally, general inefficiency caused by rent extraction or pork can lead to lower health quality for the entire nation. In the qualitative chapters, I try and shed light on this important mechanism of spending efficiency. Findings from extensive fieldwork undertaken in Thailand and Mauritius support Cox and McCubbins conjecture that we cannot simply assume a given budget category has (or not) high BRQPG content. Thus, success in the health and education outcomes I use in this chapter (and that organizations such as the UN and WHO use to assess a country's achievements in these areas) entails effective spending and equal and efficient distribution of funds across "broad swaths of the population" (Shugart 1999).

5.3 Empirical Model and Hypotheses

5.3.1 Model Specification

The model presented in the formal theoretic chapter implies that the effect of political institutions on allocation breadth is modified by the social structure of the society within which it operates. Alternatively, I have structured this dynamic in terms of social preferences being filtered through institutions. The implication is identical in terms of our empirical model: social structure and institutions should be entered multiplicatively. Thus, at the broadest level we get:

$$AllocationBreadth = a + \beta_1 Institutions + \beta_2 SocialStructure + \beta_3 Institutions \times SocialStructure + \beta_i \mathbf{X} + \varepsilon. \quad (5.1)$$

However, having defined social structure more richly, consisting of two interactive characteristics—*ethnic-income cross-cuttingness (EIC)* and *ethnic fractionalization (ELF).*—I adjust this model to:

$$AllocationBreadth = a + b_1 Institutions + b_2 ELF + b_3 EIC + b_4 Institutions \times ELF + b_5 Institutions \times EIC + b_6 ELF \times EIC + b_7 Institutions \times ELF \times EIC + \beta_i \mathbf{X} + \varepsilon. \quad (5.2)$$

where **X** is a vector of control variables discussed below in section 5.3.3. In terms of *Institutions*, my primary focus is on PPP—the Proportion of Population per Politician (introduced in Chapter 3)—since I believe it provides the cleanest operationalization of the concept. The Proportion of Population per Politician is calculated as the average district magnitude divided by the number of legislators. PPP, thus, differentiates between countries with identical district magnitude, but a different number of districts, and thus

total number of legislators. The idea is that a politician who is one of fifty legislators is more likely to be seen as representing the entire nation than a politician who is one of three hundred legislators. PPP ranges from 0 to 1, where 1 represents a politician ostensibly elected by the entire population such as in the Netherlands. The minimum is never reached in practice, and is lowest in the UK where district magnitude is 1 and there are over 600 legislators. One of its primary advantages is that it already incorporates much of the information contained in district magnitude (M). As discussed previously we know that the effect of M is very much contingent on the type of electoral system. As the institutional variable is already part of a three-way interaction in the model above, adding another contingent variable to accurately reflect the impact of M would entail a daunting four-way interaction. Instead, I focus on PPP in the empirical analysis and then substitute M (absent the additional institutional interaction) for PPP in robustness tests. In short, either of these two variables can be substituted into Formula 5.2 in place of *Institutions*.

To calculate the full influence of *Institutions* and *SocialStructure* in multiplicative models, we must calculate the marginal effect of each variable. To do this, we take the partial derivatives. Thus, for *Insitutions*, the marginal effect is:

$$\frac{\partial AllocationBreadth}{\partial Institutions} = \beta_1 + \beta_4 ELF + \beta_5 EIC + \beta_7 ELF \cdot EIC \qquad (5.3)$$

We can similarly calculate the marginal effects for ELF and EIC.

$$\frac{\partial AllocationBreadth}{\partial ELF} = \beta_1 + \beta_4 Institutions + \beta_5 EIC + \beta_7 Institutions \cdot EIC \qquad (5.4)$$

$$\frac{\partial AllocationBreadth}{\partial EIC} = \beta_1 + \beta_4 Institutions + \beta_5 ELF + \beta_7 Institutions \cdot ELF \qquad (5.5)$$

5.3.2 Hypotheses

Next, I recap the three interactive hypotheses derived from my formal model and discuss the expected coefficients and marginal effects. I begin with Hypothesis 1 as follows:

Hypothesis 1.

a. Higher PPP leads to ***broader*** *resource allocation—a positive marginal effect, but only where ethnic fractionalization (EF) is* ***low*** *and ethnic-income cross-cuttingness (EIC) is* ***high****.*

b. Higher PPP leads to ***narrower*** *resource allocation—a negative marginal effect, where ethnic fractionalization is* ***moderate-to-high****.*

c. Increasing EIC diminishes the positive marginal effect of PPP where EF is ***low****.*

d. Increasing EIC diminishes the negative marginal effect of PPP where EIC is ***moderate-to-high****.*

The formal model in the previous chapter demonstrated that going from single-member districts to a single-national PR district[22] had different effects on allocation breadth depending on the degree of fractionalization and cross-cuttingness. Specifically, I expect the marginal effect of PPP to be positive in countries with low ethnic fractionalization and high ethnic-income cross-cuttingness, the logic simply following "traditional" institutional theories: when politicians are accountable to larger proportions of society, they are more likely to target goods to broad swaths of the population.[23] Because EIC is high, ethnicity is not salient in society, and so does not change my assumptions regarding this institutional mechanism. However, as EIC increases, the positive marginal effect of PPP tends toward zero. This is because EIC has a similar constituency-broadening

[22] The comparison between a national district with PR and single-member constituencies with plurality was used as a proxy for institutional constituency breadth. My model builds on Iversen and Soskice (2006) who define citizens based on class only. I add the ethnic dimension to the characterization of citizens, allowing their utility to depend on co-ethnics' economic well-being according to the level of ethnic-income cross-cuttingness.
[23] See my extensive literature review and theoretical discussion in Chapter 3.

effect to our institutional mechanism, and the higher this social-structure effect the lesser the institutional effect. We can say that society no longer has a "need" for the broadening effect of institutions, since preferences are *ex ante* broad. Note, that when EIC is low, there are no observations in my sample along the low fractionalization range. This corresponds to both Lijphart's claim that these types of societies are rare, and the lack of such countries in my dataset.[24] I thus refrain from discussing these types of societies.

Alternatively, where ethnic fractionalization is moderate-to-high, I expect the marginal effect of PPP to be negative. Where there are many ethnic groups, constructing a stable majority is extremely difficult. Low electoral-system breadth encourages ethnic groups to come together and form electoral alliances. For example, political parties might be encouraged to field multi-ethnic slates, and/or enter into pre-electoral coalitions with other parties. The result of a highly fractionalized social structure being filtered through narrow electoral-system breadth is effectively broader constituencies. Again, increasing ethnic-income cross-cuttingness has a diminishing influence on this marginal effect as higher cross-cuttingness effectively broadens constituency size, *ex ante*. Alternatively, as EIC rises, the numerous ethnic groups are increasingly connected by socio-economic similarities, lessening the need for "bonding" political institutions.

[24] See *The Architecture of Democracy,* p.21 footnote 5. While Horowitz refutes this claim, arguing that bipolar arrangements emerge as the amalgamation of group identities, it is likely that the electoral rules have a strong role in any amalgamation.

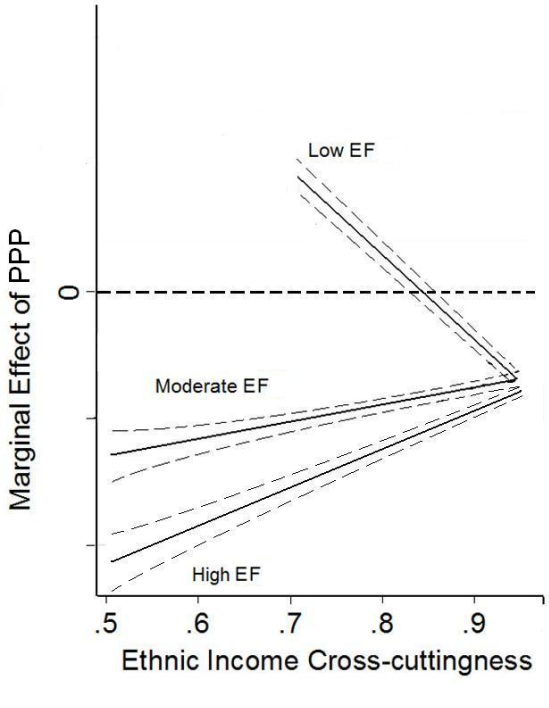


Figure 1. Depiction of Hypothesis 1: The Marginal Effect of PPP on Allocation Breadth

Since I will be plotting the marginal effect of my institutional and social structure variables as the primary means of evaluating my hypotheses, it is helpful to provide a visual illustration in the same form. Figure 1 does this for Hypothesis 1, plotting the marginal effect of PPP on allocation breadth across levels of ethnic-income cross-cuttingness (the horizontal axis) and ethnic fractionalization (three different plots). The solid, thick lines plot the marginal effect of PPP at each level of ethnic fractionalization (high, moderate and low); the thin, dashed lines either side are confidence intervals—purely contrived for illustrational purposes. Figure 1 shows that at high and moderate levels of EIC, the marginal effect is below the zero line[25], i.e. negative; that the confidence intervals do not cross the zero line indicate that the marginal effect is significant across all

[25] The zero line indicates no marginal effect.

values of ethnic-income cross-cuttingness. In contrast, the marginal effect of PPP at low levels of EF falls above the zero line, thus indicating a positive marginal effect.

