UNIVERSIDADE DE SÃO PAULO
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Robert Myles McDonnell

Explaining the Determinants of Foreign Policy Voting Behaviour in the Brazilian Houses of Legislature, with a Focus on the Senate

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ROBERT MYLES MCDONNELL

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ABSTRACT

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This thesis seeks to analyse nominal voting patterns in the Brazilian houses of legislature, in particular the Federal Senate and with a focus on foreign policy issues. Foreign policy analysis through nominal votes has often been focused on the Chamber of Deputies, and so a primary objective of this thesis is to extend the discussion to the Senate, which is in many ways the more powerful institution in this area, in a way that is formally comparable. In order to do so, ideal points estimated through Bayesian Item-Response models are employed, including some novel adaptations and the use of certain aspects of the model that have not often been used to analyse nominal voting patterns before. The hypotheses posited in the literature for being determinants of voting behaviour are systematically examined and tested, using methods either new to the ideal-point literature in Brazil or rarely used, leading to findings contrary to the majority of the literature on several points, and in accordance with other studies on others.

Keywords: Foreign Policy, Brazilian Legislative Politics, Bayesian Item Response.

RESUMO

MCDONNELL, R. M. **Explicações das determinantes do comportamento legislativo em votações nominais no Congresso Brasileiro, com foco no Senado.** 2016. 161 f. Tese (Doutorado) - Instituto de Relações Internacionais, Universidade de São Paulo, São Paulo, 2016.

Esta tese busca analisar as votações nominais no Congresso brasileiro, particularmente o Senado Federal e com foco nos temas de política externa. A análise de política externa por meio de votação nominal tem sido limitada à Câmara dos Deputados, e nesse sentido, o primeiro objetivo desta tese é ampliar a discussão para incluir o Senado, a casa mais poderosa em muitos aspectos, numa forma que é formalmente comparável. Portanto, pontos ideais estimados através de modelos Resposta ao Item Bayesiana são empregados, incluindo novas adaptações e a utilização de aspectos do modelo que não são frequentemente usados. As hipóteses da literatura das determinantes de comportamento em votações nominais são testadas sistematicamente, usando métodos que são ou novos à literatura de pontos ideais no Brasil ou pouco utilizados, resultando em constatações contrárias à maior parte da literatura em uns pontos, e de acordo com outros.

Palavras-chave: Política Externa, Política Legislative Brasileira, Resposta ao Item Bayesiana.

Acknowledgements

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Contents

1 Introduction

We know little about why Brazilian senators vote the way they do on foreign policy matters. In fact, the Senate as a whole is a very understudied institution, certainly compared to the *Câmara dos Deputados*, or Chamber of Deputies. With regard to the latter, the literature has been quite consistent: the significant powers of the Brazilian president induce a government–opposition dynamic to nominal voting behaviour, mediated through party leaders who keep their members in line. Considering foreign policy, studies have found no difference between voting behaviour on foreign policy issues and other themes, meaning that foreign policy too appears determined by this government–opposition dynamic. A detailed review of these literatures is given later here in Chapter One.

Creating ideal points means, in essence, creating a scale. Hence, *measurement* is an important topic: the way we create these scales and utilise them for analysis matters. This is especially important for legislative arenas such as the Senate where we observe much absence and party and coalition switching. In cases such as these, certain choices of method can have significant bearing on the outcome of the analysis. Therefore, an in-depth discussion of the methodology employed herein is warranted, which is undertaken in Chapter Two. The reasons for the choice of the Bayesian Item-Response model are given, as well as a comparison to the more common `NOMINATE` set of methods. The more technical aspects of the discussion may be found in the Appendix.

A crucial element of this thesis is the extension of the literature reviewed here in Chapter One to the Federal Senate. Since the majority of the work undertaken so far in this field has been on the Chamber, the first task is to understand how exactly we may relate findings on

the Senate to findings on the Chamber, given that ideal-point scales created separately for the two institutions are not formally comparable. This is the subject of Chapter Three.

In Chapter Four, I examine all the major hypotheses derived from the literature. I test these hypotheses using a suite of methods applicable with the use of the Bayesian Item-Response model, from 'quasi-natural' experiments related to party and coalition switching, to multilevel models incorporating regressions that avoid some of the statistical problems discussed in Chapter Two. I discuss ideology and *dimensionality* (see Chapter Two) by using the 'discrimination' parameter of the Item-Response model; to the best of my knowledge, this parameter has not been utilised to explore nominal vote behaviour in this way before, in either the Brazilian or international literatures. To be clear, I group domestic policy and foreign policy together because the findings in the literature point to no difference between the two. In Chapter Five, I explore this finding.

Having explored the hypotheses from the literature, I take a closer look at foreign policy in Chapter Five. This chapter contains a novel adaptation of a Dynamic Item-Response model, which allows us to estimate separate ideal points for each theme. In this way, foreign policy can be directly compared to domestic policy using comparable ideal points; it also allows us to compare sub-themes of foreign policy to one another. The idea of informal districts for the senators is also introduced. This allows for an exploration of the supposed mechanism that underlies the International Political Economy literature reviewed in §1.1. This is also a novel contribution, as I am not aware of another attempt to test these International Political Economy hypotheses by creating such informal districts for Brazilian senators. Chapter Six then concludes and discusses possible avenues for future research in this field.

1.1 Review of the General Literature

Since the late 1980s, there has been a huge growth in International Relations (IR) studies that utilise, to one degree or other, an International Political Economy (IPE) framework. These IPE studies are often based on Putnam's celebrated idea of a 'two-level game' (Putnam, 1988), which detailed the mechanisms by which domestic and international politics interact, and Rogowski's work on factor endowments, which studied in both theoretical and historical detail the effects of international trade on domestic political coalitions and vice-versa (Rogowski, 1989). These works either foreshadowed or were produced alongside what came to be a huge literature (Milner, 1997; Simmons, 1997; Sklair, 1997; Broz and Frieden, 2001; Mansfield et al., 2002; Frieden, 1988).[1] Although much of this work understandably focuses on areas of IR such as trade or monetary policy, the argument is applicable to all areas of the international interactions of a state, assuming the policy in question has some domestic effects.

An important facet of the Rogowski/Putnam framework is the idea that domestic actors seek to impose their will upon decision-makers in order to achieve their policy preferences. Studies of how this works in practice have most often focused on legislator voting behaviour in the houses of legislature (for example, Milner and Tingley, 2009), because of the availability of data and due to the obvious difficulties inherent in observing the policy-making process at high levels of power (Clinton, 2012, p.80). The reasoning is straightforward: for example, if one accepts the assumption that legislators most desire to be (re-)elected, then it stands

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[1]Of course, these were not the first attempts to highlight the interplay of domestic and international politics (see for example, Gourevitch, 1977); neither were they the first attempts to re-integrate studies of politics and economics along with international and domestic factors (a history of IPE is given by Cohen, 2008). However, the ideas contained in Putnam and Rogowski's studies provided a launchpad for a veritable explosion of academic work which sought to account for events in global politics by using the logic of two-level games and factor endowments.

to reason that they are permeable to demands from those who can affect their chances of re-election: from voters, special interest groups, or perhaps from their party or government. Hence their voting behaviour on publicly-available nominal voting data is expected to reflect these pressures, along with the personal preferences of the legislator, which may be sincere or strategic. As a simple example, consider a legislator whose electoral base is located in a district in which there is a large inefficient industry, which would suffer from overseas competition. If the legislator's Executive signs a bilateral trade agreement with another state that proposes to liberalise trade between the two countries, then it is to be expected that the legislator in question would vote against the agreement. In this simple example, we are assuming that the legislator is: a) permeable to demands from his/her constituency; b) seen as a valid focal point for lobbying efforts; c) free from overwhelming party or government pressure on the vote; d) is sufficiently motivated towards (re-)election as to take these pressures seriously, and e) a rational decision-maker. For the purposes of this thesis, (e) is not doubted, although the other assumptions may of course be questioned and are discussed later in the empirical analysis. In addition to these 'demand-side' effects, there are institutional factors and the preferences of the decision-makers. Lawrence (2005), citing Rodrik (1995), writes that "demand for trade policy reflects (a) individual preferences and (b) the behaviour of interest groups; the supply of policy reflects (c) policymaker preferences and (d) the institutional structure of government" (2005, pp.1-2).

Regarding the institutional structure of government, although many of these IPE studies have focused on democracies, and indeed, mainly on rich, western democracies, the logic of the Rogowski/Putnam framework is equally applicable to other types of states, as there

are good theoretical reasons to assume that the mechanism is the same in any polity. From the view of the selectorate theory, leaders rely in some fashion on their *winning coalition*, i.e. those whom they must appease in order to stay in office (Bueno de Mesquita et al., 2003, p.51), regardless of whether the polity is a democracy or an autocracy. The median voter theorem (Black, 1948; Downs, 1957) is influential in explaining how legislators and leaders respond to an imaginary 'median' voter in democracies; simply put, this median voter holds the balance of power in an election, in a similar fashion to how 'swing states' are focused on in the mainstream US media during presidential elections. The median voter theorem is simple and powerful, and even though it appears theoretically limited to simplistic cases, it has found plenty of empirical support (Congleton, 2003), although for trade policy, findings have been mixed, with some finding support (Dutt and Mitra, 2005) and others not (Dhingra, 2014).

If the median voter theorem and the selectorate theory (at least in a democratic context) help to explain why legislators would respond to voter demands, theories of special interest group politics (Grossman and Helpman, 2001) help to form a fuller, more realistic picture. Interest groups, whether large-scale professional lobbying organisations or small-scale entities, are generally taken to be interested in policy output, particularly in areas such as trade policy (Rogowski, 1989; Schonhardt-Bailey, 2006) or divisive social policies; however, their impact on trade policy output depends on the situation (Kindleberger, 1951), whether the issue in question has caused an impact upon the polity (Onuki and Oliveira, 2010), and on the complexity of the analytical models employed (Fordham and McKeown, 2003).

There are other factors posited in the literature that impact upon a politician's responsiveness

to societal demands. It is often thought that individual legislators are more parochial than Executives since the latter have a larger, national electoral base, rather than the narrower electoral bases of legislators (Clinton et al., 2013, p.8).[2] However, constituency size has not been found to be a powerful predictor of legislator behaviour, at least concerning trade policy (Karol, 2007). There is also a belief that Executives are more dominant in the area of foreign policies. Often termed the 'Two Presidents Thesis' (Wildavsky, 1966) in the US literature, this theory enjoyed early empirical support but it is now argued that the effect has waned as the US Congress has become more active and more partisan in international affairs (Fleisher et al., 2000).

As regards how these IPE ideas interact with mainstream International Relations (IR) theory, the sharpest divergence between the two can be found on the topic of the *unitary actor assumption* of classical IR theory, which sees states as 'black box' entities in a global anarchic system, similar, and from an analytical view, like "units" (Waltz, 1979, p.79). Milner, among others, makes the case for relaxing this assumption and for treating states as *polyarchies*, somewhere in between hierarchies and anarchies, in which the distribution of domestic preferences (tied to the structure of political institutions and the flow of information in the polity) is the key variable for whether a state *appears* as a unitary actor or not. Thus, *aligned* preferences cause a state to appear as a unitary actor, although Milner notes that this is extremely uncommon, even among dictatorships such as those of Hitler and Stalin (Milner, 1997, pp.11-13).[3]

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[2]There are studies that detail the efforts of interest groups in lobbying the US Executive, and so it cannot be assumed that the president *always* has a national interest and a broader constituency, or that he/she is actually insulated from interest group pressure (Orman, 1988).

[3]All classical theories of IR see the state as the core actor in international politics, but this should not be seen as blindness to domestic factors. "Rather, the question is how much empirical power is lost relative to

While a polyarchy may be perfectly reasonable in the arena of domestic policy, there is added complication when considering foreign policies. As noted above, an "enduring and controversial debate centers on whether there exist 'two presidencies', that is, whether presidents exercise fundamentally greater influence over foreign than domestic affairs" (Canes-Wrone et al., 2008, p.1), which points to the fact that even if one accepts a relaxation of the unitary actor assumption, there are reasons to believe that foreign policy is a fundamentally different arena and one in which all other actors, minus the Executive, play a lesser role (or perhaps even no role). Some of those reasons lie in the idea that the public are generally badly-informed about foreign policy, so that they don't hold politicians accountable for these policies (Guisinger, 2009) and take their cues from elites (Saunders, 2015), although others disagree, and maintain that the public does take an interest and can (and does) influence foreign policy (Aldrich et al., 2006). Other reasons lie in the fact that the Executive possesses more information and capability in the international political context than other actors, such as the houses of legislature (Martin, 2000). Empirical examinations of this phenomenon, as noted previously, have shown a decreasing effect over time.

An important feature of this theory is that legislators are absent in some way from the formulation of foreign policies. This aspect, when noted empirically in the United States, was often put down to ideas of bipartisanship of the legislature in the arena of foreign policy; that is to say, legislators displayed an alignment of preferences in the area, delegating to the Executive. The effect was strongest when legislators felt united in the face of some kind of foreign threat, such as Communism (McCormick and Wittkopf, 1990). However, ideas

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the parsimony that is gained, and whether we can identify any guidelines for when state-centric theory is likely to be more or less useful and necessary." (Lake, 2008, p.46)

of bipartisanship do not mean that legislators do not invest in foreign policies (Milner and Tingley, 2015). In Latin America, and particularly in Brazil, the debate over bipartisanship in foreign policy themes has been one of the key debates in the analysis of Brazilian foreign policy and has focused on whether the houses of legislature abdicate or delegate to the Executive. Studies of Brazilian legislative activity have found evidence of delegation (Figueiredo and Limongi, 2000, p.156), although this was on a particular issue (the *Plano Real*, Cardoso's economic stabilization plan). Important studies in this foreign policy literature are referenced in a later section (§ 1.4) below.

1.2   The Literature on the Analysis of Roll Call Data

This section details the literature on the analysis of nominal voting data, as this is a key method in analysing the mechanism by which domestic interests seek to pursue their preferences through influence on legislators, and, moreover, is the approach taken in this study. A more detailed discussion of the methods involved is deferred until Chapter Two.

Analysis of nominal votes, also called roll-call votes, is done most often in tandem with the spatial voting model (SVM)(Ladha, 1991). The SVM has been called "the most successful model in the field of political science" (Armstrong et al., 2014, xi). As applied to legislative voting, the model assumes a policy space, usually of one or two dimensions, in which legislators choose a 'Yes' or 'No' alternative (or may simply abstain) on a policy proposal, voting for whatever proposal is closest to their preferred policy. Choosing 'Yes' or 'No' aligns the legislator with others who vote the same way, and distances him/her from those who vote differently. A spatial position can then be assigned to the legislator, the meaning of which is

then inferred from the political context. The model does not assume that these locations are the personally preferred position of the legislator, only that, over rounds of voting, the various pressures on the legislator (sincere or strategic voting, the influence of the party or ideological concerns, for example) produce this positioning. The position of the legislator in the policy space is called his/her 'ideal point', and as Clinton *et al.* note, the "primary use of roll call data [. . .] is the estimation of ideal points" (2004, p.1).

Although the SVM has a long history (Poole, 2005), many studies on ideal points and the spatial voting model were published in the aftermath of the work of Poole and Rosenthal (1985); most works utilised their scaling methods (the `NOMINATE` algorithms)[4]. Although the literature is heavily based on analyses of the United States' legislatures (for example, McCarty et al., 2001; Clinton and Meirowitz, 2004), scholars have also analysed legislatures in France (Rosenthal and Voeten, 2004), the United Kingdom (Kellermann, 2012), the United Nations (Voeten, 2000) and the European Parliament (Hix et al., 2006). Ideal points have been estimated for arenas other than legislatures, such as the US Supreme Court (Martin and Quinn, 2002; Lauderdale and Clark, 2012), and for particular themes such as opinions on education (Doyle, 2010). Common scales have been made to compare different institutions across time (Bailey, 2007; Treier, 2011) and to put voters and parties in Europe on one single scale (Lo et al., 2014a; Konig et al., 2013). While this literature is enormous, some overviews are provided in Clinton (2012) and Poole (2005).

IPE theories have often been tested by using ideal point estimates in further, 'second-stage'

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[4]`NOMINATE` stands for Nominal Three-step Estimation, and is a family of ideal-point estimation algorithms developed first by Keith Poole and Howard Rosenthal who were later joined by others. The comments on `NOMINATE` in this thesis pertain to the non-Bayesian versions, as there is a recently-developed Bayesian version of `NOMINATE` available for `R`. For more on `NOMINATE`, see www.voteview.com.

regression analyses. "The use of ideal point estimates in regression analysis gives rise to a 'errors-in-variables' problem, almost universally ignored by students of congressional politics", write Clinton et al. (2001) (p.5).[5] While scholars have noted these "serious methodological problems" (Milner and Tingley, 2009, p.213) that arise when including these estimates in regression analyses, it hasn't stopped this being the principal method by which ideal points and IPE theory have combined.[6] Some key findings of this IPE ideal-point literature that are pertinent to our discussion here are that constituency and party pressures can indeed matter for how legislators vote on foreign policy. Broz (2005) showed as much for the US congressional politics of international financial rescues, as was also demonstrated as regards the politics of foreign trade and foreign aid in the US (Milner and Tingley, 2011, 2009), and the domestic US politics associated with financing the International Monetary Fund (Broz and Hawes, 2006), where higher proportion of higher-skilled workers in the constituency leads a legislator to be more favourable towards voting for a financial rescue (Broz, 2005). In 25 developed countries between 1945 and 1988, Milner and Judkins find party membership to be important predictors of openness to trade, with right-wing parties favouring trade more and left-wing parties less (2004). These positions appear reversed for foreign aid policies, where left-wing legislators are more favourable (Milner and Tingley, 2009).

While most of the earlier works in this field utilised the `NOMINATE` family of algorithms to produce estimates of ideal points, a lot of the later work has been done by utilising the Bayesian Item-Response theory (IRT) model of Clinton, Jackman and Rivers (2004). The

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[5]That is to say, the error in the estimation of the ideal points is ignored when these estimates are included as predictor variables in a regression. This can have serious consequences for small-n legislatures or for extremist legislators (Clinton et al., 2001).

[6]However, it is now generally recognised that researchers need to incorporate the uncertainty inherent in ideal-point estimates into second-stage analyses (Armstrong et al., 2014, p.278).

increased flexibility of this model has allowed scholars to study more advanced aspects of the SVM, as well as questioning some of the assumptions of classic ideal point work, such as how to assess dimensionality (Jackman, 2001), how to estimate unpredictable voters (Lauderdale, 2010) and how to properly address the comparability of estimates across institutions and time (Bailey, 2007). Importantly, this model has allowed researchers to focus on how to include important external information in roll-call models. This has included grouping legislators by party and votes by theme (Lu and Wang, 2006), including information from the text of the proposals themselves (Gerrish and Blei, 2011, 2012; Lauderdale and Clark, 2014), elite surveys (Zucco Jr. and Lauderdale, 2011) and manifestos (Lo et al., 2014b; Konig et al., 2013). Leveraging these extra sources of information brings us closer to answering the question of which incentives legislators respond to and in what contexts, and their inclusion 'inside' the model avoids the need for the two-stage analyses that use ideal points as variables in second-stage regressions.

There are, however, clear limits to how much we can say with analyses of nominal voting patterns. Nominal votes are not *all* votes, and votes are not the only facet of legislative behaviour worth studying. This thesis therefore makes no claims about legislative behaviour outside of the roll call votes studied; behaviour on nominal votes is not extrapolated to account for behaviour on non-nominal votes. As regards the utility of roll-call votes themselves, some have raised concerns about the 'biased' nature of roll-call votes (Saiegh, 2009; Roberts, 2007; VanDoren, 1990) for various reasons. For VanDoren, "roll-call votes are not a random sample of congressional decisions" (1990, p.311), however, the use of Bayesian methods frees us from concerns of the sampling distribution, sample sizes and the underlying frequency assumptions,

which are "to be polite, questionable" in the roll-call context anyway (Clinton et al., 2004, p.1). As long as inferences are not extended beyond the nominal votes available, there is little need to overly concern ourselves with this source of bias.[7] Referring to theories of how party leaders and members stake out positions in order to realize their preferences, Roberts (2007, p.346) notes that the "implicit assumption in all of this literature is that the ideal points of party leaders are stable across issues and agendas." It is true that the basic version of NOMINATE and the basic Bayesian IRT model make no allowances for temporal or issue-related variations, but this can be easily accommodated in expanded IRT models, as was done in the dynamic models of Martin and Quinn (2002) or the issue-grouping approach of Lu and Wang (2006). There are other concerns related to the use of roll-call votes, in particular in Brazil, that are raised below.

1.3 Analyses of Legislatures, Foreign Policy and the Ideal Point Literature in Latin America and Brazil

Latin America as a region has been the focus of increasing numbers of studies devoted to legislative politics, but to a lesser degree foreign policy, and to a lesser degree again, ideal point analyses of both themes, which remain rare (Ribeiro, 2012, p.12). Regarding foreign policy and Latin American legislatures, various studies have found little difference in the way that foreign policy is treated as an issue area by legislators compared to domestic policy (Onuki et al., 2009; Ribeiro, 2012). Often this has been analysed with reference to the idea that legislators abdicate or delegate in the arena of foreign policy, itself a corollary of

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[7]However, if theorising about lawmaking behaviour in general, this bias may be important.(Clinton, 2007)

the two presidents thesis as was previously mentioned. Little evidence of abdication has been found, certainly in Chile (Ribeiro et al., 2009), and indeed Chile has proven to be an interesting case as regards the median voter theorem, as Londregan showed how the Chilean president could force policy outcomes closer to his preferred outcome by weakening veto players (Londregan, 2000), behaviour also found in other presidential regimes in the region (Malamud, 2005; Silva, 2014). Chile is also one of the few countries in the region where the Senate was studied using ideal point methods (Alemán, 2008), studies of upper houses in the region being extremely rare (Neiva and Soares, 2013). Alemán's study found the policy space in the Chilean Senate to be unidimensional, with co-authorship of bills revealing more complex patterns based on coalitional grouping. Unidimensionality, based on the government-opposition divide, is also argued for on votes pertaining to the sending of troops to Haiti in the lower houses of Argentina, Brazil and Chile (Ribeiro and Miranda, 2011), and in fact, the government-opposition divide is overwhelmingly dominant in the literature as the primary dimension in roll-call voting on Brazil (Leoni, 2002; de Freitas et al., 2012; Izumi, 2012), coupled with the power of parties and the Executive in the legislature (Figueiredo and Limongi, 2000; Cheibub et al., 2009; Oliveira, 2013; Neiva, 2011).

Saiegh uses survey data[8] to estimate ideological positions for parties in Latin America (2009), a strategy that has been used elsewhere (for example, Alcántara and Rivas, 2006; Wiesehomeier and Doyle, 2012), although results are somewhat conflicting. Wiesehomeier and Doyle find evidence of a clear understanding of 'left' and 'right' in Latin America among citizens (2012), as do Rosas and Zechmeister among parties (2000), although elsewhere Wiesehomeier cautions against simplistic understandings of left and right in the region (2010).

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[8]The survey data in question comes from the PELA project (see Alcántara and Rivas, 2006).

Power and Zucco Jr. use surveys to place Brazilian parties on an ideological scale over time, and find a moderation of ideological positioning (2009), whereas others find a 'PT versus the rest' ideological situation in Brazil (Samuels and Zucco Jr., 2013; Lucas and Samuels, 2010). Lauderdale and Zucco Jr. incorporate survey information in a hierarchical Bayesian IRT ideal-point model and find that the government–opposition dynamic appears to be growing in importance over time (2011), a finding echoed in Zucco Jr. (2009), who argued that ideology does not fully explain voting behaviour on nominal votes in the Brazilian Chamber of Deputies, and that its influence is diminishing over time, as the government–opposition dynamic strengthens.

As mentioned earlier, one common assumption found in analyses of legislative behaviour is that legislators most desire to be re-elected, an assumption so common that in the words of Carey it has reached "axiomatic status" (Samuels, 2003, p.1). However, studies of Brazilian legislative politics have thrown doubt upon the use of this assumption in Brazil, particularly with reference to the Câmara dos Deputados, noting that deputies do not seek re-election in high numbers (Limongi and Figueiredo, 1996) and that they use the Chamber as a stepping stone to other careers (Samuels, 2003). Samuels also argues for the strong presence of federalism in Brazilian legislative politics (2003), although this does not seem to have a significant effect on party unity, according to Desposato (2004) or on legislative behaviour on foreign policy (Oliveira, 2013), and argues that pork-barrelling behaviour in the Chamber of Deputies is not related to municipal effects (Ames, 1995), but to satisfying federal pressures in order to procure careers outside the Câmara.

Indeed, much of the early literature focused on this pork-barrelling behaviour, linking it to

individualism and a lack of party discipline in Brazil (Mainwaring and Liñán, 1997), which was countered by others who demonstrated the high levels of party discipline in the Chamber (Limongi and Figueiredo, 1996; Figueiredo and Limongi, 2000). While in-house discipline has been shown to be true, scholars have differed over the policy space in the Chamber, some interpreting ideal point scores as positions on a left-right scale (Morgenstern, 2003), while many others have argued for the importance of the government coalition in understanding ideal points from the Chamber, as referenced above. Outside of nominal vote analysis, Diniz and Ribeiro argue that Brazilian legislators are extremely constrained when it comes to acting on foreign policy matters owing to the design of the institutions themselves (2010).

Earlier, concerns were noted over the use of nominal votes and ideal point estimation. An important aspect of studying nominal votes in the Brazilian houses of legislature is the role of "[i]nstitutional variables – the legislative powers of the president and the centralized organization of the legislative work" (Figueiredo and Limongi, 2000, p.151). It is the president that proposes most legislation, and has the sole prerogative in certain areas (budgetary matters, taxation and public administration). The deal-making between the (powerful) president and the party leaders (who hold power over their members) is the key to understanding politics inside the Chamber of Deputies, as Figueiredo and Limongi state (2000). These dynamics inside the Câmara are important for how we analyse nominal votes in the house:

> In the Brazilian congress roll call voting is not the norm. [. . .] A roll call vote takes place in two situations. First, it is mandatory for the most important decisions, such as constitutional amendments and legislation that is supplementary to constitutional norms (*leis complementares*). Second, it may be requested by

party leaders. Leaders will force a roll call based on political calculations. They may hope to reverse decisions or to increase their adversaries' political costs by recording their votes. Therefore, it is unlikely that party leaders will require a roll call on noncontroversial matters. Their right to call a recorded vote is also limited. [. . .] Thus, the 575 roll call votes included in our data set represent the most important and controversial issues considered by the congress as selected by the political process itself. (Figueiredo and Limongi, 2000, p.158)

Hence, although some scholars have criticized ideal points for capturing effects that are larger than what they should be (VanDoren, 1990), it is possible that it is quite the opposite in Brazil. Ideal points reflect positioning on a restricted set of votes, on which party leaders and the Executive hold an active interest, and on topics over which legislators in general hold little power. Therefore, the magnitude of ideal point differences that we observe in the Chamber of Deputies and the Federal Senate are likely to be less than we would observe if legislators cast nominal votes on all votes that came before the houses, and if they had free rein to vote how they liked.

1.4   The Brazilian Senate and Foreign Policy

Although foreign policy votes do not usually occur in large numbers in the Brazilian houses of legislature (Oliveira, 2013), there are good reasons to study the particular connection between the Federal Senate and foreign policies. Firstly, from the point of view of IPE theories, senators are much more likely to act as a conduit for domestic pressures for a variety of reasons. Secondly, the Senate holds particular powers in the area, which renders it a more

interesting case for foreign policy than the Chamber.

The mechanism assumed in the IPE literature cited earlier is more likely to exist in the Senate then the Chamber. This is because senators are high profile politicians, counting among their number government ministers, presidential candidates and even a former president (Collor). This is important for two reasons. First, the formulation of Brazilian foreign policy is insular in nature – it has historically been the remit of the foreign ministry, Itamaraty, and when not under Itamaraty influence, comes under the direction of the Executive, a *presidential diplomacy* style that grew under the Cardoso and Lula years (Cason and Power, 2009). There are also those in the literature who see present-day Brazilian foreign policy as being almost *completely* dictated by the Executive, given the high level of Executive control over Itamaraty and the presidential diplomacy style of the Executives (Malamud, 2005; Cason and Power, 2009). However, there are others who disagree. Helfand (1999) quotes the president of the National Agriculture Confederation (*Confederação Nacional da Agricultura*) as saying: "It was much easier before. It was enough to go to the executive branch and get what you wanted. Now you have to go to the executive first, then to Congress, and finally to the judiciary" (1999, p.25). Given that networks of influence in Brazil have been shaped by this style of personal contacts among high-level players (Schneider, 1997; Helfand, 1999), it is reasonable to assume that only politicians who already have these high-level connections, such as former government ministers, would be in a position to influence foreign policy formulation in the insulated Itamaraty or the Executive. Hence, any prospective pressure groups are more likely to target senators than deputies, although there may of course be individuals in both houses who are more likely to be targets of pressure groups.[9]

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[9]'Pressure groups' in this discussion is taken to mean any group that seeks to influence policy output to

Secondly, although deputies may have their electoral strongholds (Ames, 1995), there is a huge number of them per state. Senators, on the other hand, only number three per state, regardless of the size of the state, which increases their visibility hugely compared to deputies. Senators are also elected through majority voting, which means that for every municipality, the campaigning senators either win or lose the district. Empirically, this means that we can justify building a personal constituency for each elected senator, which consists of the municipalities that he/she won in the state, somewhat similar to what Hiroi and Neiva (2013) did for the Senate for the 2006 election,[10] and that it is reasonable to assume that higher-profile senators are more likely to be held accountable for their votes than the multitude of lower-profile deputies. This allows for the testing of IPE hypotheses related to district pressures in a manner not easily done with the Chamber.

Regarding the particular powers of the Senate in the area of foreign affairs, it is notable that the Brazilian Senate has the power to authorize any external credit proposal by municipalities and states, further strengthening the link between senator constituencies, senators, and the world at large, and, indeed, is the only Senate in the world to have this power. More than 80% of the resolutions emitted by the Senate between 1989 and 1998 referred to the authorization or restructuring of the debt of different levels of government and public companies (Neiva, 2008, p.47). During a period of serious economic restructuring[11], the importance of the role played by the Senate was clear to see, and this is one of the reasons that Neiva (2008) ranks the Brazilian Senate as one of the most powerful in the world. Indeed, Neiva explicitly

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their favour, be it professional lobbies, national associations, worker unions, or civil society groups. (e.g. Thomas and Hrebenar, 2008)

[10]This method is expanded upon in more detail in §5.2.

[11]This was the era of the *Plano Real* and all its concomitant economic re-organization. See, for example, Flynn (1996).

comments on the 'privileged' role of the Senate with regard to matters of the state:

> "[This data] reinforces the privileged role of the Senate on topics that I will call 'state-related'. As can be observed [. . .], themes of an economic nature, those relative to the Judiciary and international relations receive more attention in the Upper House, whereas the Lower House is more concerned with themes related to the environment, human rights and agriculture." (Neiva, 2008, p.48, author's translation)

Other powers of the Senate include the exclusive right to nominate the directors and the president of the Central Bank and the right to approve the ministers of the *Tribunal das Contas*. Since the president has the exclusive right to issue budgetary proposals, these powers are important counter-weights to executive power when it comes to the finances and the economy of the state. The above are also key reasons why, if we are to observe any attempts at domestic influence on foreign policy passing through the houses of legislature, it will be in the Senate.

2 Methodology

2.1 Descriptive Statistics

The principal voting data used in this thesis is from the CEBRAP database, modified and expanded to suit the needs of the research.[12] Further information was taken from the Senado Federal and Câmara dos Deputado websites, along with data from IPEA and the Tribunal Superior Eleitoral.[13] All data and scripts are available from a Dropbox folder.[14] **Table 1** gives totals for the number of Deputies and Senators included in the analysis. All were included, as were all votes, as there is no need for unanimous or quasi-unanimous votes to be discarded, nor those who vote few times, as is necessary with `NOMINATE` (e.g. Clinton and Jackman, 2009). Of course, we recover worse estimates for those who voted fewer times, but there is no need to discard this information *a priori*; as Clinton *et al.* comment, "[e]xcluding particular legislators or roll calls ought not to be the 'default' procedure, driven by the need to avoid computational problems" (Clinton et al., 2001, p.4). This proved to be important for the Senate, as there are high levels of 'missingness' in the data. Many legislators are absent or abstain, or change parties, creating 'new' legislators in the database each time they do this. Moreover, testing the government-opposition hypothesis requires 'splitting' the legislators each time they enter or leave the coalition, creating yet more 'new' legislators and further adding to the levels of missing data. Without these divisions, the number of senators included would be just over three hundred and sixty, as opposed to the almost six hundred

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[12]Centro Brasileiro de Análise e Planejamento, http://cebrap.org.br/v3/.

[13]http://www12.senado.leg.br/hpsenado; http://www2.camara.leg.br/; Instituto de Pesquisa Económico Aplicada, http://www.ipea.gov.br/portal/; http://www.tse.jus.br/

[14]https://www.dropbox.com/sh/23ocyhdoyeupkoc/AABgxZnPIXpjieChC48gYeFaa?dl=0.

and fifty included in **Table 1**. This study therefore includes more legislators and nominal votes in the analysis than in previous studies.

Table 1: Totals for votes and legislators included in the analysis of nominal votes in the Senate and Chamber, 1989-2010.

Legislature	Senators	Deputies	Votes	Votes
			Senate	Chamber
48th	95	555	45	94
49th	107	595	179	250
50th	113	871	514	523
51st	117	806	280	464
52nd	105	1004	222	538
53rd	108	609	168	583
Totals	645	4440	1408	2452
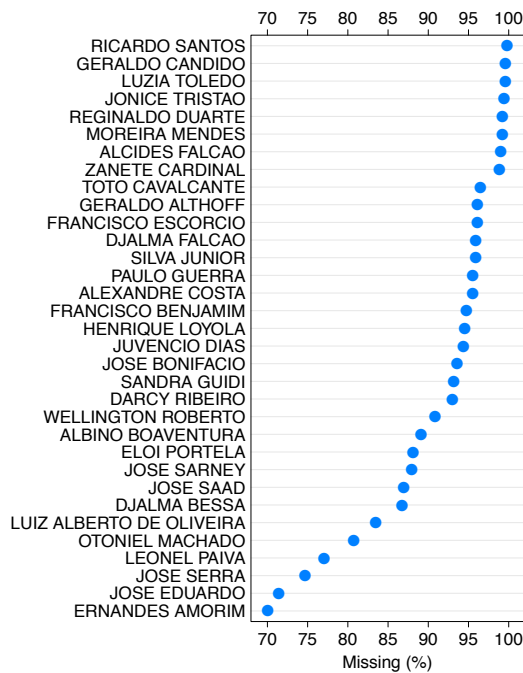
Figure 1: Absenteeism, Senate 1995-1999

As the Chamber has been studied in detail elsewhere in the literature, this section will focus on the Senate. In general, senators are often absent, as can be seen for the 50th legislature in **Figure 1**. Some of these cases were down to senators leaving the Senate temporarily to become government ministers, such as Marina Silva for example, or due to health reasons. Their *suplentes* took their place and voted in their stead, with the Senate at times having a significant number of suplentes, who often voted more for the Executive than their *titulares* (Neiva and Izumi, 2012). Some of these suplentes only voted

on a few roll calls, however, which explains the high absence statistics in **Figure 1**. Indeed, all of the names from Senators Santos to Guerra are suplentes, Senator Alexandre Costa being the highest placed titular on the list; he suffered health problems early on in Cardoso's first term and left the Senate as a result.

Party cohesion and loyalty are themes taken up in detail elsewhere (Figueiredo and Limongi, 2000; Desposato, 2004), but **Figure 2** provides a snapshot of the type of party cohesion we see in the Senate, showing the 53rd legislature. Although it is accepted in the literature that the Chamber displays high levels of party unity (for example Figueiredo and Limongi, 2000), the effects appear weaker in the Senate, as Neiva has noted (2011). This plot is representative of the Senate as a whole; some senators are loyal to the party, others are not. The role of suplentes is also notable here: the PFL is one of the more unified parties (at this time in opposition) and one of their most disloyal members was Gilberto Miranda, a suplente for Senator Gilberto Mestrinho of Amazonas state (Miranda is sixth from the top in the graph).[15]

As mentioned earlier, the majority of the proposals that arrive on the Chamber floor for voting come from the Executive or the government coalition. This is also true for the Senate, as shown in **Table 2**. However, there are plenty of cases where the opposition managed to have a proposal put to a vote, as can be seen from the table.

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[15]These loyalty plots were created from statistics returned as part of the call to the `ideal()` command from the `pscl` package in `R` (Jackman, 2015) and are computed from simple agreement scores, i.e. how often a legislator votes with the rest of his/her party.
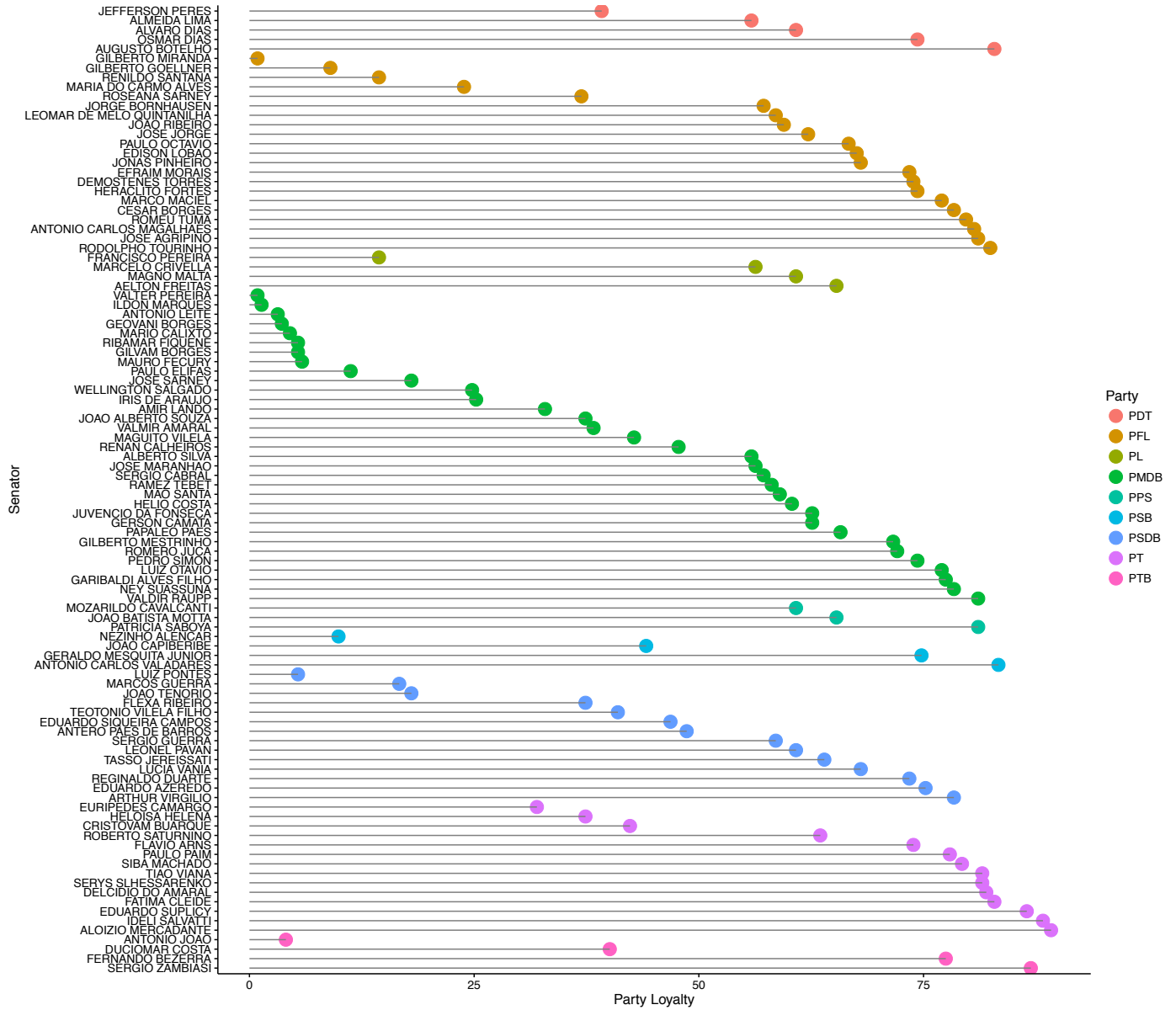
Figure 2: Party Loyalty in the Senate, 2007-2010.

