

Three essays on the political-economy of international taxation and investment

by

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Dedication

Je dédie cette thèse à Sari, Mailis, Béa et Władek.

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Abstract

This dissertation has three parts. (1) The political determinants of foreign direct investment: A machine learning approach. (2) Network externalities and interdependent policymaking: The case of international withholding taxes. (3) Individual-specific uncertainty, political institutions, and treaty-making.

Chapter 1

The political determinants of foreign direct investment:

A machine-learning approach

Abstract

Many studies claim to show that political institutions affect where foreign direct investment (FDI) flows, but three problems cast doubt over their findings: measurement error, publication bias, and the lack of out-of-sample predictive power. I use data on the investment location decisions of over 237,000 multinational corporations to circumvent these problems and reassess the relationship between politics and FDI. I evaluate the predictive power of 45 “political determinants” of FDI (e.g. democratic institutions, size of government, judicial independence) using logistic regression, supervised learning algorithms, and split-sample tests. While economic and demographic characteristics can help us develop accurate expectations about firm behavior, none of the political factors I consider appear to hold much influence over investment location decisions. This empirical result has important theoretical implications: it suggests that governments enjoy considerable leeway in the organization of their polities, despite the perceived constraints imposed by capital mobility.

Many studies claim to show that political institutions affect where foreign direct investment (FDI) flows, but three problems cast doubt over their findings. First, measurement error in aggregate FDI data poses a major threat to inference because errors are large and almost certainly related to our regressors of interest. Second, the fact that dozens of political variables may be related to investment behavior raises the prospect of multiple testing, and suggests that known results may be subject to publication bias. Third, as in other areas of the discipline (see e.g., Ward, Greenhill and Bakke, 2010), very little attention has been paid thus far to the fit between our theories of political-economy and new events in the real-world.

In this research note, I use data on over 237,000 multinational corporations to re-assess the relationship between politics and FDI. I evaluate the out-of-sample predictive power of 45 “political determinants” of FDI (e.g. democratic institutions, size of government) using a unified statistical/algorithmic framework. I find that while economic and demographic characteristics can help us develop accurate expectations about firm behavior, none of the political factors I consider appear to hold much influence over investment location decisions; models that exclude all political variables fare just as well as those that include them.

This empirical result has important theoretical implications: it suggests that governments might enjoy considerable leeway in the organization of their polities, despite the perceived constraints imposed by capital mobility.

My findings also dovetail with critical work by economists who point out that very few variables are robustly and systematically associated with patterns of international investment (Chakrabarti, 2001; Moosa and Cardak, 2006; Blonigen and Piger, 2011;

Eicher, Helfman and Lenkoski, 2012).¹ If even the more commonly accepted (economic) determinants of FDI are fragile, and if political variables hold little predictive power, then perhaps we should reevaluate the real-world usefulness of our political theories of international investment.

In section 1.1, I discuss some of the challenges that political scientists encounter when they study large datasets, and I argue that calculating the out-of-sample prediction accuracy of our models allows us to assess both their goodness-of-fit and the substantive importance of our theories. Section 1.2 reviews the principal problems that afflict aggregate FDI data, and points to firm-level analysis as a promising avenue for future empirical work. I describe Orbis (Bureau Van Dijk), a database which tracks the location of subsidiaries for a large sample of multinationals. Section 1.3 takes a first look at Orbis using the familiar framework of logistic regression. The results suggest that the data behave as expected given our theoretical priors, but also that seemingly important political variables such as “regime type” may not help us develop better expectations about investment behavior. Section 1.4 generalizes this insight, using a non-parametric model (random forests) to assess the out-of-sample predictive power of a wide range of political determinants of FDI.

¹Blonigen and Piger (2011), for example, write that the “variables with consistently high inclusion probabilities [in a Bayesian Model Averaging framework] are traditional gravity variables, cultural distance factors, parent-country per capita GDP, relative labor endowments, and regional trade agreements. Variables with little support for inclusion are multilateral trade openness, host-country business costs, host-country infrastructure (including credit markets), and host-country institutions. Of particular note, our results suggest that many covariates found significant by previous studies are not robust.”

I.I TOO MUCH OF A GOOD THING?

Many of the modern datasets that political scientists use are high-dimensional. For applied researchers, this is both a blessing and a curse.