Hypothesis 2.

a. Higher ethnic fractionalization leads to ***broader*** *resource allocation—a negative marginal effect, but only where PPP is* ***low.***

b. Higher ethnic fractionalization leads to ***narrower*** *resource allocation—a positive marginal effect, where PPP is* ***moderate-to-high****.*

c. Increasing EIC diminishes the positive marginal effect of EF where PPP is ***low****.*

d. Increasing EIC diminishes the negative marginal effect of EF where EIC is ***moderate-to-high****.*

I now turn to the marginal effect of ethnic fractionalization. Not surprisingly, I expect the marginal effect of ethnic fractionalization to depend on both PPP and EIC. Specifically, when PPP is high, increasing ethnic fractionalization effectively narrows the size of constituencies to which politicians respond. This is illustrated by the plot lines below zero in Figure 2. Moderate-to-high PPP more directly translates the numerous and disparate ethnic groups into the legislature, leading politicians to cater to their own narrow, ethnically-based constituencies. In contrast, when PPP is small (narrow electoral-system breadth), increasing EF effectively broadens constituency breadth because a low-PPP institutional environment is conducive to a highly fractionalized society. The plot lines above the zero line in Figure 2 capture this. Note how the logic I offer is different from previous studies, which argue that ethnic fractionalization always leads to narrower allocation due to more diverse preferences. I amend this logic, by asserting that ethnic fractionalization only has a negative effect when ethnic groups are sufficiently economically disparate and electoral system breadth is sufficiently large so that these numerous, dissimilar groups are translated into the legislature. Moreover, fractionalization can have a positive effect where PPP is low as it increases the effective breadth of constituencies.

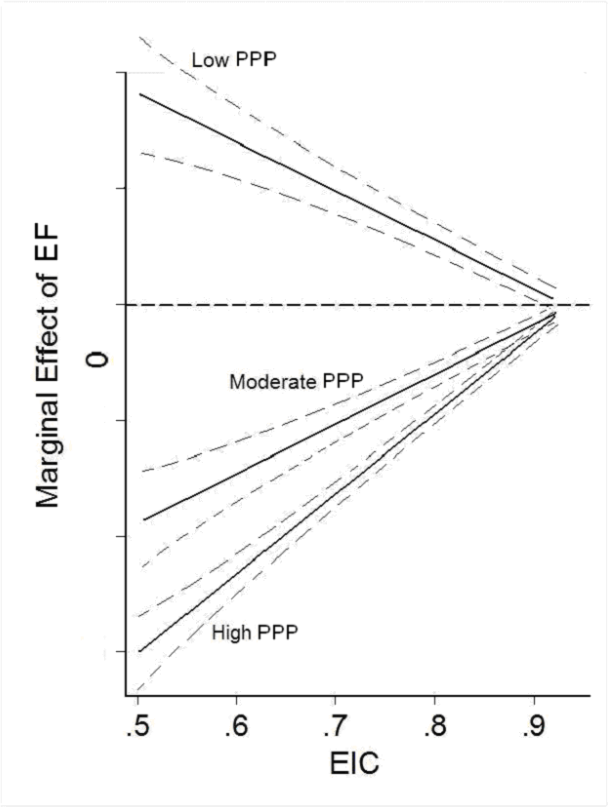


Figure 2. Depiction of Hypothesis 2: The Marginal Effect of Ethnic Fractionalization on Allocation Breadth

Ethnic-income cross-cuttingness also influences the effect of EF on allocation breadth. First, raising EIC reduces the saliency of ethnicity, rendering the number of ethnic groups increasingly meaningless. Alternatively, increasing EIC effectively broadens constituencies, as ethnic groups are increasingly connected by socio-economic similarities. The result is that as EIC increases, the effect of EF along different values of PPP diminishes. Thus, when PPP is low, the positive marginal effect of EF decreases (decline slope in Figure 2), and when PPP is moderate-to-high, the negative marginal effect of EF decreases (inclined slope in Figure 2).

Hypothesis 3.

> *a. Higher ethnic-income cross-cuttingness always leads to* ***broader*** *resource allocation—a positive marginal effect, but more so with moderate-to-high EF and high PPP, or low EF and low PPP, compared to moderate-to-high EF and low PPP, or low EF and high PPP, respectively.*
>
> *b. Increasing EF enlarges the positive marginal effect of EIC where PPP is* ***high****.*
>
> *c. Increasing EF diminishes the positive marginal effect of EIC where PPP is* ***low****.*

Lastly, I discuss the marginal effect of ethnic-income cross-cuttingness on allocation breadth. First, I posit that EIC should always have a positive marginal effect since it reduces the saliency of ethnicity. My discussion of the first two hypotheses, however, has emphasized that highly salient ethnicity can be channeled by political institutions. Accordingly, EIC has the greatest positive effect in societies where the underlying combination of PPP and EF are worst for allocation breadth: high PPP and moderate-to-high EF, or low PPP and low EF. In the other two combinations—high PPP/low EF and low PPP/moderate-to-high EF—reducing the saliency of ethnicity (by increasing ethnic-income cross-cuttingness) still has a positive effect, but a much milder one, since the socio-institutional arrangement is already conducive to broad allocation. In all cases, EIC affects constituency breadth. Where the socio-institutional arrangement creates effectively narrow constituencies, increasing EIC leads to broader constituencies, as ethnic groups are united by class similarities. Where the socio-institutional arrangement creates effectively broad constituencies, increasing EIC still increases constituency breadth, but not by so much.

Hypotheses 3b and 3c simply state that increasing EF when PPP is high (low) will enlarge (diminish) the positive effect of EIC. Again, the logic is tied to the effective breadth of constituencies that the underlying combination of EF and PPP creates. Hypotheses 3b and 3c are captured by the slopes of the lines in Figure 3. Where PPP is high, increasing ethnic fractionalization leads to increasingly narrower constituencies, and EIC's

constituency-broadening effect is more "needed". Where PPP is low, increasing EF leads to effectively broader constituencies, and EIC's constituency-broadening effect is less "needed". In short, we can think of the interactive relationships as follows: the more the underlying combination of EF and PPP already result in effectively broad constituencies, the less the marginal effect of EIC.

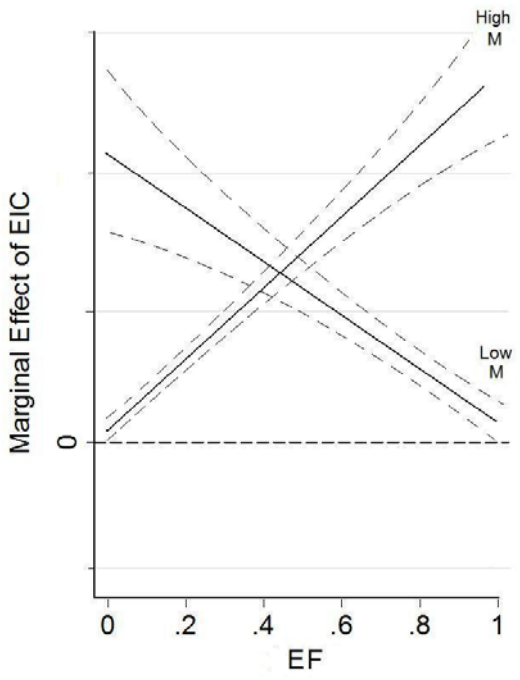


Figure 3. Depiction of Hypothesis 3: The Marginal Effect of EIC on Allocation Breadth

5.3.3 Control Variables

Formulas 5.1 and 5.2 contain a vector of control variables, **X**, that I now discuss. I follow Achen's (2003) advice to minimize the number of independent variables. With such complicated interactive terms consuming degrees of freedom, I thus opt to include just three in addition to my independent variables of focus: wealth, population size, and democratization. If our goal was to maximize R^2, we might include a number of other

variables such as region, former British colony, size of rural population, size of country (land area), etc.[26]