Table 2: Nominal Votes by Proposer, Federal Senate, 1989-2010. **Note**: the category 'Other' contains legislators who were independent at the time of making the proposal, the Central Bank, Parliamentary Inquiry Commissions, the Public Ministry, the *Tribunal das Contas*, the Judiciary, the *Mesa* of the Senate and the Chamber, and mixed Senate and Chamber commissions.

Proposer	48th	49th	50th	51st	52nd	53rd
Executive	17	54	82	56	81	52
Coalition Legislator	11	16	105	107	62	71
Senate Commission	10	7	19	8	3	0
Chamber Commission	1	10	256	47	1	5
Opposition Legislator	4	78	46	59	73	36
Other	2	14	3	3	1	4

The numbers in **Table 2** refer to the number of times a proposal was voted on, and not to a single proposal. **Table 3** displays the percentage of proposals in the Senate that were voted on in one round of voting, from which we can see the high percentages for 'one-round-of-voting' proposals from Chamber commissions. Many of these votes, particularly the high number during Cardoso's first term, were from the *Comissão de Ciência e Tecnologia, Comunicação e Informática* of the Chamber of Deputies, and were on the granting of radio licences.

Table 3: Percentage of these proposals that were voted on in one round of voting Senate, 1989-2010.

Proposer	48th (%)	49th (%)	50th (%)	51st (%)	52nd (%)	53rd (%)
Executive	94	26	32	55	52	78
Coalition Legislator	55	63	40	49	39	48
Senate Commission	30	71	57	87	100	–
Chamber Commission	100	90	100	98	100	60
Opposition Legislator	100	27	50	51	33	50

One important aspect of the Brazilian houses of legislature raised earlier is the fact that nominal votes are not the norm, and that party leaders and the Executive have great control

over what reaches the plenary floor for voting. We can see from **Table 4** that not many votes are contentious[16] in the Senate, many passing with large majorities or being defeated by the same.

Table 4: Level of close votes in the Senate, 1989-2010.

	Sarney	Collor	Franco	FHC I	FHC II	Lula I	Lula II
Contentious	0	2	1	12	7	8	3
Not So	26	80	115	502	273	214	165

This calls our attention to a computational aspect of the analysis that was mentioned in the introductory part of this section and is described in more detail in §2.2. The heavily 'lop-sided'[17] nature of the vote patterns in the Brazilian houses of legislature can result in quite a loss of information, as many of these votes are discarded automatically by the NOMINATE algorithms. Moreover, many works in the Brazilian literature have adopted 90% support as a cut-off point (Izumi, 2012, p.10). In the Bayesian IRT framework, we can still learn from all but 100% unanimous votes, as heavily lop-sided votes are analogous to test items that are 'too easy' or 'too hard' for test-takers, meaning that we can say, for example, that a certain legislator is liberal, but not exactly *how* liberal (Jackman, 2009, p.461). Although many of these votes were heavily lop-sided, very few were actually *unanimous* (see **Table 5**). Using NOMINATE's default settings would cause us to lose some 18% of the votes in the Senate; the 90/10 per cent cut-off rate adopted by many in the literature causes a loss of almost 40% of the nominal votes. Given that the rate of unanimous votes is very low (2.7%), I have included all nominal votes during the period in the analysis.

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[16]These values were calculated according to the quorum requirement of each vote. If the quorum required is a simple majority, then 'contentious' is a vote with a result that is a split between the Senators in the range of 45-55%. For two-thirds majority votes, the range for being contentious is 60-70%.

[17]The term 'lop-sided' refers to a very high (or very low) level of support for a proposal. NOMINATE by default discards votes that receive less than 2.5% support, or more than 97.5%. (Poole et al., 2011, p.4)

Table 5: Levels of lop-sidedness in the Senate, 1989-2010.

Legislative Support	Total (%)
100% support	2.06
97.5% or greater support	16.76
90% or greater support	34.38
0% support	0.64
2.5% or less support	1.5
10% or less support	4.69

Moving to foreign policy, **Table 6** displays the vote counts for proposals on these themes. The criteria for choosing to label a vote as 'foreign policy' or not were simple, and are explained in more detail in §2.3. I have followed the lead of Oliveira (2013) in these choices, in that the chosen proposals had to be "clearly foreign policy" (Oliveira, 2013, p.16, author's translation). The totals here differ from those presented in Oliveira, as I also used a different method to ascertain the content of each proposal, which allowed me to include more votes than has been done previously. These methodological aspects are discussed in detail in §2.3.

Table 6: Vote totals in the Senate by foreign policy theme, 1989-2010.

Domestic	Foreign Policy	Security	Trade	Diplomacy	Finance	Loans
1253	155	36	62	28	14	15

As can be seen, foreign policy votes only constitute some 12% of the total. It is also well-known that a lot of foreign policy votes come from the Executive branch, nevertheless, as **Table 7** shows, it is not the only source of foreign-policy themed proposals.

Table 7: Foreign Policy themed proposals by proposer, 1989-2010.

	Executive	Coalition	Commission	Opposition	Other
Security	18	4	0	3	11
Trade	30	15	0	17	0
Diplomacy	1	10	10	9	7
Finance	5	2	5	2	0
Loans	3	1	9	0	2

Another facet of nominal voting is the *type* of proposal voted on, which in general terms may be *substantivo* or *procedimento*. **Table 8** shows the breakdown of the votes in the Senate by these two types; less than twelve per cent of the votes were procedural. The votes also show similar patterns of contentiousness (or lack thereof, rather) for both types.

Table 8: Votes in the Senate, Procedural or Substantive, 1989-2010.

Vote Type	Qty.	Contentious	Not So
Procedural	166	6%	94%
Substantive Material	1242	2%	98%

Of course, there are many specific types of proposals that come before the houses to be voted on. Some, such as *Medida Provisórias* (MPV), can only be emitted by the Executive; others arrive in one house after coming from the other. The table below shows these details for the Senate.[18] These totals are with regard to counts of individual proposals.

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[18]MSF=Mensagem do Senado; PEC= Propostas de Emenda à Constituição; PLC/PLS=Projetos de Lei (**C**hamber and **S**enate, respectively); PDS=Projetos de Decreto Legislativo; PLV=Projeto de Lei de Conversão; PRS=Projetos de Resolução; REQ=Requerimento.

Table 9: Totals for proposals by specific vote type in the Senate, 1989-2010.

Project Type	48th	49th	50th	51st	52nd	53rd
MPV	16	0	0	4	36	8
MSF	1	0	0	0	1	1
PDF	1	0	0	0	0	0
PDS	2	11	259	49	3	5
PEC	7	35	108	127	115	68
PLC	5	101	83	46	41	24
PLS	2	25	36	41	23	37
PLV	0	0	0	0	0	24
PRS	10	7	25	12	2	1
REQ	1	0	2	1	1	0

As mentioned, the Executive has exclusive power to emit MPVs. However, other pieces of legislation, such as PECs (see footnote 18), may be proposed by individual legislators. The vote types are summarised by proposer in **Table 10**.

Table 10: Totals for proposals by specific vote type and proposer in the Senate, 1989-2010.

	Executive	Coalition	Sen. Com.	Cham. Com.	Opposition	Other
MPV	64	0	0	0	0	0
MSF	3	0	0	0	0	0
PDF	0	0	0	0	1	0
PDS	1	2	6	319	1	0
PEC	104	210	0	0	145	1
PLC	144	65	0	1	73	17
PLS	0	87	1	0	70	6
PLV	24	0	0	0	0	0
PRS	2	7	40	0	3	5
REQ	0	1	0	0	3	0

The above discussion on the data and the descriptive statistics of the Senate has highlighted the non-contentious nature of the house, and the methodological need for the use of the Bayesian Item-Response Model, and its advantages. The Bayesian IRT model is now explained in more detail and various potentially problematic issues are discussed.

2.2 The Bayesian Item-Response Model

Since the hypotheses in later chapters are framed in the language of both the SVM and the Bayesian IRT model, it is necessary to expand on the latter here before we discuss these hypotheses. As was highlighted above, a key method used in the literature for analysis of the theorised mechanism of domestic pressure on foreign policy output is the analysis of nominal votes. There are various methods for doing so. The simplest method is perhaps the use of agreement scores that measure the amount of times legislators vote with one another. These 'roll rates' are used to produce scores of party cohesion and discipline, and obviate the need for parametric assumptions and a statistical model. However, they do not tell us very much about *why* legislators vote as they do. "Avoiding ideal points may escape the problems introduced by using estimates based on the wrong dimension, but the tests are crude and incorporate so little of the theoretical explanation so as to be almost uninformative with respect to the suggested causal mechanism." (Clinton, 2007, p.467)

Another method is that of factor analysis methods, which "provide ideal points relatively cheaply" in terms of computation, although the model "does not follow neatly from a formal model of legislative voting" (Clinton et al., 2004, p.5).[19] In the words of @Jackman:2001tz:

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[19]These methods can be seen in use in the popular 'House of Cunha' project too. http://houseofcunha. com.br/

"First, factor analysis is fundamentally a model for correlations and not a model of the individual level responses. Factor analyses collapse individual level responses to form a correlation matrix, discarding information about the means and the variances of the input variables. Information is necessarily lost in this way, making it difficult to learn simultaneously about the locations of legislators (the $\boldsymbol{x}_i$) and properties of the proposals (the discrimination parameters β_j and the difficulty parameters, α_j). Contrast the MIRT [20] framework, where the individual binary responses (the Yeas and Nays, y_{ij}) are modeled directly as functions of the parameters of substantive interest." (p.230)

In the political science literature using ideal-point methods, there are two main distinctions: the aforementioned family of `NOMINATE` algorithms, which attempt to estimate ideal points using approximate Maximum Likelihood Estimation techniques, and the Bayesian IRT Models, which use Markov Chain Monte Carlo (MCMC) sampling techniques (Gilks et al., 1996).

A large part of the reason for the choice of the Bayesian IRT model over `NOMINATE` is the adaptability of the Bayesian IRT model, but there are other reasons for this choice that are linked to the limitations of `NOMINATE`, discussed in detail in Clinton and Jackman (2009). Indeed, many of these limitations have important ramifications for our understanding of the ideal point analyses carried out in Brazil thus far. Some of these are discussed as they appear in the text; the more technical aspects are discussed in the Appendix.

IRT models seek to measure an underlying 'latent trait', which cannot be directly observed. There are many examples of such latent traits in the social sciences, such as surveys of political attitudes or psychological tests of intelligence. In our present case, the latent trait is the content of the policy space, and is often thought to be political ideology, i.e. a scale between liberal and conservative, or a scale of attitudes towards social issues such as abortion or religious affairs. These models often use binary data, in the form of 'Yes/No' answers,

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[20]'MIRT' here refers to *multidimensional* Item-Response Theory.

but can also be extended to ordinal scales (e.g. Treier and Jackman, 2008). It is assumed that the 'Yes' or the 'No' observation is a discrete manifestation of an underlying continuous latent scale (Johnson and Albert, 1999, p.91).

The basic Bayesian ideal point IRT model (Jackman, 2001, 2009, p.455) can be expressed as:[21]

$$\pi = Pr(y_{ij} = 1 | \boldsymbol{x}_i, \beta_j, \alpha_j) = F(\boldsymbol{x}_i \beta_j - \alpha_j),$$

where

• $y_{ij} \in \{0, 1\}$ is the ith subject's answer to the jth item (e.g. $y_{ij} = 1$ if 'Yes', $y_{ij} = 0$ if 'No'), where $i = 1,\dots,n$ indexes respondents and $j = 1,\dots,m$ indexes items;

• $\boldsymbol{x}_i \in \mathbb{R}$ is an ideal point, an unobserved latent trait of subject i (usually considered ability in the educational test literature, or revealed preferences in the analysis of nominal voting data);

• $\beta_j \in \mathbb{R}$ is the *discrimination* parameter of the jth item, showing how the probability of a correct answer responds to change in the latent trait $\boldsymbol{x}_i$;

• $\alpha_j \in \mathbb{R}$ is the *difficulty* parameter, which is the probability of a correct answer regardless of changes along the scale θ of the ideal points $\boldsymbol{x}_i$;

• $F(\cdot)$ is a monotone function mapping from the real line to the unit probability interval, typically the logistic or normal cumulative distribution function.

In the psychometrics literature, attention mainly focuses on α and β, as measures of the worth of an educational test. The ideal points, measuring the test-takers ability θ, are of secondary interest. In this model, the questions are designed, and so it is known *a priori* what a high or low score on the scale θ should signify.

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[21]The notation in the literature varies for the ideal points $\boldsymbol{x}_i$, being at times denoted as ξ_i or θ_i. The notation here in general follows Jackman (2001), except where explicitly stated otherwise. I reserve θ for the unknown content of the policy space, i.e. the scale along which the ideal points are placed.

When adapted to the political context, the latent trait is of primary interest, although the discrimination parameter is also useful. In the original model in the education testing literature, the discrimination parameter is constrained to have only positive values, as negative discrimination (lower ability leading to higher probability of a correct answer) is undesirable and unlikely. This model can be found in the political science literature (for example, Bafumi (2005)), but the roll-call votes must be organised and recoded in such a way as to make a 'conservative' or 'liberal' vote represent a move in a particular direction (Bafumi, 2005, p.179). However, in roll-call voting, negative discrimination can be permitted and signifies that a lower position on the scale of θ (for example, a left-wing ideal point location) leads to a higher probability of voting 'Yes' on a vote proposal with this characteristic. There is added complication in the political context, as the 'questions' (proposals) are not designed as per an experiment, meaning that the substantive meaning of locations in θ are up for debate. The best that researchers can do in most cases is to run the model and infer from outside knowledge as to the content of the recovered dimensions, as the ideal points without this qualitative knowledge are "just a bunch of dots" (Poole, 2005, p.2). The Bayesian IRT model allows us other means to do so, however, as the necessity of specifying prior distributions is, for example, one opportunity to import qualitative knowledge about the political process into the estimation process. The model can also be extended with other parameters to account for theorised mechanisms, such as party pressure. For example, Lauderdale and Zucco Jr. use ideological placements, gained from surveys, as a means to specify different prior distributions for members of different parties (2011). Lu and Wang extend the model to account for 'testlet' and 'grouplet' effects, i.e. grouping votes by theme and voters by party, for their estimates (2011).

An important aspect of analysing nominal votes is the aforementioned dimensionality of the policy space. In reality, the policy space may be incredibly high-dimensional, as legislators may take differing positions on a huge range of issues. However, most studies point to low dimensionality as being sufficient for inference. The reason for this is that many different

issue positions get bundled together as part of a political ideology or belief system (Armstrong et al., 2014, p.8). Consequently, the high-dimensional reality maps onto an underlying low-dimensional 'basic space'. "In many instances, two ideological dimensions – one for economic items such as taxation, the other for cultural items such as abortion – are sufficient to capture variation in the issue space." (Armstrong et al., 2014, p.9) It is worth noting that many studies have argued that legislative voting in many cases is indeed unidimensional (Jackman, 2001; Poole, 2005; de Freitas et al., 2012), or when there is a second dimension present it is unstable, temporary, or present to a much lesser degree (Poole, 2005).[22] It is also worth remembering that "there is no generally 'correct' answer to the dimensionality issue" (Lauderdale and Clark, 2014, p.761).

Dimensionality may be assessed using various methods, although any measure of dimensionality is "more of a substantive question than a statistical question" (Poole, 2005, p.141); however, many studies using NOMINATE do indeed treat it as a statistical question, assessing dimensionality only through the use of eigenvalue 'skree' plots like that in **Figure 3**[23] or by studying the Aggregate Proportional Reduction in Error (APRE) statistic (Poole, 2005). In NOMINATE, the only significance of higher dimensions is that they pick up variance left unexplained by the lower dimensions (Clinton et al., 2001, p.19). With the Bayesian IRT model, we can use the discrimination parameter β to assess dimensionality in a way that is far more qualitative, and depends on the substantive *content* of the dimensions.

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[22]In contrast, see Hix et al. (2006) for a discussion of three dimensions in the European Parliament.

[23]Dimensionality is ascertained by noticing which dimension has the largest straight drop of the line according to the eigenvalues. For this legislature, it appears that one dimension would suffice, although there is some evidence to consider a second and third dimension. Thereafter, the line evens out.
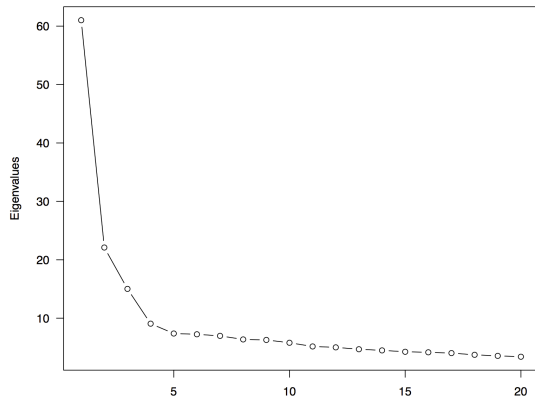
Figure 3: Eigenvalue plot, 52nd Legislature, Senate

Not only is eigenvalue analysis of dimensionality somewhat disconnected from the substance of the votes by virtue of just focusing on variance, but this more statistically-minded approach is also linked to the common practice of mechanically and automatically producing two-dimensional plots from NOMINATE scores and trying to infer the content of the dimensions by just the 'dots' alone, without discussion of why two dimensions is a better choice in substantive terms than one dimension. In contrast, the discrimination parameter β of the Bayesian IRT model allows us to note *which votes* discriminate on *which dimension(s)*, and an investigation of the content of these votes tells us about the substantive content of the dimension. In addition, Bayesian IRT models such as those of Lauderdale (2010) allow us to see *which legislators* are captured in certain dimensions. Furthermore, topic models like those presented in Chapter Five allow us to see *which themes* are important for legislators. In sum, the Bayesian IRT model brings many advantages to the study of nominal votes, while avoiding many of the problematic elements of NOMINATE.

2.3   Classification of Votes

A key part of this study is the categorization of votes into thematic areas, principally to facilitate the comparison of foreign-policy-related proposals to others. Legislative proposals are often complex and multi-faceted, and dividing them into categories based on their content naturally raises questions about the legitimacy of such a method. Some proposals are simple to categorise in a typology because they only deal with one specific issue. Others, principally the *Medida Provisórias* emitted by the Executive, are often large pieces of legislation that

encompass many issue areas and cover many themes. There are two main methods employed in the literature to code vote content, one subjective, the other not. The subjective process is termed by Lauderdale and Clark (2014) as 'expert coding' and involves the labelling of votes, based on content, by an expert in the area. The second method available is a topic model in which the content of the votes may be learned by a computer algorithm through a supervised or unsupervised process (Lauderdale and Clark, 2014; Gerrish and Blei, 2012, 2011). This second method was tried, using the *indexação* of the votes, available respectively on both the websites of the Senate and the Chamber, which was web-scraped from both sites. However, the terms in the *indexação* are repeated heavily, with the vast majority being related to administration. This resulted in analyses that either ended up ignoring foreign policy themes (as the terms were so rare) or required such manual pruning of terms that them 'automated' process ended up being similar to expert coding. Hence, although I do not claim to be an expert, expert coding was the method used to label votes based on their content.

In order to do this, I exploited a source of information not often used in roll-call analysis in Brazil. Each proposal contains a *justificação* (*justificativa* in the Chamber), written by the legislator in order to explain the purpose of the legislation and its hoped-for benefits, and calling for the support of colleagues. These justifications may be found (for the years after 2003 or so) on the websites of the Chamber and the Senate, in pdf format.[24] I have focused only on the Senate for three reasons: one, it is extremely time-consuming to sift through this information, given all the faulty web-links and such on the websites of the houses. Secondly, the Câmara has already been the subject of many studies, and as was mentioned in the review of the literature, scholars have already examined foreign policy in the Chamber. Thirdly, as is set out later, there are good theoretical reasons to analyse foreign policy themes separately in the Senate.

Classifying the votes using these justifications is usually a very straight-forward process,

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[24]If reading this document electronically, an example may be found by clicking on this link, or pasting into a browser: http://www.senado.leg.br/atividade/rotinas/materia/getPDF.asp?t=4131&tp=1

given that the purpose of the legislation is explicitly spelled out in the document. For the years before 2003, the justification can be usually be found in the official diary, by tracing the date of the nominal vote and the Senate number associated with the proposal. There are links provided on the Senate website in the *tramitação* part of the page associated with the proposal, but very often these links are faulty, indeed frequently the proposal had to be traced manually by scanning through the *Diário Oficial* because the wrong page numbers or dates are provided on the Senate website.[25]

For Executive proposals, which are the majority of proposals, there is a slightly different procedure, although it is still quite similar. Executive proposals, and in particular the MPVs, contain a section where the purpose of the proposed legislation is spelt out (and is addressed to the president). Because of the multi-faceted nature of the these proposals, I was cautious in designating any of them as foreign policy related or not. Only if the important parts of the proposal were related to foreign policy, or if the majority of the proposed legislation was related to foreign policy, was an Executive proposal coded as such. As regards content, the dataset variable `FP` marks votes as being foreign policy themed or not; more information is contained in the `Category` variable (see **Table 11**), which contains information on which type of foreign policy the vote pertains to; more detail is contained in the '`Topic`' variables (explained below).[26]

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[25]Since this research was conducted, the Senate website (http://www12.senado.leg.br/hpsenado) has been overhauled and redesigned. The links seem to have been improved, and the documents that were originally in the *tramitação* section can be found in the *Documentos* section of the landing page when a search is done for a particular proposal. However, searches for justifications made before 2003 need to be done in the *Diário Oficial*, but the links from the *tramitação* section to the relevant page in the diary no longer appear, making the process more difficult now.

[26]The dataset and codebook are available in the Dropbox folder, with information on these and the other variables: https://www.dropbox.com/sh/23ocyhdoyeupkoc/AABgxZnPIXpjieChC48gYeFaa?dl=0.

Table 11: Levels of the variable '`Category`', along with examples.

Level	Content	Example	Details
1	Security/Defence	PLC0043/98	Deals with the autonomy and management of Military personnel in service of the Navy.
2	Trade	PEC0017/08	Creates two new taxes on imports to finance social security and other social programs.
3	Diplomacy	PEC0061/95	Permits the admission of foreign professors and scientists to Brazilian universities; concedes autonomy to institutions of scientific research and technology.
4	Finance/Monetary Policy	PLC0164/08	Creates the Sovereign Fund of Brazil in order to: create public savings; mitigate the effects of economic cycles; promote investments in Brazil and abroad; promote strategic Brazilian projects abroad.
5	Loans	PRS0011/89	External credit application ($13 million) for FURNAS S.A. from the SKENDINAVISKA ENSKILDA BANKEN, Sweden.

As mentioned above there are two methods for ascertaining the content of topic models, machine learning methods and an expert coding method, the pre-labelling of votes. Although less reproducible, the latter method was used because this labelling accounts for the fact that foreign policy votes are **(a)** not particularly plentiful in the database, and **(b)** are often not labelled as such in the *Ementa* provided on the Senate website, which forms the content of the vote in the CEBRAP database. Many votes have an *Ementa* of the sort, "*Altera o artigo X da Lei. Numero X*", which is to say that the actual content is very often *only* visible by checking the *justificação*. The use of these justifications has allowed me to include many more votes in the analysis of foreign policy voting than has previously been done in the literature. However, the use of these topics obviously simplifies reality. When coding the

`Topic` variables, I originally ended up with almost 500 topics, which is realistic for legislative activity but totally unwieldy for analysis. I eventually reduced this down to just over thirty topics.

The use of such quantitative methods calls for transparency and reproducibility. As such, all supplementary materials (including data and plots not included for reasons of space) can be found in the Dropbox folder for this thesis[27], along with `R` scripts to prepare the data, run the models, analyse the output and run diagnostic checks on the MCMC sampling process. Although there are elements of the work that are not strictly reproducible (such as the subjective coding based on the justifications), it is my hope that the majority of the work can be easily reproduced.

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[27]https://www.dropbox.com/sh/23ocyhdoyeupkoc/AABgxZnPIXpjieChC48gYeFaa?dl=0

3 Comparing the Senate and the Chamber

As was noted in §1.4, the Senate is a worthwhile case to study in terms of foreign policy, and as foreign policy ideal points have already been estimated in the literature for the Chamber (e.g. Ribeiro, 2012; Oliveira, 2013), the specific analysis of foreign policy through ideal point analysis in this thesis will only be done for the Senate. Consequently, there is a need to be able to relate the work already done on the Chamber with the work done here on the Senate. As such, a correct method for comparing analyses of the two houses is of importance. Unfortunately, this is not as straightforward as producing estimates of the Senate and comparing them with studies already done, as these two sets of estimates are not comparable (Bailey, 2007). Therefore, this chapter discusses the best way to compare the two houses and does so through means of a joint policy space.

As noted previously, most work on legislative politics in Brazil has focused on the Chamber of Deputies, and to a much lesser extent, on the Federal Senate. Far less common has been a comparison of the two. Of the few studies that exist, there have been conflicting findings. Desposato finds that federalism weakens party cohesion in both houses (2004), and although he finds less cohesion in the Senate, he argues there is no consistent and significant difference between the institutions (2006). Neiva (2011) finds lower levels of party discipline in the Senate, while Bernabel (2015) finds the opposite; de Melo and Batista find little difference in party discipline between the two (2012). Freitas *et al.* (2012) compare the houses and find that Brazilian legislative politics is unidimensional and structured by the government-opposition dynamic in both. Of the studies above, only Desposato (2006), Bernabel, and Freitas *et al.* utilise ideal points, and this chapter therefore discusses only these latter studies. I point to methodological problems associated with comparing the two houses and offer a method which overcomes these problems. I then present ideal point analyses for the Chamber and the Senate in a joint policy space and discuss these findings with reference to both the literature cited immediately above and the wider literature on legislative voting patterns in the Brazilian

Congress.

3.1 Methodological Considerations

As Bailey succinctly puts it, "no matter how well preferences are estimated within an institution, they are not comparable across institutions without clear points of reference" (2007, p.434).[28] What 'clear points of reference' means can depend on the context. In the present case, comparing the Federal Senate and the Chamber of Deputies necessitates utilising a dataset that contains instances where both houses voted on the *exact same* proposals, analogous to test-takers responding to the same questions in an educational IRT context.[29] In the legislative setting, although we do not design the 'questions', they are ostensibly the same in the two houses: after all, proposals need to be passed by both before becoming law. However, as noted in §2.1, many proposals go through multiple rounds of voting, as some legislators try to amend the proposed legislation. In turn, the government may indicate a preference for a 'yes' or 'no' vote depending on what exactly is being voted on, as the vote itself may be on the amendment and not the original proposal. Consequently, the fact that a certain proposal, PEC0054/95 in the Senate for example (which was PEC0500/97 in the Chamber) was voted on in both the Chamber and the Senate is not sufficient for us to judge it as the *exact same* proposal, akin to it being the same question in the education-testing context.

This issue raises the following methodological difficulty: how do we decide which vote is the

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[28]The ideal point comparisons of the Chamber and the Senate in the literature have usually consisted of producing ideal point estimates for the two houses separately and then comparing these estimates, however, as Bailey (2007) explains, these estimates are *not* formally comparable. Bailey goes into more detail, but the basic import that concerns us is that an ideal point of '1' in the Senate is not the same as a '1' in the Chamber, and indeed may not even be particularly close. The reasons for this are down to the referential nature of the scaling process– legislators are placed on the scale with reference to how they vote in comparison with one another, and not to an external metric, even one that is of the same size (the metric between -1 and 1 in which NOMINATE scores are constrained to lie, for example).

[29]The proposals crucially need to be *coded* as the same proposal (Bailey, 2007, p.440), which constrains their cutpoints in the same manner. Desposato (2006) is the only work in the literature that validly places senators and deputies in a joint space, however, I was unable to find evidence that the proposals were coded as is necessary.

same in both houses? Desposato (2006) leverages the fact that senators and deputies vote sequentially on the same proposals in the National Congress, the *Congresso Nacional*, as a way to place both houses in a joint policy space. However, the CEBRAP database does not contain many entries for the *Congresso Nacional*, especially in the Senate database, and in some legislatures, does not contain any at all. The ideal situation would be to use the proposals that were voted on in both houses, either as part of the National Congress or as part of the regular passage of voting. If all proposals started in the Chamber, then we could take the last vote on a proposal as the 'definitive' version that the Chamber voted on before the proposal was sent to the Senate, however, many proposals also start in the Senate and may face rounds of voting before they go to the Chamber. This to-and-fro between the houses leaves us with two choices: either code all the votes on a certain proposal as the same vote, or use only the last round of voting in both houses. A quick glance at **Figure 4** shows us why the former is not possible. This plot graphs the number of times a proposal was voted on (the x-axis) with the discrimination parameter values for the votes plotted on the y-axis, for both Lula presidencies. The proposal number is coloured for the government indication: orange for 'no' and turquoise for 'yes', while the black lines track the proposal numbers through the passage of voting rounds.

What we can clearly observe is that the same proposal – PEC0067/03, for example, which is the furthest to the right in the plot – can undergo radically different changes in its discrimination values over the rounds of voting, meaning that we cannot consider these to be the same proposals in an IRT model context. It is also not true for all votes, as some undergo wild swings, heavily associated with the government's preference, while others do not. For these reasons, I chose to take the last round of voting on a proposal (in both the Senate and the Chamber) as the proposal to be considered in a joint policy space. In this way, the ideal points in this common policy space are estimated from votes which passed the house in question, ready to be sent to the other house for consideration.[30] The studies that

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[30] A possible improvement to this method would be to take the first vote in the Senate for a proposal that
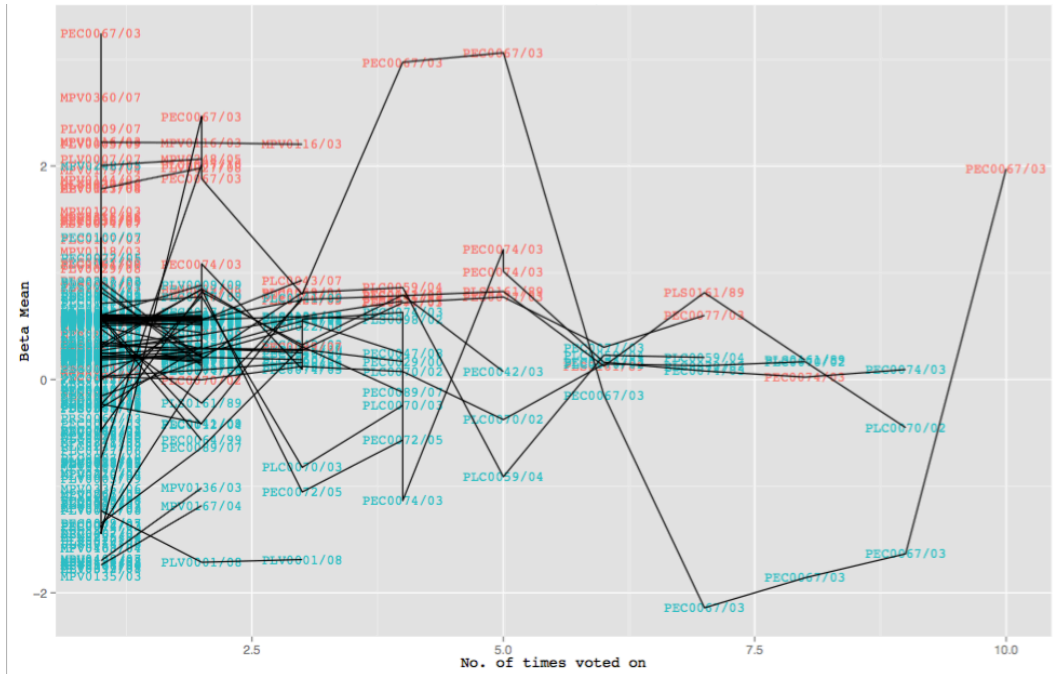
Figure 4: Discrimination parameter values over rounds of voting, Lula presidencies.

do not place ideal points from the Senate and the Chamber in a joint policy space are best understood as "mostly descriptive" (Bernabel, 2015, p.106). The analysis to follow in this section differs from that of Desposato (2006) in that I consider more legislatures (namely, those of Lula and Sarney) and that I use Bayesian IRT instead of `NOMINATE`. This is relevant in this case because of the small number of shared votes in the National Congress and the impact of this on the quality of the ideal-point estimates, which in turn is important due to the subsequent use of these estimates by Desposato in a regression analysis, as was detailed in §1.2, which is something I avoid here. I also label the votes in a manner consistent with the needs of estimating a joint policy space (Bailey, 2007, p.440); there is no evidence available that Desposato (2006) did so.

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came from the Chamber and the first in the Chamber for a vote that came from the Senate. However, this complicates matters greatly, as some proposals go between the houses a number of times. Many of these proposals might still have to be voted on in one of the houses, as the waiting process can be very long, making the quest for a final, 'definitive' position on a proposal from each house counter-productive, as we would lose many of the votes in the database.

3.2 Theoretical Considerations

Moving to substantive matters, an important question to consider is *why* we would expect the Senate to be different to the Chamber (or not, as may be the case). In §1.4, I expanded on reasons why the Senate is particularly interesting when it comes to foreign policy. However, the differences between the Senate and the Chamber are not just limited to the extra powers afforded to the upper house in foreign policy matters. Senates all around the world have ostensibly different purposes than lower houses, such as defending smaller states from their larger neighbours in the United States, or protecting the elite in the United Kingdom (Neiva, 2008, p.35). As regards the Brazilian Federal Senate in particular, scholars have noted the conservative, elite nature of the Senate and of senators themselves (Neiva, 2010) and how the institutional design of the house serves to empower poorer, less-populated states, leading to a north-eastern bloc with effective veto powers (Backes, 2008). The Senate also "has the exclusive power to impeach and try the President, Vice President, Ministers, Supreme Court Justices, and Attorney Generals [. . .] [and] approves many key appointments and chooses many federal judges" (Desposato, 2006, p.1021). Senators also serve for eight years and not four, and are elected under a simple plurality system, in comparison to the much-discussed open-list proportional representation system that governs the election of deputies. Finally, in terms of party differences between the houses, the PMDB is "strangely divided between lower house and upper house factions" (Zucco Jr. and Lauderdale, 2011, p.382) and so it is quite possible that parties are divided simply by virtue of having different factions depending on the house in question. Therefore, it may well be the case that we cannot compare the work in the literature on foreign policy voting in the Câmara with foreign policy voting in the Senate. These potential differences between the houses are examined next.

3.3 Differences between the Senate and the Chamber

Thus there are ample reasons to suspect that the Senate would take different positions on nominal votes than the Chamber: the federal nature of the Brazilian state and the state-related politics noted by Backes (2008) lead us to suspect a stronger case for regional or state politics in the Senate; the conservative nature of the senators themselves raises the possibility that we should observe more right-wing positions in the upper house; the different electoral systems employed by the houses would lead us to think that senators "should have weaker incentives for personalistic behavior and substantially stronger incentives for cooperating with party leaders" leading to higher party unity (Desposato, 2006, p.1022); while the senior position and higher profile of many senators raises the possibility that they are more likely to be independent of party pressure, as was mentioned in §1.4; the upper house and lower house factions of the PMDB also mean that we would expect to observe the greatest differences between the houses for this particular party, and perhaps perhaps differences between the institutions for all parties.

Accordingly, the hypothesis we wish to test is that there is a difference between the two houses, which is done here through the analysis of nominal votes. Due to the large number of deputies, party means of ideal points instead of individual ideal points are considered for both houses. The testable hypothesis then becomes, *is there a significant difference in party means across the two houses, and if so, how large is its effect?* We may also test for differences across the institutions as a whole, that is, considering the mean ideal point of the Chamber compared to the mean ideal point of the Senate. In order to test this hypothesis, I utilise methods detailed in Kruschke (2013), namely a Bayesian version of Gosset's t-test for a difference in the means of two groups. This test, implemented in R with the BEST package (Kruschke and Meredith, 2015) accounts for the uncertainty inherent in ideal point estimates through the use of hierarchical priors on the group means (Kruschke, 2013). The effect size is the point of importance in the comparison: statistical significance only tells us of the

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existence of a difference (Ziliak and McCloskey, 2008).[31]

With the `BEST` package, it is straightforward to produce a comparison of the means of the two houses, and also for each party of each house. **Figure 5** shows the graphical output of the `plotAll()` command in the package, displaying the test for the 50th legislature, the first presidency of Fernando Henrique Cardoso. '**Group 1**' refers to the Chamber, while '**Group 2**' is the Senate. The upper left half of the plot shows the means for the ideal points for both houses, demonstrating that the Chamber is clearly to the left of the Senate. The right-hand side of the upper portion of the plot shows posterior predictive checks.[32]

The plot also shows the standard deviations for both houses on the lower left-hand side and the 'normality' parameter, in Kruschke's terminology, for the t-distribution (commonly referred to as the 'degrees of freedom' parameter and denoted ν).[33] The lower right-hand side of the plot displays the most important comparisons, the difference of the means between the Chamber and the Senate and the effect size of this difference. As can be seen from the plot, we can strongly reject the hypothesis that there is no difference between the two houses when it comes to this legislature. The effect size is -1.05, meaning that the average deputy is about 85% more likely to be to the left of an average senator.[34]

The difference observed for Cardoso's first term in **Figure 5** is not found for all periods.[35] **Table 12** summarises the findings for this test across all legislatures. For Lula's second

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[31]Ziliak and McCloskey (2008) in fact argue that statistical significance test are tests of philosophical questions, and not therefore admittable to scientific inference. Regardless, both are considered here.

[32]In which the estimates are used as a base for simulations to check whether the model can describe the data well. The blue lines show the simulated values while the red bars display the data. As can be seen, the model does a reasonable job of describing the data. For more on posterior predictive checks, see Gelman et al. (2014).

[33]Kruschke describes the plotting of this parameter thus: "[t]he values are shown on a logarithmic scale, because the shape of the t distribution changes noticeably for values of ν near 1 but changes relatively little for $\nu > 30$ or so. On a base-10 logarithmic scale, $\log_{10}(\nu) = 0$ means $\nu = 1$, $\log_{10}(\nu) = 1$ means $\nu = 10$, and $\log_{10}(\nu) = 2$ means $\nu = 100$" (Kruschke, 2013, p.579). Hence the values of ν in **Figure 5** show that there were outliers in the data, as the t-distribution had large tails to accommodate these outlier values, $\log_{10}(\nu)$ being between 0 and 1.

[34]The fact that the posterior distribution for the differences is normal allows us to make this calculation. See Coe (2002) for details.

[35]Plots for all legislatures and plots specific to large parties can be found in the Dropbox folder: https://www.dropbox.com/sh/23ocyhdoyeupkoc/AABgxZnPIXpjieChC48gYeFaa?dl=0 . The file is "Sen-CamDifferences.zip".
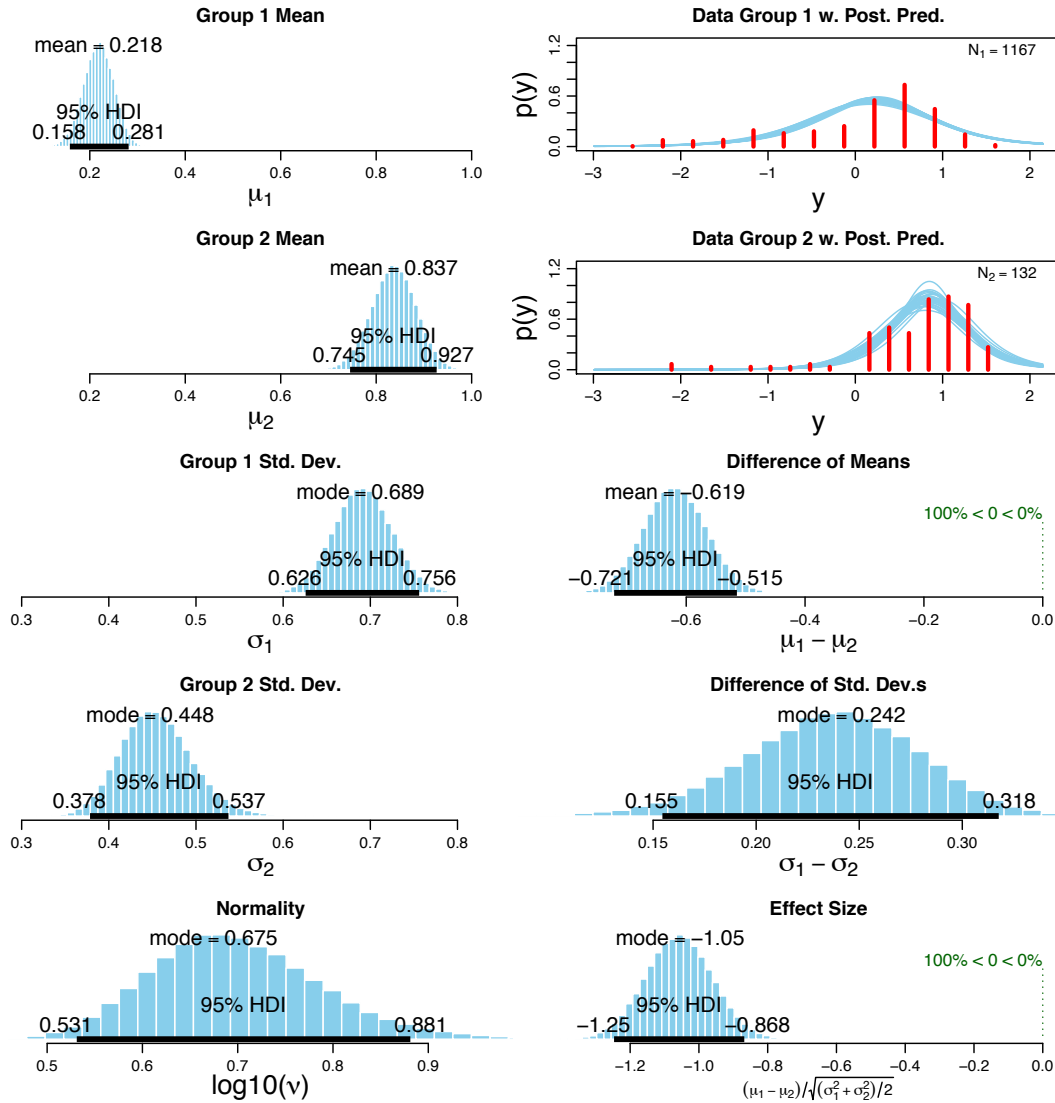
Figure 5: Differences in Means, Chamber and Senate, 50th Legislature.

term, there is little difference between the houses, which is also the case for the Sarney and Franco presidencies. There is slightly more difference between the two during Collor's time, although the difference is not significant. Lula's first government and both of Cardoso's display the greatest differences between the two houses, although the differences are the inverse of one another for the two presidents: the Senate is further right in Cardoso's time, while the Chamber is further right during Lula's first presidency.