One consequence of the increase in dataset sizes is a corresponding decrease in the usefulness of standard Fisherian null hypothesis tests. Indeed, if the sample is large enough, one can find statistically significant associations between most pairs of political and economic variables. This puts researchers at risk of (correctly) rejecting null hypotheses in the context of statistical models that are largely irrelevant to real world outcomes.

A related problem arises when analysts have access to a vast array of potential regressors. In such cases, one can and *should* rely on theory to guide variable selection. But even when we have strong theory, the fact remains that high-dimensional datasets carry with them a risk of over-fitting, and that they make “fishing” for statistically significant regressors easier than it perhaps should be.

I consider the “many variables” and the “many observations” problems in turn, and argue that out-of-sample estimates of predictive accuracy convey information that can guide both variable selection and the substantive interpretation of our results. Prediction error is a simple statistic which can be interpreted as goodness of fit, and which provides a window into the substantive significance of our variables of interest. Even if we have no interest in forecasting (though we should), the computation of prediction errors imposes itself as a best practice for model assessment, and as a useful complement to the more standard analysis of parameter estimates in terms of uncertainty and effect size.

Many variables

The relationship between politics and foreign direct investment is the topic of a large and growing number of studies (see Jensen et al. (2012) for an important new edited volume on the subject). These efforts build on rapid developments in the study of “political risk” during the 1960-70s in the fields of economics and business management (see Kobrin (1979) for a contemporary survey). Recent contributions by political scientists often emphasize the role of institutions in overcoming the “obsolescing bargain” problem that Vernon (1971) identifies.

Many political factors are considered important in the literature. For example, some analysts explore the relationship between regime type and FDI flows (Oneal, 1994; Li and Resnick, 2003; Jensen, 2003). Others have focused on partisanship (Pinto and Pinto, 2008; Pinto, 2013), the contractual environment and transaction costs (Henisz and Williamson, 1999; Henisz, 2000), corruption (Fredriksson, List and Millimet, 2003; Caprio, Faccio and McConnell, 2013), or international treaties (Kerner, 2009; Kerner and Lawrence, 2014).

These authors should be commended for developing precise concepts and theories that can be translated into measurable quantities and testable propositions. As a general matter, however, it is fair to say that the political determinants of FDI could work through a variety of distinct channels. For example, “institutional constraints on the Executive” could reduce the cost of doing business by making expropriation less likely (property rights protection), by preserving the status quo (veto players), by empowering a professional and independent judiciary (rule of law), or by limiting the discretionary power and rent extraction capabilities of the Executive (corruption). Each of these

causal pathways, in turn, could be operationalized using a slew of alternative measures. Sifting through the hundreds of “quality of governance” indicators assembled by Teorell et al. (2013) should suffice to convince anyone that there exists a plethora of likely political determinants of investment behavior.

In published studies, authors typically select one or a few of these variables for empirical testing; I am aware of no study to have systematically compared the explanatory power of a large array of political variables. This is problematic, because the vast number of plausible explanators means that the sum of our knowledge is potentially subject to a form of publication bias. Indeed, it is well established that academic journals tend to favor the publication of novel results, as well as articles that reject null hypotheses. This gives rise to the well-known “file drawer effect”, whereby published studies run an increased risk of committing a Type I error (Sterling, 1959; Rosenthal, 1979; Gerber, Green and Nickerson, 2001; Gerber and Malhotra, 2008). Importantly, publication bias obtains even in the absence of malicious intent by individual researchers.

In sum, if we can test the “institutional constraints” argument by regressing a measure of FDI on any of a large set of independent variables, then it is likely that the data will yield some statistically significant coefficient estimates, even if only by chance. The current note addresses this problem by leveraging data that does not appear to have been used in a study of this genre so far, and by explicitly comparing the predictive power of a large number of political variables within a unified statistical/algorithmic framework.

Many observations

Datasets that include many observations tend to yield statistically significant parameter estimates when we study them using the usual multiple regression technology. These estimates are important and useful because they convey information about the instantaneous rate of change that can be expected in our DV given a change in the IV, when other factors are held constant. But things are never *ceteris paribus*. If the phenomenon of interest is noisy, or if control variables are more strongly associated with the DV than our regressors of interest, then even an important-looking marginal effect may not matter much in the real world. In this section, I advocate for the use of prediction-based goodness-of-fit measures as a tool to assess the substantive importance of our models and explanations.