First, I control for the wealth of countries. The assumption is that the richer the country, the more resources the state has to redistribute, and thus, *ceteris paribus*, health and education outcomes will be higher (Barlow and Vissandjee 1999; Crenshaw and Ameen 1993; Dollar and Kraay 2000; Filmer and Pritchett 1999; Firebaugh and Beck 1994; Kim and Moody 1992; Moon 1991; Pritchett and Summers 1996; Shen and Williamson 1997; Wennemo 1993). In addition to absolute increases in resources, Wagner's law states that the development of an industrial economy will be accompanied by an increased share of public expenditure in the gross national product. Furthermore, as a country's income increases so do the personal incomes of its citizens. Individuals will be better able to purchase more of and in superior quality, such things as food and water—essentials that significantly influence health outcomes such as life expectancy and infant mortality. In addition, with higher personal incomes, medical emergencies do not take as much toll on family savings. In terms of education, higher family incomes mean that children are more likely to finish more school as parents have excess wealth to be able to invest in their children's future (Feachem et al. 1992, Hobcraft et al. 1984, Kawachi et al 1999, Liu et al. 1992, Russett 1978, Tulasidhar and Sarma 1993, United Nations 1991). Lastly, GDP per capita may affect health and education outcomes via changes in labor force composition (Crenshaw and Ameen 1993; Moon 1991), or urbanization (Murthi et al. 1995; Rogers and Wofford 1989; Subbarao and Raney 1995; United Nations 1991: 3).

Second, I control for the size of population. My initial assumption was that the larger the population, the harder it is to achieve health and education outcomes. However, it might be that large populations benefit from economies of scale, in terms of purchasing of

[26] Indeed, my results are robust to the first of these two variables. I did not gather data on the last two.

equipment, use of buildings, etc. Economies of scale do not extend to every feature of health or education systems; certain costs are irreducible. For example, a teacher can only efficiently teach a limited number of students; a hospital can only cater to a certain size of population. My final results do not depend on this variable, but it so often used in the literature that I include it to enhance comparability.

Lastly, I include level of democracy. Since one of my key explanatory variables is a feature of democratic systems, it is possible that the effects of this feature (PPP) are weaker the less democratic a country is.[27] As with population size, my results do not change when this control variable is omitted. All controls are lagged by one year since I expect policy and spending decisions require time to take effect.

5.3.4 Estimation Strategy

Since my data are TSCS with time-invariant (social structure), rarely-changing (institutions) and slowly-moving (spending & policy measures) variables, I follow Plumper and Troeger (2007) in their three-stage procedure for the estimation of time-invariant and rarely changing variables in panel data models with unit effects. The first stage of their proposed estimator runs a fixed-effects model to obtain the unit effects; the second stage breaks down the unit effects into a part explained by the time-invariant and/or rarely changing variables and an error term; and the third stage re-estimates the first stage by pooled OLS with panel-corrected standard errors including the time-invariant variables plus the error term of stage 2, which then accounts for the unexplained part of the unit effects. I also use robust standard errors clustered by country.

[27] While democracy might also be interacted, since the model already includes three interactive variables, I opt to vary cut-off values of my proxy for democracy (Polity IV). The results do not change significantly for various cut-off points.

For robustness, I also estimate my models using cross-sectional data. Hicken and Simmons (2008) posit that a cross-sectional design is actually more appropriate given the nature of the data. They state:

> "The independent variables of interest for us are institutions that are time invariant for most countries and change only rarely for others. The TSCS format would likely call for the inclusion of country effects . . . which will be highly correlated with the time-invariant variables and would therefore wash out any effects of the institutions that are the focus of our study (p.115)."

While I believe a cross-sectional design is wasteful of information, I nevertheless attempted to respond to this critique using both mean values and proportional changes overtime as the dependent variable. However, since my multiple interaction terms consume degrees of freedom, which are scant in the cross-sectional data (<50 observations), the standard errors are huge.

5.4 Data

5.4.1 Dependent Variables

I use four outcomes, two for health and two for education, as proxies for my dependent variable. For health, I use infant mortality and life expectancy, while for education I use literacy and the gross enrollment rate. I also use several indices developed by the United Nations Human Development Program *(UNHDP):* separate health and education indices and a composite index comprising both health and education. Following, I describe these variables in detail, including their sources and scope. For spending, I look at three categories: social security, education and health.

All the outcome measures I use, except infant mortality, are taken from the United Nations Development Program (UNDP) Time Series Dataset (1970-2000).[28] Infant mortality (*InfMort*) is taken from the World Bank Development Indicators (WBDI) (2000) and calculated as the number of infants who die before reaching one year of age, per 1,000 live births in a given year. The probability is expressed as a rate per 1,000. Life expectancy (*lex*) is calculated as the number of years an infant is expected to live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. The rate is averaged across gender, and equally weighted (50-50). I use the adult illiteracy rate (*lit*), which is the percentage of people aged 15 and above who cannot, with understanding, read and write a short, simple statement on their everyday life. Lastly, for the individual measures, I use the gross enrollment rate (*ger*), which is the total of all primary, secondary and tertiary students as a percentage of total school-aged children for each respective level of education. [29]

The UNDP indices rely on the above measures (except infant mortality). Specifically, the Education Index (*EdX*) is a combination of *lit* and *ger* weighted 2/3 and 1/3 respectively. For example, for Turkey in 2005, with an adult literacy rate of 87.4% and a combined gross enrolment ratio of 68.7%, the Education Index is calculated as follows:

$$2/3\ (0.874) + 1/3\ (0.687) = 0.812 \qquad (5.4)$$

For the Education Index, and indeed all the UNDP indices, higher values correspond to better performance/provision, in this case better provision of education.

[28] Note: Data is available up until 2007 for some, but not all of the variables. The Dataset was obtained by request by writing to hdro@undp.org. I thank the Statistics branch of the UNDP for their generous sharing of data.

[29] For robustness I run the results using logged values and the percent change from the prior year as the dependent variable. The results do not change significantly.

The Health Index (*HlthX*) relies solely on the life expectancy rate, but takes into consideration "minimum" (25 years) and "maximum" (85 years) values. The "minimum" and "maximum" values are chosen by the UNDP as goalposts and are used to express life expectancy as a value between 0 and 1. *HlthX* is thus calculated as the country's life expectancy rate minus the "minimum" divided by the maximum minus the minimum. For example, for Turkey in 2005, the Health Index was:

$$\frac{71.4-25}{85-25}=0.773 \qquad (5.5)$$

The Composite Index (*CmpX*) is a combination of the Health and Education Indices, each weighted by half. For example, for Turkey in 2005, the Composite Human Development Index[30] was:

$$\tfrac{1}{2}\,(0.812)+\tfrac{1}{2}\,(0.773)=0.792 \qquad (5.6)$$

5.4.2 Independent Variables: Institutions

I rely on Golder's (2005) Democratic Electoral Systems Around the World, 1946-2000 dataset for both my institutional variables. For district magnitude, I use the average district magnitude, logged (*ln(M)*) so that extreme values do not drive my results. My main proxy for electoral system breadth, however, is the Proportion of Population per Politician (*PPP*), which is calculated as the average district magnitude divided by the number of legislators.

[30] Referred to as HDISTAR in the spreadsheet provided to me. It differs from the commonly used HDI index, which also includes the GDP index.

5.4.3 Independent Variables: Social Structure

I rely on the new dataset I created and presented in Chapter 2 for my social structure variables. I thus use Selway's ethno-linguistic fractionalization index, or *SELF*, and the Ethno-Income Cross-cuttingness index, *EIC* which is based on a new measure of cross-cuttingness, *C*, that I justify in detail in Chapter 2.[31] Theoretically, *C* ranges from 0 to 1, with higher levels of EIC meaning more cross-cuttingness. Empirically, EIC ranges from .538 (South Africa) to .938 (Costa Rica). For enhanced readability of this chapter, I include here an abbreviated description of the dataset.

The most accurate source for these indices would be country censuses. However, many countries do not collect such information, and for many of those that do the raw data are difficult to obtain. An alternative strategy is to extract similar information from nationally representative surveys, such as public opinion surveys. Thus, I compiled my indices from seven sources: The World Values Survey (WVS), The Eurobarometer (EB), the Afrobarometer (AFB), the Latin American Public Opinion Project (LAPOP), the Asian Barometer (AB), the Comparative Study of Electoral Systems (CSES), and the World Health Organization (WHO). The use of several surveys allowed me to test the robustness of my scores for a handful of countries that appeared on two or more of the surveys. I was also able to check the quality of these categorizations by compiling indices for the familiar ethnic/religious fractionalization and bipolarization scores. I used the ethnic and religious group categories chosen for inclusion by each of the survey designers, relying on their local

[31] Specifically, $C \equiv 1 - \sqrt{\left[\sum \frac{(O-E)^2}{E}\right] / nm}$ where O refers to the observed observations and E the expected observations in a two-dimensional contingency table, n is the sample size, and m is the smaller of either the number of columns minus one or the number of rows minus one.

knowledge rather than the alternative strategy of eliminating any group under 1% so as to avoid introducing more error to that inherent in survey sampling.[32]

Since GDP per capita has such a strong influence on health and education outcomes, I evaluated the income-breadth of the countries included in my sample.[33] The average GDP per capita of countries included in the indices compared to those missing from the indices, are given in Table 1. The difference in economic development between in- and out-sample countries is almost $5,000. While this disparity in levels of economic development at first seems quite severe, among developing countries the difference is not seriously pronounced. Indeed, in West Africa, the Middle East and Latin America, out-sample countries actually have a slightly higher GDP per capita. Nevertheless, this difference in average GDP per capita is certainly something to be aware of when evaluating the results.