Table 12: Bayesian estimation of differences in means, 1989-2010, for the Chamber & the Senate.

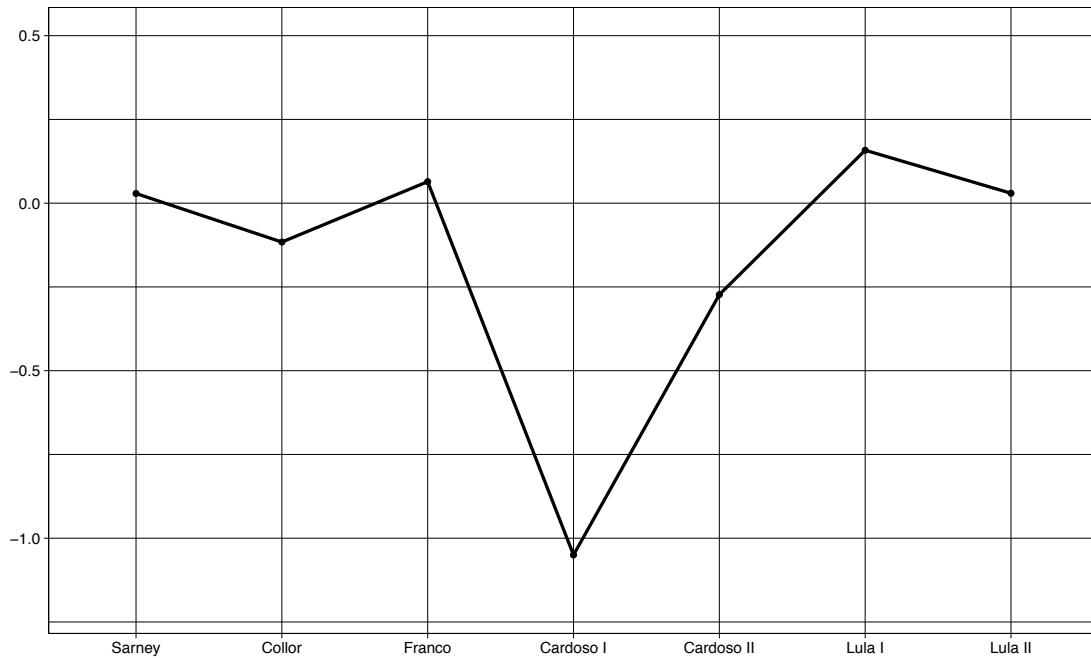| residency	Posterior Below Zero (%)	Posterior Above Zero (%)	Effect Size
Sarney	36.8	63.2	0.0289
Collor	87.2	12.8	-0.116
Franco	20.6	79.4	0.0642
Cardoso I	100	0	-1.05
Cardoso II	100	0	-0.273
Lula I	2.9	97.1	0.158
Lula II	42.3	57.7	0.0297

Figure 6: Effect sizes of differences between the Chamber and the Senate, 1989-2010.

Graphing these differences over time (**Fig. 6**) highlights the finding: there is a clear difference between the Senate and the Chamber in the Cardoso presidencies and in Lula's first, somewhat less in Collor's time, and almost none during the other three presidencies analysed. Hence the

hypothesis that the Senate as an institution is more conservative than the Chamber receives some qualified support: it is clearly *different* in some legislatures, although it varies in being more to the left or to the right depending on the president. The findings of Desposato (2006) are supported for some legislatures but not for others. Party unity *inside* the houses is not directly relevant to our discussion, as we are seeking to clarify to what extent the two houses are comparable, however, party unity *across* the institutions is relevant. The literature has posited that there exist differences between the parties in the Senate and their Chamber factions, in particular the PMDB, which would lead us to believe that we cannot generalise party-specific findings in the Senate to the Chamber. **Figure 7** plots the effect sizes of the differences between the two institutions for the legislatures considered (the PT is plotted from Cardoso onwards due to the low number of Senators the party had before this period). As can be readily observed from the graph, the PFL is the party among the four that seems most split between the houses, joined in later periods by the PSDB. It seems that all the major parties share differences between the houses during the Cardoso presidencies and the first term of Lula, the effect sizes being much smaller in the other periods. Of course, *why* these differences exist in some periods and not others is an interesting next step for future research. As regards the purpose of this thesis, these differences between the Senate and the Chamber mean that we should be cautious when generalising findings from the Senate to the Chamber and vice-versa. Clearly, the houses share much in common; they are statistically identical at the 95% significance level in all but three of the seven presidencies studied, but they are not identical. Hence, this thesis will continue with the assumption that findings from the Senate are directly comparable to those from the Chamber, with the caveat that the Senate was more to the right during Cardoso's presidencies and more to the left during Lula's first presidency, and so comparisons for these legislatures need to be made with care. The substantive meaning of these rightward and leftward moves is the subject of the next chapter.
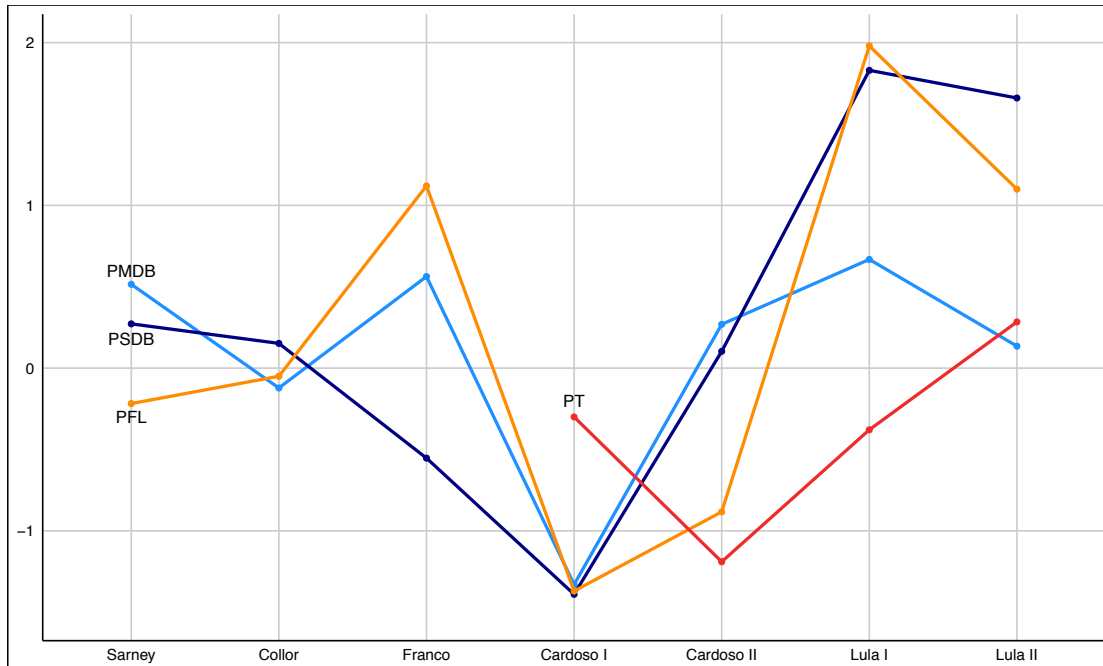
Figure 7: Differences between main parties in the Chamber and the Senate, 1989-2010.

3.4   Summary

The main focus of this chapter was to explore how we might compare ideal point estimates for foreign policy issues from the Senate to estimates of foreign policy themes from the Chamber. Findings from the literature that no differences exist were supported in four of the seven cases, while in three cases, statistically significant differences were found along with sizeable effects. Differences within parties across houses were similar. Whether these movements along the scale of θ represent movements in ideology (or something else) is analysed in detail in Chapter Four. What we can say after this analysis is that there does indeed exist differences between the houses, depending on the period. Quite why the Senate is at times different to the Chamber is an interesting avenue for future research, but is outside the focus of this thesis. The only aspect raised earlier that we were unable to discuss (due to the lack of an explicit unique constituency for each legislator) was that of the regional and state politics posited by Backes (2008). This topic is discussed in more detail in §4.4 and in Chapter Five.

4   The Content of the Policy Space

Given that studies in the literature have not found any difference between voting behaviour on foreign policy and voting behaviour on domestic policy in the Chamber of Deputies (e.g. Oliveira, 2013; Ribeiro, 2012), this chapter will continue with the assumption that $\theta_{\text{FP}} = \theta_{\text{DP}}$, in other words, the policy space is the same for foreign policy as for domestic policy. Therefore, in order to understand the determinants of voting behaviour on foreign policy themes, we must understand what a certain position on the underlying scale θ signifies. In other words, what exactly is the substantive content of the policy space? How many dimensions do we need to accurately depict voting patterns? In the following sections, I analyse various hypotheses in order to shed some light on these questions. The content of the policy space θ is quite difficult to infer outside of the 'easy' cases such as the US Congress,[36] where hypotheses concerning party influence, government and opposition, and ideology are effectively rolled together into one due to the nature of the political system. Two parties that are ideologically distinct, highly unified and composed of loyal legislators make separating government, party and ideological pressures almost impossible, whereas the explicit constituency link makes lobby and electoral base pressures much easier to examine compared to Brazil, where legislators represent entire states. The Brazilian case is indeed a highly interesting one for ideal point analysis, as the high levels of party switching and coalition switching enable us to examine party and government influences through what are 'quasi' natural experiments. However, the high levels of party switching, the large number of parties and the difficulty of separating ideology from the government coalition also complicate matters. As will be shown, it is much easier to infer what θ might *not be* rather than what θ actually might *be* with any degree of confidence.

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[36]The US houses of legislature are often referred to as 'easy cases' in the ideal point literature, because there are only two parties, both quite unified, few party switchers, and with most variance captured in the first dimension, there are less complications, certainly compared to Brazil. See Clinton and Jackman (2009), p.598.

As mentioned in the literature review above, there have been various determinants of Brazilian legislative behaviour on nominal votes posited. These lead us to some hypotheses on what we should expect to observe with ideal point estimates. For the **government–opposition** hypothesis, the assumption is that membership of the government coalition is the driving force behind nominal voting behaviour. Hence, one test of this hypothesis is the change observed in ideal points before and after joining or exiting the government coalition. Party or coalition switching is an ideal event with which to test hypotheses of legislative voting behaviour, as it "provides something akin to a natural experiment" (Clinton et al., 2004, p.7). To be clear, I am not claiming that these are natural experiments: there is no random assignment, or 'as-if random' assignment, and the agenda of course changes over the lifetime of a legislature. For example, the Executive has extra rights in regards to making Congress consider legislation in the first year of the presidency. Therefore, the agenda on the two sides of a switch will never be the same. However, this is a problem faced by any analysis of legislative politics. We simply cannot run experiments in this setting, and these 'quasi-natural' experiments are the best we can do under the circumstances.

To cast doubt on this hypothesis, we would need to see $\boldsymbol{x}_{i_{\text{GOV}}} - \boldsymbol{x}_{i_{\text{OPP}}} \approx 0$, where the difference between the ideal point of the legislator as part of the government and her ideal point as part of the opposition are approximately zero. The **party influence** hypothesis is similar. For party influence to be a principal determinant (or *the* principal determinant) of roll-call voting behaviour, we should **not** observe: $\boldsymbol{x}_{i_2} - \boldsymbol{x}_{i_1} \approx 0$, where legislator i's ideal points are subscripted 1 and 2 for a switch to another party (or being independent). 95% credible intervals are displayed for all ideal points in the discussion of these hypotheses, hence, if the pre-switch ideal points and intervals on either side of them do not touch the post-switch ideal point credible intervals, the change in position is statistically significant at the 95% level, compared to a hypothesis of no change.[37]

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[37]Jackman (2001) uses a similar method to discern the significance of the discrimination parameter in relation to the dimensionality of θ.

I use the phrase 'approximately zero' because the analysis to follow focuses on identifying changes that occur (or not, as may be the case) when a legislator leaves his/her party, or the party joins or leaves the coalition. There is a valid concern about the compatibility of these ideal points, even for the same legislator. Legislators naturally face different votes during different time periods, and face these in differing political contexts. Hence the concern that $\boldsymbol{x}_{i_{\text{GOV}}}$ and $\boldsymbol{x}_{i_{\text{OPP}}}$ might not actually be formally comparable.

Clinton et al. (2004) discuss this problem (pp. 7-9) with reference to Senator James M. Jeffords of Vermont, who left the Republican party to become an independent. To enforce comparability, they impose a $\boldsymbol{x}_i \backsim \mathcal{N}(0,1)$ normalization condition on ideal points from the two different periods when Senator Jeffords switched party in 2001, and thus divide the entire legislature into two periods: pre-Jeffords' switch, and afterwards. I have adopted a slightly different strategy here. The frequency of party switching in Brazil would render the above method unwieldy and so I have created 'new' legislators every time that a party or coalition switch occurs, as has been done elsewhere in the literature.[38] The normalization condition of Clinton et al. (2004) is then imposed on all ideal points as part of the identification strategy for the model (see Appendix, §7.3). This method of creating 'new' legislators also avoids the issue of how to account for the changes that naturally occur for the ideal points of all other legislators over the two different time periods as was the case for Clinton et al. (2004); there is only one time period (each legislature) and the changes in the switchers' $\boldsymbol{x}$ are compared within this period. Also, in the cases explored below, there is usually a wide variety in the type of proposal voted on pre- and post-switch, suggesting in terms of substantive content, these are reasonable comparisons between the ideal points of a pre- and post-switch legislator, although this is obviously not the case for those who voted very few times before or after switching.

Regarding the case for **unidimensionality**, hypotheses regarding the dimensionality of θ can

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[38]For example, Izumi (2012). Zucco Jr. and Lauderdale (2011) also do this for the PMDB, however the coding of the party into factions was done based on regional and state considerations and not switching.

be tested using various approaches, two of which are statistical in nature and one which is a synthesis of quantitative and qualitative methods. Eigenvalue skree plots, like the example in **Figure 3** in §2.2, can demonstrate how much variance is due to which dimension, however, variance due to a mixture of dimensions is not captured, as the variance in higher dimensions is that left over from the lower dimensions. Percentage Correctly Predicted (PCP) is another way of gauging the value of a move to a higher dimensional model. Higher PCP statistics for multidimensional models indicate clearly that a move to such a model is worthwhile, whereas the inverse indicates that the added complexity of a multidimensional model (see Appendix, §7.3) is not worth the effort. Another method is due to Jackman (2001), who argues that the Bayesian approach he adopts makes "the analysis of roll call data less a technical 'scaling' exercise and more genuinely *data analytic*" (2001, p.228, emphasis in original). This method consists of examining the discrimination parameter values from a one-dimensional model to see whether a large proportion of the votes possess the capacity to discriminate on the first dimension. High numbers of non-discriminating votes indicate that a multidimensional model may do a better job of fitting the data. Jackman (2001) then utilises the substantive content of the non-discriminating votes as a guide to the content of the second dimension, setting second-dimension prior distributions on β according to this analysis (see Appendix, §7.3). This method avoids the need to set hard constraints on legislators in the second dimension when we are not aware of their possible spatial locations in such a dimension. All three methods are discussed in this chapter.

Regional and **State** factors are also analysed, although there are limitations to how regional and state influences can be assessed using the most basic Bayesian IRT model, as was mentioned in §3.4. In any case, these latter two determinants have not found much support in the literature, apart from regional factions of the PMDB (Zucco Jr. and Lauderdale, 2011). These factors are relevant for foreign policy analysis, however, and so are discussed further in Chapter Five; these determinants are also discussed later in the present chapter in the context of a multilevel Bayesian IRT model.

4.1 Ideal Points for the Senate

The following figures show ideal points for the Senate for the years 1989-2010, split by legislature, or presidency for the Sarney-Collor-Franco years.[39] In these figures, the government coalition is coloured blue and the opposition coloured red. The president in each case is marked by a bright blue estimate. The ideal points for the presidents were recovered by giving the president a 'Yes' vote for each round of voting where the government indicated a 'Yes' preference for the vote, and similarly for 'No' votes or abstentions. As such, the president is the most loyal government legislator, so to speak, and is a useful indicator of where absolute loyalty to the government lies in the policy space.

A quick historical note on these presidencies is in order. The roll-call data available for President Sarney presents only a limited picture of his term, being available only for the final period of his presidency. This was a period in which he was very unpopular and Brazil was suffering economic problems that many blamed on him (Brooke, 1990). Collor famously pursued an 'anti-party' strategy in the houses of legislature, only turning back when things got difficult (Figueiredo, 2007, p.196). In contrast, Collor's successor Itmar Franco maintained an "extremely" broad coalition (Samuels, 2006, p.31). The Cardoso terms, particularly the first, were marked by a 'wholesale' coalition-building strategy (Samuels, 2006) and a government coalition that was ideologically coherent (Zucco Jr., 2009), whereas "Lula's first term was disastrous in terms of coalition management" (Zucco Jr., 2009, p.1089). In his second, he constructed a "broad alliance [...], which widened in less than six months to include almost all political forces in Brazil" (Zucco Jr., 2008, p.34).

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[39]These plots were produced from model runs using the R package MCMCpack (Martin et al., 2011), for 1 million iterations. This model was also run using pscl (Jackman, 2015) , and tested, with different constraints and with multiple chains, in JAGS (Plummer, 2003) and rstan (Stan Development Team, 2015). Convergence is not an issue in the unidimensional model and so for speed and the manner in which constraints can be easily set using MCMCpack, they were run using this package. More details are in the Appendix.
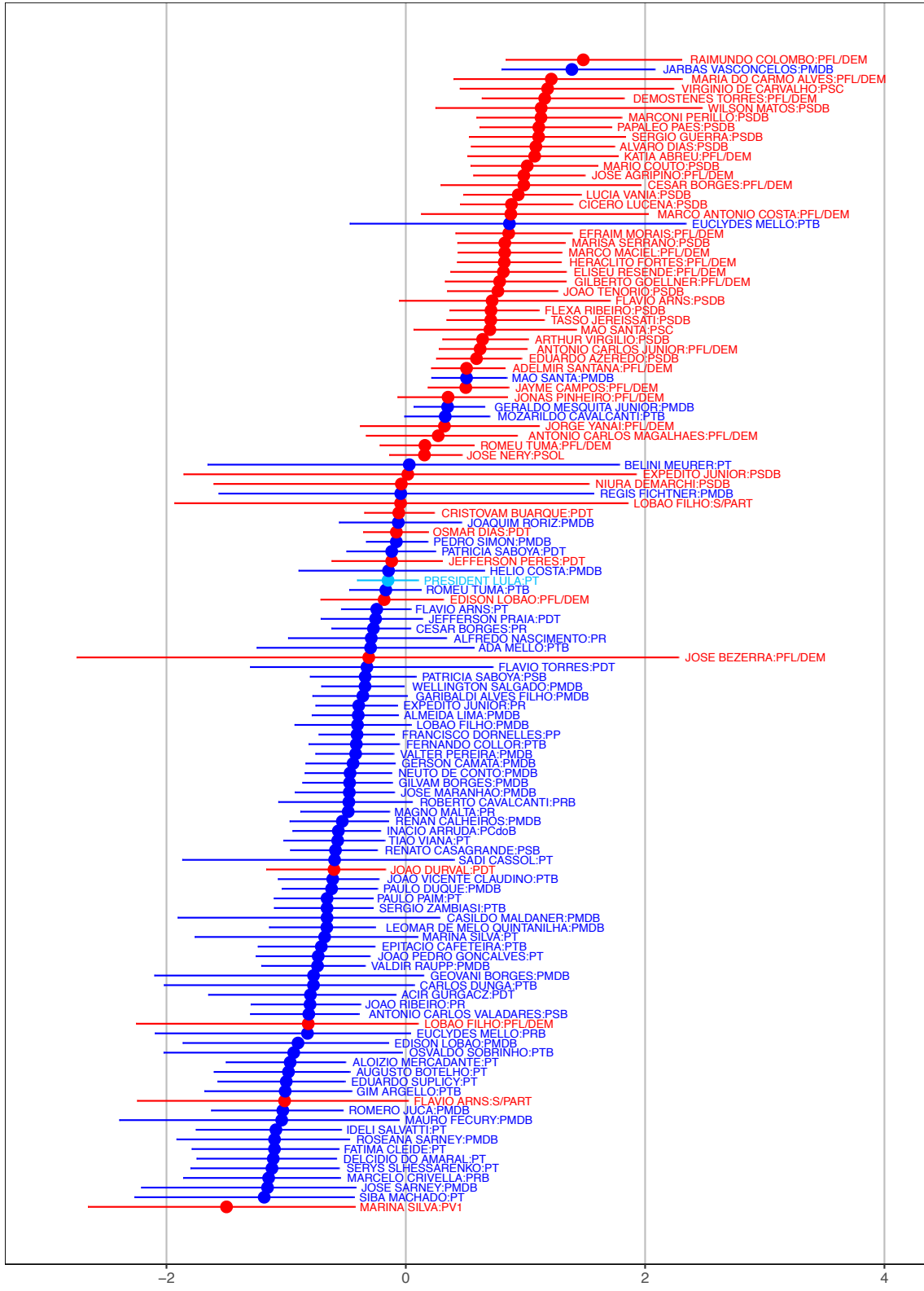
Figure 8: Senate Ideal Points, Lula II, 2007-2010, with 95 percent credible intervals shown.
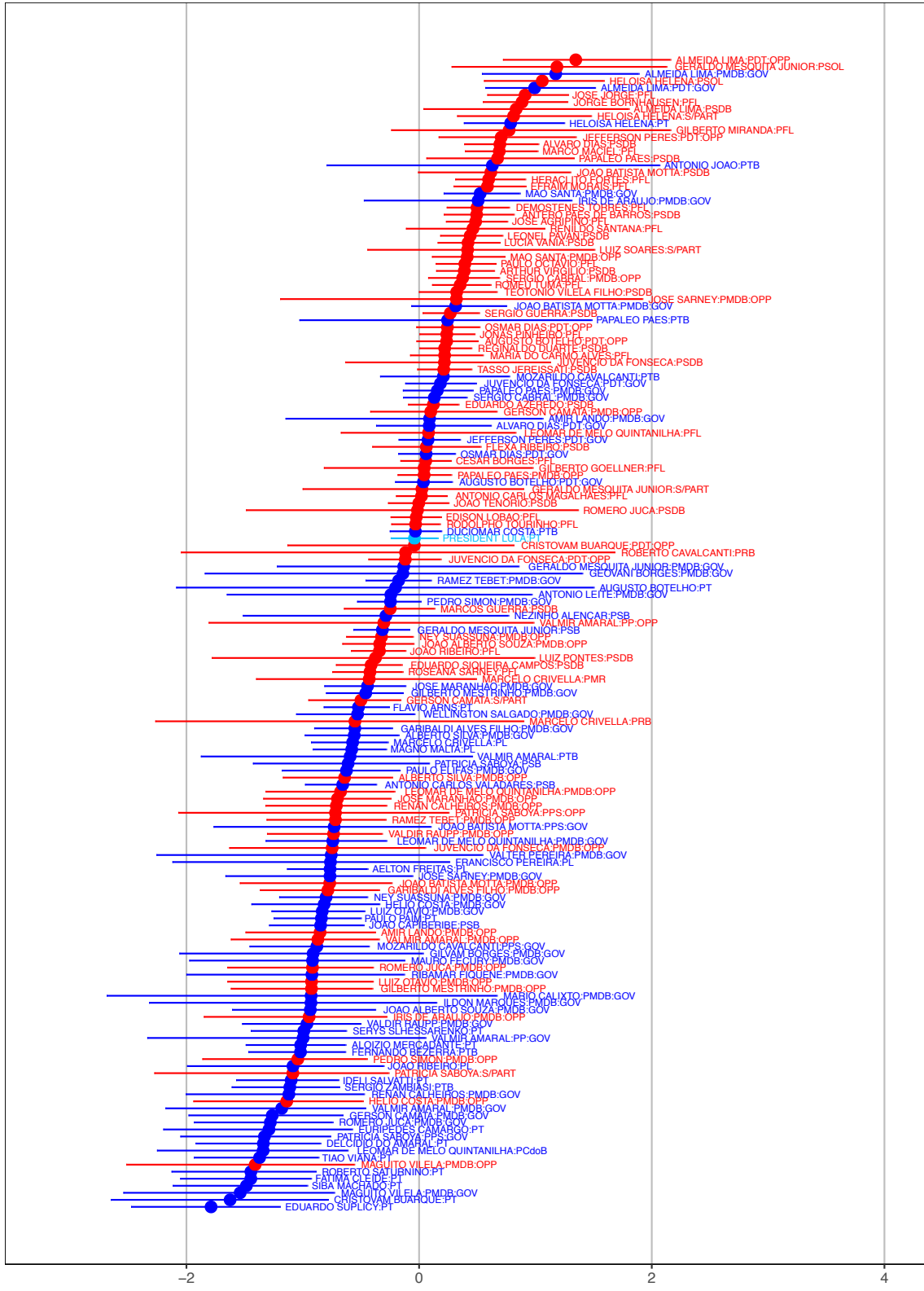
Figure 9: Senate Ideal Points, Lula I, 2003-2007.

It is clear from **Figures 8** & **9** that Lula's coalition strategy change did indeed appear to result in different spatial configurations of the senators. There are very few senators that we find far outside of their respective coalitions in the 53rd legislature in **Figure 8** (Senators Jarbas Vasconcellos, Euclydes Mello, Mão Santa, Geraldo Mesquita Junior, Mozarildo Cavalcante on the right; Senators Marina Silva, Flávio Arns, Lobão Filho and João Durval on the left), whereas **Figure 9** is peppered with government and opposition senators intermingling in the policy space. President Lula, nonetheless, barely changes position, remaining in the centre of the spread of the ideal points in both plots.

Indeed, this is an interesting pattern that emerges concerning the position of the president. During the legislatures in which the presidents opted for building strong coalitions (particularly Cardoso's first term, **Figure 11**, and Lula's second, **Figure 8**), we observe the president at the 'margin' of his coalition, with a quite solid block of government legislators behind him on the scale. Lula's first term, in contrast, is typified by a much 'messier' plot (**Figure 9**). Collor's isolationism is also evident in his extreme position, although curiously Franco occupies an equally extreme position on the opposite end of the scale (**Figs. 12** & **13**)[40]. Since the presidential ideal point represents absolute loyalty to the government, it is clear that such loyalty in Franco and Collor's time marks a senator as extremist in term of θ, while the same loyalty in the Cardoso and Lula periods denotes a central position, close to zero (not necessarily the centre of the scale in terms of ranking, but in the centre of the overall range of the scale). How this relates to hypotheses on the content of the policy space, particularly the government–opposition divide, is discussed in detail shortly.

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[40]Note that these positions in different time periods are not *directly* comparable, as was discussed in Chapter Three, however, the relative position of the president compared to the senators is. That is to say, the exact value of Collor's ideal point is not comparable to that of Franco, but their positions in reference to other ideal points are.
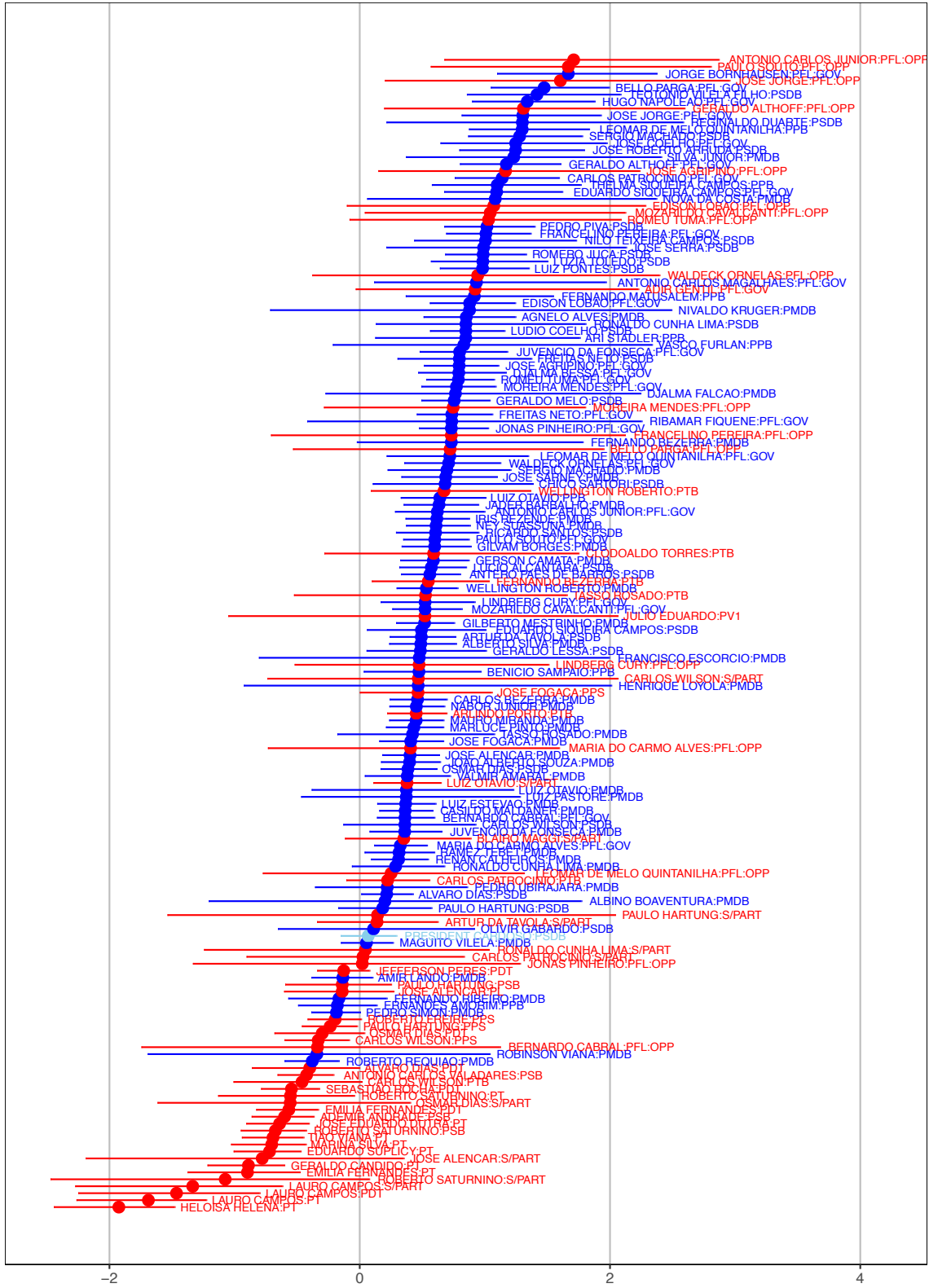
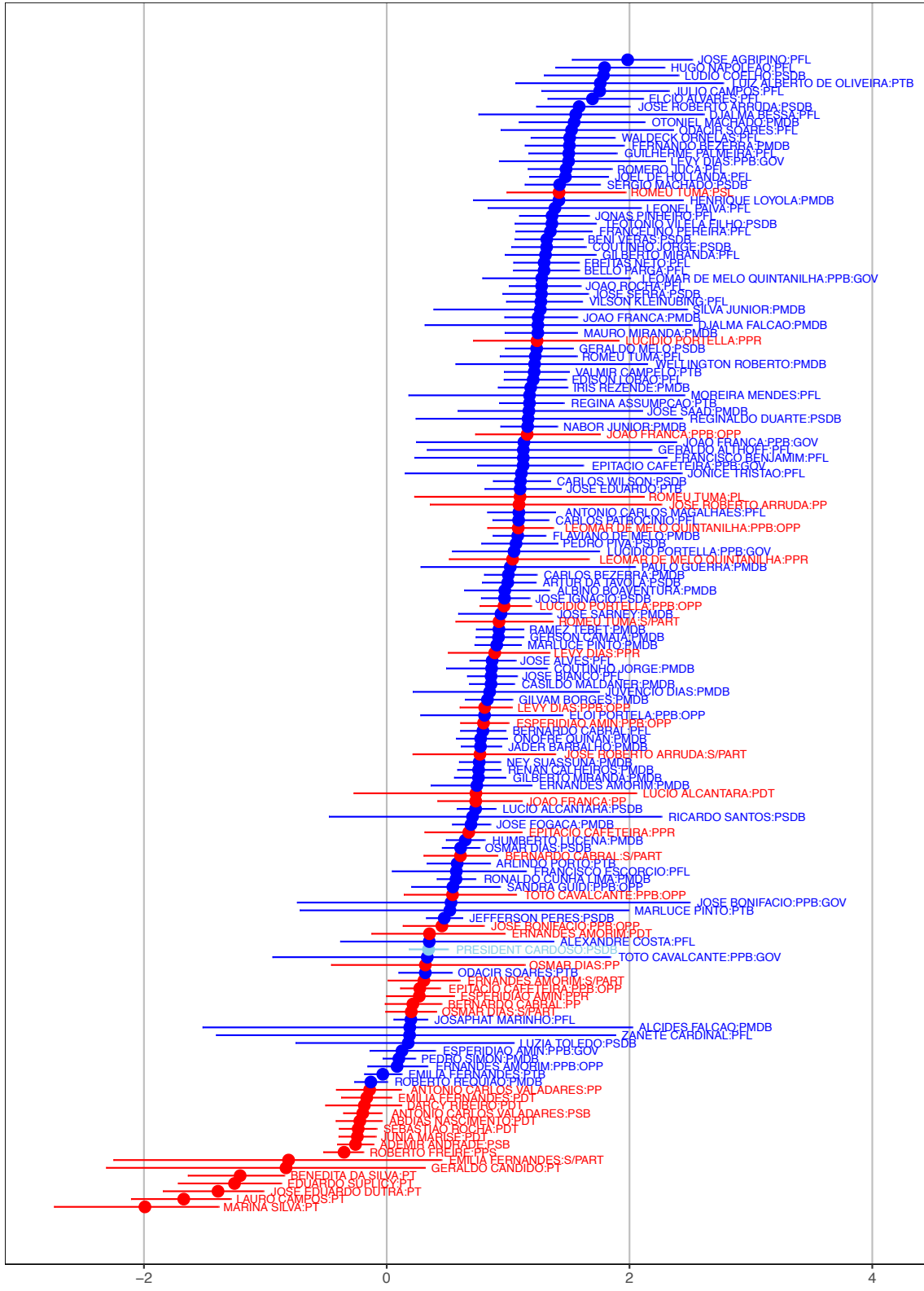**Figure 10:** Senate Ideal Points, FHC II, 1999-2003.

Figure 11: Senate Ideal Points, FHC I, 1995-1999.

These simple one-dimensional models do a decent job of telling us what was happening during these legislatures. The unusual nature of Collor's presidency is easy to see, as is the bipartisan nature of Franco's coalition, where the opposition find themselves grouped in the centre. Lula's first period too, is marked by the 'disastrous coalition management' noted above, whereas it is clear he changed tactics for his second term. The strong nature of the coalition in Cardoso's first term is also evident, as is its weakening in his second. There are also few surprises in the positioning of senators: the PFL and the PSDB occupy the right-wing ends of the plots, whereas the PT is at the opposite end, being more extreme earlier on; the PMDB occupies its traditional role as the king-maker party, as is widely noted, even in the international mainstream media (Watts, 2015). These models therefore produce estimates that broadly agree with the literature on coalition politics during these periods (Amorim Neto, 2006; Samuels, 2006; Zucco Jr., 2009; Figueiredo, 2007).

Regarding determinants of the voting behaviour we observe, it is in the 'strong-coalition' legislatures (Cardoso I and Lula II) that the government–opposition dynamic is most clearly evident. The ideal points do not show a U.S.-style split between the two sides, however, with government and opposition senators frequently overlapping on the scale. Some senators occupy similar positions regardless of party or government membership, such as Senator Heloisa Helena at the top of **Figure 9**, as part of the government/PT, and the opposition/PSOL, or Senator Marina Silva, who occupies the far left of any legislature that she is in. Such cases are perhaps better estimated using other models, such as Lauderdale's Bayesian IRT model for heterogeneous variances, designed to produce more accurate measures of 'mavericks' such as Helena (Lauderdale, 2010) (since it is unlikely in the extreme that we can consider her right-wing).