Prediction is obviously not the only goal of social science, but it is a singularly important one. In his response to Leo Breiman's important *Two Cultures* polemic (Breiman, 2001b), David R. Cox (2001, 217) insists that we must not dismiss theories that offer understanding and good retrospective explanations, but that "[t]he success of a theory is best judged from its ability to predict in new contexts[.]" My claim is more modest: even if we grant that researchers pursue a multiplicity of goals, it is reasonable to demand that the knowledge we derive from theory-building and hypothesis-testing help us develop better expectations about the world around us; our work should reduce the surprise that new events provoke when we encounter them. Therefore, even if we do not wish to predict, in individual instances, whether firm X will invest in country Y, the average prediction accuracy of our model remains an important criterion by which we can judge the relevance and usefulness of our explanations.

The above should be rather uncontroversial, since goodness-of-fit statistics have long been recognized by methodologists as an important complement to parameter and uncertainty estimates.² Yet, even if political scientists continue to report R^2 alongside their regression results (Krueger and Lewis-Beck, 2007), they tend to shy away from drawing much inference from the statistic. Their reticence to do so must certainly be linked to repeated admonitions that R^2 can be manipulated by adding more parameters to the model, but it is telling that a recent discussion of “best practices” in political science fails to mention the obvious alternative to in-sample goodness-of-fit statistics: split-sample assessment of predictive accuracy (Krueger and Lewis-Beck, 2007).

Out-of-sample testing has become standard in machine-learning, where analysts are acutely aware of the facts that (a) in large samples certain regressors may have effects that are (statistically) different from zero even if they explain very little of the variation in the dependent variable, and that (b) where there are multiple relevant regressors, the unbiasedness of OLS and GLM estimates is sometimes achieved at a considerable cost in terms of variance.³ In the next sections, I draw on the best practices of this other field to answer the following question: can we use information about politics to build a model that substantially improves our expectations with regards to investment-location decisions? The answer to this question should provide a lucid appraisal of the state of knowledge in the field, and could help direct future research efforts.

²See for instance the *Great R^2 /SEE Debate of 1990*, in which everyone agreed that prediction-based goodness-of-fit measures were useful, but disagreed over which one to use (Lewis-Beck and Skalaban, 1990; Achen, 1990; King, 1990).

³This second point motivates the search for parsimonious (regularized) models with good predictive performance in Tibshirani (1996), for example.

I.2 MEASUREMENT ERROR, FIRM-LEVEL DATA, AND SAMPLING STRATEGY

I open this section by reviewing several well-known problems in aggregate FDI data. This discussion leads me to propose that future research work on the political determinants of FDI be moved to the firm level, and I describe a large dataset which can help us do just that. I conclude by describing the set of political predictors that will be part of prediction models in sections 1.3 and 1.4.

Measurement error in prior work on FDI

The only data that allow cross-national and over time comparisons in FDI flows at the aggregate level are published in UNCTAD's World Investment Reports and in the International Monetary Fund's Balance of Payments Yearbooks. The breadth of coverage and the convenience of these data have made them a primary source for research on international investment in both political science and economics.

It is well known, however, that inference drawn from these datasets is fraught with problems. Kerner and Lawrence (2014) provide an excellent overview of the methodological problems involved in measuring aggregate FDI flows, with a focus on the use of these measures in the literature on the political determinants of FDI. The authors highlight three principal problems. First, bilateral FDI data typically record information on the location of an investment and the location of its direct owner, rather than its global ultimate owner. Second, cross-national comparisons are seriously hampered by discrepancies in data-collection methods and by inconsistent reporting standards. This is particularly problematic in the accounting of reinvested earnings, a category of investment that makes up a very large share of total FDI. Third, MNCs often con-

trol capital assets that were financed through debt issued in the host-country's financial market, and these funds are often unaccounted for in the aggregate FDI data.⁴

These problems pose a nontrivial threat to inference because many of our (political) independent variables of interest are likely to be correlated with the error in measures of FDI. For example, if the level of respect for property rights in the host-country dictates a firm's decision to invest there in the first place, there are good reasons to believe that it will also influence its choice to reinvest or repatriate foreign-earned income. And while typical treatments of the linear model tend to conclude that measurement error in the dependent variable is rather unproblematic (e.g. Greene, 2008, 326), this conclusion does not hold where, as is the case here, the error is correlated to some of the regressors.