	Average GDP Per Capita	
	All Region	Missing Countries
23/27 East Europe	10,700	5,476
10/22 Middle East	12,066	14,060
23/25 Western European	35,017	42,380
17/24 Asia Pacific	10,120	2,683
6/20 West Africa	3,039	3,195
12/26 South, East & Central Africa	3,487	2,898
21/25 Latin America	7,688	8,376
All (112 Countries)	**11,931**	**7,141**

TABLE 1. Representativeness of World Geographic Regions and of Economic Development

In general the indices have good regional coverage. Of the 168 countries with a population over 400,000, the indices have scores for 112 countries. 23 of 25 countries in Western Europe, 23 of 27 in Eastern Europe, 17 of 24 in Asia Pacific, 21 of 25 in Latin

[32] Fearon (2003), for example, only considers ethnic groups that compose >1% of the population.
[33] There may be additional problems of representativeness in terms of the self-selection bias inherent in the types of surveys I am using. While this may exclude countries that have recently experienced civil war, the data go back far enough to diminish this problem.

America, 10 of 22 in the Middle East and North Africa, 18 of 46 in Sub-Saharan Africa (IMF 2007).

	SELF	Reynal-Querol	Fearon	Alesina Lang	Alesina Eth
SELF	1				
Reynal-Querol	0.714	1			
Fearon	0.771	0.785	1		
Alesina Lang	0.620	0.702	0.686	1	
Alesina Eth	0.796	0.785	0.907	0.666	1

TABLE 2. Correlation of Ethno-linguistic fractionalization indices with *Self*

Since surveys have a certain level of measurement error, I computed ethnic and religious fractionalization and bipolarization scores and compared them with existing indices: Reynal-Querol's (2002), Fearon's (2003) Ethno-linguistic fractionalization index, and Alesina et al. (2003). Table 2 shows the correlation between indices of ethnic fractionalization. My index of ethno-linguistic fractionalization (Selway's ELF, or *SELF*) and Reynal-Querol's (RQ) account for both racial and linguistic differences. Fearon's also does, but additionally accounts for religious differences in some countries. Lastly, Alesina et al. separate racial and linguistic dimensions. *SELF* is highly correlated (>.70) with the RQ, Fearon and Alesina Race. Its correlation with other indices, moreover, is similar to the correlation between those indices. RQ and Fearon, for example, correlate at 0.785. Considering the measurement error to which all indices are exposed, that *SELF* correlates this highly with the other indices gives us confidence in the surveys' categorization, which is a crucial issue for calculating cross-cuttingness: the ommitance of any one group on a given cleavage could drastically affect the cross-cuttingness score for that country.

5.4.4 Independent Variables: Controls

For country wealth, I use the UNDP's gross domestic product equalized for purchasing power parity. For population size, I use the WBDI's Annual Total Population. So that my results are not driven by extreme values, I take the logged values of both country wealth (*lngdp*) and population (*lnpop*). For level of democracy (*dem)*, I rely on the Polity IV dataset, which assigns countries an annual score ranging from -10 (most autocratic) to +10 (most democratic).[34]

5.4.5 Sample

The sample consists of developing democracies. I define as a developing country, low- and middle-income countries that had a per-capita GDP (by purchasing power parity) of US$13,500 or less in the year 2000.[35] My set of country-year observations are restricted to democracies, defined as having a score greater than six according to the Polity IV dataset.[36] In total, there are 47 countries in the sample, although all of them do not appear in every regression.[37] Table 3 lists the countries with the mean values of the main independent and dependent variables.

[34] My results are robust to the use of the Freedom House measure of democratic freedoms.
[35] I experiment with different cut-off points, such as $15,000 and $12,000. The results do not significantly change.
[36] Using the more generous definition of a polity score greater than zero does not greatly change my results except in one area: where EIC is high and SELF is low, the marginal effect of PPP/ln(M) does not dip below the zero line and become negative until really high levels of EIC.
[37] For robustness, I run my model excluding outliers. For life expectancy, the outliers are Lesotho, Botswana, Bangladesh and Haiti. For literacy, the outliers are Niger, Mali, Bangladesh, Haiti, Thailand and Dominican Republic. For infant mortality, the outliers are Niger, Bangladesh and Turkey. The results do not change significantly.

Table 3. List of Developing Countries in Time-Series Database and Mean Statistics*

Country	SELF	EIC	ln(M)	PPP	lit	lex	InfMort	ger
Albania	0.022	0.922	2.14	0.007	82.42	72.73	30.64	67.92
Argentina	0.020	0.930	1.67	0.026	95.78	71.68	15.97	85.29
Armenia	0.064	0.918	0.47	0.006	98.20	70.16		69.32
Bangladesh	0.151	0.881	0.00	0.003	36.92	57.82	84.77	54.52
Bolivia	0.529	0.879	2.19	0.089	80.00	59.72	79.93	78.38
Botswana	0.367	0.887	0.00		64.43	57.08	67.30	63.82
Brazil	0.428	0.854	3.05	0.038	84.17	67.51	43.37	81.24
Bulgaria	0.296	0.847	2.00	0.030	98.03	71.36	15.60	77.23
Chile	0.159	0.921	0.69	0.025	94.01	73.52	22.01	76.80
Colombia	0.586	0.857	1.80	0.035	86.52	67.08	39.38	64.10
Costa Rica	0.142	0.938	2.10	0.143	92.89	73.82	23.51	65.15
Dominican Rep.	0.566	0.749	1.30	0.034	79.53	65.07	53.84	70.16
Ecuador	0.325	0.917	1.42	0.041	87.82	69.01	47.91	73.01
El Salvador	0.521	0.922	1.51	0.061	74.24	65.89	47.11	62.96
Georgia	0.493	0.839	2.71			70.49	15.65	73.37
Ghana	0.621	0.849	0.00	0.007	60.69	54.94	79.33	45.81
Guatemala	0.517	0.789	2.00	0.039	61.54	61.83	60.04	56.99
Haiti	0.075	0.886		0.012	45.29	49.14	74.78	45.61
Honduras	0.571	0.877	1.86	0.056	69.23	64.88	49.94	61.60
India	0.835	0.807	0.00	0.002	46.76	56.82	95.29	52.20
Indonesia	0.707	0.839	2.71	0.037	87.59	66.27	41.92	65.53
Jamaica	0.201	0.894	0.00	0.017	79.81	70.82	31.11	69.78
Kenya	0.890	0.856	0.00		85.14	47.30		56.76
Latvia	0.587	0.906	3.00	0.200	99.00	69.73	15.91	84.36
Lesotho	0.015	0.900	0.79		82.63	45.99	93.23	62.37
Lithuania	0.170	0.903	0.67	0.007	99.00	71.02	12.37	87.33
Macedonia	0.424	0.848		0.008		72.68	21.34	69.46
Mali	0.818	0.809	0.79	0.018	24.27	47.39	122.39	28.70
Mexico	0.646	0.809	2.81	0.002	90.76	73.97	30.87	71.93
Moldova	0.375	0.915	4.62	1.000	98.49	66.99	19.87	70.48
Mongolia	0.050	0.882	0.33	0.024	98.23	62.20	65.60	66.53
Nicaragua	0.587	0.928	1.42	0.081	65.34	67.54	41.96	66.01
Nigeria	0.814	0.850	0.00	0.002	51.72	44.43	92.80	54.83
Pakistan	0.527	0.850		0.005	33.31	58.01	114.00	29.22
Panama	0.564	0.804	0.61	0.025	90.87	73.43	23.02	75.48
Peru	0.641	0.851	3.36	0.039	85.55	65.38	62.38	81.32
Philippines	0.764	0.834	1.21	0.005	92.24	66.41	40.67	79.94
Romania	0.139	0.926	2.12	0.024	97.80	70.03	22.59	69.57

Russia	0.299	0.918	0.69	0.002	99.00	65.98	17.71	84.93
Senegal	0.720	0.850	1.39		39.26	55.53		34.64
Slovakia	0.134	0.889	4.51	1.000		73.14	9.83	73.80
South Africa	0.684	0.538	1.92	0.571	79.21	56.98	64.09	73.51
Thailand	0.704	0.735	1.26	0.019	91.20	66.81	42.21	61.64
Turkey	0.026	0.935	1.70	0.007	75.65	63.81	68.03	62.99
Ukraine	0.490	0.829	0.44	0.012	99.00	66.69	14.21	83.38
Uruguay	0.087	0.874	1.65	0.002	96.63	72.99	22.03	82.67
Venezuela	0.660	0.886	1.39	1.000	86.64	69.61	31.16	68.25

*Not all countries have observations for the entire 30 years. Either they were not democracies for the missing years, or data is missing for the dependent variables. The variable *ger* is only recorded every five years from 1975-2000.