While these figures are a useful description that agree broadly with the literature, this model can also be used to test hypotheses of the determinants of voting behaviour, as was mentioned previously. The next section discusses the government–opposition hypothesis, and subsequent sections examine other posited determinants, namely, party and regional factors.
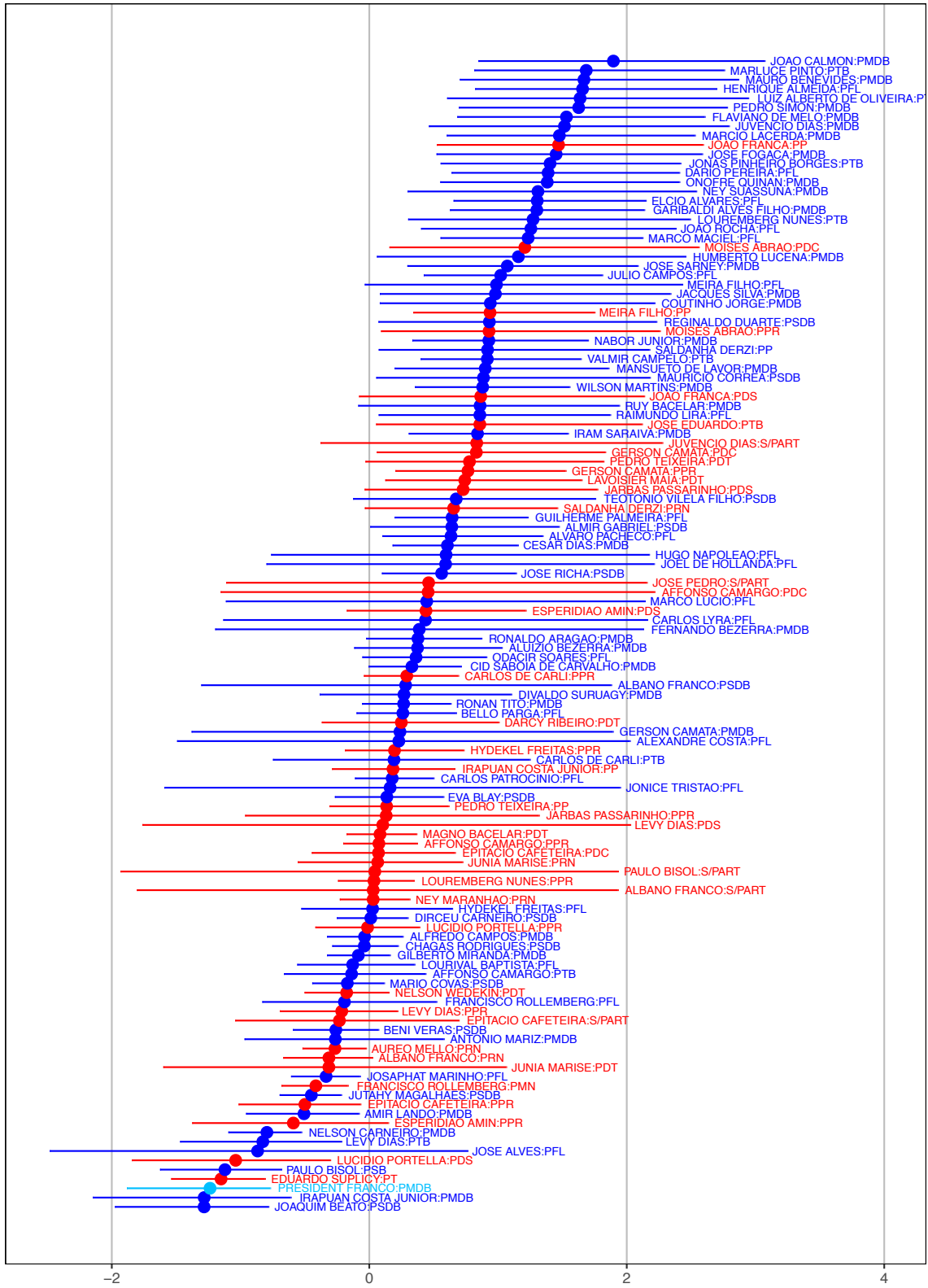
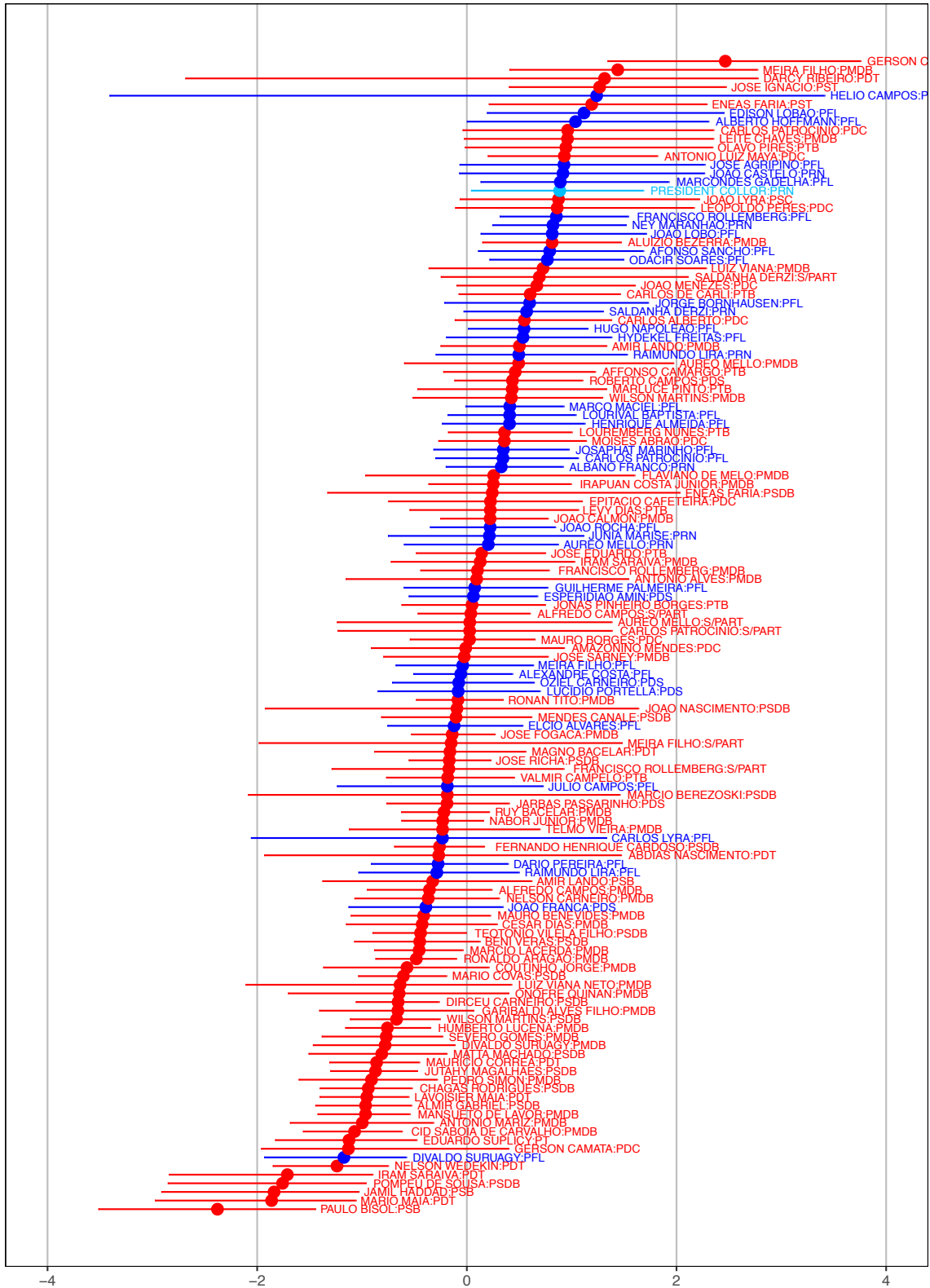**Figure 12:** Senate Ideal Points, Franco, 1992-1995

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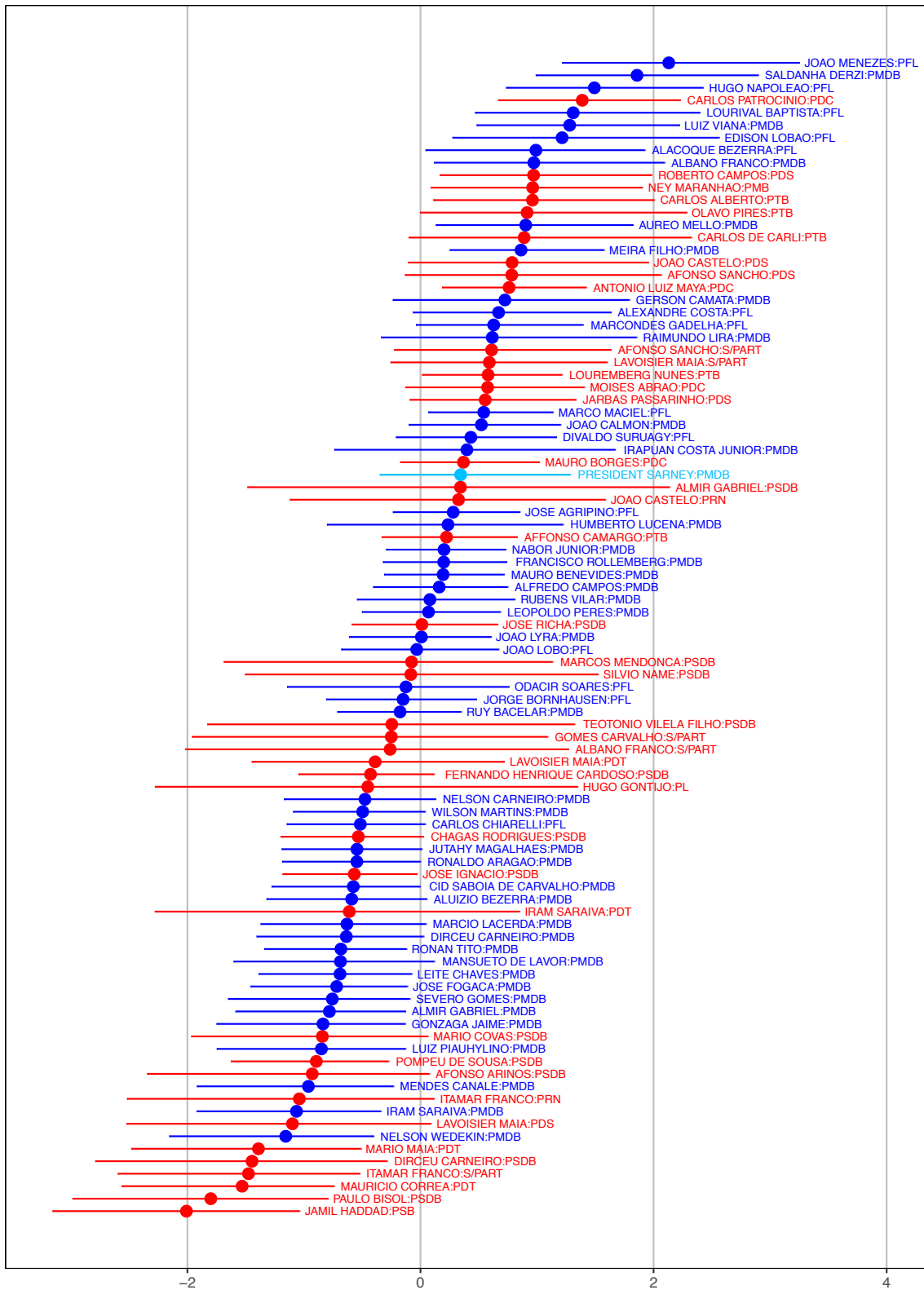**Figure 13:** Senate Ideal Points, Collor, 1990-1992

Figure 14: Senate Ideal Points, Sarney, 1989-1990

4.2 The Government–Opposition Hypothesis

Probably the most common claim in the literature is that membership of the government coalition is the primary determinant of voting behaviour in the Brazilian houses of legislature; a corollary of this is that the policy space is unidimensional (Izumi, 2012; Ribeiro and Miranda, 2011). Leaving aside dimensionality momentarily, a test of the government–opposition hypothesis is simple: as was stated earlier, if $\boldsymbol{x}_{i_{\text{GOV}}}$ is the ideal point of legislator i when part of the government, and $\boldsymbol{x}_{i_{\text{OPP}}}$ the same legislator's ideal point as part of the opposition, then we should not observe anything like $\boldsymbol{x}_{i_{\text{GOV}}} \approx \boldsymbol{x}_{i_{\text{OPP}}}$.

Freitas et. al (2012) did not find any meaningful change for the Câmara dos Deputados and the Senate using party means; the smaller size of the Senate allows for a closer look at this finding using individual ideal points. Zucco Jr. and Lauderdale analyse this hypothesis by focusing on cabinet membership instead of the coalition in general, commenting that "there is no uncontroversial metric by which to measure 'government' status" (2011, p.371); however, the choice of cabinet membership is also problematic, as it "lumps together parties that [hold] several important ministries and parties that [hold] a single and small cabinet seat", while also ignoring those who do not hold any cabinet positions but are still part of the coalition (2011, p.385). Therefore, I decided to use a straightforward measure of coalition status: the senator is simply either part of the opposition or part of the government, based on his/her party's coalition status. **Figure 15** shows coalition switchers in the Senate for Fernando Henrique Cardoso's first term. All the senators in this plot belong to the PPB, as it was the only party that switched coalition, joining the government in April 1996. In these plots, the government senators' ideal points are coloured blue, while opposition ideal points are red. 95% credible intervals are shown as lines on either side of the ideal points.

Out of the eight senators involved in this movement to the presidential coalition, only two display significant ideal point changes, Senators Cafeteira and Amin, in the upper left of the plot. The ideal points of these two senators, however, move in *opposite* directions. The
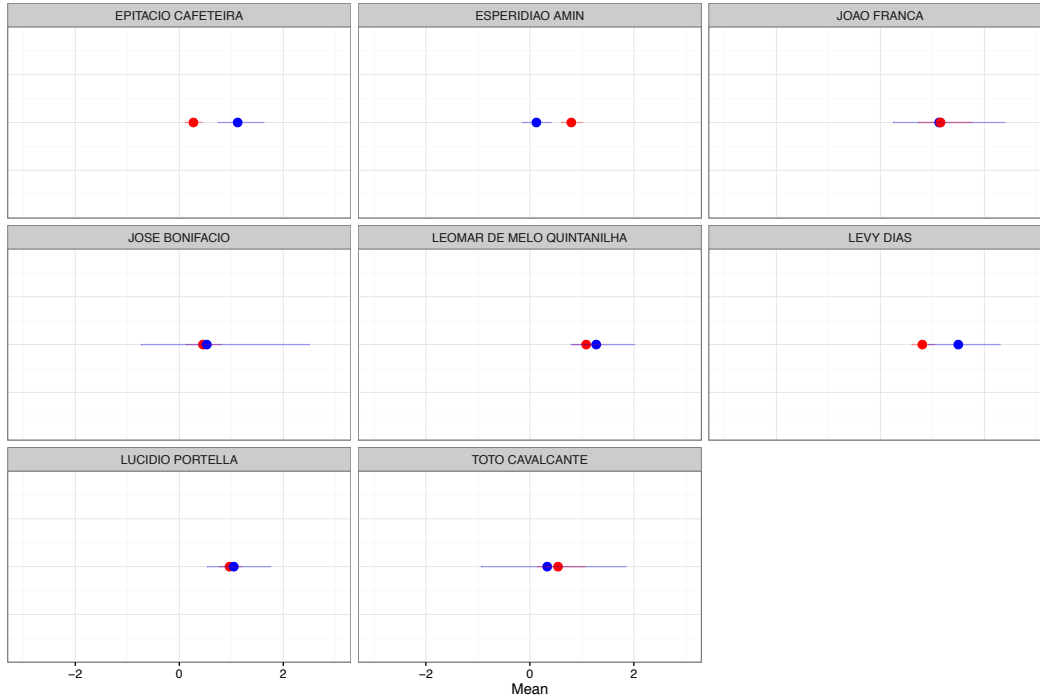
Figure 15: Ideal Points Changes for Coalition Switchers in the Senate, FHC I

changes associated with the other senators are not statistically significant at this level, as some of their ideal points are estimated poorly due to a lower number of votes. We can see from the credible intervals surrounding the ideal point of Senator Levy Dias that his switch is almost statistically significant at the 95% level, and so is of practical significance. This move is similar to Senator Cafeteira, both moving rightwards when the PPB joined Cardoso's government coalition. As the PPB are ranked as possibly the most right-wing party in this period by Power and Zucco Jr. (2009) (p.228; in their earlier incarnation as the PPR they were similarly ranked), it is a curious move rightwards when joining a nominally more centrist government coalition, suggesting perhaps that the entry into government 'radicalised' the senators somewhat, and also suggesting, that at least for these two senators, θ can indeed be characterised as a scale between government and opposition. Senator Amin, on the other hand, is pulled towards the centre by the move into government, his ideal point estimates practically switching places with those of Cafeteira. What could be the substantive meaning of these contrary moves for members of the same party? First of all, it is notable that five

out of the eight PPB senators have almost identical ideal points in and out of the coalition, suggesting the move to join the government produced little or no effect upon the voting behaviour of most of the PPB in the Senate, and perhaps suggesting party influence may have been a stronger factor (party influence is discussed further in §4.2). A look at their respective histories does not offer many clues. Of the eight, only Senators João Franca and Toto Cavalcante changed during their career as senators to parties of a different ideological hue: Franca to the centrist PMDB and Cavalcante, in a complete ideological switch, to the left-wing Partido Comunista do Brasil; all the others were members only of the PPB or its predecessors and successors (the PPR, the PP, the PDS and the PDC). Senator Cafeteira changed party outside of this group, but to the ideologically similar PTB.[41] Hence, ideology does not seem to play a strong role in the movements, since all three of Cafeteira, Amin and Dias appear ideologically similar, at least judging by their history of party identification. Cafeteira is a north-eastern senator who represented Maranhão, while Dias represented the centre-west Mato Grosso do Sul and Amin the southern state of Santa Catarina, and so the north-eastern bloc of Backes (2008) does not seem relevant in this case. Perhaps Amin is simply an outlier or a senator of strong personal preferences. Regardless, the government–opposition hypothesis receives only faint support from the switch of the PPB in the 50th legislature, with two out of eight senators demonstrating effects that can reasonably be linked to the presidential coalition, and only one of these statistically significant at a 95% level.

In the last year of Cardoso's second term, the PFL left the coalition government in protest over a Federal Police raid on the offices of the husband of PFL presidential hopeful Roseana Sarney. **Figure 16** displays the ideal points for the PFL senators before and after this switch, showing not one statistically significant change; indeed, three are practically identical (Senators Cury, Alves and Mendes). A further four are almost identical (Senators Althoff, Lobão, Tuma and Ornelas), while Senators Pereira, Jorge and Agripino are not far away from being so either. We see a sizeable gap between the ideal points for Senators Carlos

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[41]Discussion of ideological placements in this section are all based on Power and Zucco Jr. (2009), p.228.
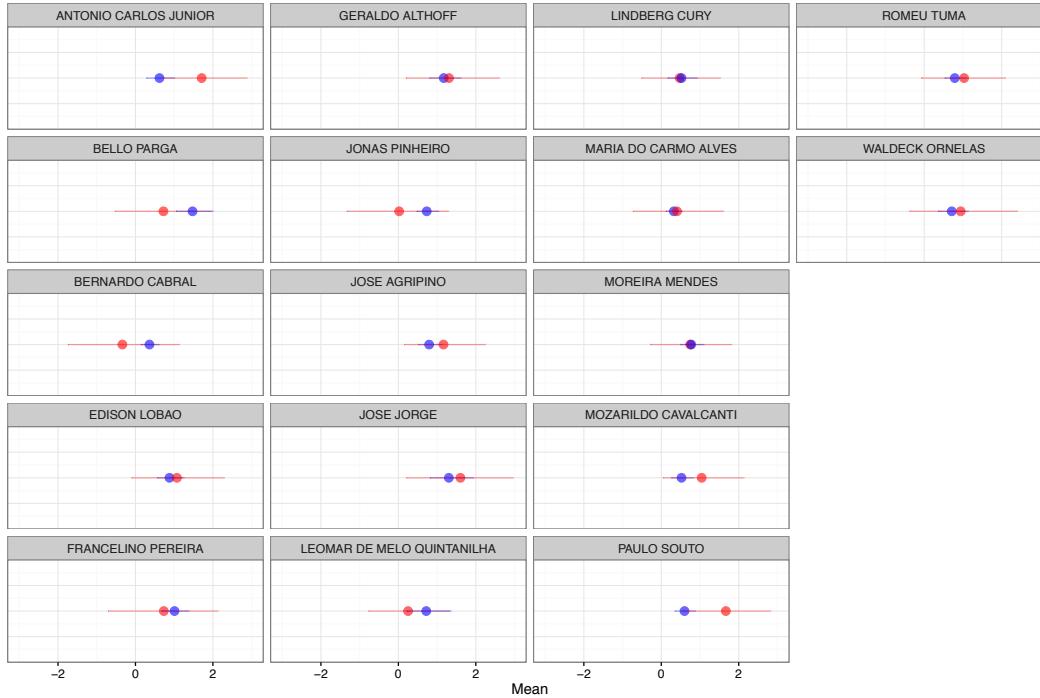
Figure 16: Ideal Points Changes for Coalition Switchers in the Senate, FHC II.

Junior, Parga, Cabral, Pinheiro and Souto, but as already noted, these are not statistically significant at the 95% level. Of this latter group of five senators, two are suplentes (Parga and Carlos Junior), however, so are Senators Cury and Mendes, who both have identical ideal points over the switch.

These findings from the Cardoso presidencies underline an aspect highlighted in Zucco Jr. and Lauderdale (2011); namely, the ideological coherence of the Cardoso presidential coalitions. It is quite possible that we observe very few significant changes in ideal points in and out of the governing coalition because the parties are already ideologically aligned. In addition, in both cases we are dealing with only one party. In contrast, Lula's first term in government witnessed a host of coalition changes and a presidential coalition that was ideologically heterogeneous.

The entire coalition over the period consisted of the PT, PL, PC do B, PSB, PTB, PDT, PPS, PV, PMDB and the PP (Figueiredo, 2007). Using the ideological rankings of Power and Zucco Jr. (2009), we can see that this coalition counts among its members parties belonging
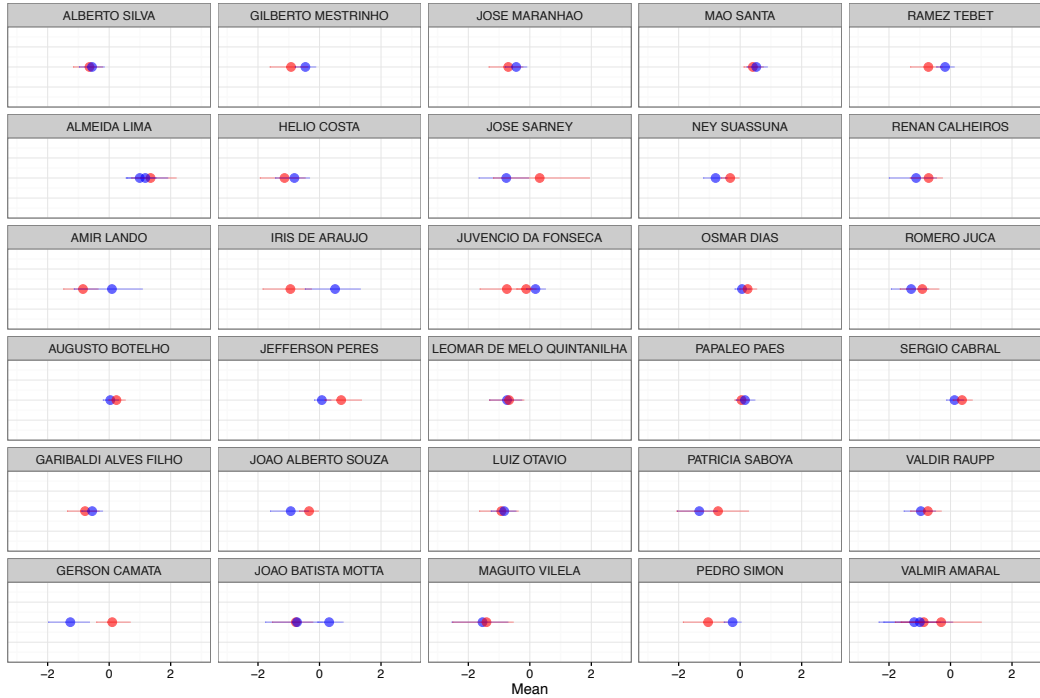
Figure 17: Ideal Points Changes for Coalition Switchers in the Senate, Lula I

to the left, the centre and the right. The PMDB, PPS, PDT may be described as centrist; the PT, PC do B and the PSB as left-wing; whereas the PP, PL and the PTB sit on the right or centre-right. The PV do not figure on the scale of Power and Zucco Jr. (2009), but may be regarded as a left-wing or centre-left party.

Apart from this ideological variety, Lula's first term in government witnessed a host of changes to the presidential coalition. The PP and the PMDB joined, while the PPS, PDT and PV left. There is only one significant change in **Figure 17**, that of Senator Gerson Camata of the PMDB, in the lower left corner of the plot.[42] The PMDB are hardly noted for their ideological extremism and so it is curious that the one statistically significant coalition change arising out of this legislature came from the catch-all centrist PMDB, and not from the right-wing PP, although there was only one senator involved in the PP switch, Valmir Amaral (who also switched party between the PMDB and the PP), and so there is admittedly little

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[42]There are multiple ideal points for some senators in this plot in cases where they belonged to more than one party that switched coalition. Senator Valmir Amaral, for example (in the bottom right of the plot) was a member of the PMDB and the PP and so changed coalition four times.

with which to make inferences on this point. Nevertheless, Senator Camata did experience a significant shift leftward upon the PMDB joining the government coalition (as did Sen. José Sarney), whereas other PMDB senators, such as Senators Pedro Simon and Amir Lando, undergo shifts in the opposite direction, highlighting the ideological heterogeneity of the PMDB, and the fact that there is little evidence in this legislature to support the hypothesis that θ is exclusively a government–opposition scale.

Indeed, this legislature provides many of the 'natural experiments' that Clinton et al. (2004) refer to, and yet we observe only one significant change out of thirty such natural experiments. Coupled with the seventeen observations in Cardoso's second term and the eight in his first, we have observed exactly three statistically significant changes out of fifty-five quasi-natural experiments, with perhaps another four or five that are close to statistical significance at 95%.[43] On this evidence, there is almost zero support in the Senate for membership of the governing coalition being the primary determinant of nominal voting behaviour in a unidimensional space. Similar tests for all legislatures with the Bayesian IRT models of the Chamber found the same results with no significant changes in party means for coalition switchers. Indeed, many were identical across the switch.[44] This finding agrees with Freitas et. al (2012), although they maintain that θ is a government–opposition scale in all legislatures regardless.

Again, it is worth remembering what we should expect to see, if the government-opposition hypothesis were true. If membership of the coalition was the *defining* characteristic of a unidimensional policy space, as is claimed by the majority of the literature, then a change of coalition status would signal a shift to somewhere *on the opposite side of the plot*, especially with parties who are ideologically different than the party of the president, as is the case in Lula's first term. As Figueiredo and Limongi note, roll-call votes in Brazil are principally

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[43]Sarney's term and Lula's second provide no observations of ideal points for the same senator in and out of a coalition. The attempted bipartisan nature of Franco's coalition makes such comparisons somewhat uninformative as to the suggested causal mechanism, as does the anti-party nature of Collor's reign.

[44]Plots for these tests in the Chamber are available in the Dropbox folder for this thesis. The file is "CamaraCoalitionSwitch.zip".

only on the most important proposals (2000, p.158). Hence these votes matter for parties and individual legislators alike, and so it is unlikely that legislators would vote idiosyncratically on these votes, or simply not care. If θ was unidimensional and the government-opposition hypothesis true, then all these parties that moved into or out of the presidential coalition should show evidence of that in their voting record, namely, their ideal points. Of course, it may be that the governing coalition is ideologically coherent, and hence a change of coalition status does not produce a move in the policy space. This would suggest, however, that the policy space is a scale of ideology and not a scale between a government faction and the opposition, and indeed, there is evidence for this is the lack of significant moves with the PFL in the 51st legislature and in the lack of significant changes for the majority of the PPB in the 50th.

There is no simpler test of the government–opposition hypothesis then the natural experiments offered by legislators leaving or entering the coalition, and on this evidence, we cannot claim that the divide between the government and the opposition is the fundamental determinant of roll-call voting behaviour in the Senate, certainly based on *membership* of the governing coalition. There is also the matter of informal coalitions, that is to say, a coalition formed by the Executive in order to pass particular votes or for particular periods. This point is discussed in more detail in §4.5 with reference to the government preference indication.

4.3   The Influence of the Party

In conjunction with the governing coalition hypothesis, there is support for party pressure on voting behaviour in the literature. These two hypotheses are of course linked, as the power of the president manifests itself through the party leaders, who in turn discipline their party (Figueiredo and Limongi, 2000). While party pressure may be felt in various ways, there is no doubt that a legislator's position on a recorded nominal vote is an easy way for a party to gauge the loyalty of its members. Measuring party influence can be difficult in legislative contexts such as those of the United States, as usually votes for which party pressure is suspected would have to be first identified, and then analysis can proceed; the rarity of party switching necessitates recourse to this method. However, the relatively high numbers of party switchers in Brazil makes a test of party influence much more straightforward. Similarly to the government-opposition hypothesis above, for the party influence hypothesis to find support, we would **not** expect to see that $\boldsymbol{x}_{i_2} - \boldsymbol{x}_{i_1} \approx 0$, i.e. the difference in ideal points for the party switcher i for party 1 and party 2 is close to zero.
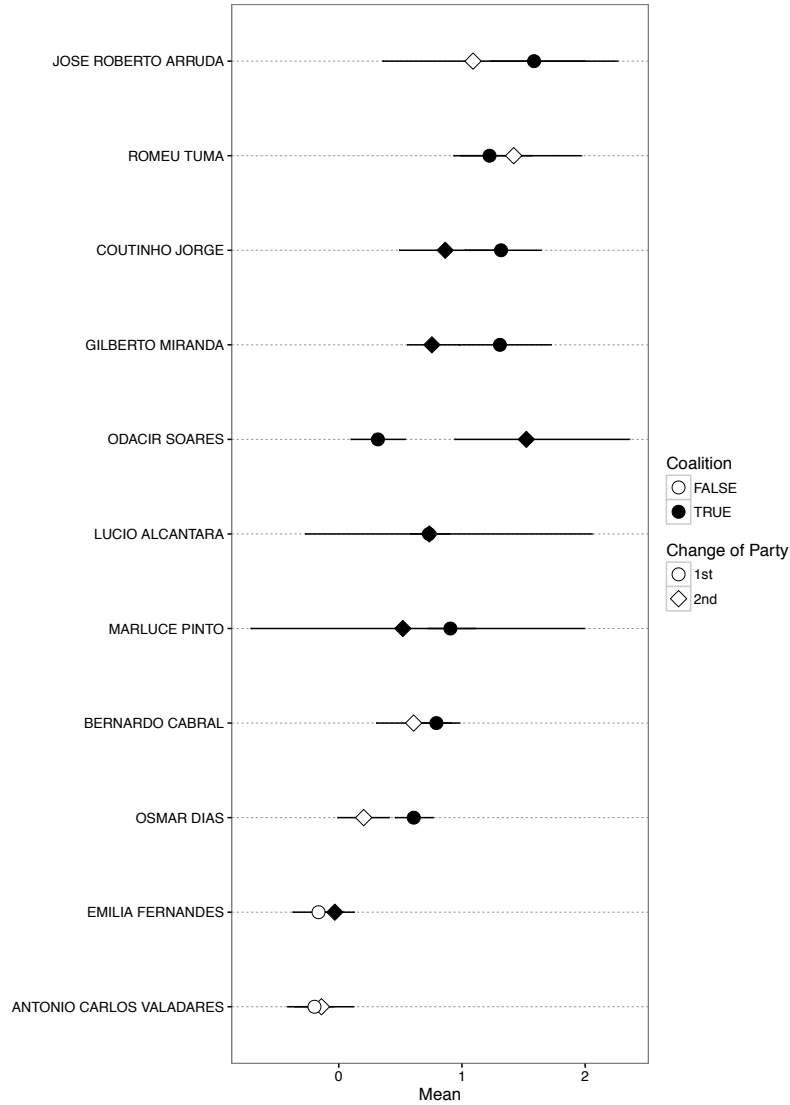
Figure 18: Ideal Points Changes for Party Switchers in the Senate, FHC I (first switch).

When we look at party switchers for Cardoso's first term in government, only the first switch involving Senators Odacir Soares (PTB → PFL) and Osmar Dias (PSDB → Independent) are significant, the latter barely so (see **Fig. 18**). Senators who switched party a second time (including to or from being an independent) are shown in **Figure 19** along with Senators Amorim and Tuma, who both made a third switch; none of these changes were significant. The change for Senator Soares involved two ideologically similar parties and yet we witness a significant move (although it should be noted that the PFL are regarded as being to the right of the PTB, hence this move does make ideological sense. See Power and Zucco Jr. (2009));

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(a) Second switch **(b)** Third switch

Figure 19: Ideal Points Changes for Party Switchers in the Senate, FHC I

Osmar Dias became independent yet did not record a change to the same degree. Some of the second and third switches are estimated with large credible intervals surrounding the $\boldsymbol{x}_i$: each time a senator switches party, there is a reduction in the number of votes that can be attributed to the same individual and so these large intervals are a consequence of this subdivision of the same senator. The two significant first switches also provide more evidence against the interpretation of θ as government–opposition: Soares' switch is by far the larger of the two, yet it did not involve leaving the government coalition, whereas Dias' did.

There is a similar pattern in Cardoso's second term. Senators Osmar Dias (PDT $\rightarrow$ PSDB) and Alvaro Dias (PDT $\rightarrow$ PSDB) display significant changes, although the distance between the 95% credible intervals for Senator Alvaro Dias is minuscule. For second and third switches, there are no significant changes. The above first switches were made in an ideologically rightward direction, both senators moving from the centre-left PDT to the centre-right PSDB. They both experience similar rightward shifts in their respective ideal points, as shown

in **Figure 20**. These changes also occur in the context of an opposition to government switch, meaning it is difficult to tell whether the changes are associated with the party or the coalition.

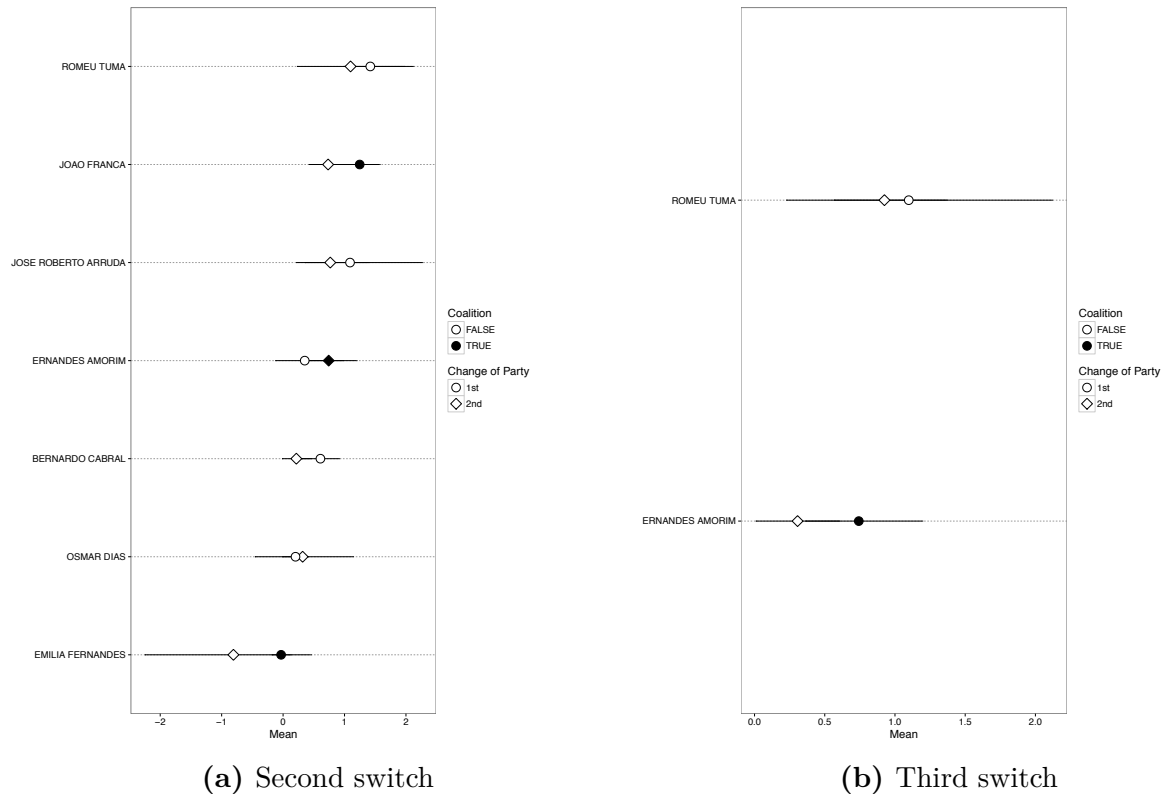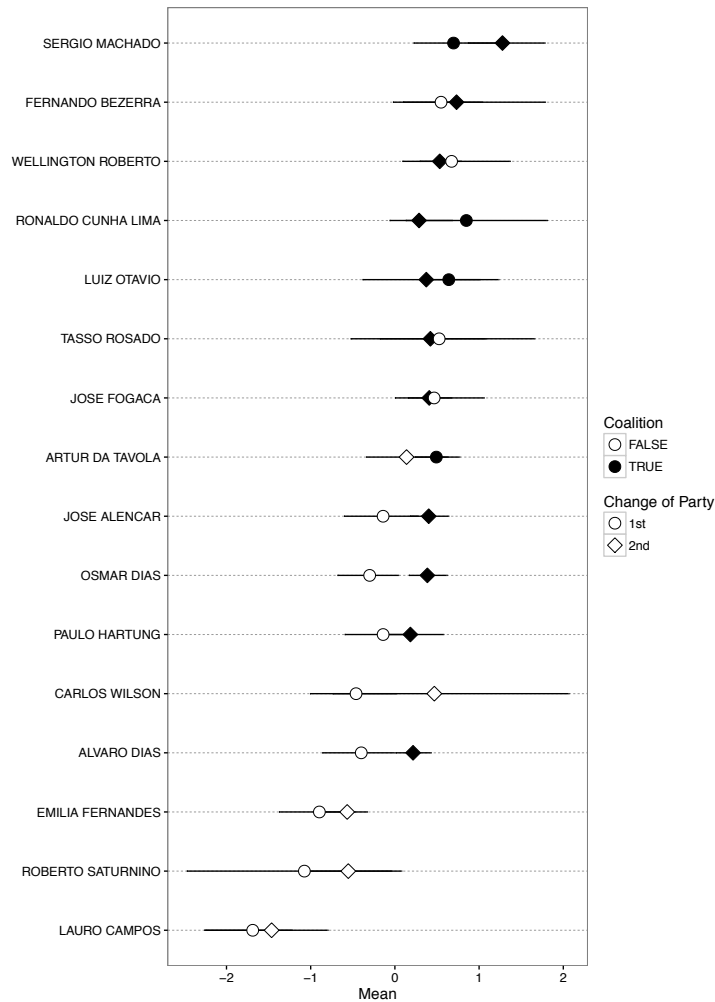**Figure 20:** Ideal Points Changes for Party Switchers in the Senate, FHC II (first switch).

Lula's first term contains no significant ideal point changes, either between parties of the same coalition status or of differing coalition status. Among these switchers is Senator Heloisa Helena, who left the PT, became independent, and then joined (formed, in fact) the PSOL, all the while maintaining almost identical ideal points, pointing to a strong ideological position.[45] In the 53rd legislature, Senator Cesar Borges, switching from the PFL/DEM to

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[45]Plots for Lula's terms are in the Dropbox folder for this thesis and are left out of the main document

the PR (and from the opposition to the government), experiences a leftward move in ideal point, significant at the 95% level. His is the only significant switch in Lula's second term.

After this analysis of both party and government influence, we can see that there is no overwhelming support for either hypothesis. Certainly, there are instances where we can reasonably point to the government–opposition divide as a factor, and similarly, although less so, for the influence of the party. Of course, it is perfectly reasonable to suppose that a government–opposition split is important in any legislature; after all, parties are in *opposition* for a reason. Nonetheless, the claim in the literature that θ is, without doubt, a scale between the government and the opposition cannot be sustained, regardless of whether the effect of Executive influence manifests itself directly through membership of the government coalition or indirectly through the power of party leaders. Some of the findings in these two sections support the view of Zucco Jr. and Lauderdale (2011), in that θ seems best characterised as a mixture of ideology and government pressures, both dove-tailing in importance over time and relative to the political context. However, the method of Zucco Jr. and Lauderdale (2011) consists of using positions on a scale gained from legislator surveys and transporting this scale to the Chamber to serve as the scale for the first dimension of a two-dimensional model. The second dimension is then estimated from the data, and Zucco Jr. and Lauderdale (2011) argue that this second dimension is a government–opposition scale. While this is an innovative way to test the government–opposition hypothesis, it does assume that the first dimension is an ideological scale. There is little evidence that ideological positions from legislator surveys are reproduced in nominal voting patterns, in fact, the support for the government–opposition hypothesis in the literature points to the opposite view. Ideology as a determinant is examined in more detail in §4.6 with reference to the discrimination parameter β of the two-parameter IRT model.

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because there are no significant switches and for reasons of space. The file is "PartySwitchersSenate.zip".
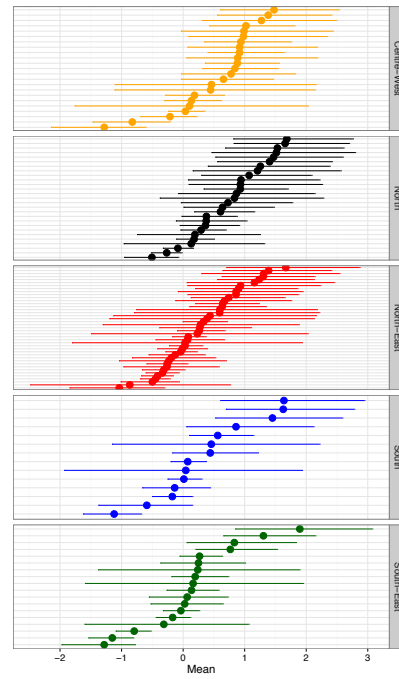
4.4 State and Regional Politics

As noted previously, regional and state pressures have received little support in the literature. Distinguishing between state/regional effects and general pressures reduces to a situation of seeing whether there are notable and consistent patterns when legislators are organised by region or state. A representative example is shown in **Figure 21**, which shows ideal points grouped by region for the Senate, for four presidents (Collor, Franco, Cardoso and Lula). As we can see from the plots, there are no consistent effects. When we do notice a pattern (for example, the lurch rightwards for the Centre-West during Cardoso's first term), it is accompanied by similar movements across all regions.