To circumvent this problem, I jettison aggregate FDI data altogether and consider firm-level evidence on the investment behavior of 237, 270 multinationals.

Dependent variable

The Orbis database is maintained by Bureau Van Dijk. It includes information on over 120 million private companies in nearly every country. Most of these firms run purely domestic operations, but many of them are multinationals. In my analyses, I consider the subset of companies that Orbis links to a named Global Ultimate Owner (GUO), and eliminate firms that reside in the same country as their GUO (i.e. domestic investments). This leaves us with a sample of 736, 709 individual instances of FDI, from

⁴Kerner and Lawrence (2014) point out that this is good practice when your objective is to measure components of the balance of payments, but that most of our theories of political risk and investment behavior should apply to all the capital that an MNC controls in the host-country, not just that which was paid using funds from outside the host.

Table 1: Share of net FDI inflows and share of recorded foreign subsidiaries by country income level. Sources: World Bank and Orbis.

Income	Aggregate (%)	Firm-level (%)
High	57.4	69.9
Upper middle	34.1	26.1
Lower middle	7.5	3.4
Low	1.0	0.5

237, 270 parent companies.⁵

These data are often studied in other disciplines but do not appear to have been exploited much in political science yet. They offer the distinct advantage of covering multinationals from many countries, unlike the more regionally-focused databases like the BEA Survey of Direct Investment Abroad (see for example Jensen (2013)). The Orbis data is typically considered to be a fairly representative sample of the worldwide population of large firms. My discussion of the problems of aggregate FDI flow data (section 1.2) strongly suggests that examining the correlation between aggregate FDI data and the country by country breakdown of Orbis firms would not be informative. Still, Table 1 shows that the share of FDI that flows to countries in each income bracket roughly matches the corresponding share of Orbis firms, although high-income countries may be slightly over-represented when using firm-level accounting.⁶

The unit of analysis for all the tests I describe below is the GUO-country, and I use a binary dependent variable which indicates whether a particular GUO owns a company in a given country.

⁵Because some regressors are not available for all countries, the effective sample for the analysis covers 699, 431 foreign companies and 234, 844 GUOs.

⁶This may be a consequence of the fact that the firms tracked by Orbis are mostly quite large.

Independent variables

I consider three types of predictors: firm-level, dyadic, and host-country. The first firm-level predictor is a simple count of the number of countries in which a parent company has operations. The second is a series of dummy variables that indicate whether the firm has activities in each of the 25 top-level codes of the North American Industry Classification System (NAICS). I include four dyadic measures: a population-weighted measure of geographic distance between the host and the home-country, a dummy which indicates whether the host and the home share an official language (Mayer and Zignago, 2006), and indicators for the existence of bilateral tax treaties (BTTs) and bilateral investment treaties (BITs).⁷

The main variables of interest, for my purposes, pertain to host-country characteristics. My criteria for inclusion are exceedingly liberal: the variables need to measure a macro-level feature of the political environment or of political institutions, they need to be plausibly related to the behavior of international investors, and they need to be available for a broad cross-section of countries. My goal is to include very many political variables in order to stack the odds in favor of a “politics matters” conclusion. The full list of political predictors that I consider is reported in Table 4. It includes many of the measures that were used in previous research on the political determinants of FDI (e.g. regime type, property rights protection), as well as several other variables that do not seem to have been considered in this context so far (e.g. religion in politics, quality of the bureaucracy).

Because an MNC’s presence today depends on the political environment in the

⁷Information on BTTs and BITs was collected in July 2012 from the websites of Bureau van Dijk and UNCTAD, respectively.

recent past, I take country averages for each variable over the ten years that precede my acquisition of the cross-sectional Orbis data (2002-2012). I estimate two sets of models. The first uses all political predictors, but only covers 62 countries due to limited data availability. The second extends coverage to 131 countries by restricting the set of political predictors to 25.

Sampling

The large number of possible host-countries for each investing firm, and the fact that firms typically invest only in one or two foreign countries, means that the dependent variable will be highly unbalanced: just under 2% of observations show positive values. This “unbalanced labels” situation is common in machine-learning applications, and it poses two minor challenges: (1) considering all observations imposes an unnecessary computational burden, (2) it makes it easy to devise a highly accurate but trivial prediction model (i.e. guessing “no investment” for all observations gives over 98% prediction accuracy).