5.5 Results

5.5.1 The Marginal Effect of PPP

Using health and education outcomes as proxies for allocation breadth provides us with strong support for most parts of my three hypotheses. The marginal effect of EIC gives an unexpected result when SELF is low and PPP high—a significant negative marginal effect. Otherwise, the results indicate that an effective-constituency-breadth paradigm is a useful tool for analyzing the socio-institutional context of the policymaking process.

Table 5 displays the regression results for all four outcomes (Infant Mortality, Life Expectancy, Literacy and General Enrolment Ratio) with *PPP* as the proxy institutional variable. I start with the general proposition that each of the main independent variables (EIC, SELF and PPP) affect our health and education outcomes. Thus, for EIC, I perform a joint F-test on the coefficients of all terms that include EIC. The null hypothesis, that the model excluding all EIC terms is correctly specified is rejected at the 99% level. In fact, the same is true of all the joint F-tests for EIC, SELF and PPP regardless of the dependent variable. We thus know that our dependent variables, in some way, depend on each of our main independent variables in an interactive manner.

Table 5. Estimated Effects of PPP, SELF and EIC on Life Expectancy, Infant Mortality, Literacy and Gross Enrollment Ratio

	lex	*InfMort*	*lit.*	*ger.*
lngdp	0.05***	-6.51	-0.01***	6.18
	(0.00)	(29.20)	(0.00)	24.56
lnpop	-0.61***	10.32	-0.42***	8.89
	(0.00)	(60.71)	(0.00)	43.19
Democracy	-0.02***	0.18	-0.00***	0.06
	(0.00)	(0.93)	(0.00)	0.45
Lagged DV	0.99***	0.84	0.99***	0.17
	(0.00)	(0.58)	(0.00)	0.54
PPP	112.27***	-1580.06***	92.11***	-2638.69***
	(0.02)	(452.01)	(0.00)	242.29
SELF	31.68***	-583.39***	26.11***	-635.90***
	(0.01)	(119.35)	(0.00)	30.64
EIC	21.38***	-353.77***	17.48***	-335.08***
	(0.00)	(76.45)	(0.00)	16.78
PPP×SELF	-208.43***	3124.39***	-127.33***	6934.80***
	(0.04)	(801.72)	(0.00)	683.53
PPP×EIC	-128.16***	1800.43***	-105.35***	3027.64***
	(0.03)	(511.48)	(0.00)	274.31
SELF×EIC	-34.12***	627.97***	-28.06***	705.95***
	(0.01)	(128.36)	(0.00)	32.91
PPP×SELF×EIC	234.83***	-3513.39***	142.99***	-7907.67***
	(0.04)	(917.71)	(0.00)	784.55
Constant	-9.52***	211.04***	-8.21***	158.42***
	(0.00)	(67.48)	(0.00)	13.03
N	546	297	534	91
No. Countries	46	45	44	43
adj. R-squared	0.99	0.99	0.99	0.93
Joint F-test on EIC[§]	*0.00*	*0.00*	*0.00*	*0.00*
Joint F-test on SELF[§]	*0.00*	*0.00*	*0.00*	*0.00*
Joint F-test on PPP[§]	*0.00*	*0.00*	*0.00*	*0.00*

*p < 0.1, **p < 0.05, ***p < 0.01; Standard errors in parentheses;
[§]Joint F-tests on all single and interactive variables containing either EIC, SELF or PPP, respectively
InfMort and ger are lagged by five years as data is only available in five-year intervals.

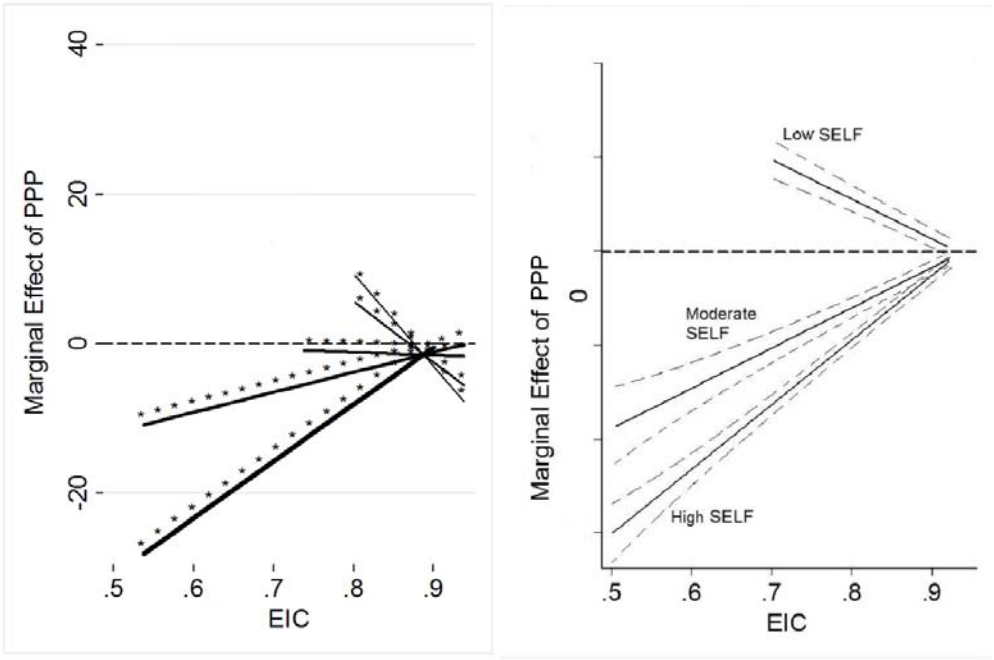
Next, I turn to the single t-tests on the individual and interactive coefficients in each of the regressions in Table 5. The t-tests on the singular variables of EIC, SELF and PPP indicate the significance of that variable's effect when the other variables simultaneously equal zero. For both EIC and SELF, this is logically irrelevant since PPP cannot be zero—

politicians are always relevant to a proportion of the population greater than zero. Moreover, the coefficient on PPP is substantively irrelevant, since the minimum value of EIC in the sample is .538. The two-term interactive variables also fail to provide us much information on our hypotheses for similar reasons, except the interaction term between PPP and EIC. The t-test on this coefficient tells us that we can reject the null hypothesis that PPP×EIC ≥ 0, and conclude that the effect of PPP decreases in EIC (and vice-versa) when SELF is zero. Note what limited information this t-test gives us still.

In short, the traditional table of coefficients tells us little about the effects of our main independent variables on health/education outcomes. Indeed, to avoid conflating coefficients with marginal effects, several authors recommend plotting the marginal effect (Franzese and Kam, 2007; Brambor, Clark and Golder, 2005). I thus continue exclusively with the display of marginal plots.

Figure 4a shows the marginal effect of PPP on life expectancy. Comparing this graph to Figure 4b—the hypothesized marginal effect—we see that the empirical results are similar to my predictions in Hypothesis 1. Since Figure 4a contains 5 plots (one at each level of SELF), I make two changes to traditional displays of marginal effects. First, rather than plot the confidence intervals for each effect, I follow Brambor, Clark and Golder (2006) in employing stars to represent statistical significance at the 10% level. In addition, I vary the thickness of the line according to its value of SELF. Thus, the thickest line represents the marginal effect of PPP on life expectancy where SELF==.87, the maximum value in the sample. The thinnest line is where SELF==0.02, the minimum of the sample. The three lines in-between are the values of SELF at the 25^{th}, 50^{th}, and 7^{th} percentile of the sample. As predicted by Hypothesis 1a, PPP has a positive marginal effect on life expectancy when SELF and EIC are low, i.e. an increase in PPP will raise life expectancy. Moreover, the

declined slope implies that as EIC increases the marginal effect of PPP on life expectancy decreases, verifying Hypothesis 1c.