Looking just at the states, we still do not observe any patterns that would suggest the presence of state politics. As a representative example, **Figure 22** displays ideal points by the mean of each state in the Senate, for Cardoso's first and Lula's second terms. There are some, such as Rio de Janeiro, that have a tendency to be left-leaning, but this is not a strong pattern. If we rank the states by the number of times that they have the most leftward ideal-point mean, over all legislatures, we do observe this tendency for the south-eastern and southern states to rank among the furthest left (see **Table 12**). The ranking of states on the high positive end of the scale is less clear-cut though, as many states show up a low number of times, shown in **Table 13**. The presence of Sergipe in both tables, as well as the southern state of Paraná in the second, caution against making inferences from such a simple ranking of the states. Nevertheless, even from this brief analysis, it is clear that state and regional pressures appear to play little role in nominal voting patterns, which is a finding supported in the multilevel IRT approach of the next section, which seeks to analyse these regional variables through regression methods. Given the constitutional purpose of the Senate, this continues to be an area that should be explored in more detail in future research.
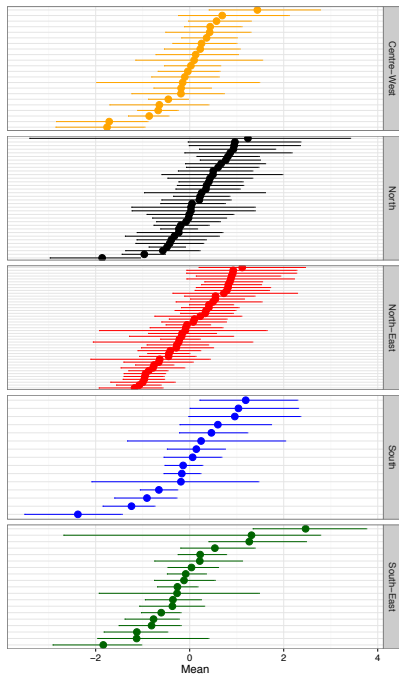
(a) Collor Presidency

(b) Franco Presidency
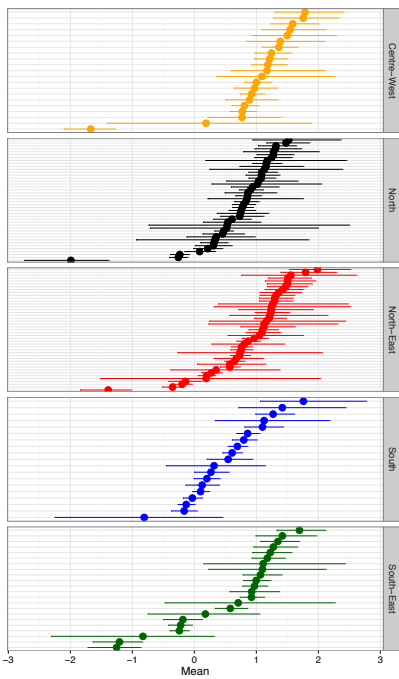
(c) Cardoso I
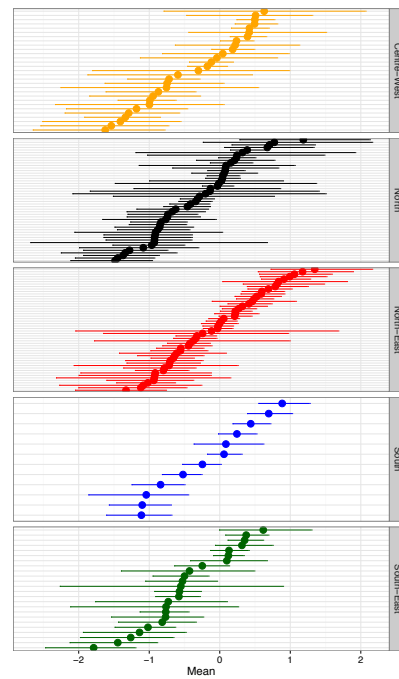
(d) Lula I

Figure 21: Regional Politics, selected legislatures
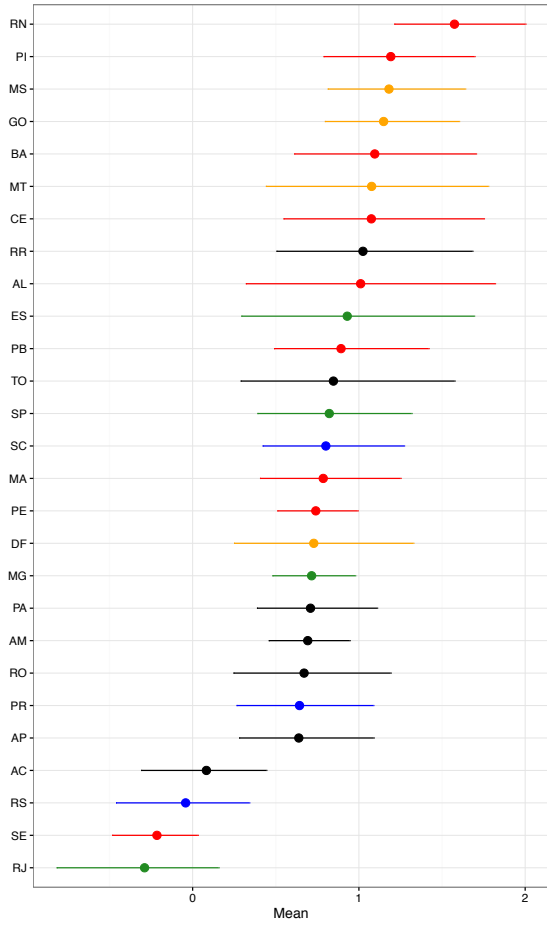
(a) FHC I
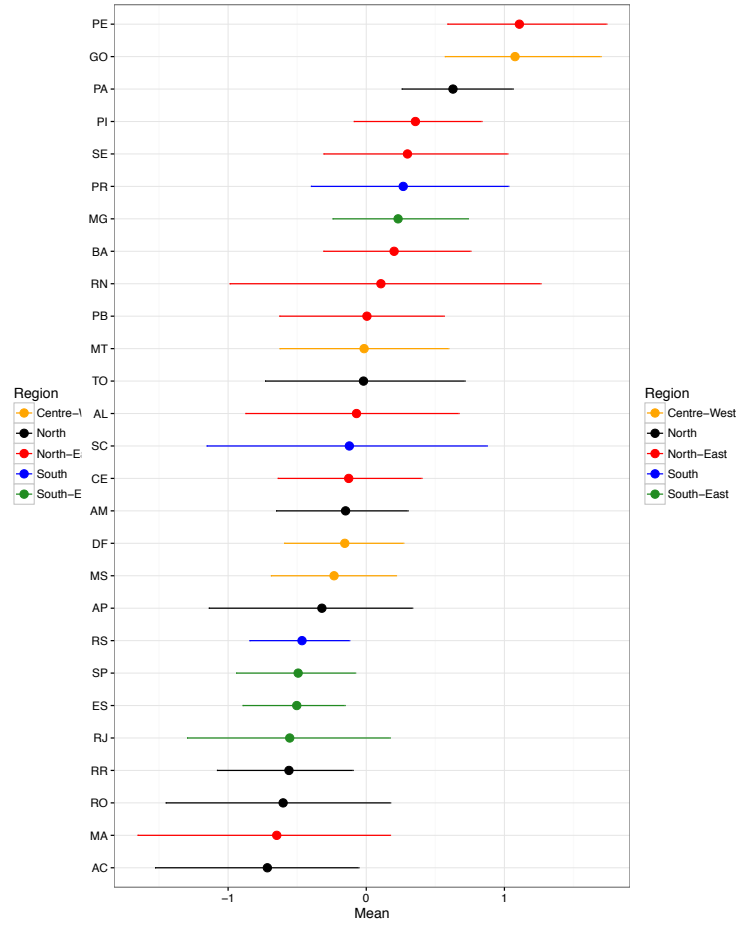
(b) Lula II

Figure 22: State Politics, Cardoso I and Lula II.

81

Table 13: Number of times a state is ranked among the three furthest left ideal points by state means in the Senate, 1989-2010.

State	Tally
Rio Grande do Sul	5
Rio de Janeiro	4
São Paulo	3
Sergipe	2

Table 14: Number of times a state is ranked among the six furthest right ideal points by state means in the Senate, 1989-2010.

State	Tally
Piauí	4
Sergipe	4
Tocantins	3
Amapá	3
Rio Grande do Norte	3
Paraná	3
Pará	3
Maranhão	3

4.5 Examining θ using a Multilevel IRT model

Of course, there are other ways to examine these hypotheses. The simplest way is to run a linear regression with the outcome variable as the ideal point $\boldsymbol{x}_i$ of each legislator. To avoid the 'errors-in-variables' problem raised by Clinton et al. (2001) and others, I include this linear regression in a multilevel Bayesian IRT model. The model has a simple extension to the basic Bayesian IRT model specified in §2.2, where the ideal point $\boldsymbol{x}_i$ is the basis for a higher level:

$$y_{ij} = \beta_j \boldsymbol{x}_i - \alpha_j;$$
$$\boldsymbol{x}_i \sim \mathcal{N}(\mu_x, \sigma),$$

where μ_x is a linear function of eleven dummy predictor variables:

$$\boldsymbol{\mu}_i = \gamma_0 + \gamma_1 \text{GOVERNMENT}_i + \gamma_2 \text{RIGHT}_i + \gamma_3 \text{LEFT}_i + \gamma_4 \text{INDICATION}_i + \gamma_5 \text{SUPLENTE}_i + \gamma_6 \text{FP}_i +$$
$$\gamma_7 \text{CENTREWEST}_i + \gamma_8 \text{SOUTH}_i + \gamma_9 \text{SOUTHEAST}_i + \gamma_{10} \text{NORTHEAST}_i + \gamma_{11} \text{NORTH}_i.$$

GOVERNMENT refers to membership of the governing coalition; RIGHT and LEFT indicate that legislator i is a member of a right-wing or left-wing party respectively[46]; INDICATION refers to the vote preference indicated by the government, SUPLENTE to whether the senator is a titular or a suplente, and FP denotes foreign policy votes; the remaining variables are indicators of the region that the senator's state belongs to. This model also allows us to use all the votes, which is advantageous in terms of the reliability of the estimates, while taking a look at how foreign policy votes might affect a senator's ideal point.

The results for Lula's two terms in government are shown in **Figure 23**. The red lines show 80% credible intervals and the thin black lines show 95% intervals of the highest density

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[46]These parties are coded as such based on Power and Zucco Jr. (2009). Centrists are coded zero for both variables.

(a) 52nd Legislature **(b)** 53rd Legislature
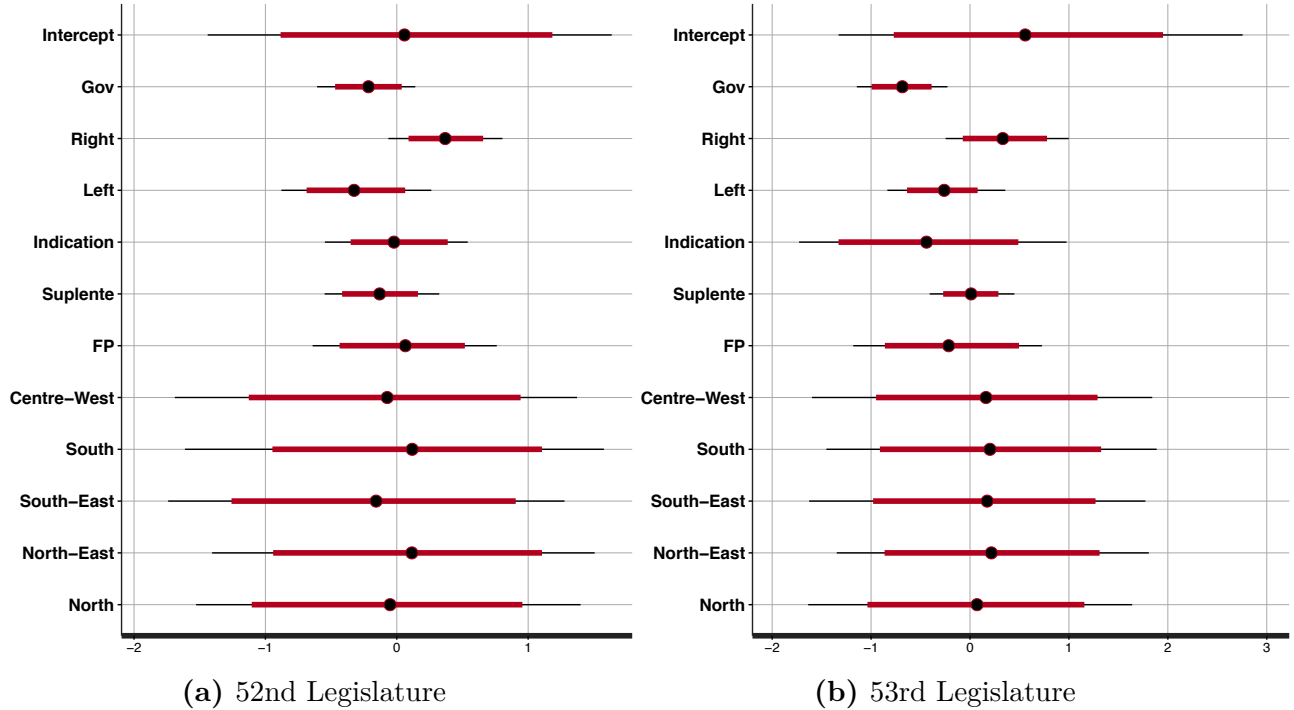
Figure 23: Coefficients, Multilevel IRT model, Lula Presidencies. Lines show 80 (red) and 95 percent credible intervals (black).

region for each parameter.[47] The x-axis in each of these plots is the range of the ideal points $\boldsymbol{x}_i$ for the legislature shown. The intercept is not especially useful; although zero values for all predictors are possible, the value of $\boldsymbol{x}$ when all γ are zero is equivalent to an ideal point for an opposition legislator from a centrist party and no particular region, and so the intercept does not simply represent the mean value for ideal points for the Senate, nor an ideal point absent the pressures indicated by the predictor variables. The mean is easily calculated to serve as a reference point, nonetheless. For the 52nd legislature it is 0.018, close to the mean intercept value, and for the 53rd -0.067, which is far from the intercept mean.

Firstly, it is evident that regional factors possess such wide variation that they are of little consequence. This finding is the same across all legislatures, as can be seen in the plots over the next few pages. Therefore, we can discount regional pressures as an important predictor of an ideal point value, at least in this form, supporting the analysis from the previous section.

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[47]These plots were produced by the `plot()` command of the package `rstan` (Stan Development Team, 2015).

Other means of examining these pressures are discussed in §5.2. As for foreign policy, FP is associated with ideal points close to the mean value in both legislatures. Since this is where we find the president, as was noted in §4.1, this suggests a tendency for supporting the Executive in foreign policy matters during Lula's terms in government. Whether this can be construed as evidence for or against 'abdication/delegation' arguments is not clear. It certainly seems to suggest support for the argument, however, this discussion is considered in more detail in §5.1 and §4.7.

In the 53rd legislature, the effect of GOVERNMENT (plotted as 'Gov') is comparatively stronger, with reference to LEFT, than in the 52nd, suggesting that Lula's change of strategy to a more Cardoso-like 'wholesale' coalition (Samuels, 2006) reinforced the power of the coalition. The finding of Neiva and Izumi (2012) regarding suplentes' proclivity towards voting for the Executive is supported in Lula's first term: being a suplente is related to a move left of the mean x_i value towards the value of GOVERNMENT, although SUPLENTE makes little difference in Lula's second term.

Expanding the scope to consider all legislatures (**Figs. 24** & **25**), these multilevel models once again present us with the difficulty of separating the government–opposition divide from the right- and left-wing nature of the opposing coalitions: being from a right-wing or left-wing party is a strong predictor of a right or left position, however, being in the government coalition produces much the same effect. One other way to try and separate the two influences is to assess INDICATION, which is coded 1 for a government 'Yes' position. This variable simplifies the distinction between the government coalition and the influence of the party or ideology, as support for the Executive is simple: either the senators follow the government indication of a preference for the outcome of a vote and vote with the Executive, or they don't, regardless of party or coalition status.

Surprisingly, INDICATION predicts centrist positions; it is not associated with rightward moves during Cardoso's time, nor a leftward move in the 52nd legislature, and has a large variation in

(a) 50th Legislature

(b) 51st Legislature
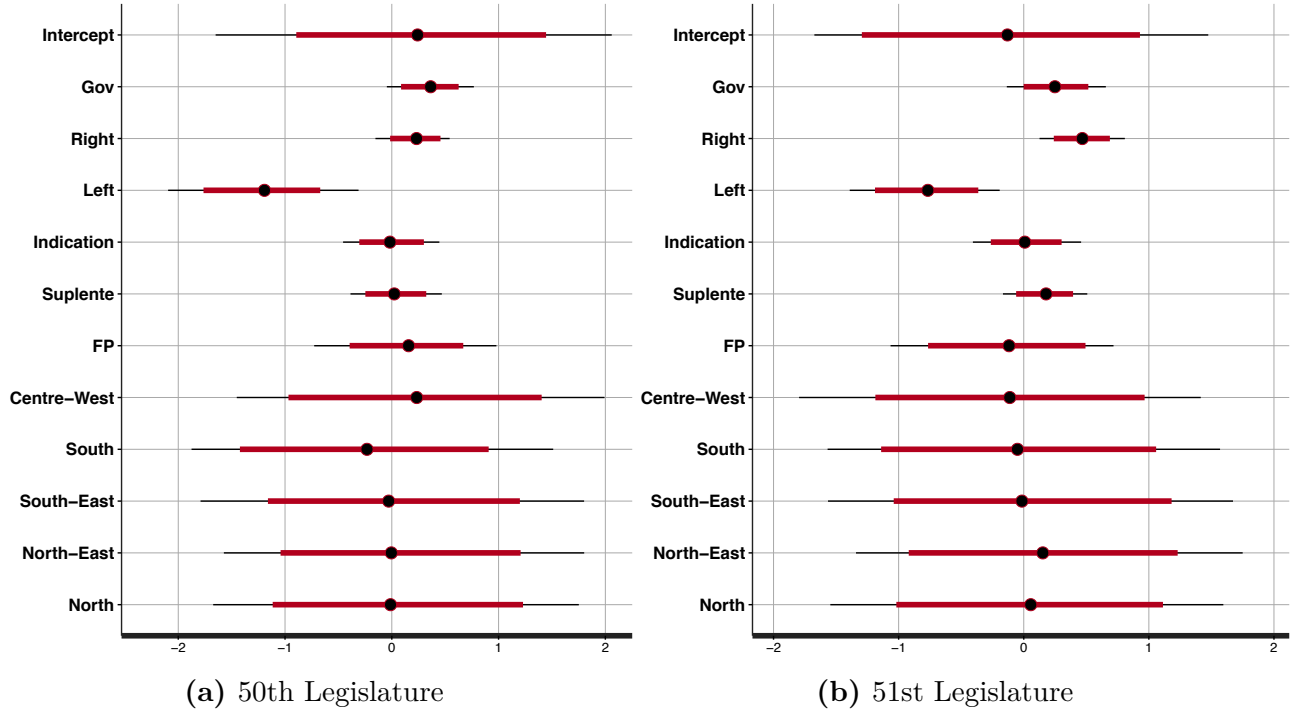
Figure 24: Coefficients, Multilevel IRT model, Cardoso Presidencies.

the 53rd, which is consistent with the findings from the basic unidimensional model presented earlier. In other words, absolute loyalty to the Executive results in ideal points in the centre of the policy space, as was seen with the presidential ideal points in the earlier discussion. This is an interesting finding for how we think about the content of θ. Claiming that voting behaviour is determined solely by a government–opposition divide implies that loyalty to the governing coalition is of high importance. Indeed, de Freitas et al. (2012) and Izumi (2012) show very high correlation statistics between support for the government and the ideal point scale (pages 17 and 34, respectively). In other words, a move towards 1 is associated with high support for the government in a right-wing presidency, whereas a move towards -1 is associated with high support for the government in a left-wing presidency.[48] However, these claims appear to confound ideology and government influence. The president, who is the most loyal 'legislator' in the database due to the manner in which his ideal point is produced, repeatedly turns up in the middle of the scale, with the exception of Presidents

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[48]These are NOMINATE scores and therefore -1 and 1 represent the two extremes of the scale.

Collor and Franco. Hence, loyalty to the government *cannot* be the sole substance of θ, for if so, the president would always be located at one extreme, with the opposition at the other. Then the claims of Izumi (2012) and de Freitas et al. (2012) would be correct: a move to -1 or 1 would indeed represent a government–opposition divide. However, we observe the president in the middle of the policy space for Cardoso and Lula, which the findings regarding INDICATION support: loyalty to the government coalition is not associated with movements to the right or the left of the policy space, it is related to centrist positions in almost all legislatures, suggesting ideology is the remaining factor that, along with the government–opposition dynamic, drives separation along θ.

Of the other variables, RIGHT and LEFT are again associated with movement in these directions for Cardoso's terms, but this is not the case for the three earlier presidencies. SUPLENTE is related once more to a centrist position, suggesting that suplentes are more likely to be loyal to the Executive. Foreign policy is linked to a centrist position close to the mean for the 50th legislature (0.306 for the 51st, and 0.547 for the 50th), although in Cardoso's second term, FP is associated with a move away from the government and the mean and towards the left, however, the credible intervals are quite wide. Being from a left-wing party is a strong predictor of a negative ideal point, however, the ideological coherence of the Cardoso coalitions, coupled with the unity of the PT in the Senate at this time make it difficult to ascertain if this effect is down to ideology or opposition.

Using this multilevel approach has allowed us to see more clearly the substantive content of θ. Of the hypotheses posited throughout this text, we find most support for a mixture of ideology and the government–opposition divide, which supports the work of Zucco Jr. and Lauderdale (2011) for the Chamber of Deputies. However, Zucco Jr. and Lauderdale (2011) differ from the rest of the literature in arguing for the presence of two dimensions to the policy space, raising the possibility that we may see foreign-policy themes such as trade policy discriminating on a second dimension, as in Jackman (2001). This discussion of dimensionality is taken up in the next section.
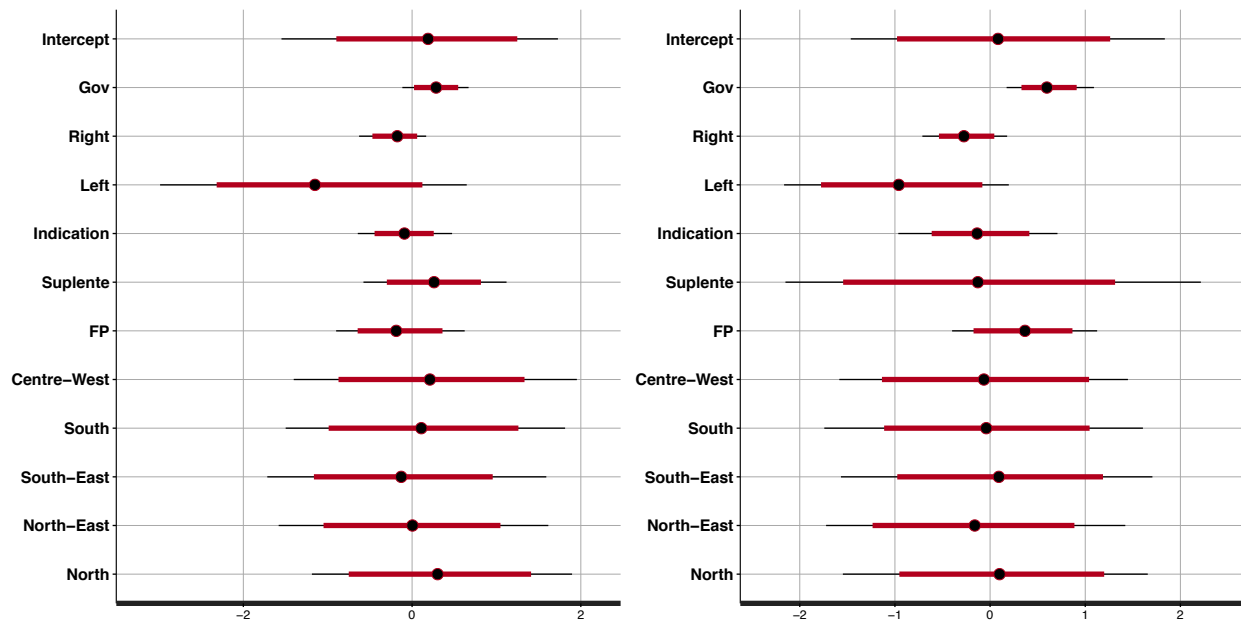
(a) Franco Presidency

(b) Collor Presidency
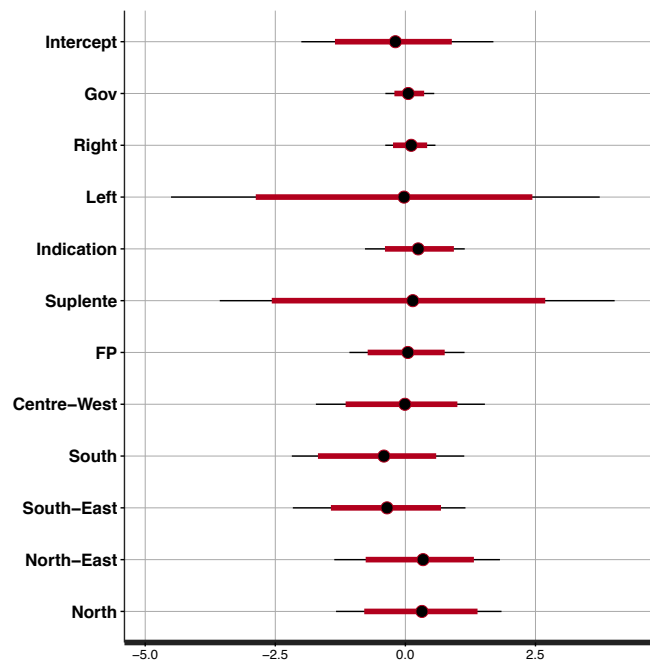
(c) Sarney Presidency

Figure 25: Coefficients, Multilevel IRT model, 48th and 49th Legislatures.

4.6   Dimensionality

A corollary of the hypothesis that θ is explained by only the government–coalition divide is that the policy space is unidimensional. As mentioned, some in the literature have argued for a second dimension in Brazilian legislative politics (Zucco Jr. and Lauderdale, 2011), which raises interesting possibilities about the discrimination of foreign policy issues on a second or higher dimension. In order to explore these ideas and to see if foreign policy does indeed discriminate on a separate dimension to domestic policy, I analyse the dimensionality of θ in the Senate. This is not an especially straightforward matter, and as Lauderdale and Clark (2014) note, there is no 'correct' answer to the number of dimensions, as it is a substantive matter and not a statistical one (Poole, 2005).

We can ascertain dimensionality through skree plots, percentage correctly predicted statistics (PCP), or the discrimination parameter. PCP statistics for unidimensional models of the U.S. houses of legislature are usually in the region of 85-95%, indicating that a one-dimensional model fits these cases well. For the Brazilian Senate, we observe get the curious finding that PCP can get worse as we move to a second dimension, as shown in **Table 15**.[49]

Table 15: Percentage Predicted Correctly

Presidency	One Dimensional Model (%)	Two Dimensional Model (%)
Sarney	78.91	81.46 / 79.65
Collor	86.02	83.34 / 78.55
Franco	82.68	82.35 / 80.26
Cardoso I	85.47	77.56 / 85.39
Cardoso II	85.98	84.66 / 85.56
Lula I	87.85	85.93 / 86.95
Lula II	88.28	82.69 / 86.66

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[49]There are two sets of statistics for the two-dimensional model because there were two different modelling strategies employed, as is explained below.

These PCP statistics strongly suggest that a one-dimensional model is a better fit to the data, nevertheless, if we look at the discrimination parameter statistics (**Table 16**), we see that there are many votes that do not discriminate on the first dimension, meaning fitting a two-dimensional model could be informative. However, fitting a two-dimensional model proved to be quite problematic. There are two general strategies for identifying an ideal-point model: either one constrains the position of the ideal points of certain legislators, or one constrains the position of certain vote item parameters α or β (this point is expanded upon in the Appendix, §7.3). The PCP statistics on the right-hand side of the slash for the two-dimensional model are from a model in which the ideal points were constrained, whereas the left-hand side shows a model in which β was constrained.

Table 16: Discrimination statistics for the Senate, one-dimensional model

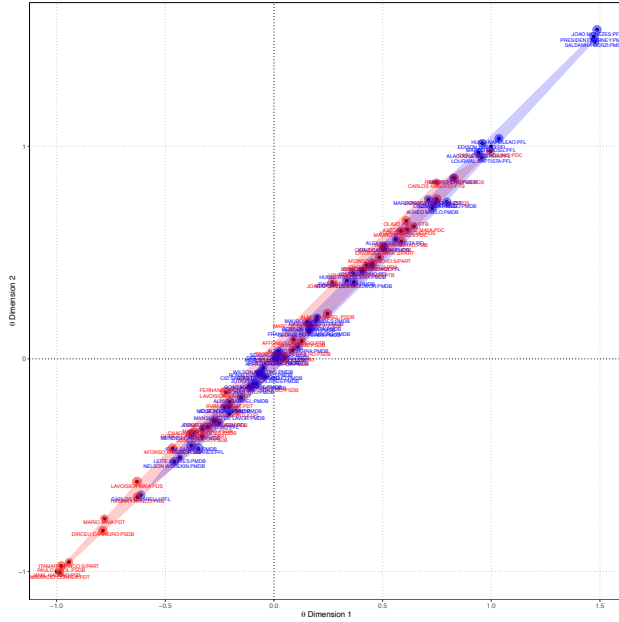| Legislature by Presidency	First Dimension Discrimination (%)	No Discrimination First Dimension (%)
Sarney	57.7	42.3
Collor	36.59	63.41
Franco	57.75	42.25
Cardoso I	33.46	18.29
Cardoso II	50.71	49.29
Lula I	34.23	65.77
Lula II	25.6	74.4

Figure 26: Distorted 2D Policy Space, Sarney Presidency.

In order to identify the model in two dimensions using the legislators, we need to form a triangle in the 2D space. The `NOMINATE` strategy for doing so assigns ideal points of the type ({-1,-1};{0, 0}; {1, 1}) to the three legislators. Doing so for the Senate can create unwanted distortions; since we do not have a good enough sense of where to place the constraints in the second dimension, the choice of constraints can warp the spread of the ideal points. In legislatures where there may be no strong second dimension, or for which we cannot be sure of the right senators to use as constraints, the ideal points become stretched out to reach the extremes set by the constraints chosen. This is a particular problem for legislatures in which we do not have a whole lot of votes or voters, such as Sarney's presidency, which is shown in **Figure 26**. The other strategy is that of Jackman (2001), in which we constrain the values of β for two votes, following an examination of the substantive content of the votes that do not discriminate in the first dimension, as shown in **Table 16**. In this way, we set the scale for the second dimension to some extent, and then see how the senators are positioned on such a scale. Examining the non-discriminating votes did not result in the straightforward 'mirror-image' votes found by Jackman (2001, p.235). (**Table 17** shows the proposals chosen as constraints.) As can be noted, there were almost no foreign policy themes chosen. Foreign policy themes do not discriminate in a consistent fashion across the two dimensions: at times, even the same proposal can discriminate in two different dimensions. The majority of foreign policy votes discriminated in the first dimension, which, as we have seen, appears to be a mixture of ideology and government influence.

Table 17: Votes chosen as constraints on the discrimination parameter.

Presidency	Proposals	Vote Numbers	Content
Sarney	PRS0003/89	1989013; 1989021	Adapt the internal rules of the Senate to the new Constitution
Collor	PEC0006/91	1991040; 1991041	Deals with tax on Petroleum
Franco	PLC0001/93	1992070; 1992071	Election norms
Cardoso I	PRS0149/97	1997098; 1997099	Deals with how states pay back loans and taxes
Cardoso II	PLS0338/99	2000060; 2000061	Rural Insurance system
Lula I	PEC0009/06	2006020; 2006021	Lessen the financial burden on municipalities with regard to providing basic education, returning it to the Union.
Lula II	PDS0090/08 PDS0139/08	2008016 2009011	UN Convention on the Rights of Persons with Disabilities; UN Optional Protocol to the International Covenant on Civil and Political Rights

The only legislature for which it seemed reasonable to use foreign-policy related proposals as constraints was the 53rd, for which two UN Convention proposals were used, as shown in **Table 17**.[50] The government vote preference for both votes was 'Yes', allowing us to rule out the government–opposition divide as a confounding factor. β on the Convention on the rights of persons with disabilities was given a negative constraint, whereas the Optional Protocol to the International Covenant on Civil and Political Rights was constrained to lie on the positive side of the y-axis; the former received more support than the latter. As we can see from **Figure 27**, the senators are grouped mainly according to the x-axis; there is little or no difference between the government coalition and the opposition on the second dimension, suggesting that these foreign policy proposals lack the capacity to distinguish well between

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[50]'Vote Numbers' refers to the number of the vote in the CEBRAP database.
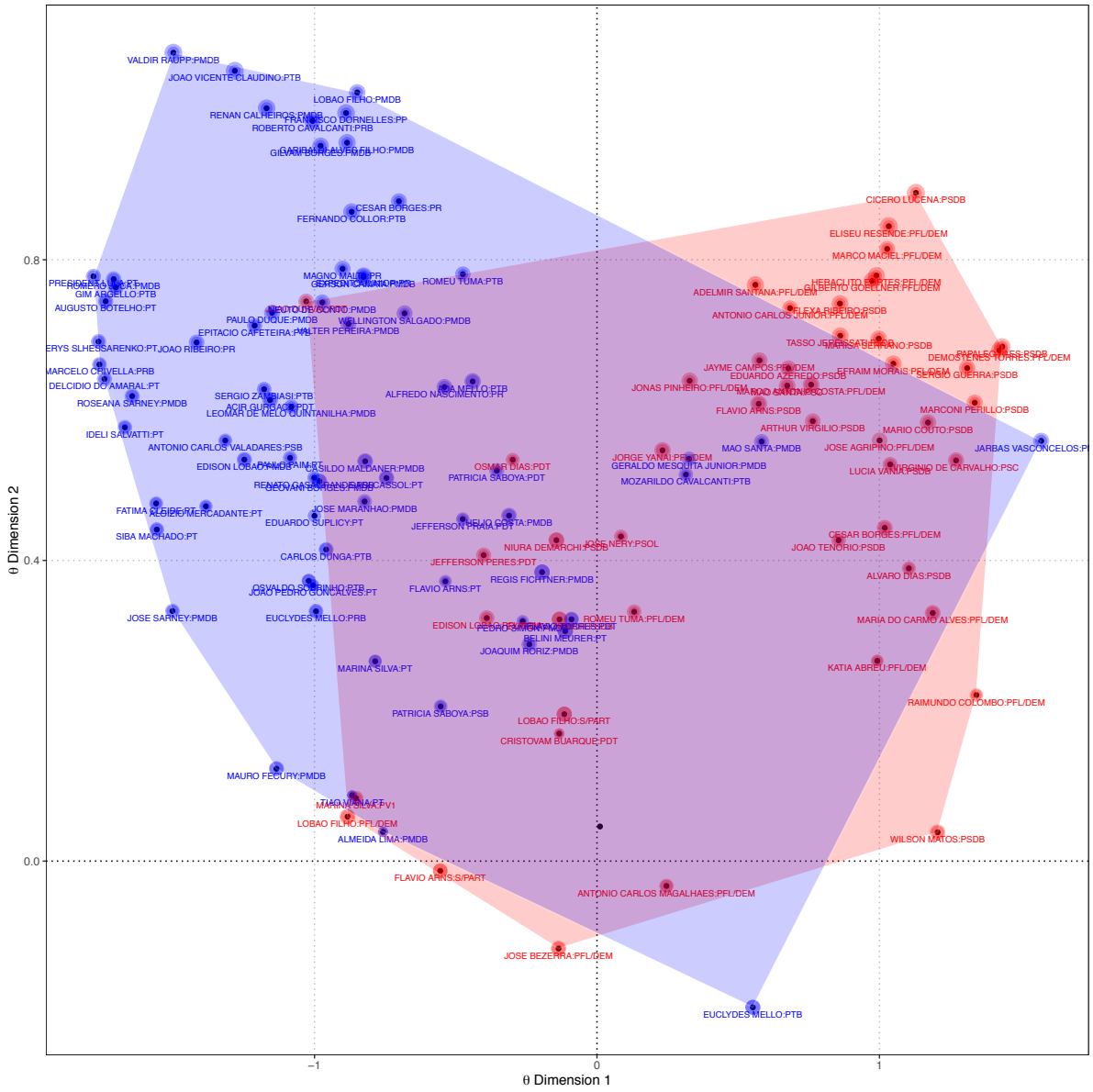
Figure 27: Two-Dimensional Model, 53rd legislature. The blue polygon marks the government coalition and the red the opposition.

the senators, which is no surprise, given that international treaties of this sort are routinely passed with a high percentage of support. It may also indicate a poor choice of constraints, as there is no clear theoretical ideological scale that would place these proposals at opposite ends. Nevertheless, they were received differently by the senators and as such formed part of my educated guess as to the content of the second dimension.
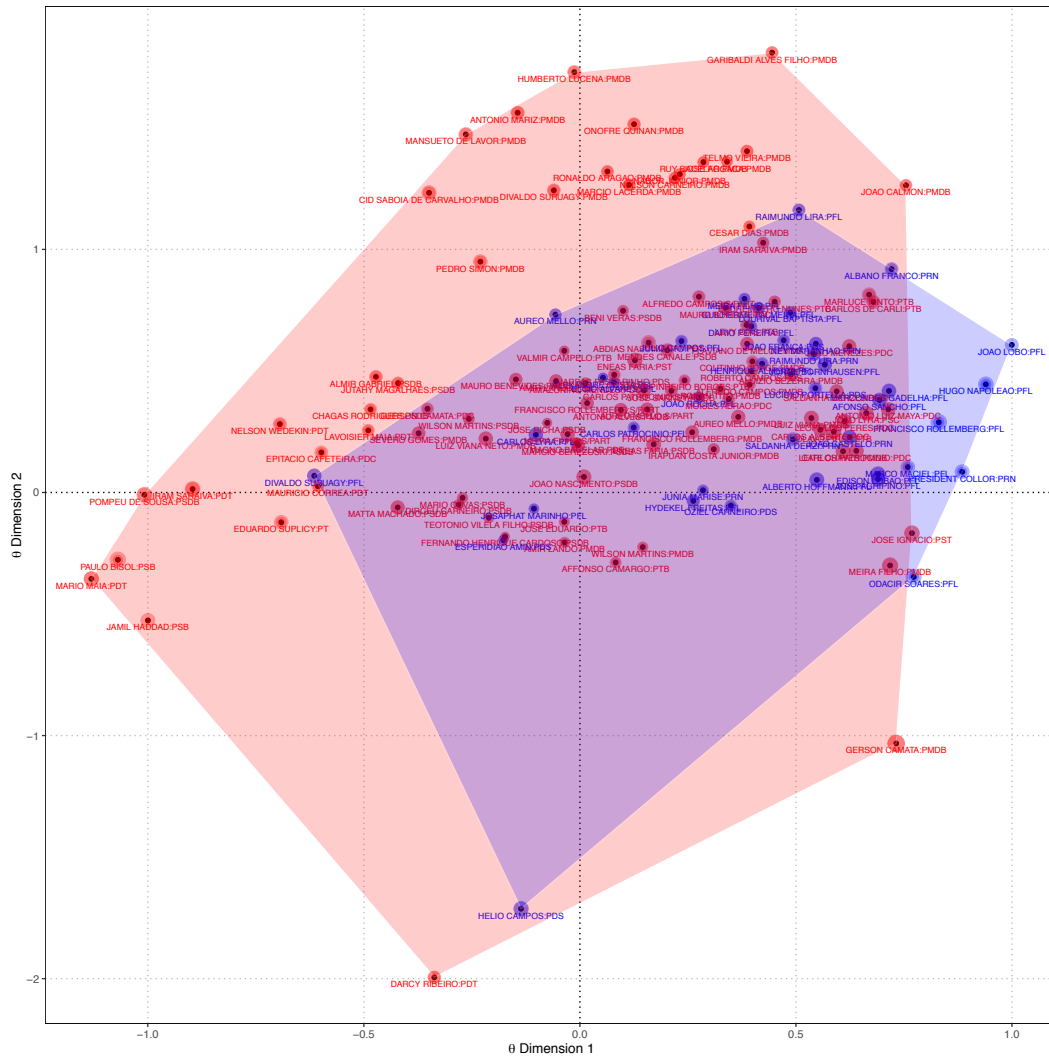
Figure 28: Ideal Points in 2 Dimension, Collor Presidency.