Figures 4a & 4b. Marginal Effect of PPP on Life Expectancy: Actual Results vs. Hypothesized

Plots lines represent (from thinnest to thickest) SELF=0.02, .20, 0.53, 0.66, 0.87

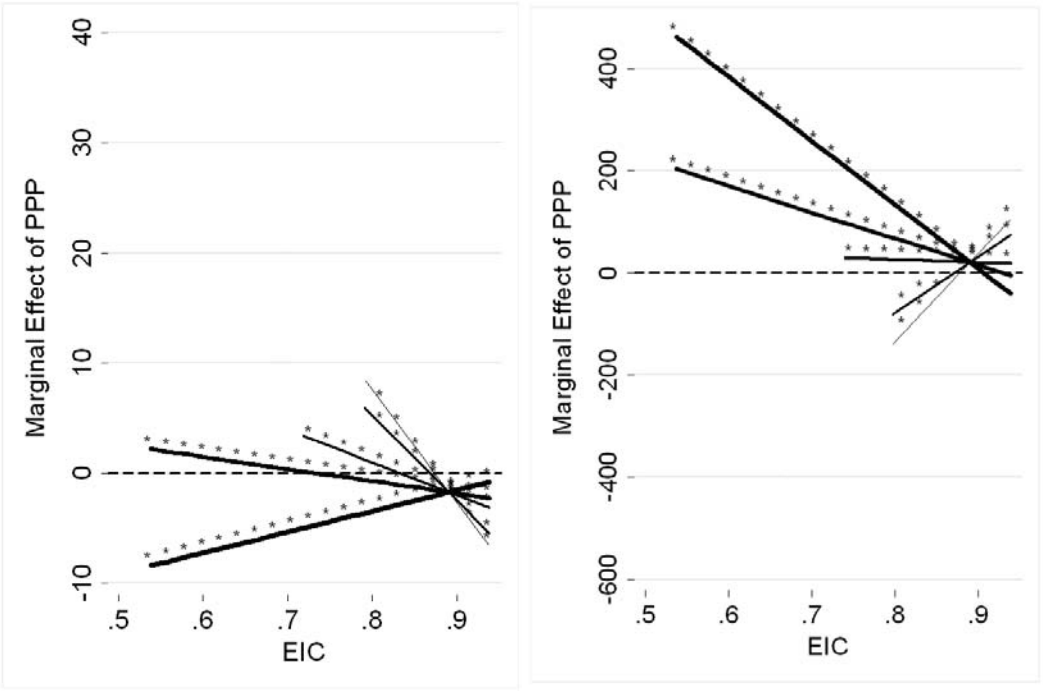
Where SELF is moderate-to-high, approximately between the mean (.66) and the max (.87), Hypothesis 1b correctly predicts that the marginal effect of PPP is negative. Increasing EIC also diminishes this negative effect in accordance with Hypothesis 1d. Finally, as Hypothesis 1e predicts, when EIC is high, the marginal effect of PPP is negative regardless of the level of SELF.

An interesting finding in these results is that, as EIC increases to the "very high" range, approximately >0.90, the positive marginal effect of PPP crosses the zero line and becomes negative. Why would PPP ever have a negative marginal effect? Put differently,

when would lower PPP help increase the provision of health and education? While narrow institutional constituencies, or local constituencies, are often associated with pork-barrel politics, in certain circumstances education and health provision might benefit from local specialization. Politicians responsible to a specific geographic area are more likely to be intimately familiar with the particular infrastructural, personnel or resource needs of the locale. In short, resources are distributed more efficiently: "the right services to the right people in the right amounts."[38] Local units can also become laboratories for innovation, with all units learning from the successes and failures of each other (Kollman, Miller, and Page 2000).[39]

The key difference between when PPP has a negative or positive marginal effect, where ethnic fractionalization is low, is the level of ethnic-income cross-cuttingness. The higher EIC, the lower is the salience of ethnicity, and the lower the need for the constituency-broadening effect of PPP. Only where salience is extremely low, is lower PPP able to exhibit a positive efficiency effect on the provision of health and education. It is interesting to note that even in highly fractionalized societies, where EIC is high, the marginal effect of PPP has the same direction and similar magnitude to low fractionalized societies with similar levels of EIC.

[38] SATI Workshop on Tax Policy and Administration, University of Pretoria, June 18-20, 2006.
[39] While this logic has mostly been applied to federal sub-units in the decentralization literature, there is no reason to think that it cannot apply to policy innovation channeled through political representatives in a non-federal system.

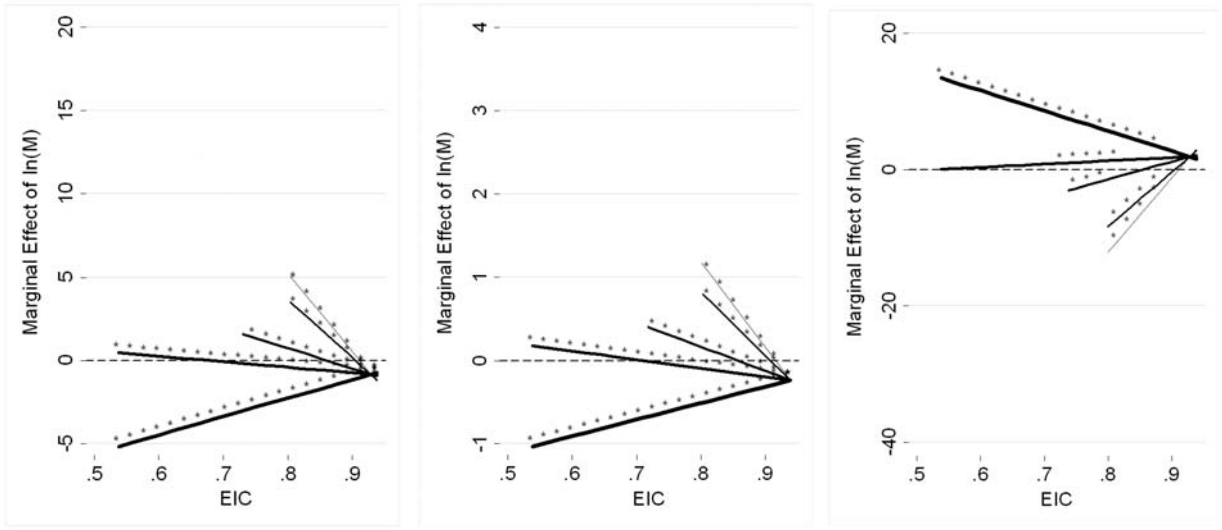


5a & 5b. Marginal Effect of PPP on *lit* and *InfMort*

Plots lines represent (from thinnest to thickest) SELF=0.02, .20, 0.53, 0.66, 0.87

In sum, we see that the direction and magnitude of the marginal effect of PPP on life expectancy depends on the level of both EIC and SELF. Similar results are obtained for literacy and infant mortality (Figures 5a and 5b). Note that the graph for infant mortality is flipped, since higher levels imply worse performance in health (as a result of narrower allocation).

This result is also robust to the use of the log of district magnitude as the proxy for electoral-system breadth. Figures 6a-6c are almost identical to Figures 4a, 5a & 5b, respectively. As noted in Chapter 3, district magnitude is a rougher proxy for constituency breadth, but seems to perform equally well as PPP in this analysis.

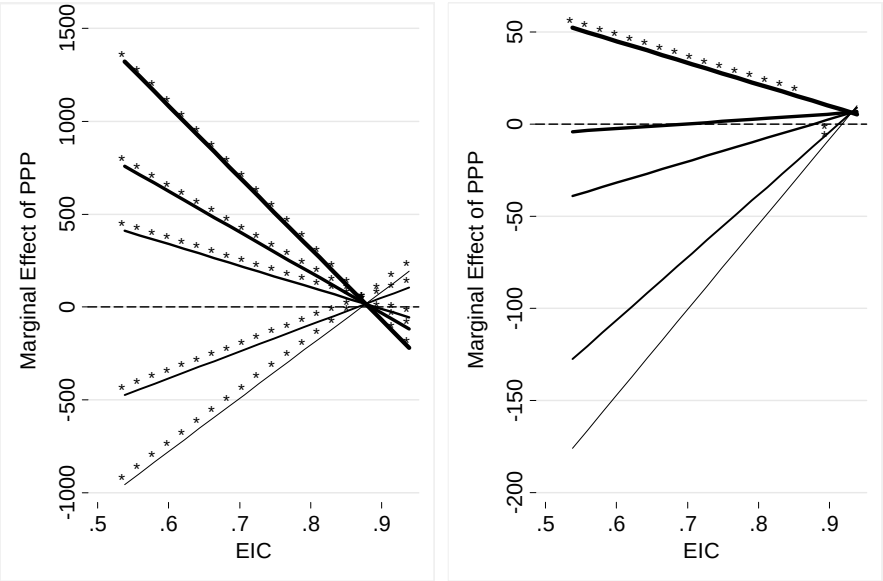


6a, 6b & 6c. Marginal Effect of ln(M) on *lex*, *lit*, and *InfMort*

Plots lines represent (from thinnest to thickest) SELF=0.02, .20, 0.53, 0.66, 0.87

Next in this section, I discuss the marginal effect of PPP on the combined gross enrolment rate for primary, secondary and tertiary education—my second proxy for education provision. Figures 7a & 7b show that the marginal effect of PPP on the gross enrollment rate does not conform to our expectations, and actually exhibits completely opposite effects, perhaps implying that *ger* may be proxying for narrow allocation. Addison and Rahman's (2001) study cited in the literature review above, suggests that *ger* may not be a great measure for developing countries. In particular, the authors suggest that tertiary education is more indicative of narrow targeting.[40] The marginal effect may be negative, then, due to *ger* being highly affected by enrolment rates in tertiary education. Thus, I am unable to offer any greater insight since the proxy variable is likely conflating too many different aspects of education success.

[40] The authors use the ratio of primary to tertiary spending to capture "public goods" provision.



7a & 7b. Marginal Effect of PPP and ln(M) on *ger*

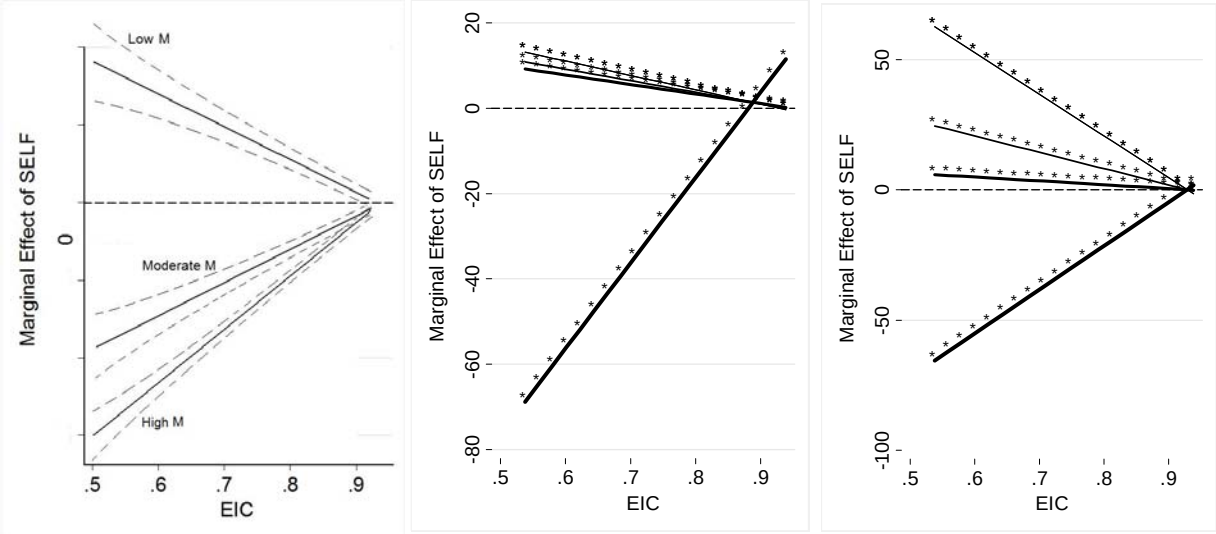
Plots lines represent (from thinnest to thickest) SELF=0.02, .20, 0.53, 0.66, 0.87

Finally, I discuss the marginal effect of PPP on the UNDP indices for health and education. I do not include the graphs here, but the graph for the Health Index (*HlthX*) is almost identical to the life expectancy graph in Figure 4—understandable since the UNDP index is derived solely from life expectancy rates. However, the marginal effect of PPP on the Education Index does not support Hypothesis 1, probably reflecting the fact that it relies on *ger* as well as *lit*. *ger* likewise affects the Composite Health and Education Index, which also does not support Hypothesis 1. In short, due to the troublesome nature of *ger,* the UN indices are not good proxies for my dependent variable. Nevertheless, with the exception of *ger*, the underlying components of the indices are robust results.

5.5.3 Testing Hypotheses 2 & 3: The Marginal Effects of *SELF* and *EIC*

Hypothesis 2 and most of 3 are also verified by the data. I begin with the marginal effect of SELF, comparing Figure 8a (hypothesized marginal effects) to Figures 8b (PPP as

the modifying institutional variable) and 8c (ln(M) as the modifying institutional variable). The line thickness now corresponds to values of PPP, with the thickest line as PPP=1. We see, as Hypothesis 2b predicted, that ethnic fractionalization only has a negative marginal effect when PPP is high (2a).[41] The inclined slope where PPP is high verifies Hypothesis 2d: as EIC increases, the marginal effect of SELF diminishes. In contrast, when EIC is low and PPP is low, the marginal effect of SELF is positive in accordance with Hypothesis 2a. Again, as EIC increases, this positive marginal effect diminishes. Lastly, the results support Hypothesis 2e, showing that when EIC is high, the marginal effect of SELF is positive regardless of the level of PPP.



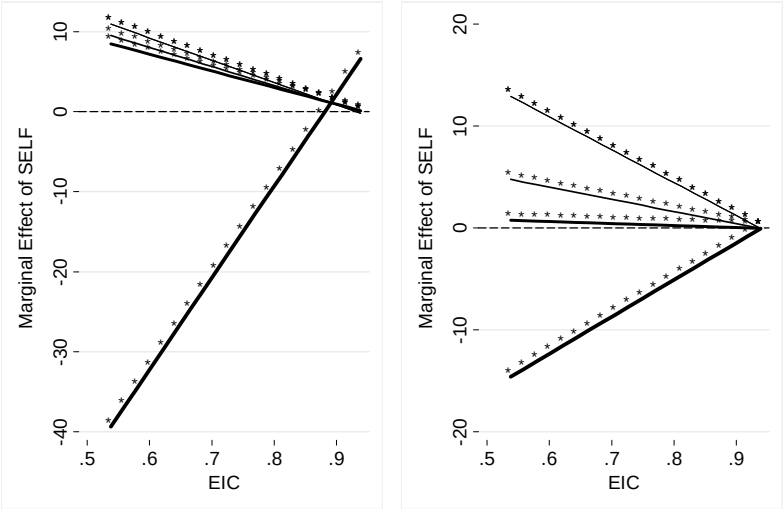
8a, 8b, & 8c. Hypothesized and Actual Marginal Effect of SELF across various levels of PPP and ln(M) on *lex*

Plots lines represent (from thinnest to thickest) PPP=0.0015, 0.03, 0.05, 1, or ln(M)=0,1.42, 2.12, 4.89

Figures 9a and 9b show that these results are robust to the use of *lit* as the dependent variable. One interesting departure from Hypothesis 2 is that, when PPP is

[41] Since moderate values of PPP are not substantively relevant—the 75% percentile is PPP=.05 while the max is PPP=1—we can only make conclusions about the marginal effect of SELF when PPP is low or high. Alternatively, we can say that moderate values of PPP as per my sample display the same interactive mechanisms as when PPP is low.

used as the institutional proxy, at very high levels of EIC where PPP is high, the marginal effect of SELF actually crosses the zero line and becomes positive and significant. While this same result is not supported with ln(M) as the proxy, it suggests that when ethnic-income cross-cuttingness is very high, that increasing the number of ethnic groups has a positive marginal effect regardless of the types of institutions in place.