Regarding other periods, the results from these models using the two different methods were markedly different for all presidencies with the exception of Collor, suggesting his was the only presidency to have an important second dimension, a finding that supports other work

in the literature (de Freitas et al., 2012).[51] Looking at **Figure 28**, we see that senators in fact spread further on the second dimension than the first. The values of β are set in such a way so that a positive position towards the top of the plot in this dimension signifies support for the Collor presidency regarding tax, whereas negative positions relate to opposition on the theme; neither dimension clearly separates the opposition from the government, although Collor's extreme position relates to one dimension only, suggesting the second is unrelated to his presidential strategy and thus is most likely ideological in nature (his ideal point is one of the furthest right at y=0).

The other legislatures are not consistent across the two methods, leaving us with a choice of constraining legislators in a dimension where we cannot be sure of their position *a priori*, or using the β-constraining method of Jackman (2001), which depends on the existence of proposals that can discriminate among the legislators, which may not be the case, as we saw for the 53rd legislature. This tension between the two methods (see the Appendix, §7.7) and the higher PCP statistics for the unidimensional model suggest that the Senate is best characterised by a unidimensional policy space, with the exception of Collor's presidency. Since his was an 'anti-party' presidency which results in an extreme position for the presidential ideal point, it is reasonable to see the first dimension as a government–opposition divide and the second as an ideological scale. For the other terms, a two-dimensional model does not appear to help in understanding the content of θ in the Senate, unlike the Chamber of Deputies (Zucco Jr. and Lauderdale, 2011). Since we do not observe a difference between foreign policy and domestic policy in terms of the dimensions, it is worth exploring if we observe differences in how these themes discriminate on the first dimension, for which the parameter β may also be used, as is done in the next section.

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[51]Although this finding was made in relation the 49th legislature as a whole, and the authors argue that this can therefore be explained by the presence of two presidents and an impeachment scandal. Looking at the period by presidency instead of legislature, we can see that this finding is related to Collor's specific period of governing as opposed to the 49th legislature as such.

4.7 Assessing Ideology using the Discrimination Parameter β

The discrimination parameter is useful for more than just assessing the dimensionality of the policy space, as it can also tell us which proposals possess the capacity to discriminate among legislators. It is the absolute value of β that is important: high values indicate a vote that possessed the capacity to distinguish between legislators, whereas values of β near zero demonstrate that the legislators were indifferent to the outcome of the vote. Legislators with negative $\boldsymbol{x}$ values are predicted to have a higher probability of voting for proposals with high negative β values; the inverse is true for legislators with positive values on the scale of θ.
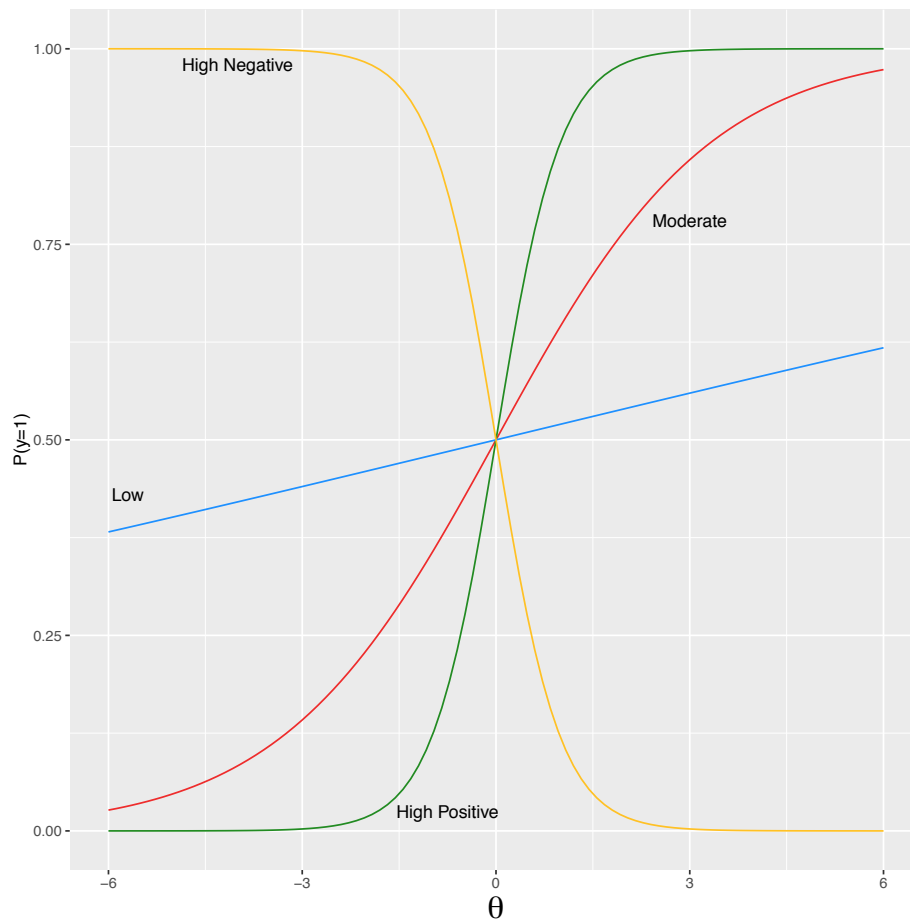

Figure 29: Interpretation of the Discrimination Parameter.

Figure 29 displays some of the curves possible with differing values of the discrimination parameter. For low values near zero, the blue line demonstrates the fact that the probability of voting 'Yes' to such a low-valued proposal does not significantly change as we move across the scale of θ. The votes that cause a predicted separation of the senators along θ are those with high-positive (green line) and high-negative (gold line) β values. As we can see, these high values predict a distinct separation between those strongly predicted to vote 'Yes' and 'No'. Note that it is the difficulty parameter α that controls where on the θ scale that these lines change from a positive prediction to a negative one. In this example, α is set to zero.

Given that we have seen that θ is primarily a mixture between ideology and government influence, this would suggest that large negative values of β should belong to votes for which left-wing senators are predicted to support with higher probability, and vice-versa for right-wing senators. Themes that we find with low values of β are usually associated with these issues belonging to a higher dimension (Jackman, 2001); however, the underlying idea is that these proposals fail to distinguish between the voters. Since we have seen that there is little evidence to suppose a second dimension in the Senate, this would suggest that themes with values of β close to zero are those for which the senators are simply indifferent, with no higher-dimension interpretation necessary. Hence, testable hypotheses of the ideological content of θ is possible using this parameter: high negative values of β should correspond to proposals for which voting 'Yes' is consistent with common understandings of being left-wing, whereas high positive values of β should be associated with proposals for which voting 'Yes' is consistent with normal interpretations of a right-wing ideology. If the proposals for which we observe large absolute values of β are not consistent with commonly-understood interpretations of the political left and right, it is evidence that θ is not solely an ideological space, supporting the finding so far of a mixed ideology/government influence space. It also allows us to examine the hypothesis that foreign policy votes provoke disinterest among senators, in other words, they delegate or abdicate to the Executive, which is visible by β values close to zero for these themes.

Table 18 presents the topics that discriminate exclusively either far to the left ($\beta \leq -2.5$) or far to the right ($\beta \geq 2.5$). There are no exclusive left-wing topics in Sarney's tenure, nor are there on the right for Franco.

Table 18: Topics that discriminate exclusively on the right/left by presidency.

Presidency	Left-wing Topics	Right-wing Topics
Sarney	(None)	Public Sector, Political Norms, Government
Collor	Social Security	Property, Public Sector, Labour, Procedural
Franco	Elections, Commerce	(None)
Cardoso I	Elections, Judiciary	Telecommunications, Labour, Government, Military, Monetary Policy, Commerce, National Program, Social Affairs
Cardoso II	Social Affairs, Banking, Education, Government, Health National Program,	States, Labour, Political Norms, Telecommunications, Trade, Elections, Social Security
Lula I	Infrastructure, Education, Security, Government, Trade, Procedural	Natural Resources
Lula II	Budgetary, Industry, National Program, Taxation, Public Sector Int'l Relations, Trade	Education, Infrastructure, Government, Banking

It is reasonable to see patterns of left–right ideology in the topics displayed above: 'Social Security', 'National Program', 'Health', 'Government' all line up on the left, while 'Banking', 'Trade', 'Military' and 'Property' all line up on the right. Obviously however, we need more information in order to know whether these topics indicate proposals that were supportive or not of the substantive content: 'National Program' appears on the right and left, as does 'Government', for example, but these might be left or right-wing proposals in terms of their content. As the focus in this thesis is on foreign policy, I leave an in-depth examination of

how ideology on other topics relates to θ for future work; this discussion in relation to foreign policy is undertaken here and in the next chapter.[52] For now, it suffices to observe that we do observe a potential ideological scale for θ; if we did not, the same topics would either discriminate on both sides of the scale or be indistinguishable from zero; that is to say, we would observe few or no exclusively-discriminating themes on either side of the table.

In terms of foreign policy themes, we can see from the table that these are related to the government in power. 'Trade' and 'International Relations' have high-negative β values during Lula's terms, indicating that votes on these themes received more support from left-wing senators: hardly surprising given that the Executive is the source of most of these proposals. 'Trade' switches over to the right side during Cardoso's time, where we also find 'Monetary Policy' and 'Military'. Hence, right-wing senators are predicted to support votes on these themes during Cardoso's presidencies. It is not particularly surprising to find the themes of 'Monetary Policy' and 'Military' on the right: the Brazilian right is known for connections to the military, and high-positive values for 'Monetary Policy' suggest support for the Executive during this period, in which there were periods of crisis and reform related to the theme.

Table 19 provides data on the question relating to abdication and delegation. This debate is more commonly framed as 'abdication vs. delegation' (e.g. Lemos, 2010). However, in the roll-call context, both ideas predict similar behaviour in terms of vote outcomes: 'delegation' assumes that the senators lack either informational or institutional capability in foreign policy matters and so delegate to the more capable and informed Executive by voting *en masse* for presidential foreign policy initiatives; 'abdication' assumes the same non-involvement, albeit with a more negative connotation, both ending in the same voting outcome (i.e. passively supporting the Executive). The main difference lies in behaviour observed outside of nominal voting: behaviour relating to oversight (such as the nomination of heads of diplomatic

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[52]An examination of the β values for particular roll-calls, which are theoretically left-wing or right-wing in terms of content, is one possible avenue for research. Other possibilities are using β values on theoretically left or right-wing votes to create a scale in much the same way as was done for the second dimension in §4.6; the ideal points are then observed to see how legislators line up on the scale.

missions), perception (as gleaned from surveys of legislators), committee and budget output (Lemos, 2010); other behaviours may be observed in reservations stated and heated debate (Diniz, 2012). The revealed preferences that we obtain from nominal voting behaviour do not allow us the fine distinction between abdication and delegation; they are rolled into one, as the senators will either display behaviour typical of abdication/delegation on foreign policy votes (indifference) or will not. The discrimination parameter helps us to observe such behaviour: as mentioned, values close to zero for foreign policy themes indicate that these themes provoked indifference among the senators. I will use the term 'delegate' to refer to this debate; as we cannot separate the two notions using nominal voting only, I prefer the less judgemental phrase.

Table 19: Non-discriminating foreign policy themes across the presidencies. † There is a second dimensional element to Collor's presidency and so this presidency should be interpreted differently than the others.

Presidency	Foreign Policy Themes where β is indistinguishable from zero
Sarney	–
Collor	Trade; Monetary Policy; Military†
Franco	Military
Cardoso I	International Relations
Cardoso II	Security; Military
Lula I	International Relations; Military
Lula II	Security; Military

The pattern from Franco to Lula's second term is quite striking. Clearly, if senators do delegate in favour of the Executive, they do it with regard to matters of diplomacy, national security and the military. This finding suggests a division between the 'high politics' of these non-discriminating themes and the 'low politics' of trade and monetary policy, which do discriminate among senators. The delegation hypothesis is therefore contingent upon the type of foreign policy proposal being considered. On this evidence, senators do in fact delegate to

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the Executive in the areas of the military, diplomacy and national security. This also supports the 'Two-Presidents Thesis' described in §1.1 (Wildavsky, 1966), with the aforementioned caveat that this bipartisanship in foreign policy matters applies only to 'high politics'. This finding is in contrast to much of the literature, where evidence for bipartisanship with regard to foreign policy in Latin America has not been found (e.g. Ribeiro, 2012), but is in keeping with the literature on the United States (e.g. Prins and Marshall, 2001).

This analysis of the discrimination parameter also demonstrated the mixture of themes that we find with high and low values of β: we see no clear ideological continuum without further information on the content of the votes, nor is there a clear division in terms of left and right regarding the foreign policies that *do* discriminate along θ; we only see that there are certain topics that induce delegation/indifference, but that these are constant across legislatures, suggesting they may have little to do with ideology. One potential solution to this confusion is to estimate separate ideal points for each topic. In this way, we can see exactly how the senators differentiate across the themes, since the discrimination parameter only tells us if they do differentiate or not. Such an exercise is the subject of Chapter Five.

4.8   Summary

This chapter set out to discover the substantive content of the policy space, along with its dimensionality. All the main determinants of voting behaviour in the literature were examined as hypotheses. In keeping with the literature, little evidence was found to suppose that regional or state politics play a role. However, there were regional factors noted for some parties (particularly the PMDB) and for some issues; §5.2 takes a closer look at the constituency pressures that may influence voting behaviour. The hypothesis of a government–opposition divide as the sole content of θ can now be firmly rejected, with only 3 out of 55 of the natural experiments provided by coalition switching being statistically significant at the 95% level. Similarly, the influence of the party as the primary determinant of voting

behaviour found little support. Moving beyond party and coalition switching, a multilevel IRT model allowed us to examine further the posited determinants on voting behaviour. Arising from this analysis, support was found for θ being defined as a mixture of ideology and government influence; an attempt to separate the two and to examine ideology was made using the discrimination parameter of the Bayesian IRT model. This latter analysis showed quite clearly that there is quite strong evidence to support the hypothesis that senators delegate to the Executive in matters of diplomacy and national security. The parameter β was also employed to help resolve the issue of dimensionality. Although a clear answer to the question was not found, evidence points to one dimension being a better fit to the data, apart from Collor's term.

Considering the overall purpose of this thesis, an investigation of θ has revealed it to be a mixture of ideology and the government–opposition divide, which supports the findings of Zucco Jr. and Lauderdale (2011); however, the dimensionality of θ was judged to be one, disagreeing with Zucco Jr. and Lauderdale (2011) but agreeing with the work of Izumi (2012) and de Freitas et al. (2012). In terms of foreign policy, an analysis of β has shown that foreign policy is not a homogeneous area: some themes provoke discrimination among senators, others indifference. As we know that the Senate is formally comparable to the Chamber with the exception of the Cardoso presidencies (and less so the first term of Lula), this suggests that the view in the literature that the policy space in the Chamber is exclusively a government–opposition scale may need to be re-examined. The findings against bipartisanship in foreign policy matters may also need to be analysed again, as strong evidence points to its existence for 'high politics' in the Senate.

Two questions remain: if we can characterise θ as a policy space consisting of a government–opposition dynamic coupled with ideology, to what extent do we observe this for foreign policy? In other words, is $\theta_{\mathrm{FP}} = \theta_{\mathrm{DP}}$ true for the Senate? Analysis of β has shown us that certain themes appear to induce indifference from the senators. One way to extend this to the ideal points is to estimate separate ideal points for each topic, showing us whether certain

themes are associated with indifference, which will cause a grouping together in the middle of the policy space, or if the senators' ideal points spread out across the scale of θ, indicating that the senators are not indifferent to these themes, or in a foreign policy context, that they do not delegate to the Executive on these themes, which is done in the next Chapter.

5   Foreign Policies and Domestic Policies in the Senate

Previous work comparing foreign policy voting behaviour to domestic policy voting behaviour has focused on the Chamber of Deputies. This chapter extends the discussion to the Senate, offering a method of estimating separate ideal points for the topics concerned. This allows us to compare foreign policy themes to domestic policy themes using ideal points, and also to compare ideal points for sub-themes inside the foreign policy area.

The first section addresses the question of comparing foreign policy to domestic policy, and comparing sub-themes of foreign policy to one another. The subsequent section then introduces the idea of informal electoral districts for senators. Creating informal districts for the senators allows us to establish an explicit link between the senator and his/her constituency. As such, IPE theories on the suggested mechanism underlying the Rogowski/Putnam framework may be analysed, which to the best of my knowledge has not been done in Brazil before in this manner.

5.1   Comparing Foreign Policy to Domestic Policy

Voting behaviour on foreign policy themes has been analysed in the literature by separating foreign policy votes from domestic policy votes and then producing ideal points from the subset to compare either with previous work or the full set; as was previously noted, no differences between the two sets of ideal points have been found (e.g. Oliveira, 2013; Onuki et al., 2009).[53] I have employed a slightly different method for the current analysis, one that adapts the dynamic ideal point model of Martin and Quinn (2002). The dynamic model of

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[53]This method of comparison may seem similar to those discussed in Chapter Three. However, the problem of comparison here is lessened by the fact that these are a subset of the total number of votes for a particular legislature, and hence the legislators are the same and the subset is part of the whole. If the legislature in question has plenty of foreign policy votes, the comparison is not problematic. If not, there are valid concerns with this method. Other studies where ideal points on foreign policy matters are formally compared to other sources, such as ideological positions on a scale gained from surveys, are not valid formal comparisons (Bailey, 2007).

Martin and Quinn is a standard two-parameter Bayesian IRT model where the ideal points $\boldsymbol{x}_{it}$ of legislator i are allowed to vary over the time periods t. My approach is to let the ideal points vary over the topics k:

$$y_{ijk} = \boldsymbol{x}_{ik}\beta_j - \alpha_j,$$

with a 'base' ideal point that reflects the ideal point for senator i as in the simple unidimensional model.[54] To account for temporal dependence, the variance structure in the prior distribution for the ideal points in the dynamic model of Martin and Quinn is that of a 'random walk', where the best guess we can make about the value of $\boldsymbol{x}_i$ at time t is its value at time $t-1$:

$$\boldsymbol{x}_{it} \backsim \mathcal{N}(\boldsymbol{x}_{i,t-1}, \Delta_{\boldsymbol{x}_{ij}}),$$

where $\Delta_{\boldsymbol{x}_{ij}}$ is what Martin and Quinn (2002) term the 'evolution' variance parameter.[55] Since I have no *a priori* reason to think that topics are particularly dependent on one another or independent of each other, $\boldsymbol{x}_{ik}$ are given prior distributions with mean zero across all topics, and so are not related to $\boldsymbol{x}_{i,k-1}$.[56] Thus, every senator will have a separate ideal point for each topic, along with a base ideal point for comparison;[57] in this way, we achieve two things: first, we can open up 'foreign policy' to explore the various sub-themes inside the area, and second, we can compare these foreign policy themes directly with other themes. As studies in the literature have found no difference between voting on foreign policy themes and voting on domestic politics in the Chamber of Deputies (e.g. Ribeiro and Miranda, 2011; Oliveira, 2013), this model allows for an extension of the discussion of these findings to the Senate. In other words, we may also discuss the hypothesis that $\theta_{\text{FP}} = \theta_{\text{DP}}$ in the Senate by using this

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[54]This base ideal point is the same or very similar to that from the unidimensional models displayed in §4.1 and is analogous to having a separate constant ideal point in the dynamic model, which may not make much sense in that context but serves as a useful point of comparison here. It is not a composite of the ideal points across the k topics because the topics are assumed independent of one another.

[55]If $\Delta_{\boldsymbol{x}_{ij}} = 0$, this is the same as having fixed ideal points. As $\Delta_{\boldsymbol{x}_{ij}} \to \infty$, we get a model in which the $\boldsymbol{x}_{it}$ are independent across time. (Martin and Quinn, 2002, p.140)

[56]There well may be good reason to believe that some topics are related, however, for simplicity, I assumed independence. For work that does not need to focus on a smaller subset of the votes such as foreign policy, the topic models of Lauderdale and Clark (2014) or Gerrish and Blei (2012) may be better options.

[57]See §2.3 for details on how these votes were labelled as being of a certain topic.

model.

The model produces ideal points for all the topics present in a given legislature. Some topics cause the legislators to 'bunch together' in agreement: there is little controversy on these votes and so the senators are not separated spatially. Other votes cause a separation along the scale of θ, indicating that the topic in question caused disagreement and different senators are predicted to have quite different probabilities of voting yes. For us to find support for the hypothesis that $\theta_{\mathrm{FP}} = \theta_{\mathrm{DP}}$ in the Senate, we would have to observe similar probabilities of voting yes for all topics; in other words, similar spatial positions across domestic policy and foreign policy. The long-standing debate on abdication/delegation in foreign policy matters may also be (partially) analysed. As was discussed in the previous chapter, hypotheses of abdication and/or delegation reduce to the same empirical test using nominal votes. Either the senators display signs of indifference or their ideal points spread out along the scale, as is the case for the basic unidimensional model. Observing signs of indifference may be interpreted as support for the idea that senators delegate to the Executive; the distinction between abdication and delegation is not relevant here, nor is it possible to examine. The specific topic labels in the figures that relate to foreign policy are 'Military', 'International Relations', 'Monetary Policy' and 'Trade'. The latter two are the same as the categories described in §2.3, while 'Military' is the label for votes on the military and security, and 'International Relations' refers to the 'Diplomacy' category earlier described, as well as the authorisation by the Senate of loans from foreign agencies.

Starting with the Lula presidencies, we may notice a pattern that is consistent throughout the figures presented for this model: senators are indifferent to vote outcomes across a majority of the topics in all legislatures, indicating that there are a few key areas in every legislature that are the political battlegrounds. In Lula's first term (**Fig. 30**), there are only three: 'Labour', 'Natural Resources' and 'Public Sector'. While it may come as no surprise that the policy space of the first left-wing government in Brazil's history witnessed disagreement over labour and public sector issues, the disagreement evident over natural resources is unexpected.

Figure 30: Ideal Points by topic, Lula I.

Looking closer at the content of the specific proposals under this label, we can see that there is at least one proposal that could be expected to create spatial differentiation in an ideological space: MPV0144/03, which proposed the regulation of the energy sector, ostensibly seeking to improve the quality of service and protect consumers from high prices. Although this initiative– a key part of a larger project by Dilma Rousseff to construct a new model for the electric energy sector in Brazil– was originally supported by the Executive, the nominal vote was not; some 800 amendments by deputies and senators ended up disfiguring the original project and causing multiple delays in the passage of the bill (Ludmer, 2007). As such, it is a good example of the mix of determinants of voting behaviour that we observe. The opposition claimed that the proposal would place excessive demands on the industry and would weaken investor confidence in the sector (Ludmer, 2007), classically right-wing positions taken by

a right-wing opposition. That said, the overwhelming multitude of amendments and the delaying tactics of the opposition point to an opposition prepared to frustrate the government at any opportunity and hence support a government–opposition interpretation of θ; after all, the opposition could have just voted 'No'. The other proposals under this label also lend credence to this view, as the content of the other 'Natural Resources' proposals is not indicative of a classic right–left ideological split.[58]

Importantly for our purposes here, we do not see spatial differentiation on any foreign policy themes, only 'Trade' being ever so slightly less than totally bunched together. This strongly suggests that for this legislature, senators were indifferent to vote outcomes for foreign policy themed proposals. As such, the hypothesis that senators delegate to the Executive in foreign policy matters receives support from an analysis of this legislature. However, it is not correct to claim that $\theta_{\mathrm{FP}} = \theta_{\mathrm{DP}}$; clearly, it depends on the domestic policy being considered. Moving to Lula's second term (**Fig. 31**), we see that only proposals under the label 'Trade' have the capacity to distinguish between senators along θ. The substance of the two 'Trade' proposals show a strong tendency towards free trade; their content is shown in **Table 20**. As can be seen from the table, these proposals were geared towards making the export of Brazilian goods easier and the raising of the profile of these goods abroad. PLV0020/08, in particular, displays many of the characteristics we would expect from a left-wing government. However, large-scale agricultural exporters also benefit from these export-friendly measures. It is worth noting that powerful landed agricultural interests have a long history of ties to the right; indeed, their political opposition, the Landless Rural Worker's Movement (*Movimento dos Trabalhadores Rurais Sem Terra*), have an equally intertwined history with the left (Robles et al., 2015).

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[58]They were MPV0120/03, MPV0145/03 and MPV0248/05; the first proposed authorising the Union to buy credit from the states related to royalties from hydroelectric and other energy resources; the second, to create the Energy Research Company (*Empresa de Pesquisa Energética*) to carry out studies of the electricity sector; the third, to make available extraordinary credit to the Ministry of Science and Technology for research in the area of petroleum and the energy sector. Only this latter vote was contentious.
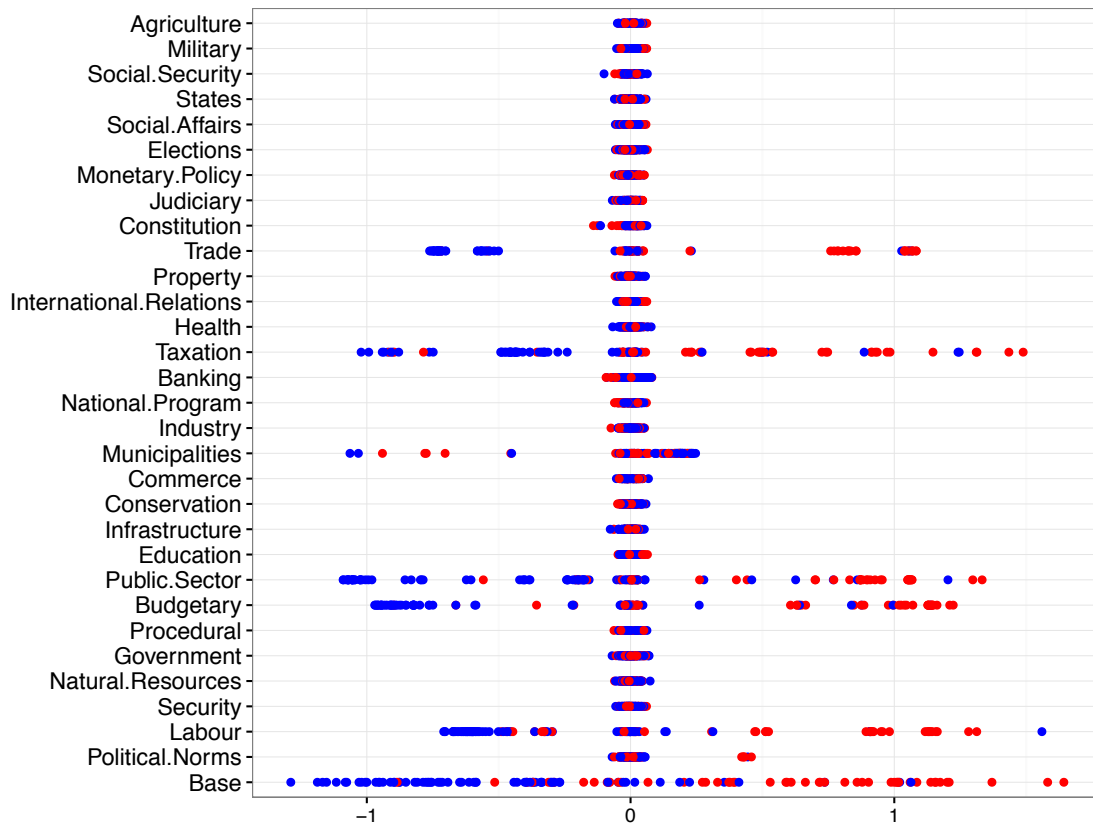
Figure 31: Ideal Points by topic, Lula II.

Ideologically, we may suppose that the *alignment of preferences* posited by Milner (1997) receives support from trade proposals in this legislature, however, both the PFL/DEM and the PSDB voted 'No' with 100% of their senators for these votes; the PTB, the other right-wing party in the Senate according to the scale of Power and Zucco Jr. (2009) and a member of the government, voted 'Yes' (100%) for both votes, suggesting that government–opposition, or at least PFL/DEM-PSDB vs. PT, was a crucial determinant during this time. I speculate PFL/DEM-PSDB vs. PT because the other major party in the government, the PMDB, was split for both votes, with a minority voting 'No' both times. There is some evidence of the regional divide in the PMDB (Zucco Jr., 2008) for these votes: the states for the 'No' camp are Piauí, Pernambuco and Acre, all northern or north-eastern states.

Table 20: Content of 'Trade' proposals during Lula's second term.

Proposal	Content
PLV0019/08	Suspends tax contributions on the import of oil-related storage, boats and port facilities; reduces to zero taxes on the import of parts for the modernization of ships; reduces tax on the acquisition of goods and capital by exporters; seeks to improve port infrastructure; contains other export- friendly measures and measures to reduce taxes on the industrial sector and promote investment.
PLV0020/08	Authorises the involvement of the Union in the Guarantee Fund for Naval Construction, in order to invest in this strategic sector (create jobs, reduce dependence on foreign freight services); permits the use of the Euro for the production or commercialization of 'international insertion' goods; permits BNDES to use the Euro for the financing of export-boosting projects; permits BNDES to establish subsidiaries abroad to help with the international insertion of Brazilian companies and regional integration; contains anti-dumping measures; contains export-boosting and import-limiting measures for the following sectors: software, fruit, ceramics, information technology services and capital services; contains other export-promoting measures.

Regarding other parties, the majority of the 'No' voters also came from northern or north-eastern states; the only states outside this region were Minas Gerais, Goias, the Distrito Federal, Mato Grosso and Paraná (there were 28 senators in all who voted against these proposals).[59].

Indeed, this putative PT vs. PSDB-PFL/DEM split highlights an interesting aspect of the behaviour of the parties in the Senate. As others have noted (Barros, 2015; Power and Zucco Jr., 2009), there is not actually a huge *ideological* disparity between the PSDB and the PMDB, and indeed the PT. Nevertheless, we repeatedly observe the PSDB aligning itself on the far right with the ideologically right-wing PFL. This calls attention to the conflation of ideology and *strategy* that we repeatedly observe, making inferences about the 'true' positions

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[59]In fact, for southern Paraná, all three senators to represent the state voted 'No' to PLV0020/08, even though the senators were members of the PT, the PDT and PSDB, respectively.

of the parties, in particular the PT and the PSDB. One way to see this clearly is by means of the aforementioned dynamic ideal-point model of Martin and Quinn (2002). Applying this model to the Senate, we can see clearly the consistency of the strategy/ideology adopted by the PT and the PSDB: over the fifteen years since the PT first became a significant presence in the Senate, ideal points for the two parties rarely enter into the same area of the policy space, making the PSDB more extreme than we would expect. The large heterogeneity in the ideal points for the PMDB point to its status a catch-all party of no ideological extremity.
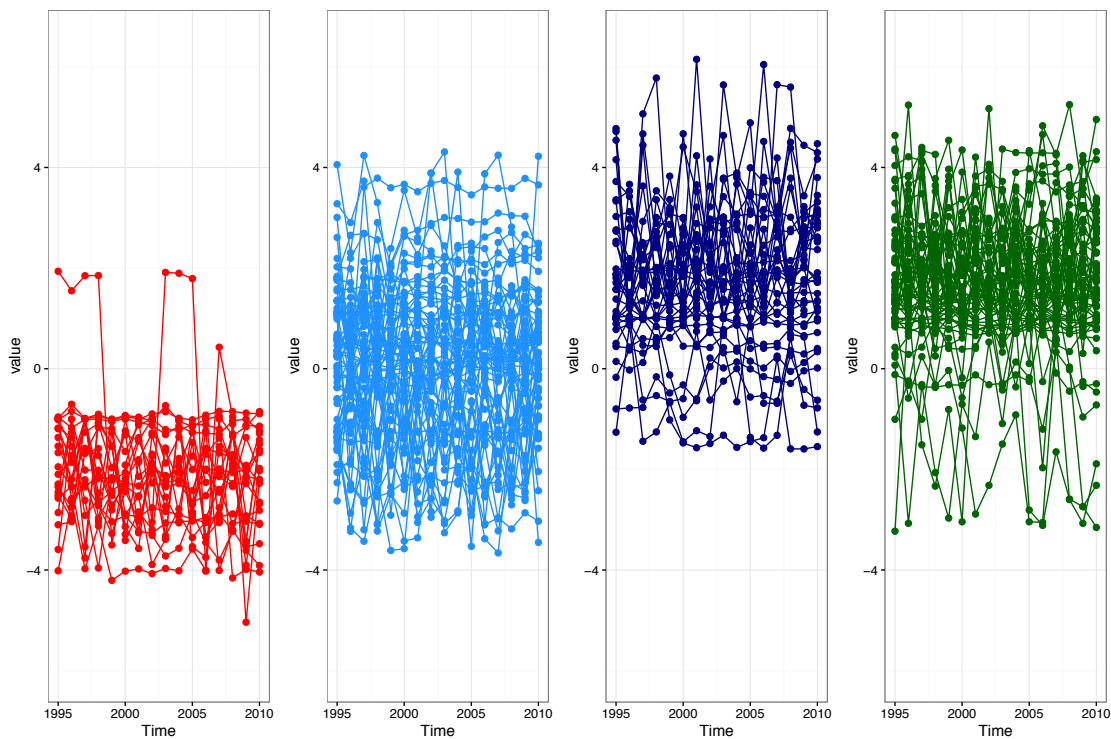
Figure 32: Dynamic Ideal Points for the PT, PMDB, PSDB and PFL (in that order), 1995-2010.

Considering Cardoso's first term, there is again separation on the topic of 'Trade', with the other foreign-policy topics ('Monetary Policy', 'International Relations' and 'Security' were all present in this legislature) appearing to result in indifference among the senators. There were four trade-related proposals during this period: PEC0029/95, PEC0032/95, PLC0115/93, PLC0087/96 and PRS0104/96; all were Executive initiatives, mostly related to the economic restructuring plans of Cardoso, with the exception of PRS0104/96, proposed by Senator

Júnia Marise of the PDT.
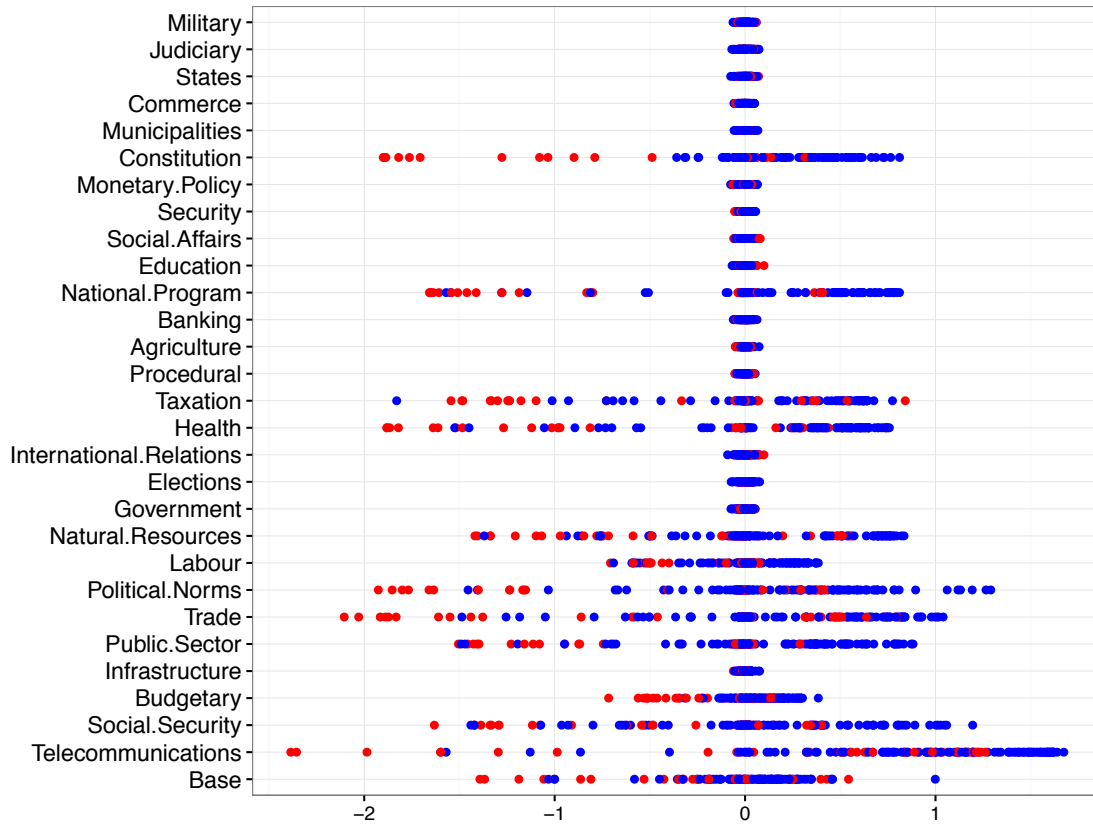
Figure 33: Ideal Points by topic, FHC I.

Their content is summarised in **Table 21**. PRS0104/96 was included in 'Trade' and hence classified as relating to foreign policy because the discussion of the privatisation of the Vale do Rio Doce company at this time included heated debate on foreign ownership of the company. As Senator José Dutra is quoted in the Senate Diary: "What are the guarantees, if the company is privatized, that foreign companies (*the only ones capable of buying it*), would care for social and regional development, as happens now?" (Senado Federal, 1995, p.8544, author's translation and emphasis). As we can see, the Executive proposals related mainly to the economic liberalisation that took place in this period.

Table 21: Content of 'Trade' proposals, Cardoso's first government.

Proposal	Content
PEC0029/95	Permits greater private investment in gas resources while maintaining state involvement.
PEC0032/95	Eliminates distinction between 'Brazilian Company' and 'Brazilian Company of National Capital' and the preferential treatment to the latter, with the objective of attracting foreign investment to mineral and energy sectors.
PLC0115/93	Revises the Industrial Property code, patent rights and patent laws; harmonizes Brazilian laws with international standards; implements the TRIPS-WTO agreement.
PLC0087/96	Deals with waterway transport; ports; shipping; norms in territorial waters.
PRS0104/96	Deals with controls on the Executive relative to the privatisation of the Vale do Rio Doce company.

Both these latter two legislatures analysed, Cardoso's first (1995-1999) and Lula's second (2007-2010), demonstrate that only trade policy seems to result in spatial separation along θ in the Senate. This is in keeping with the finding from the previous chapter: 'high politics' appears to be delegated upwards to the Executive, whereas the 'low politics' of trade induces legislative involvement. In contrast, Lula's first term (2003-2007) and Cardoso's second (1999-2003)(see **Fig. 34**) do not display trade-related differentiation amongst the senators. Indeed, Cardoso's second term is the only one where we observe 'Monetary Policy' and 'International Relations' being associated with movements in the ideal points along θ. The fact that proposals relating to monetary policy are not related to delegation in this legislature is not a surprise, given that this was the period in which Cardoso was forced into devaluation of the Brazilian currency amid the spread of financial crises from Asia and Russia, and the default on debt of the state of Minas Gerais (Palma, 2012). The fact that Cardoso had to fight

hard to see essential monetary policy bills passed (Zucco Jr. and Lauderdale, 2011) suggests that some of the senators saw this as a perfect opportunity to extract concessions from the Executive (Zucco Jr. and Lauderdale, 2011, p.384). In either case, it is a context-dependent finding that does not extend to other legislatures, as it is clear that the acute crisis starting in 1999 had a serious effect on the entire legislature.

Regarding the finding for 'International Relations', there were five separate proposals, and nine votes, under this topic heading. Two involved international conventions: the Convention on the Elimination of All Forms of Discrimination against Women, and the International Convention for the Protection of New Varieties of Plants. Two others dealt with the relationship between foreigners and Brazilians – PEC0005/02 proposed that media companies may be owned only by Brazilians or foreigners who have been naturalised for 10 years or more, and PEC0061/99 proposed voting rights for foreigners resident in Brazil, at the municipal level – and the final proposal was a loan authorisation, of the amount of $3.4 billion, under the terms of understanding of the Paris Club. None of these votes were particularly contentious, with the exception of the loan authorisation. However, the Convention on the Elimination of All Forms of Discrimination against Women was supported by only 27% of the house, unusual for U.N. treaties, which are usually passed with high levels of support. Nonetheless, it appears that the proposal on media ownership caused the spatial separation we observe. It passed through four rounds of voting, receiving varying levels of support (from a low of 7% to a high of 95%); it also resulted in involved debate in both the Chamber and the Senate, amidst the fears of some senators regarding cultural domination by foreign sources (Senado Federal, 2002, p.4069). This is not dissimilar to the debate surrounding the ownership of Vale do Rio Doce: both proposals allow us to observe a nationalist tendency regarding foreign ownership of businesses in strategically important areas. This does not seem to be linked to ideology along a left–right scale, however, even though right-wing parties often have a history of nationalism in other countries. The government parties at this time, the PSDB, PPB and the PMDB, were almost unanimous in their support of the Executive (slightly less than 10% of the PMDB
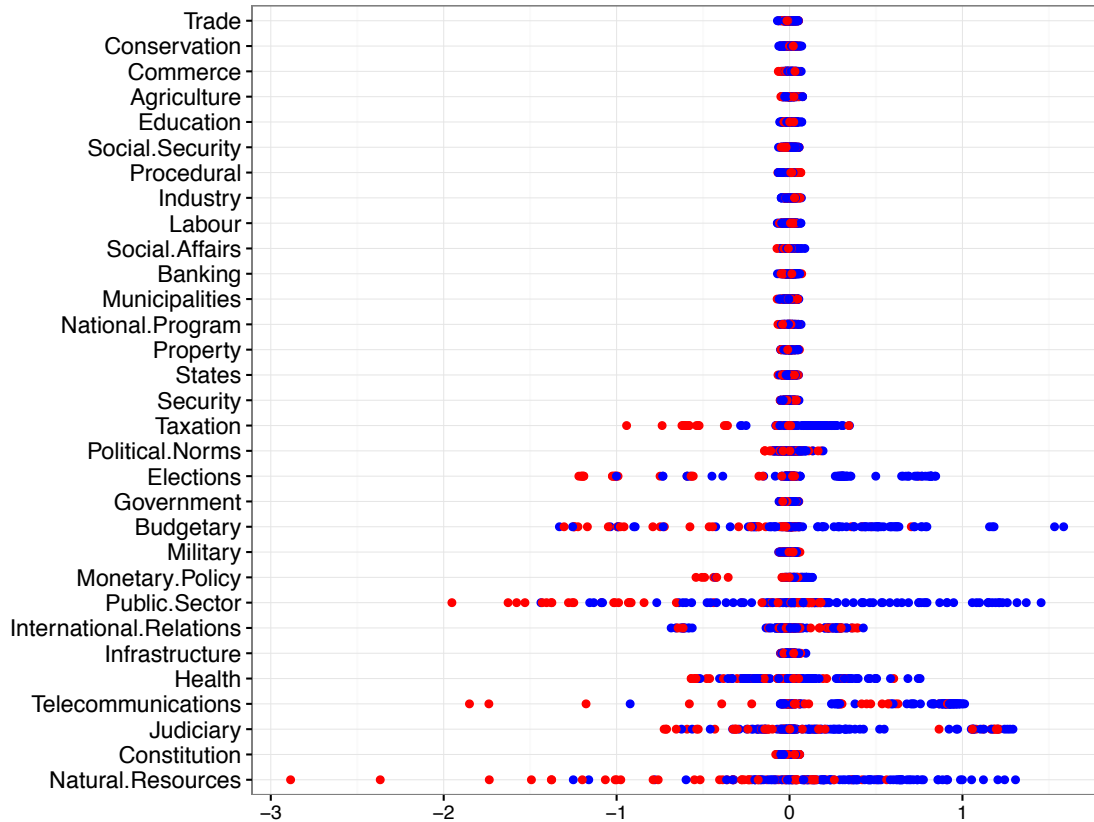
114

Figure 34: Ideal Points by topic, FHC II.

senators voted 'No' or abstained when the government indicated a 'Yes' preference on this proposal); the opposition parties were also supportive of the Executive, with only a minority of the PT disagreeing, and only the PDT substantially split by the proposal. The PFL voted almost unanimously in support of the government even though they had just left the coalition in protest. Hence, we see right and left voting with the Executive on this proposal, which was, after all, hardly even liberal in its aspirations, suggesting nationalism, if it is a factor in foreign policy voting, is common to all parties.

The topic models of Presidents Franco, Collor and Sarney do not display any spatial separation among the senators for any foreign policy themes.[60] For Sarney, the low number of votes makes the estimation of ideal points using this model less than optimal, as for some themes, there are very few votes and voters. These legislatures present interesting findings relevant to

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[60]Figures for these three periods are available in the Dropbox folder in the sub-folder 'TopicsSenate'.

other issues areas, perhaps an interesting area for future research. As regards our present discussion, 'Military' is present in both the Collor and Franco presidencies, and results in indifference for both, further lending support to our earlier findings of delegation on these themes. 'International Relations' in the Sarney presidency likewise demonstrates the indifference that we can link to delegation to the Executive (votes on the topic 'Military' did not occur during Sarney's time; 'International Relations' did not feature during the periods of Collor and Franco).

Thus an examination of ideal points on the various thematic areas has produced findings consistent with those in §4.7. There is strong evidence, now with both the parameters x and β from the Bayesian IRT model, of delegation to the Executive on matters of security, defence, the military and diplomatic matters. On a substantive level, this makes sense. As was mentioned back in §1.1, the mechanism underlying the Rogowski/Putnam framework can apply to any polity, *assuming the effects of the policies in question have some domestic effects.* It appears that proposals relating to 'high politics' are not judged by senators to affect the domestic polity, and thus are judged to be a matter solely for the Executive branch. This, however, assumes that the themes that *do* provoke spatial separation in the Senate – principally trade matters – affect the domestic polity in such a way that the response of domestic pressures is to seek to funnel their influence through the Federal Senate. The next section attempts to explore this question further using socio-economic data from the senators' electoral bases.

5.2 Constituency Pressures

Fundamental to the Rogowski/Putnam framework discussed in §1.1 is the existence of domestic pressure upon decision-makers when it comes to international politics. In a democracy, it is reasonable to suppose that the houses of legislature are likely to be a focal point for the funnelling of this domestic pressure towards the political elite. As we saw in §1.4, pressure groups now have to include the Congress among their lobbying targets, in contrast to the past, when they could just target the Executive branch (Helfand, 1999). We have also seen that trade and issues of foreign ownership 'matter' most to senators, apart from during periods of financial system instability, but how much of this behaviour can be attributed to pressures from the senators' electoral bases? To return to our simple example of §1.1, a senator that has an electoral district in which there are import-competing firms may expect to be lobbied by these interests in the event of a vote that could harm this sector.[61]

One way of exploring this question is to create an informal district for each senator, and to use socio-economic indicators as predictor variables on the ideal point, much as was done in §4.5. Since senators are elected in a majoritarian system, it is straightforward to assign municipalities to those elected. If a senator wins the majority of the votes in a certain municipality, then this municipality is part of the senator's informal district. While this a reasonable proposition, it does create two problems. Firstly, some senators dominate their states. As a result, there are senators who were elected after not coming first in any municipality, meaning these senators do not have informal districts and so we lose them from the analysis. Secondly, senators are elected in staggered elections; 2/3 in one election, and 1/3 in the next. The senators who were elected in the '1/3' elections were not considered, as their informal district is the same as their formal district, namely, the state. As such, we have little to gain from including these legislators, as they are likely to confound any of the effects we are testing for. Therefore, the senators in the analysis are those who were elected

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[61]I use the terms 'lobbying' and 'interest groups' here in the widest possible sense, to include pressure from such varied sources as professional lobbyists and business groups to workers and constituents.

in the elections of 1994 and 2002. As such, although the creation of informal districts is an interesting way for us to test IPE hypotheses relating to the funnelling of domestic pressure into the Senate, it does come with costs in terms of the data we lose.

Once the municipalities have been assigned to the senators using data from the TSE, socio-economic data for these municipalities, from IPEA and IBGE[62], can be used as predictor variables that theoretically may help to explain the positions of the ideal point estimates. Much like §4.5, these predictors can form a higher level of a multilevel Bayesian IRT model:

$$y_{ij} = \beta_j \boldsymbol{x}_i - \alpha_j;$$

$$\boldsymbol{x}_i \backsim \mathcal{N}(\mu_x, \sigma);$$

$$\mu_x = \gamma_0 + \gamma_1 \text{HDI}_i + \gamma_2 \text{AGR}_i + \gamma_3 \text{IND}_i + \gamma_4 \text{EXP}_i$$

$$+ \gamma_5 \text{GDP}_i + \gamma_6 \text{LEFT}_i + \gamma_7 \text{RIGHT}_i$$

$$+ \gamma_8 \text{LEFT}_i * \text{IND}_i + \gamma_9 \text{RIGHT}_i * \text{AGR}_i.$$

Of the predictors, HDI is the Human Development Index, AGR is the gross agricultural product of the informal district, and IND the equivalent for industry. The total exports of the district are captured by EXP, while GDP measures the gross domestic product of the district. As in §4.5, LEFT and RIGHT are dummy variables that relate to a senator's membership of a left-wing or right-wing party. The model contains two interactions: LEFT * IND and RIGHT * AGR. This is to test the hypothesis that agricultural interests will have a greater effect on right-wing senators than industrial interests, who are posited to have a greater effect on the $\boldsymbol{x}_i$ of left-wing senators.

The theoretical base for including these specific predictors is similar to that found in Milner and Tingley (2011). Applied to our current case, the Stolper-Samuelson theorem (Stolper and Samuelson, 1941) predicts that the greater the amount of human or physical capital in

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[62]The *Instituto Brasileiro de Geografia e Estatística*, http://www.ibge.gov.br/home/.

an electoral district, the higher the probability that the legislator representing the district will vote in a favourable way towards free trade proposals. As a proxy for 'human capital', or the level of higher-skilled workers in a district, I use the Human Development Index (HDI). Higher-skilled workers are assumed to be less protectionist, as they have less to fear from free-trade than lower-skilled workers, who may seek protection from the possible job losses that may come with freer trade.[63] The expectation is that HDI has a *positive* effect on the ideal point, being an association between classically free-trade right-wing ideology (and hence a positive ideal point) and the higher-skilled voter as captured by HDI.

Reasons for including AGR and IND come directly from Rogowski (1989) and the factor-endowment view of Stolper and Samuelson (1941), on which Rogowski (1989) is based. Brazilian agriculture is the export-seeking factor here and industry the protectionist factor, as Brazil is most competitive internationally in agricultural products (Haddad and Jank, 2006). The interactions were included because the left has a history of involvement with industry, albeit industrial workers, and the right with agriculture, albeit the land-owning elite and not agricultural workers. We therefore would expect to see IND (and the accompanying interaction) associated with negative ideal points and the inverse for AGR and the interaction involving it. GDP is included as a proxy for physical capital. This variable could be associated with positive or negative ideal point estimates: in Rogowski's framework, capitalists in a country like Brazil might be expected to seek protection (1989). The Brazilian elite, nevertheless, has a long right-wing history, leading us to expect a positive ideal point association. Senators who possess an informal district with higher values of GDP are also those whose districts are more likely to contain higher-skilled workers, hence leading again to a relation to positive ideal point estimates.[64]

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[63]Some have posited that this effect is reversed in developing countries (Milner and Mukherjee, 2009). However, this is an unresolved debate, as others have found evidence against this position, showing that poorer, unskilled workers are protected across countries, developing or otherwise (Lü and Scheve, 2008).

[64]All predictors were averaged over the relevant years and across the municipalities that form the informal district. The HDI score for 1991 was used for the senators elected in 1994 and the score for 2000 used for those elected in 2002, being the nearest available years.

For both periods, this model does not generally perform well. I used four MCMC chains in `rstan` and they did not show signs of convergence.[65] This poor performance was impervious to changes in prior distributions for the parameters and differing lengths of iterations. Many of the Rhat values were very high[66], already alerting us to the fact that this model is not a great fit to the data. This is most likely down to data loss, as there are only 26 senators analysed for the period after the 1994 election, and 49 for 2002 onwards to 2010. The γ estimates are also sensitive to starting values, another indication of the non-informative nature of the predictor variables as regards the ideal points for this period. We have more data for the 2002 election senators, but again the model has little explanatory power. **Figures 36** & **37**, below, display the regression coefficients for both periods. The heavily skewed nature of the distributions is evident in the location of the mean in the 95% credible intervals.
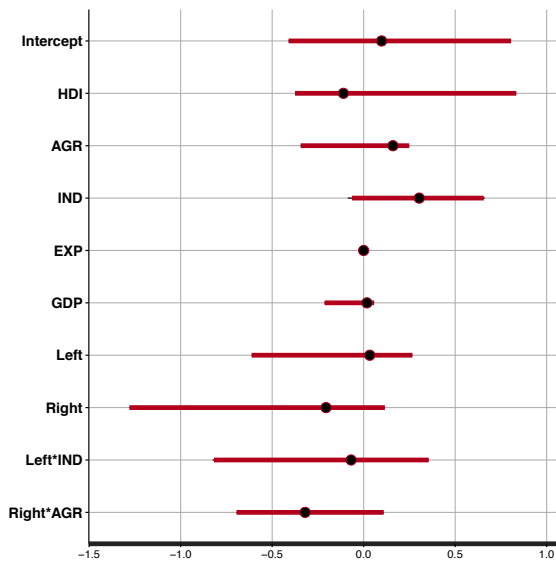

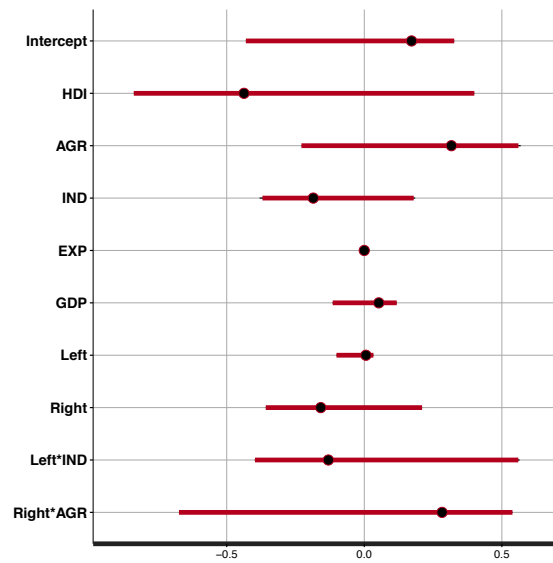**Figure 35:** Regression Coefficients, Multilevel Model, 1994 Election

Figure 36: Regression Coefficients, Multilevel Model, 2002 Election

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[65]Or 'no signs of non-convergence', as Gill (2007) puts it.
[66]See Appendix, §7.5.

The poor quality of the estimates recovered from this model mean that I present the findings here for descriptive purposes only. Nonetheless, there are some interesting results. IND is associated with positive ideal points in the earlier period, an unexpected finding. The interaction of RIGHT with AGR seems to result in an association with *negative* ideal points – again, contrary to the expected findings from theory. Agricultural and industrial influences switch places in the later period, with industry becoming associated with a more left-wing position and agriculture a more right-wing ideal point. If we recall that many of Lula's MPVs sought to improve the lot of Brazilian industry, this seems a plausible finding.

Part of the problem we face with this model is that the data as a whole are uninformative, and therefore everything, from the γ coefficients to the ideal points, are estimated poorly. There is another option, which is to take the superior ideal-point estimates from the unidimensional model and use them as outcome variables in a simple multiple linear regression.[67] This allows us the benefit of using reliable estimates for the ideal points, but it does not avoid the 'errors-in-variables' problem mentioned many times in this text.

As can be seen from **Table 22**, approaching the question this way leads to statistically significant (although flawed) findings, and interpretation remains an issue. RIGHT is significant during Lula's time, and LEFT during Cardoso's, but again we cannot separate the effects of party and individual ideology from the influence of the government coalition, since LEFT during Cardoso's tenure also means opposition, as does RIGHT in Lula's time. IND has a statistically significant relationship with positive ideal points in Lula's presidencies, the opposite of what we observed earlier and of what the previous discussion on theory predicts.

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[67]Using the `lm()` command in `R`. The linear model remains the same.

	1994-2002	2002-2010
(Intercept)	1.76	0.17
	(1.08)	(0.93)
HDI	-1.30	-0.53
	(1.69)	(1.37)
AGR	-0.00	-0.00
	(0.00)	(0.00)
IND	-0.00	0.00^*
	(0.00)	(0.00)
EXP	0.00	-0.00
	(0.00)	(0.00)
Left	-1.85^{***}	-0.38
	(0.49)	(0.22)
Right	-0.32	0.47^{**}
	(0.54)	(0.17)
IND*Left	0.00	-0.00
	(0.00)	(0.00)
AGR*Right	0.00	0.00
	(0.00)	(0.00)
R^2	0.61	0.33
Adj. R^2	0.50	0.26
Num. obs.	37	79
RMSE	0.58	0.58

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 22: OLS Regression Coefficients, both periods.

5.3 Summary

This chapter has attempted to delve further into the question of how senators vote on foreign policy themes and why. Yet more evidence for delegation to the Executive has been found for 'high politics' issue areas, along with the finding that trade, and to a lesser extent monetary policy, draws in the involvement of senators. These findings naturally lead to the next question, which is to wonder what it is about trade that would reverse the indifference we observe on foreign policy proposals. Theoretically, the IPE framework referenced in §1.1 predicts exactly such an occurrence: when foreign policy can affect domestic interests, these interests will seek to influence decision-makers to affect desired changes in policy. To what extent does the Senate play a role in this dynamic? As noted, it is reasonable for us to suspect that senators are likely to be the focus of domestic pressures for a variety of reasons. Since we have not noted much in the way of party pressure, it is to be assumed that senators may respond to constituency pressures on an individual level. In order to test this hypothesis, we need to create the informal districts that we have just seen. The various sources of district-related pressure posited in the literature do not appear to have much of an effect upon the voting behaviour of Brazilian senators, but there could be many reasons for this finding. First of all, the simple fact that there are limitations on the data available has restricted our ability to recover reliable estimates from the models employed. The Chamber, with its much richer data, could prove an interesting case to study with regard to informal districts. The theoretical justification for creating such a district for deputies is not as clear, however. Secondly, it is quite possible that there are pressures that we were not able to include in the model. Studies that focus on the specific actions of interest groups towards senators could help to shed light on their influence; campaign contributions can likewise be used as proxy predictor variables for interest group pressure. There is evidently *something* that causes trade to be a more involving area for senators than the 'high politics' of security and diplomacy. What exactly that is, though, is still an unanswered question.

6 Conclusion

This thesis has sought to understand nominal voting behaviour in the Senate on foreign policy themes, and by extension, behaviour across all themes, and how this behaviour relates to similar studies done on the Chamber of Deputies. What have we learned from such an exercise? Clearly, there is quite significant disagreement between the findings in this study and the findings in some studies in the literature. θ simply *cannot* be characterised solely by a government–opposition divide: a hypothesis test using fifty-five quasi-natural experiments demonstrated this quite conclusively. Similarly, party influence as the sole determinant of voting behaviour can also be rejected. Taking advantage of more recent modelling methods to examine hypotheses of other determinants in a multilevel IRT model, we saw that there is a conflation between government influence and the ideology of the parties, as noted by others for the Chamber (Zucco Jr. and Lauderdale, 2011). Loyalty to the governing coalition is associated with *central* ideal points, not extreme ideal points, a finding which disagrees with de Freitas et al. (2012) and Izumi (2012). The ideology of the individuals and the parties appears to be the factor which causes spatial separation to the extremes of θ; this, along with the government–opposition divide, constitutes the content of the (mainly unidimensional) policy space for the legislatures studied.

As with other studies in the literature (e.g. Desposato, 2004), there was no regional or state pressure found. This is a curious finding for the Federal Senate, given that one of its constitutional purposes is to represent the states (Neiva and Soares, 2013), and that others have noted the presence of a north-eastern faction in the house (Backes, 2008). Brazil is a country with very large regional disparities, and therefore these non-findings of state and regional pressures are perhaps a worthwhile area for future research, although federalism is not an untouched topic in the literature. The lack of state pressures is accompanied by a lack of constituency pressure, another curious finding. It may be the case that the Senate, and perhaps the Chamber, are not seen as worthwhile entities to lobby. Given the presidential

control over the foreign ministry *Itamaraty*, and the relative isolation of the president to lobbying pressures (at least compared to most legislators), this raises the prospect of Brazil being a unitary actor in international relations. We do not find evidence for an *alignment of preferences* as in Milner's theory (1997); in fact, we see that trade policy, and to a lesser extent monetary policy, have the capacity to involve the senators to a much greater degree than issues of security and diplomacy, where 'alignment' suggests delegation.

Regarding the main hypotheses posited for the content of θ, we were therefore able to reject the idea that θ constitutes an exclusively government–opposition scale, a policy space of party influence, or a regional divide. This leaves ideology as the last posited determinant of voting behaviour. Exploring this through the use of the β discrimination parameter raised interesting points. Clearly, ideological concerns matter, but their import is inconsistent across legislatures with regard to what we would normally consider the dominant ideological scale, that is, a left–right continuum. This finding, therefore, warrants further research. There are (at least) two possible approaches: the specific vote content for proposals where $\beta \leq -2.5$ and $\beta \geq -2.5$ can be examined to see if there is indeed a classic left–right ideological split in the Senate or the Chamber, or if this ideological division takes other forms. Scales can also be created using values of the discrimination parameter on theoretically opposite proposals: legislators are then placed on this scale according to their voting behaviour on the theme in question.

Analysis of β also led to a very interesting finding regarding the delegation hypothesis of the foreign policy literature. Clear, consistent evidence was found to show that senators are indeed indifferent when it comes to so-called 'high politics'; proposals linked to the military, security, defence and diplomatic matters are strongly associated with delegation to the Executive. These findings could be extended to the Chamber to see if the pattern also manifests itself in that house; it is theoretically more likely to be the case in the Chamber than the Senate as was mentioned in §1.4.

Moving the discussion back to the Chamber also has other benefits. The topic models of Chapter Five showed interesting findings regarding the interwoven nature of ideology and government–opposition, but the estimates produced by such a model obviously depend on the number of votes and voters in each topic category. The much larger number of voters in the Chamber would make estimation of these models much more stable and produce more reliable results. It is worthwhile to explore whether deputies also display the same behaviour of disagreeing over a few key thematic areas in each legislature. Some hold the view that the Senate is a more docile house, and that most polarization occurs in the Chamber; the use of this model could shed light on this interesting area. The growing availability of electronic legislative data in Brazil also opens the door to using topic models like those of Lauderdale and Clark (2014). While this may not be the best approach for foreign policy issues, due to the lower number of votes on this subject and manner in which they are labelled in the databases of the houses, it may prove interesting for other themes, or for all themes together.

The method used in Chapter Three to compare the two institutions could also be extended, if computing power is not a problem. The votes that both houses share need not be the only ones used for such an analysis; indeed, all the votes can be included, with the votes shared by both houses becoming as 'anchors' across the institutions, as the other votes are estimated normally. There are interesting questions as to *why* we observe differences among the parties across the houses that could be explored with such a data strategy.

To conclude, the literature on foreign policy voting in the Brazilian houses of legislature has claimed consistently that **(a)** there is *no difference* between foreign policy and domestic policy, and **(b)** that only the government–opposition divide, or the influence of parties, is important for understanding voting behaviour in the Brazilian Congress, as much for foreign policy as for domestic policy. This study has found clear evidence to reject both arguments. There is clearly a difference between domestic and foreign policy, depending on the policy area

in question. Both ideology and the influence of the government and parties are determinants of voting behaviour.

Not only is there a difference between foreign policy and domestic policy, but there is also a clear difference between different areas of foreign policy itself. On themes related to 'high politics', senators demonstrably delegate to the Executive. This finding is consistent across time. On themes related to the 'low politics' of trade, foreign ownership of businesses in key areas, and monetary policy, we see a marked increase in involvement by senators, as is displayed by their separation along the scale of the policy space θ on these themes.

7 Appendix

7.1 List of Party Acronyms

The following is a list of the party acronyms used in the text or in the figures.

Table 23: Party Acronyms for the Senate, 1989-2010. † The PFL changed its name to DEM during the 53rd legislature.

Acronym	Party Name
PT	Partido dos Trabalhadores
PSDB	Partido da Social Democracia Brasileira
PMDB	Partido do Movimento Democrático Brasileiro
PFL†	Partido da Frente Liberal
DEM†	Democratas
PDT	Partido Democrático Trabalhista
PSC	Partido Social Cristão
PCdoB	Partido Comunista do Brasil
PV	Partido Verde
PTB	Partido Trabalhista Brasileiro
PRB	Partido Republicano Brasileiro
PSB	Partido Socialista Brasileiro
PR	Partido da República
PP	Partido Progressista
PMN	Partido da Mobilização Nacional
PSL	Partido Social Liberal
PSOL	Partido Socialismo e Liberdade
PDC	Partido Democrático Cristão
PDS	Partido Democrático Social
PMR	Partido Municipalista Renovador
PRB	Partido Republicano Brasileiro

Acronym	Party Name
PPB	Partido Progressista Brasileiro
PPS	Partido Popular Socialista
PPR	Partido Progressista Reformador
PST	Partido Social Trabalhista
PL	Partido Liberal
PRN	Partido da Reconstrução Nacional
PMB	Partido Municipalista Brasileiro
S/PART	Sem Partido
IND	Independent

7.2 Derivation of the Two Parameter Item Response Theory Model

This section follows the derivation in Clinton et al. (2004). We have n legislators voting on m proposals, where each nominal vote $j = 1, ..., m$ presents the legislators $i = 1, ..., n$ with a choice between a 'Yes' position $\boldsymbol{\zeta}_j$ and a 'No' position $\boldsymbol{\psi}_j$, locations in $\mathbb{R}^d$, where d denotes the dimensions of the policy space. If legislator i votes 'Yes' on proposal j, then $y_{ij} = 1$, with $y_{ij} = 0$ otherwise. The quadratic utility functions for the legislators over the policy space are as follows:

$$U_i(\boldsymbol{\zeta}_j) = -\|\boldsymbol{x}_i - \boldsymbol{\zeta}_j\|^2 + \eta_{ij}$$

and

$$U_i(\boldsymbol{\psi}_j) = -\|\boldsymbol{x}_i - \boldsymbol{\psi}_j\|^2 + \nu_{ij},$$

where $\boldsymbol{x}_i$ is the ideal point of legislator i, η_{ij} and ν_{ij} are random errors and $\|\cdot\|$ is the Euclidean norm ($\|\boldsymbol{x}\| = \sqrt{x_1^2 + ... + x_n^2}$). The recorded vote $y_{ij} = 1$ if $U_i(\boldsymbol{\zeta}_j) > U_i(\boldsymbol{\psi}_j)$ and zero otherwise. The errors η_{ij} and ν_{ij} are assumed to have a joint normal distribution with $E(\eta_{ij}) = E(\nu_{ij})$, $var(\nu_{ij} - \eta_{ij}) = \sigma^2$ and are independent across legislators and votes. The model is derived as so:

$$
\begin{aligned}
P(y_{ij} = 1) &= P(U_i(\boldsymbol{\zeta}_j) > U_i(\boldsymbol{\psi}_j)) \\
&= P(-\|\boldsymbol{x}_i - \boldsymbol{\zeta}_j\|^2 + \eta_{ij} > -\|\boldsymbol{x}_i - \boldsymbol{\psi}_j\|^2 + \nu_{ij}) \\
&= P(-(\boldsymbol{x}_i - \boldsymbol{\zeta}_j)(\boldsymbol{x}_i - \boldsymbol{\zeta}_j) + \eta_{ij} > -(\boldsymbol{x}_i - \boldsymbol{\psi}_j)(\boldsymbol{x}_i - \boldsymbol{\psi}_j) + \nu_{ij}) \\
&= P(-(\boldsymbol{x}_i^2 - \boldsymbol{\zeta}_j\boldsymbol{x}_i - \boldsymbol{\zeta}_j\boldsymbol{x}_i + \boldsymbol{\zeta}_j^2) + \eta_{ij} > -(\boldsymbol{x}_i^2 - \boldsymbol{\psi}_j\boldsymbol{x}_i - \boldsymbol{\psi}_j\boldsymbol{x}_i + \boldsymbol{\psi}_j^2) + \nu_{ij}) \\
&= P(-\boldsymbol{x}_i^2 + 2\boldsymbol{\zeta}_j\boldsymbol{x}_i - \boldsymbol{\zeta}_j^2 + \eta_{ij} > -\boldsymbol{x}_i^2 + 2\boldsymbol{\psi}_j\boldsymbol{x}_i - \boldsymbol{\psi}_j^2 + \nu_{ij}) \\
&= P(\eta_{ij} - \nu_{ij} > \boldsymbol{x}_i^2 - \boldsymbol{x}_i^2 + 2\boldsymbol{\psi}_j\boldsymbol{x}_i - 2\boldsymbol{\zeta}_j\boldsymbol{x}_i + \boldsymbol{\zeta}_j^2 - \boldsymbol{\psi}_j^2) \\
&= P(\nu_{ij} - \eta_{ij} < 2(\boldsymbol{\zeta}_j - \boldsymbol{\psi}_j)\boldsymbol{x}_i - \boldsymbol{\zeta}_j^2 + \boldsymbol{\psi}_j^2) \\
&= P\left(\frac{2(\boldsymbol{\zeta}_j - \boldsymbol{\psi}_j)}{\nu_{ij} - \eta_{ij}}\boldsymbol{x}_i - \frac{\boldsymbol{\zeta}_j^2 - \boldsymbol{\psi}_j^2}{\nu_{ij} - \eta_{ij}}\right) \\
&= \Phi(\boldsymbol{\beta}_j'\boldsymbol{x}_i - \alpha_j)
\end{aligned}
$$

where $\boldsymbol{\beta}_j = \dfrac{2(\boldsymbol{\zeta}_j - \boldsymbol{\psi}_j)}{\sigma_j}$ and $\alpha_j = \dfrac{\boldsymbol{\zeta}_j^2 - \boldsymbol{\psi}_j^2}{\sigma_j}$. Note that here $\Phi(\cdot)$ denotes the standard normal distribution function, leading to a probit model with an unobserved regressor $\boldsymbol{x}_i$. In practice, both the logistic and probit links are commonly used for these models.

The likelihood is

$$
L(\boldsymbol{B}, \alpha, \boldsymbol{X}|\boldsymbol{Y}) = \prod_{i=1}^{n}\prod_{j=1}^{m} \Phi(\boldsymbol{x}_i'\boldsymbol{\beta}_j - \alpha_j)^{y_{ij}} \times (1 - \Phi)(\boldsymbol{x}_i'\boldsymbol{\beta}_j - \alpha_j)^{1-y_{ij}},
$$

where $\boldsymbol{B}$ is an $m \times d$ matrix with jth row $\boldsymbol{\beta}_j$, $\alpha = (\alpha_1, ..., \alpha_m)'$, $\boldsymbol{X}$ is an $n \times d$ matrix with ith row $\boldsymbol{x}_i$, and $\boldsymbol{Y}$ is the $n \times m$ matrix of observed votes with i,jth element y_{ij}.

7.3   Identification of ideal-point IRT Models

The identification of spatial voting models can be surprisingly tricky, particularly in more than one dimension. Even Simon Jackman, who was fundamental in bringing the IRT model to the political science literature,[68] seems to have slightly misunderstood the requirements of identification in two dimensions, according to Rivers (2003; 2003, p.7).

There are various strategies for identifying these ideal-point models. `NOMINATE` constrains ideal points to lie between -1 and +1 in one dimension by constraining two well-known legislators to have fixed ideal points at these values; all others then have ideal points in between these two 'extremists'.[69] The most well-known example is that of 'Kennedy-Helms'. Kennedy, a well-known liberal, is constrained to have an ideal point of -1, whereas the conservative Helms is constrained to 1. This fulfils the requirements of identification because it "amounts to choosing an origin in the issue space (half way between Kennedy and Helms), a metric (the distance between Kennedy and Helms is two), and a direction (Kennedy is to the left of Helms)" (Rivers, 2003, p.1). The most obvious problem with this approach is that we need to know *a priori*, and with confidence, the relative positions of at least two legislators, which is not always the case. It also creates a problem in that we are limited in how we test theories of legislative behaviour using ideal points. For example, if we create the scale with 'hard' constraints such as Kennedy-Helms in a Brazilian context, then the most obvious route to identification is to choose a government legislator at one end, and an opposition legislator

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[68]So much so that the two-parameter Bayesian IRT ideal-point model is often called the "Jackman model" (e.g. Lauderdale and Clark, 2014, p.758)

[69]The use of this method causes problems with the legislators whose ideal points lie at the extremes, close to the constrained legislators. The posterior distribution of their ideal points is usually not normal, and can be extremely skewed. Hence, the mean point estimates produced by `NOMINATE` with respect to these extremist distributions are misleading (Clinton and Jackman, 2009).

at the other, since this is the most consistent finding in the literature. But how then do we test the government-opposition dynamic? In legislatures such as those in Brazil, with much party-switching and coalition changing (and much 'missingness' in the data), we run the risk of effectively creating a government-opposition scale to see if a government-opposition scale exists.

Another means of identifying the model is through normalization, or standardization, of all the parameters. This avoids the hard constraints approach of `NOMINATE`, although it raises other issues. Following the discussion in Jackman (2009, pp.459-460, and in his notation), normalization of the ideal points ξ_i is $\widetilde{\xi}_i = (\xi_i - c)/m$, where $c = \bar{\xi}$ and $m = sd(\xi)$. This results in a required normalization of the other parameters β and α: $\widetilde{\beta}_j = \beta_j m$ and $\widetilde{\alpha}_j = \alpha_j - \beta_j c$. This model is now *locally* identified, which is to say that a 'sign flip' is now the only possibility (Rivers, 2003, p.17; Jackman, 2009, p.459); in other words, legislators whom we might expect to be on the left turn up on the right and vice-versa, leaving us unsure as to their 'true' position. While this may not be an issue in legislatures such as the U.S. (Jackman, 2009, p.459), in my experience it is a problem in Brazil, especially in the Senate. An extra measure that we may take is to constrain the sign of two legislators by using 'inequality' constraints. Under this approach, Legislator X cannot have a positive ideal point, while Legislator Y cannot have a negative ideal point, and their ideal points are thus sampled from truncated normal distributions. This avoids the problems with the `NOMINATE` approach and provides a direction for the scale, thus identifying the model in one dimension. Such constraints can also be used on the item parameters instead of the ideal points if we have information about the content of the proposals and how it theoretically relates the the scale θ for the policy space.

The problem of identification becomes more acute the more dimensions (d) we estimate, as we need to create $d(d + 1)$ fixed points or restrictions. In two dimensions, this means creating a triangle in the 2D policy space, by constraining legislators or items (i.e., Legislator X = {-1,-1}; Legislator Y = {1,1}; Legislator Z = {0,0}). Here again we are confronted with the problem of *a priori* specifying locations in the second dimension to tie down certain

legislators. If we are trying to understand the content of the second dimension, then by pinning down the position of certain legislators beforehand, we run the risk of manually creating the scale whose existence we are trying to ascertain.

The only attempt that I am aware of in the literature on the Brazilian houses of legislature that explicitly discusses this problem is the work of Zucco Jr. and Lauderdale (2011). They run a two dimensional model on the Chamber of Deputies with the spatial locations of the parties in the first dimension determined by survey information; that is, the deputies' first dimension positions have prior distributions according to the ideological placement of their party: positive for right-wing parties like the PFL, and negative for leftist parties such as the PSOL. Zucco Jr. and Lauderdale then allow the second dimension estimates to be determined by the data, with the normalization requirement in the second dimension $\boldsymbol{x}_i \backsim \mathcal{N}(0, 1)$. While this is no doubt a great way to incorporate outside information into the model and to test the government-opposition hypothesis, it does assume the content of the first dimension, and parties' placements on it. The ideological placement of the parties is indeed one that would be "widely recognized as the left-right ideological ordering of Brazilian parties" (Zucco Jr. and Lauderdale, 2011, p.372), however, there is no evidence that this ordering is preserved in roll-call voting patterns in either the Chamber or the Senate. In fact, most studies are at pains to emphasize the government-opposition scale as the primary determinant of roll-call voting behaviour in the houses (Leoni, 2002; de Freitas et al., 2012; Izumi, 2012; Ribeiro and Amorim, 2000). Zucco Jr. and Lauderdale explain the lack of *a priori* placements on the second dimension thus: "we would be assuming that which we want to demonstrate: that a government-opposition dimension is a powerful predictor of legislative voting in Brazil" (2011, p.371). However, Zucco Jr. and Lauderdale end up assuming the first dimension in order to test the existence of a second, and the existence of an ideological dimension is therefore not tested.[70]

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[70]There can be little doubt that ideology exists in Brazilian politics, as in all politics, but my point here is that this has not been observed very much in ideal-point studies of these two houses, and has to the best of my knowledge never been tested as I attempt to do with the discrimination parameter in §4.7.

However, as they themselves note (2011, p.372), there are other other ways to identify a two-dimensional model. Apart from the fixed-position approach of NOMINATE mentioned above, we can run a one-dimensional model and observe the β_j values on the proposals to see which ones discriminate on the first dimension and which ones do not (Jackman, 2001). In two dimensions, we need $d(d+1) = 6$ independent restrictions (Rivers, 2003). Constraining the discrimination parameter of two proposals that are in some meaningful way quite different to one another is one way to start, as shown by Jackman (2001). The discrimination parameter for these proposals is constrained with prior distributions (π) of the sort:

$$\pi(\boldsymbol{\beta}_1) = \mathcal{N}\left(\begin{bmatrix} 0 \\ -4 \end{bmatrix}, \begin{bmatrix} .01 & 0 \\ 0 & 4 \end{bmatrix}\right) \text{ and } \pi(\boldsymbol{\beta}_2) = \mathcal{N}\left(\begin{bmatrix} 0 \\ 4 \end{bmatrix}, \begin{bmatrix} .01 & 0 \\ 0 & 4 \end{bmatrix}\right) \text{(Jackman, 2001, p.235)},$$

where the discrimination parameters for the particular roll calls chosen (only two are necessary) are constrained to be zero in dimension one by the use of a small variance value (0.1); they therefore are only allowed to discriminate on the second dimension. The values of the means in dimension two (-4 and 4 above) can be set in accordance with the range of the β_j values in the first dimension (Jackman, 2001, p.235). The two-dimensional models run in the analysis in this thesis were identified in the same manner. As for the unidimensional model, the basic model was identified through the use of inequality constraints on two senators; the exact constraints are shown in the next section. The topic model of Chapter Five was identified by constraining the ideal points of two legislators for the first topic (the 'base' ideal point), the equivalent of setting constraints in the first time period for a dynamic IRT model (see Martin and Quinn (2002)). Identification for the multilevel model was done through constraining two legislators based on their ideal points from the basic unidimensional model. The Stan code for all these models is available from the Dropbox for this thesis.

7.4 Implementation of the IRT models in R

The ideal point IRT models employed in this thesis were all run on the statistical software `R` (R Core Team, 2015), using RStudio (RStudio Team, 2015). In order to run these models in `R`, there are various packages which can be used. For many of the simpler models, it suffices to estimate ideal points using the `ideal` command in the `pscl` package (Jackman, 2015), especially for large, 'easy', cases, or the more general use `MCMCpack` (Martin et al., 2011). More complex or specifically-designed models can be implemented in `R` by the use of the `BUGS` (**B**ayesian Inference **U**sing **G**ibbs **S**ampling) language (Gilks and Spiegelhalter, 1994). The `BUGS` clone `JAGS` (Plummer, 2003) has often been used in the literature, while a newer option is Stan (Stan Development Team, 2015).

The unidimensional models used in Chapter Four to test hypotheses of coalition and party switching were run using `MCMCpack`. These models were also run using `ideal` and `JAGS`, and all showed similar results, although `ideal` is quite sensitive to the choice of constraints. Indeed, constraints were the reason `MCMCpack` was chosen, as I found using inequality constraints to be a much more reliable way to run the models without actually fixing the ideal points of legislators. The following tables show the legislators that were used as constraints in the one-dimensional models, first for the Senate. The basic principle employed was to keep the PT and the PFL separated, as this pattern is observed in all studies of nominal votes in Brazil. For the 51st legislature, I chose the PSDB in the Senate as the PFL left Cardoso's government coalition in the last year of the term. For later models, I simplified matters by choosing Jose Agripino and Eduardo Suplicy for all legislatures where they were present (except Suplicy in Collor's presidency).

Table 24: Constraints used to anchor the scale of θ in the Senate.

Presidency	Negatively Constrained	Positively Constrained
Sarney	Jamil Haddad:PSB	Marco Maciel:PFL
Collor	Jamil Haddad:PSB	João Lobo:PFL
Franco	Eduardo Suplicy:PT	Marco Maciel:PFL
Cardoso I	Eduardo Suplicy:PT	Jose Agripino:PFL
Cardoso II	Eduardo Suplicy:PT	Pedro Piva:PSDB
Lula I	Delicidio do Amaral:PT	Jose Agripino:PFL
Lula II	Eduardo Suplicy:PT	Jose Agripino:PFL/DEM

The 'Gibbs Sampling' part of the `BUGS` name is indicative of how these models have been estimated in the literature. In the equation $y_{ij} = \beta_j \boldsymbol{x}_i - \alpha_j$, all we have are the votes y_{ij} ($1, 0$, or `NA`). The Gibbs sampler uses starting values for the item parameters to provisionally estimate the ideal points, and then does the same for the item parameters using the provisional ideal points. In `ideal` and `MCMCpack`, the Gibbs sampler is automatically used, the only drawback being that only one MCMC chain can be run at any one time. `JAGS` allows much more control over the model, but there is an issue with the samplers with these ideal point models. `JAGS` automatically chooses samplers for the parameters based on the model and the modules loaded. The assumption in the literature seems to be that `JAGS` is able to ascertain that there is conjugacy among the distributions of this model and so uses Gibbs sampling, however, using the `runjags` package (Denwood, 2016), one can see that `JAGS` very rarely does this and usually uses the default Metropolis-Hastings (MH) sampler (for a two-dimensional model) or a slice sampler (for a unidimensional model).[71] The reason I raise this issue is because convergence of the MCMC chains in more than one dimension can prove almost

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[71] The reason is that `JAGS` cannot build a DAG (Directed Acyclic Graph) from the model because of the unobserved regressor $\boldsymbol{x}_i$. See the discussion on http://sourceforge.net/p/mcmc-jags/discussion/610037/thread/5c9e9026/

impossible with `JAGS`, as the MH sampler mixes extremely poorly. I have not seen a discussion of this in the literature as it seems the assumption is that Gibbs sampling is used by `JAGS` (or `BUGS`) for this problem, however, in my experience, it is not. For these reasons, I chose to use Stan (and the package `rstan` in R) to run the two dimensional model, the multilevel model, the topic model and the joint Chamber-and-Senate model in Chapter Three.