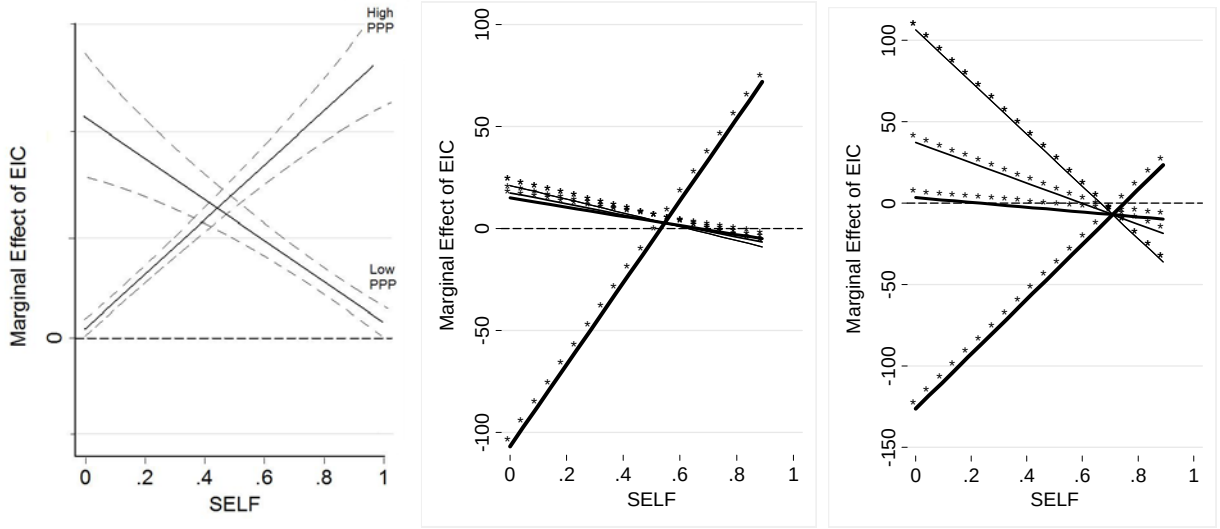


9a & 9b. Marginal Effect of SELF across various levels of PPP and ln(M) on *lit*

Plots lines represent (from thinnest to thickest) PPP=0.0015, 0.03, 0.05, 1, or ln(M)=0,1.42, 2.12, 4.89

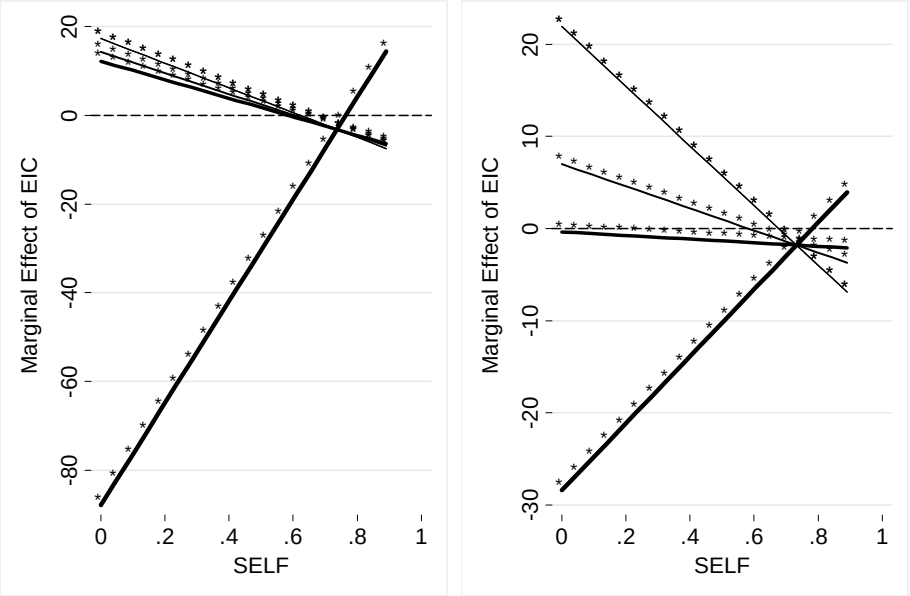
Finally, I turn to Hypothesis 3. Again, the plot lines correspond to different values of PPP or ln(M). Comparing Figure 10a (hypothesized marginal effects) to Figures 10b and 10c, we see that most of Hypothesis 3 is verified. Specifically, the results most obviously reproduce the predicted criss-cross pattern. The marginal effect of EIC, however, is only positive under two conditions: low PPP/low SELF and high PPP/high SELF. These two socio-institutional combinations were ones I identified as being in most "need" of higher EIC in order to effectively broaden constituency size.

Nevertheless, I was surprised by the negative and significant marginal effect of EIC under the two following combinations of PPP and SELF: high PPP/low SELF and low PPP/high SELF. While I hypothesized that these combinations would not be in so great a need of the constituency-broadening effect of EIC, I still expected a positive marginal effect, if any. The results establish, however, that increasing EIC under these two conditions actually narrows the effective size of constituencies. It must be that these socio-institutional combinations are appropriate for societies with low cross-cuttingness. The marginal effect evaluates what happens to allocation breadth when going from minimum cross-cuttingness to maximum cross-cuttingness. Thus, this negative marginal effect of EIC is not as surprising as I initially thought. What this says is that if you have institutions in place that help broaden constituency size, and there is a sudden and large change in the social structure, that those institutions may no longer serve their original purpose; they will interact with the new social structure in different ways, and effectively narrow constituency size.



10a, 10b, & 10c. Marginal Effect of EIC across various levels of PPP and ln(M) on *lex*

Plots lines represent (from thinnest to thickest) PPP=0.0015, 0.03, 0.05, 1, or ln(M)=0,1.42, 2.12, 4.89



11a &11b. Marginal Effect of EIC across various levels of PPP and ln(M) on *lit*

Plots lines represent (from thinnest to thickest) PPP=0.0015, 0.03, 0.05, 1, or ln(M)=0,1.42, 2.12, 4.89

5.6 Conclusion

The empirical results presented in this chapter lend support to my socio-institutional theory of constitutional breadth. Specifically, we see that when the effective size of constituencies is narrow, allocation breadth is narrow. The results underscore the interactive nature of institutions and social structure on constituency breadth—broad constituencies are not simply defined by electoral rules. Indeed, we see that the effect of electoral rules is modified by my two characteristics of social structure. For example, rather than an increase in district magnitude always leading to broader resource allocation, this chapter has shown that in certain circumstances increasing district magnitude can lead to a narrower targeting of health and education resources. Specifically, when ethnic-income cross-cuttingness is low and ethnic fractionalization is high, increasing district

magnitude leads to poorer performance on health and education indicators. The reason is that highly diverse and fragmented social preferences are directly translated into policy outcomes by the electoral system. Alternatively, we can say that decreasing district magnitude would force these diverse groups in society to compromise and coordinate on health and education provision.

The results also shed light on the effect of ethnic fractionalization on allocation breadth. First, I find that ethnic fractionalization, alone, is an inadequate measure of ethnic diversity. Whether ethnic fractionalization harms public good provision or not and the degree is does so, depends on how evenly dispersed ethnic groups are amongst income groups. Where cross-cuttingness is high, increasing the number of ethnic groups leads to broader allocation regardless of the institutional environment. Where cross-cuttingness is low, the effect of ethnic fractionalization further depends on the institutional environment: when PPP and/or district magnitude is low, increasing the number of ethnic groups broadens resource allocation, but when PPP/district magnitude is high, ethnic fractionalization leads to narrower allocation.

Lastly, the results in this chapter represent probably the first cross-country quantitative analysis linking cross-cuttingness to any political phenomena. It is fitting that our understanding of institutions has developed sufficiently that the concept of cross-cuttingness can be tested appropriately, i.e. with the institutional environment in mind. I find that higher ethnic-income cross-cuttingness only leads to broader allocation under certain *ex ante* combination of electoral rules and ethnic fractionalization, while under others it can have a negative marginal effect.

In conclusion, this chapter has offered important insight into the functioning of electoral institutions in different societies. We have seen that different social preferences, or social structures, require different institutions in order to induce compromise for and

coordination of the provision of broadly-redistributive quasi public goods. In addition, we have seen that ethnic "diversity" is not necessarily harmful to allocation breadth: even with inherently diverse and fragmented social structures, selecting the right institutions can channel these preferences in positive ways. In short, the *effective* size of constituencies to which politicians respond impacts allocation breadth. As emphasized repeatedly throughout this dissertation, institutions alone do not define the size of constituencies. We have seen that narrow constituencies may result from a combination of low cross-cuttingness and high fractionalization with low PPP/district magnitude, or high cross-cuttingness and low fractionalization with high PPP/district magnitude. In the qualitative chapters that follow, I analyze two countries that fit these two narrow constituency types. First, I look at Thailand, which experienced a dramatic increase in PPP following the 1997 constitutional changes. Whereas in the pre-1997 period, education and health were underprovided, the new constitution heralded an era of unprecedented policy attention from the government, when, among other positive changes, there was a doubling of the proportion of the population covered by state health insurance. Thailand fits the first effectively-broad-constituency scenario—low fractionalization and high cross-cuttingness with moderate PPP/district magnitude. Second, I turn to Mauritius with its highly diverse society—high fractionalization, low cross-cuttingness. Both sociological and institutional theories considered separately would condemn the country to failure in health and education provision. However, the low district magnitude in Mauritius channeled its social structure in ways that induced politicians to build cross-ethnic coalitions, field multi-ethnic candidate slates, and target health and education broadly to the population.