Regarding the specifics of model runs in `R`, the unidimensional models were run for one million iterations in `MCMCpack` with 100,000 burn-in, and the topic, multilevel and two-dimensional models were run in `rstan` for 7000 iterations with 3000 iterations discarded as burn-in (Stan needs far less iterations). Stan code for the models is provided in the Dropbox folder for this thesis: [https://www.dropbox.com/sh/23ocyhdoyeupkoc/AABgxZnPIXpjieChC48gYeFaa?dl=0.]

7.5   Diagnostics

There are various diagnostic checks available for MCMC methods (see Gill, 2007, for a critique and analysis). Some recommend running multiple chains and checking for signs of convergence using the Gelman-Rubin statistic (also referred to as 'Rhat' or the potential scale reduction factor) (see Gelman et al., 2014, p.285). The desired result is that the Rhat statistic is close to 1, usually 1.03 or lower. A representative sample is shown for the joint-space unidimensional model of Chapter Three, for the 52nd legislature (**Fig 37**); in general, this statistic was lower than 1.03 for most models, rising above this value for some legislatures with the 2D model, but even in these cases the statistic appeared to be high for only a few parameters. As Hollyer et al. (2014) argue, for models such as these, with hundreds of individual parameters, this can happen by chance (2014, p.18). There are other diagnostics: trace-plots, running means, Geweke statistics, posterior densities and histograms are all useful and are straightforward to produce in `R` from the `rstan` runs shown above. In the `R` scripts provided for reproducibility, commands are given to produce these diagnostics. In general,

running these models in `rstan` resulted in no signs of non-convergence for most models. The estimates are obviously better for when we have more information: some parameters in the 2D model displayed 'snaking' trace-plots (indicating non-convergence), as did ideal points for topics where there were not many votes. The 'snaking' was reasonably small, however.
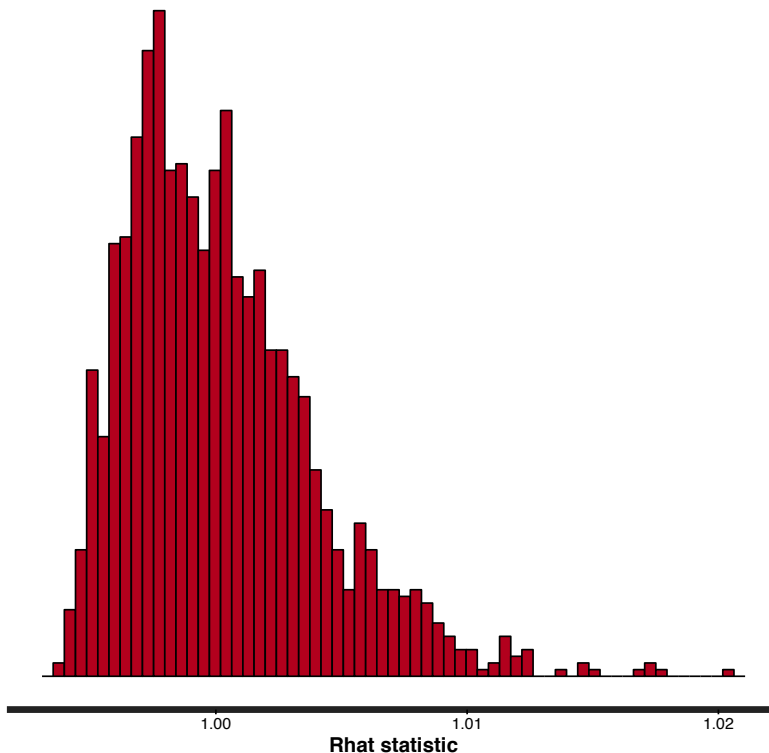

Figure 37: Gelman-Rubin statistic for the 52nd legislature, Senate and Chamber.

7.6   Two-Dimensional Models for the Senate

The following figures present two-dimensional models for the periods not shown in §4.6. As can be seen, the two methods produce notably different results, leaving us unsure as to which is appropriate. Regardless, neither appear overly reliable for the Senate, where we need confidence either in the placement of vote content on an ideological scale or ideal points on a scale, the content of which may not be clear. These figures highlight the lack of clarity between the two methods, and so were another reason why the Senate was judged to be better described by a unidimensional policy space instead of two or more dimensions.
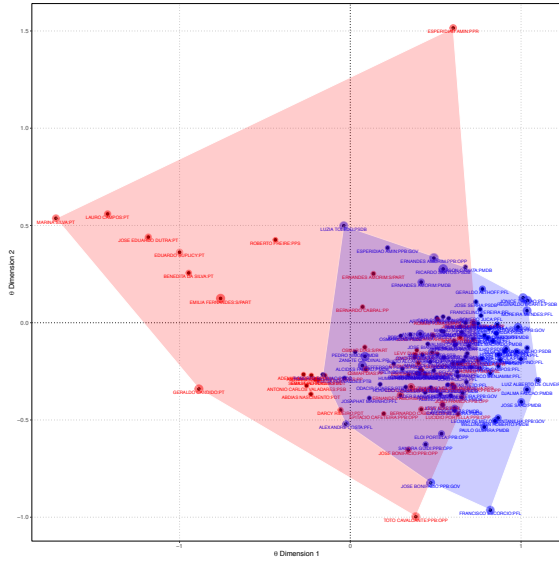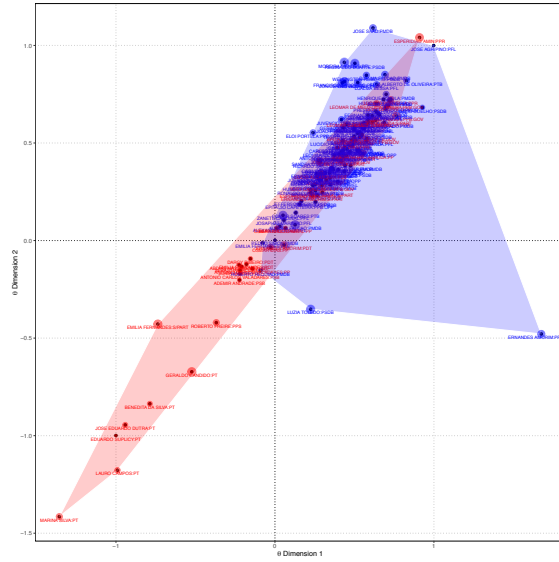
Figure 38: Jackman Method

Figure 39: NOMINATE Method

Two-Dimensional Models for the 50th Legislature, using both methods detailed in the text.
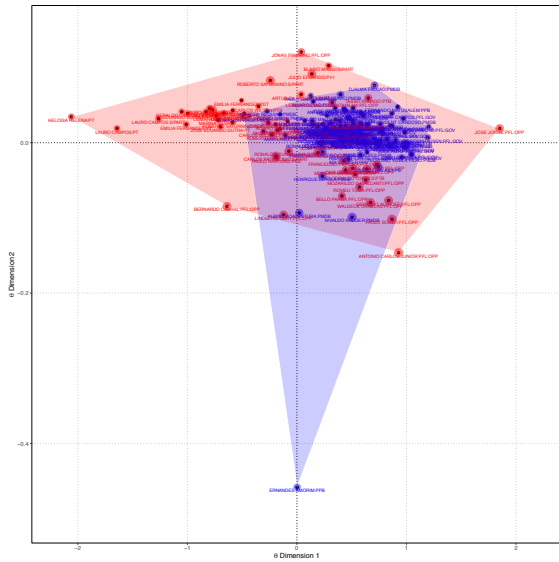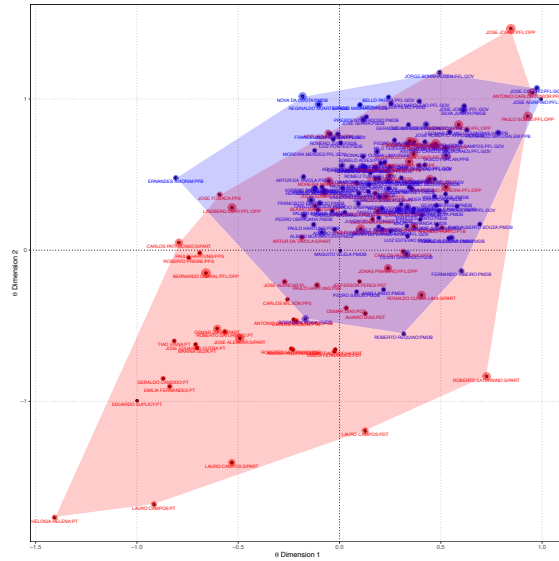

Figure 40: Jackman Method

Figure 41: NOMINATE Method

Two-Dimensional Models for the 51st Legislature, using both methods detailed in the text.
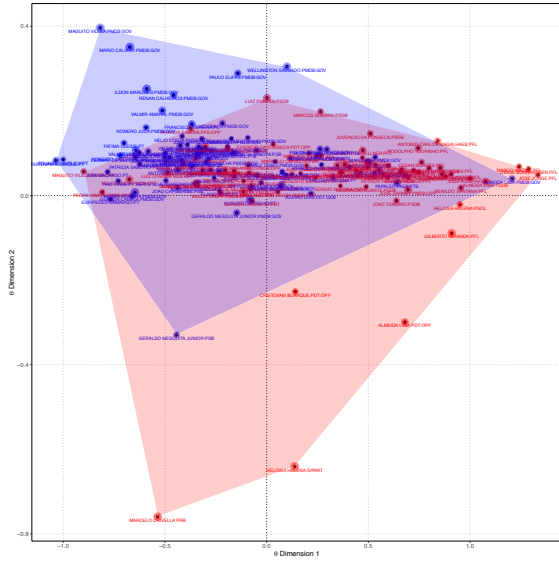
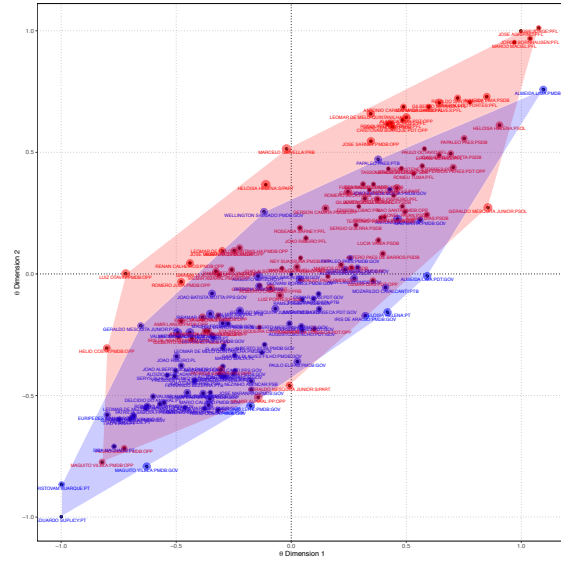**Figure 42:** Jackman Method

Figure 43: NOMINATE Method

Two-Dimensional Models for the 52nd Legislature, using both methods detailed in the text.
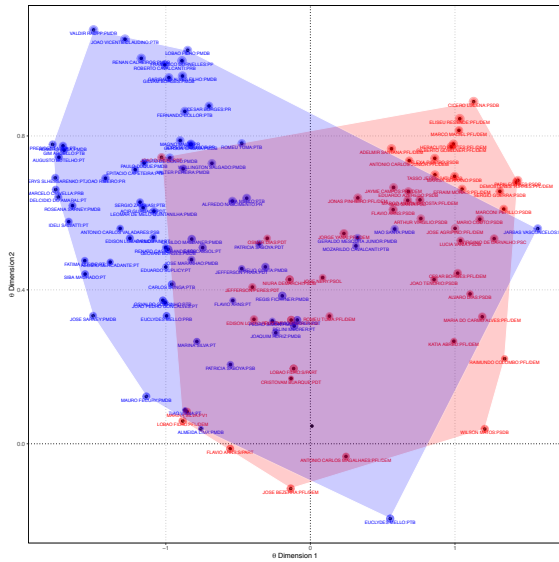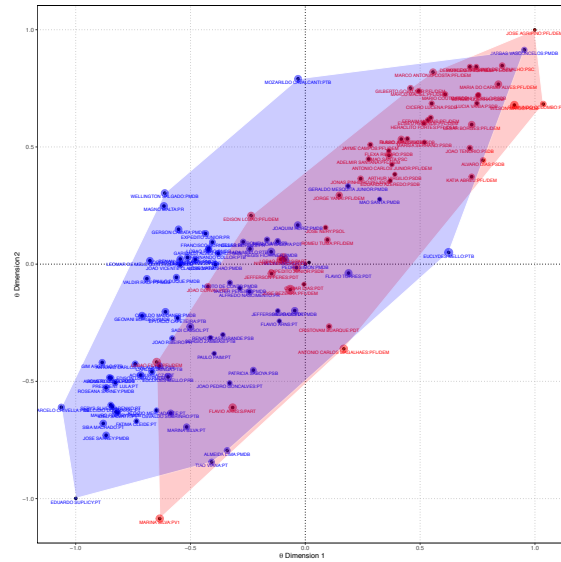

Figure 44: Jackman Method

Figure 45: NOMINATE Method

Two-Dimensional Models for the 53rd Legislature, using both methods detailed in the text.

References

Alcántara, M. and Rivas, C. (2006). The Left-Right Dimension in Latin American Party Politics. Prepared for delivery at the 2006 Annual Meeting of the American Political Science Association, August 30th-September 3.

Aldrich, J. H., Gelpi, C., Feaver, P., Reifler, J., and Thompson Sharp, K. (2006). Foreign policy and the electoral connection. *Annual Review of Political Science*, 9:477–502.

Alemán, E. (2008). Policy Positions in the Chilean Senate: An Analysis of Coauthorship and Roll Call Data. *Brazilian Political Science Review*, 2(2):74–92.

Ames, B. (1995). Electoral Rules, Constituency Pressures, and Pork Barrel: Bases of Voting in the Brazilian Congress. *Journal of Politics*, 57(2):324–343.

Amorim Neto, O. (2006). The Presidential Calculus. *Comparative Political Studies*, 39(4):415–440.

Armstrong, D., Poole, K., R. Bakker, H. Rosenthal, R. Carroll, and C. Hare (2014). *Analyzing Spatial Models of Choice and Judgement with R.* CRC Press.

Backes, A. L. (2008). Fortalecimento parlamentar de minorias regionais e suas razões. In Lemos, L. B., editor, *O Senado Federal brasileiro no pós-constituinte*, Edições Unilegis de Ciência Política, chapter 2, pages 62–84. Senado Federal, Unilegis.

Bafumi, J. (2005). Practical Issues in Implementing and Understanding Bayesian Ideal Point Estimation. *Political Analysis*, 13(2):171–187.

Bailey, M. A. (2007). Comparable Preference Estimates across Time and Institutions for the Court, Congress, and Presidency. *American Journal of Political Science*, 51(3):433–448.

Barros, C. (2015). O giro do PSDB no espectro politico e o deslocamento do PT. *Folha de São Paulo*, 9 September.

Bernabel, R. (2015). Does the Electoral Rule Matter for Political Polarization? The Case of Brazilian Legislative Chambers. *Brazilian Political Science Review*, 9(2):81–108.

Black, D. (1948). On the rationale of group decision-making. *Journal of Political Economy*, 56(1):23–34.

Brooke, J. (1990). In Brazil, Scathing Criticism For the Departing President. *The New York Times*, March 13.

Broz, J. L. (2005). Congressional Politics of International Financial Rescues. *American Journal of Political Science*, 49(3):479–496.

Broz, J. L. and Frieden, J. A. (2001). The Political Economy of International Monetary Relations. *Annual Review of Political Science*, 4(1):317–343.

Broz, J. L. and Hawes, M. B. (2006). Congressional Politics of Financing the International Monetary Fund. *International Organization*, 60(2):367–399.

Bueno de Mesquita, B., Smith, A., Siverson, R. M., and Morrow, J. D. (2003). *The Logic of Political Survival*. MIT Press, Cambridge, Mass.

Canes-Wrone, B., Howell, W. G., and Lewis, D. E. (2008). Toward a Broader Understanding of Presidential Power: A Reevaluation of the Two Presidencies Thesis. *The Journal of Politics*, 70(1):1–16.

Cason, J. W. and Power, T. J. (2009). Presidentialism, Pluralization, and the Rollback of Itamaraty: Explaining Change in Brazilian Foreign Policy Making in the Cardoso-Lula Era. *International Political Science Review*, 30(2):117–140.

Cheibub, J. A., Figueiredo, A., and Limongi, F. (2009). Partidos políticos e governadores como determinantes do comportamento legislativo na câmara dos deputados, 1988-2006. *Dados*, 52(2):263–299.

Clinton, J. D. (2007). Lawmaking and roll calls. *Journal of Politics*, 69:457–469.

Clinton, J. D. (2012). Using Roll Call Estimates to Test Models of Politics. *Annual Review of Political Science*, 15(1):79–99.

Clinton, J. D., Jackman, M., and Jackman, S. (2013). Characterizing Chief Executives: Comparing Presidential and Congressional Preferences and Their Effect on Lawmaking, Agency Budgeting, and Unilateral Executive Action, 1874–2010. Working Paper.

Clinton, J. D. and Jackman, S. (2009). To Simulate or NOMINATE? *Legislative Studies Quarterly*, 34(4):593–621.

Clinton, J. D., Jackman, S., and Rivers, D. (2001). The Statistical Analysis of Roll Call Data. http://politics.as.nyu.edu/docs/IO/4756/jackman_nemp.pdf. Working Paper.

Clinton, J. D., Jackman, S., and Rivers, D. (2004). The statistical analysis of roll call data. *American Political Science Review*, 98(02):355–370.

Clinton, J. D. and Meirowitz, A. (2004). Testing Explanations of Strategic Voting in Legislatures: A reexamination of the compromise of 1790. *American Journal of Political Science*, 48(4):675–689.

Coe, R. (2002). It's the Effect Size, Stupid: What effect size is and why it is important. http://www.leeds.ac.uk/educol/documents/00002182.htm.

Cohen, B. J. (2008). *International Political Economy: an intellectual history.* Princeton University Press, Princeton.

Congleton, R. D. (2003). The median voter model. In Rowley, C. K. and Schneider, F., editors, *The Encyclopedia of Public Choice*, pages 707–712. Springer.

de Freitas, A. M., Izumi, M., and Medeiros, D. B. (2012). O Congresso Nacional em Duas Dimensões: Estimando Pontos Ideais de Deputados e Senadores (1988-2010). Paper presented at the 8th Meeting of ABCP 01-04 August, Gramado-RS.

Denwood, M. J. (2016). runjags: An R package providing interface utilities, parallel computing methods and additional distributions for MCMC models in JAGS. *Journal of Statistical Software.*

Desposato, S. W. (2004). The Impact of Federalism on National Party Cohesion in Brazil. *Legislative Studies Quarterly*, 29(2):259–285.

Desposato, S. W. (2006). The Impact of Electoral Rules on Legislative Parties: Lessons from the Brazilian Senate and Chamber of Deputies. *Journal of Politics*, 68(4):1018–1030.

Dhingra, S. (2014). Reconciling observed tariffs and the median voter model. *Economics & Politics*, 26(3):483–504.

Diniz, S. (2012). O Senado Federal e a deliberação de atos internacionais no presidencialismo brasileiro. *Revista Brasileira de Ciências Sociais*, 27(80).

Diniz, S. and Ribeiro, C. (2010). Acordos internacionais e controle parlamentar no Brasil. *Revista de Sociologia e Política*, 18(37):75–92.

Downs, A. (1957). An economic theory of political action in a democracy. *The Journal of Political Economy*, 65(2):135–150.

Doyle, W. R. (2010). U.S. Senator's Ideal Points for Higher Education: Documenting Partisanship, 1965–2004. *The Journal of Higher Education*, 81(5):619–644.

Dutt, P. and Mitra, D. (2005). Political ideology and endogenous trade policy: an empirical investigation. *Review of Economics and Statistics*, 87(1):59–72.

Figueiredo, A. C. (2007). Government Coalitions in Brazilian Democracy. *Brazilian Political Science Review*, 1(2):182–216.

Figueiredo, A. C. and Limongi, F. (2000). Presidential Power, Legislative Organization, and Party Behavior in Brazil. *Comparative Politics*, 32(2):151.

Fleisher, R., Bond, J. R., Krutz, G. S., and Hanna, S. (2000). The Demise of the Two Presidencies. *American Politics Research*, 28(1):3–25.

Flynn, P. (1996). Brazil: the politics of the 'Plano Real'. *Third World Quarterly*, 17(3):401–426.

Fordham, B. O. and McKeown, T. J. (2003). Selection and Influence: Interest Groups and Congressional Voting on Trade Policy. *International Organization*, 57(03).

Frieden, J. A. (1988). Sectoral conflict and foreign economic policy, 1914-1940. *International Organization*, 42(1):59–90.

Gelman, A., Carlin, J. B., Stern, H. S., Dunston, D. B., Vehtari, A., and Rubin, D. B. (2014). *Bayesian Data Analysis*. Chapman & Hall/CRC, third edition.

Gerrish, S. and Blei, D. M. (2011). Predicting legislative roll calls from text. In *Proceedings of the 28th international conference on machine learning*, pages 489–496.

Gerrish, S. and Blei, D. M. (2012). How they vote: Issue-adjusted models of legislative behavior. In Pereira, F., Burges, C., and Bottou, L., editors, *Advances in Neural Information Processing Systems*, volume 25, pages 2753–2761.

Gilks, W. R., Richardson, S., and Spiegelhalter, D. J. (1996). Introducing Markov chain Monte Carlo. In Gilks, W. R., Richardson, S., and Spiegelhalter, D. J., editors, *Markov Chain Monte Carlo in Practice*, chapter 1. Chapman and Hall, London.

Gilks, W. R. and Spiegelhalter, D. J. (1994). A language and program for complex Bayesian modelling. *The Statistician*, 43:169–178.

Gill, J. (2007). Is Partial-Dimension Convergence a Problem for Inferences from MCMC Algorithms? *Political Analysis*, 16(2):153–178.

Gourevitch, P. A. (1977). International trade, domestic coalitions, and liberty: Comparative responses to the crisis of 1873-1896. *The Journal of Interdisciplinary History*, 8(2):281–313.

Grossman, G. M. and Helpman, E. (2001). *Special Interest Politics*. MIT, Cambridge, Mass.

Guisinger, A. (2009). Determining Trade Policy: Do Voters Hold Politicians Accountable? *International Organization*, 63(03):533.

Haddad, E. A. and Jank, M. S. (2006). The Evolution of Agricultural Policies and Agribusiness Development in Brazil. *Choices*, 21(2).

Helfand, S. M. (1999). The Political Economy of Agricultural Policy in Brazil: Decision Making and Influence from 1964 to 1992. *Latin American Research Review*, 34(2):3–41.

Hiroi, T. and Neiva, P. R. P. (2013). Malapportionment and Geographical Bases of Electoral Support in the Brazilian Senate. *Journal of Politics in Latin America*, 5(1):127–150.

Hix, S., Noury, A., and Roland, G. (2006). Dimensions of politics in the European Parliament. *American Journal of Political Science*, 50(2):494–520.

Hollyer, J. R., Rosendorff, B. P., and Vreeland, J. R. (2014). Measuring Transparency. *Political Analysis*, 22(4):1–22.

Izumi, M. (2012). Governo e Oposição no Senado brasileiro. http://www.fflch.usp.br/dcp/assets/docs/SemDisc2012/04-2_Mauricio_Izumi.pdf. Prepared for the II Seminário Discente da Pós-Graduação em Ciência Política da USP, University of São Paulo.

Jackman, S. (2001). Multidimensional analysis of roll call data via Bayesian simulation: identification, estimation, inference, and model checking. *Political Analysis*, 9(3):227–241.

Jackman, S. (2009). *Bayesian analysis for the Social Sciences*. Wiley series in probability and statistics. Wiley, Chichester, U.K.

Jackman, S. (2015). pscl: Classes and methods for r developed in the political science computational laboratory, stanford university. http://pscl.stanford.edu/.

Johnson, V. E. and Albert, J. (1999). *Ordinal data modeling.* Statistics for social science and public policy. Springer, New York.

Karol, D. (2007). Does constituency size affect elected officials' trade policy preferences? *Journal of Politics*, 69(2):483–494.

Kellermann, M. (2012). Estimating ideal points in the British House of Commons using early day motions. *American Journal of Political Science*, 56(3):757–771.

Kindleberger, C. P. (1951). Group behavior and international trade. *The Journal of Political Economy*, pages 30–46.

Konig, T., Marbach, M., and Osnabrugge, M. (2013). Estimating Party Positions across Countries and Time–A Dynamic Latent Variable Model for Manifesto Data. *Political Analysis*, 21(4):468–491.

Kruschke, J. K. (2013). Bayesian Estimation Supersedes the t Test. *Journal of Experimental Psychology: General*, 142(2):573–603.

Kruschke, J. K. and Meredith, M. (2015). BEST: Bayesian Estimation Supersedes the t-Test. https://CRAN.R-project.org/package=BEST.

Ladha, K. K. (1991). A spatial model of legislative voting with perceptual error. *Public Choice*, 68(1-3):151–174.

Lake, D. A. (2008). The State and International Relations. In Reus-Smit, C. and Snidal, D., editors, *The Oxford handbook of international relations*, chapter 1, pages 41–61. Oxford University Press, Oxford.

Lauderdale, B. E. (2010). Unpredictable Voters in Ideal Point Estimation. *Political Analysis*, 18(2):151–171.

Lauderdale, B. E. and Clark, T. S. (2012). The Supreme Court's Many Median Justices. *American Political Science Review*, 106(04):847–866.

Lauderdale, B. E. and Clark, T. S. (2014). Scaling politically meaningful dimensions using texts and votes. *American Journal of Political Science*, 58(3):754–771.

Lawrence, R. Z. (2005). Policymakers and trade legislation. Paper prepared for The Political Economy of Globalization: How Firms, Workers, and Policy-Makers Are Responding to Global Economic Integration, April 29-30, Princeton University.

Lemos, L. B. (2010). *Brazilian Congress and Foreign Affairs: Abdication or Delegation?* Global Economic Governance Programme, GEG Working Paper 2010/58.

Leoni, E. (2002). Ideologia, Democracia e Comportamento Parlamentar: a Câmara dos Deputados (1991-1998). *Dados*, 45(3):361–386.

Limongi, F. and Figueiredo, A. (1996). *Câmara dos Deputados: Organização Interna e Processo Legislativo.* Caderno de Pesquisa CEBRAP.

Lo, J., Proksch, S. O., and Gschwend, T. (2014a). A Common Left-Right Scale for Voters and Parties in Europe. *Political Analysis*, 22(2):205–223.

Lo, J., Proksch, S. O., and Slapin, J. (2014b). Ideological Clarity in Multi-Party Competition: A New Measure and Test Using Election Manifestos. http://q-aps.princeton.edu/files/jameslo.pdf.

Londregan, J. B. (2000). *Legislative institutions and ideology in Chile.* Cambridge University Press, Cambridge, UK.

Lü, X. and Scheve, K. (2008). Protecting the Poor: Skill Bias in the International Distribution of Trade Protection. Working Paper.

Lu, Y. and Wang, X. (2006). A Hierarchical Bayesian Framework for Item Response Theory Models with Applications in Ideal Point Estimation. http://www.polmeth.wustl.edu/media/Paper/hier_ide_0715.pdf.

Lu, Y. and Wang, X. (2011). Understanding complex legislative and judicial behaviour via hierarchical ideal point estimation. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, 60(1):93–107.

Lucas, K. and Samuels, D. (2010). The Ideological "Coherence" of the Brazilian Party System, 1990-2009. *Journal of Politics in Latin America*, 2(3):39–69.

Ludmer, P. (2007). *Derriça Elétrica.* Artliber Editora, São Paulo.

Mainwaring, S. and Liñán, A. P. (1997). Party discipline in the Brazilian constitutional congress. *Legislative studies quarterly*, pages 453–483.

Malamud, A. (2005). Presidential Diplomacy and the Institutional Underpinnings of MERCOSUR: An Empirical Examination. *Latin American Research Review*, 40(1):138–164.

Mansfield, E. D., Milner, H. V., and Rosendorff, B. P. (2002). Why democracies cooperate more: Electoral control and international trade agreements. *International Organization*, 56(3):477–513.

Martin, A. and Quinn, K. (2002). Dynamic Ideal Point Estimation via Markov Chain Monte Carlo for the U.S. Supreme Court, 1953-1999. *Political Analysis*, 10(2):134–153.

Martin, A., Quinn, K., and Park, J. H. (2011). MCMCpack: Markov Chain Monte Carlo in R. *Journal of Statistical Software*, 42(9):1–21.

Martin, L. (2000). *Democratic Commitments: Legislatures and International Cooperation.* Princeton University Press, Princeton, N.J.

McCarty, N., Poole, K. T., and Rosenthal, H. (2001). The hunt for party discipline in congress. *The American Political Science Review*, 95(3):673–687.

McCormick, J. M. and Wittkopf, E. R. (1990). Bipartisanship, Partisanship, and Ideology in Congressional-Executive Foreign Policy Relations, 1947–1988. *The Journal of Politics*, 52(04):1077–1100.

Melo, N. M. L. d. and Batista, M. (2012). Diferentes, mas iguais? Padrões de disciplina partidária na Câmara e no Senado. *Revista Política Hoje*, 21(1).

Milner, H. V. (1997). *Interests, Institutions, and Information.* Princeton University Press.

Milner, H. V. and Judkins, B. (2004). Partisanship, Trade Policy, and Globalization: Is there a left–right divide on trade policy? *International Studies Quarterly*, 48(1):95–120.

Milner, H. V. and Mukherjee, B. (2009). Democracy and the Skill-Bias in Trade Policy in Developing Countries. *Available at SSRN 2182080.*

Milner, H. V. and Tingley, D. (2015). *Sailing the Water's Edge: The Domestic Politics of American Foreign Policy.* Princeton University Press.

Milner, H. V. and Tingley, D. H. (2009). The Political Economy of U.S. Foreign Aid: American Legislators and the Domestic Politics of Aid. *Economics & Politics*, 22(2):200–232.

Milner, H. V. and Tingley, D. H. (2011). Who supports global economic engagement? The sources of preferences in American foreign economic policy. *International Organization*, 65(01):37–68.

Morgenstern, S. (2003). *Patterns of Legislative Politics Roll-Call Voting in Latin America and the United States.* Cambridge University Press, Cambridge.

Neiva, P. (2008). Os poderes dos senados de países presidencialistas e o caso do Brasil. In Lemos, L. B., editor, *O Senado Federal brasileiro no pós-constituinte*, Edições Unilegis de Ciência Política, chapter 1, pages 23–62. Senado Federal, Unilegis.

Neiva, P. (2010). Senado brasileiro: Um conselho de anciãos? *Revista de Informação Legislativa*, 47(187).

Neiva, P. (2011). Disciplina partidária e apoio ao governo no bicameralismo brasileiro. *Revista de Sociologia e Política*, 19(39):183–196.

Neiva, P. and Izumi, M. (2012). Os sem-voto do Legislativo brasileiro: quem são os senadores suplentes e quais os seus impactos sobre o processo legislativo. *Opinião Pública*, 18(1):1–21.

Neiva, P. and Soares, M. M. (2013). The Brazilian senate: a federative or a party politics chamber? *Revista Brasileira de Ciências Sociais*, 28(81):97–115.

Oliveira, A. J. d. (2013). Partidos Políticos, Legislativo e Política Externa no Brasil: de 1995 à 2009. CAENI Working Paper.

Onuki, J. and Oliveira, A. J. d. (2010). Política comercial e legislativo: a atuação do empresariado brasileiro. In Mancuso, W. P., Leopoldi, M. A., and Wagner, I., editors, *Estado, Empresariado e Desenvolvimento no Brasil: Novas Teorias, Novas Trajetórias*. Editora de Cultura, São Paulo, Brazil.

Onuki, J., Ribeiro, P. F., and Oliveira, A. J. d. (2009). Political parties, foreign policy and ideology: Argentina and Chile in comparative perspective. *Brazilian Political Science Review*, 4.

Orman, J. (1988). The president and interest group access. *Presidential Studies Quarterly*, 18(4):787–791.

Palma, J. G. (2012). The 1999 Brazilian financial crisis: how to create a financial crisis by trying to avoid one. *Financial Stability and Growth Workshop*, Center of Structuralist Development Macroeconomics, Fundação Getulio Vargas.

Plummer, M. (2003). JAGS: A program for analysis of Bayesian graphical models using Gibbs sampling. In Hornik, K. and Leisch, F., editors, *Proceedings of the 3rd International Workshop on Distributed Statistical Computing, March 20-22*, Vienna, Austria.

Poole, K., Lewis, J., Lo, J., and Carroll, R. (2011). Scaling Roll Call Votes with wnominate in R. *Journal of Statistical Software*, 42.

Poole, K. T. (2005). *Spatial models of parliamentary voting.* Cambridge University Press, New York.

Poole, K. T. and Rosenthal, H. (1985). A spatial model for legislative roll call analysis. *American Journal of Political Science*, 29(2):357–384.

Power, T. J. and Zucco Jr., C. (2009). Estimating Ideology of Brazilian Legislative Parties, 1990-2005. *Latin American Research Review*, 44(1).

Prins, B. C. and Marshall, B. W. (2001). Congressional Support of the President: A Comparison of Foreign, Defense, and Domestic Policy Decision Making during and after the Cold War. *Presidential Studies Quarterly*, 31(4):660–678.

Putnam, R. D. (1988). Diplomacy and domestic politics: the logic of two-level games. *International Organization*, 42(3):427–460.

R Core Team (2015). R: A language and environment for statistical computing. https://www.R-project.org/.

Ribeiro, P. F. (2012). *Comportamento Legislativo e Política Externa na América Latina.* PhD thesis, Faculdade de Filosofia, Letras e Ciências Humanas, São Paulo.

Ribeiro, P. F. and Amorim, C. (2000). Congresso Nacional e MERCOSUL: o caso da Aprovação da Entrada da Venezuela. *MERIDIANO 47*.

Ribeiro, P. F. and Miranda, R. (2011). Congresso Nacional e Política Externa. O caso do envio de tropas ao Haiti: Argentina, Brasil e Chile. *Revista Política Hoje*, 20(1).

Ribeiro, P. F., Oliveira, A. J. d., and Galdino, M. (2009). Política externa chilena e espectro ideológico político-partidário: um estudo sobre a Câmara dos Deputados (2002-2006). *Revista Dados*, 52(4):835–870.

Rivers, D. (2003). Identification of Multidimensional Spatial Voting Models. http://polmeth.wustl.edu/files/polmeth/river03.pdf.

Roberts, J. M. (2007). The Statistical Analysis Of Roll-Call Data: A Cautionary Tale. *Legislative Studies Quarterly*, 32(3):341–360.

Robles, W., Petras, J., and Veltmeyer, H. (2015). *The Politics of Agrarian Reform in Brazil: The Landless Rural Workers Movement.* Social Movements and Transformation. Palgrave Macmillan, New York.

Rodrik, D. (1995). Polticial economy of trade policy. In Grossman, G. M. and Rogoff, K., editors, *Handbook of International Economics*, volume III, chapter 28. Elsevier, Amsterdam.

Rogowski, R. (1989). *Commerce and Coalitions: How Trade Affects Domestic Political Alignments.* Princeton University Press.

Rosas, G. and Zechmeister, E. (2000). Ideological Dimensions and Left-Right Semantics in Latin America. http://lasa.international.pitt.edu/Lasa2000/Rosas-Zechmeister.PDF.

Rosenthal, H. and Voeten, E. (2004). Analyzing Roll Calls with Perfect Spatial Voting: France 1946-1958. *American Journal of Political Science*, 48(3):620–632.

RStudio Team (2015). RStudio: Integrated Development Environment for R. http://www.rstudio.com/.

Saiegh, S. M. (2009). Recovering a basic space from elite surveys: Evidence from Latin America. *Legislative Studies Quarterly*, 34(1):117–145.

Samuels, D. (2003). *Ambition, federalism, and legislative politics in Brazil.* Cambridge University Press.

Samuels, D. (2006). Brazilian Democracy under Lula and the PT. Constructing Democratic Governance in Latin America, September 28-29.

Samuels, D. and Zucco Jr., C. (2013). The Strength of Party Labels in Brazil: Evidence from Survey Experiments. *American Journal of Political Science*, 51(1):212–235.

Saunders, E. N. (2015). War and the inner circle: Democratic elites and the politics of using force. *Security Studies*, 24:466–501.

Schneider, B. R. (1997). Organized Business Politics in Democratic Brazil. *Journal of Interamerican Studies and World Affairs*, 39(4):95–127.

Schonhardt-Bailey, C. (2006). *From the Corn Laws to Free Trade: interests, ideas, and institutions in historical perspective.* MIT Press, Cambridge, Mass.

Senado Federal (1995). *Diário Oficial do Senado Federal.* Number 82. Senado Federal, Brasília.

Senado Federal (2002). *Diário Oficial do Senado Federal.* Number 36. Senado Federal, Brasília.

Silva, R. S. e. (2014). Beyond Brazilian Coalition Presidentialism: the Appropriation of the Legislative Agenda. *Brazilian Political Science Review*, 8(3):98–135.

Simmons, B. (1997). *Who Adjusts?* Princeton University Press.

Sklair, L. (1997). Social Movements for Global Capitalism: The Transnational Capitalist Class in Action. *Review of International Political Economy*, 4(3):514–538.

Stan Development Team (2015). Stan: A C++ Library for Probability and Sampling.

Stolper, W. F. and Samuelson, P. A. (1941). Protection and Real Wages. *The Review of Economic Studies*, 9(1):58–73.

Thomas, C. S. and Hrebenar, R. J. (2008). Understanding interest groups, lobbying and lobbyists in developing democracies. *Journal of Public Affairs*, 8:1–14.

Treier, S. (2011). Comparing Ideal Points Across Institutions and Time. *American Politics Research*, 39(5):804–831.

Treier, S. and Jackman, S. (2008). Democracy as a latent variable. *American Journal of Political Science*, 52(1):201–217.

VanDoren, P. M. (1990). Can we learn the causes of congressional decisions from roll-call data? *Legislative Studies Quarterly*, 15(3):311–340.

Voeten, E. (2000). Clashes in the assembly. *International Organization*, 54(2):185–215.

Waltz, K. N. (1979). *Theory of International Politics*. Random House.

Watts, J. (2015). Dilma Rousseff's fate as Brazil president could hinge on her political enemies. *The Guardian*, 9 December.

Wiesehomeier, N. (2010). The meaning of left-right in Latin America: A comparative view. Technical report, Helen Kellog Institute.

Wiesehomeier, N. and Doyle, D. (2012). Attitudes, Ideological Associations and the Left-Right Divide in Latin America. *Journal of Politics in Latin America*, 4(1):3–33.

Wildavsky, A. (1966). The two presidencies. *Trans-action*, 4(2):7–14.

Ziliak, S. T. and McCloskey, D. N. (2008). *The Cult of Statistical Significance: How the Standard Error Costs Us Jobs, Justice, and Lives*. Economics, Cognition and Society. The University of Michigan Press, Ann Arbor.

Zucco Jr., C. (2008). The President's 'New' Constituency: Lula and the Pragmatic Vote in Brazil's 2006 Presidential Elections. *Journal of Latin American Studies*, 40:29–49.

Zucco Jr., C. (2009). Ideology or What? Legislative Behaviour in Multiparty Presidential Settings. *Journal of Politics*, 71(3):1076–1092.

Zucco Jr., C. and Lauderdale, B. E. (2011). Distinguishing Between Influences on Brazilian Legislative Behavior: Brazilian Legislative Behavior. *Legislative Studies Quarterly*, 36(3):363–396.