One common approach, which I follow here, is to produce a more balanced sample by selecting on the dependent variable.⁸ We choose all observations with a value of one on the dependent variable, and draw a random sample of non-events of the same size. The resulting choice-based sample can be used, with appropriate weights, with any of the classification algorithms that I describe below. The strategy is analogous to the sampling scheme used by Prentice and Pyke (1979) and advocated by King and Zeng (2001) in the rare events logit case. It produces datasets that are less computationally costly to use, and which allow us to calculate measures of predictive accuracy that value

our ability to classify events and non-events equally.

I.3 A FIRST LOOK: DEMOCRACY AND FDI

Before considering the full set of predictors, it is useful to look at a subset of variables in the familiar context of logistic regression. My goal is not to present credible point estimates for the marginal effects of the regressors that I consider, but rather to (a) provide a sanity check on the behavior of my firm-level data; (b) offer a useful new test of the arguments of Li and Resnick (2003); and (c) illustrate the fact that, in large datasets, political predictors can appear to be strongly related to the conditional probability of investment, even if this relationship is of minor relevance to real-world outcomes.

I begin by randomly splitting the dataset in two equal parts. The first is used to estimate a series of logit models, and the second to test their predictive accuracy in new data. The simple models I consider in this section include at most five regressors: *internationalization* of the firm, measured by the number of countries in which it has operations (Bureau Van Dijk, 2013); log *GDP* of the host-country (World Bank Development Data Group, 2013); geographic *distance* between the host and the firm's home-country (Mayer and Zignago, 2006); level of *democracy* of the host (Marshall, Jaggers and Gurr, 2012); and the quality of *property rights* protection (Heritage Foundation, 2013; Teorell et al., 2013). I estimate four logistic regression models, including new regressors in stepwise fashion, and I calculate the marginal effect at the mean (in terms of elasticity) for each variable.

⁸See Tomek (1976); Kubat and Matwin (1997); Xu, Gunawardana and Khudanpur (2011); Mineiro and Karampatziakis (2013) for general discussions of the unbalanced labels problem and for alternative sub-sampling strategies.

Table 2 presents the results from these tests. Five points are especially noteworthy. First, all coefficients and marginal effects are statistically different from zero. Given the size of the sample, this is not especially surprising. Second, the Orbis data generally behaves as expected. On the one hand, *distance* between host and home-countries appears to reduce the likelihood of investment. On the other, *internationalization*, *GDP*, *democracy*, and *property rights* all show positive coefficients. Third, *contra* Li and Resnick (2003), models III and IV offer no evidence that democratic institutions have a negative effect on the probability of investment. Even if we control for the level of property rights protection, the coefficient associated with the *democracy* variable is positive and statistically significant. Fourth, the marginal effects appear quite large substantively. On average and holding other factors constant, the elasticity of the probability of investment with respect to democracy is 0.6.

The fifth result I want to highlight is most crucial for the arguments in this paper: including measures of democracy and property rights protection yields *no improvement at all* in the out-of-sample predictive accuracy of the logit model. These two variables appear to have no predictive power above and beyond what can already be accounted for by the *GDP* of the host. Importantly, this conclusion holds true even if the estimated marginal effects suggest that the conditional association between *democracy* and *investment* is substantively important.

In the rest of this paper, I generalize this insight by applying an algorithmic method which allows me to consider a much broader set of political predictors. I conclude that, overall, political variables are bad predictors of MNCs' investment behavior.

Table 2: Determinants of investment location. Logistic regression.

		I	II	III	IV
Coef.	Intercept	0.416	-15.723	-15.062	-15.347
	Distance	-0.675	-0.713	-0.649	-0.663
	Internationalization	0.062	0.062	0.066	0.061
	GDP		0.619	0.549	0.540
	Democracy			0.083	0.072
	Property rights				0.009
$\partial \ln(\Pr(y=1))/\partial \ln(x)$.	Distance	-5.099	-5.393	-4.912	-5.025
	Internationalization	1.117	1.111	1.172	1.088
	GDP		15.997	14.176	13.989
	Democracy			0.639	0.554
	Property rights				0.700
Predictive accuracy (%)		71.9	77.6	77.5	77.1

$p < 0.001$ for all coefficients and marginal effects.

I.4 A NON-PARAMETRIC PREDICTION MODEL FOR HIGH-DIMENSIONAL DATA

In this section, I introduce classification trees, a non-linear and non-parametric technique developed by Breiman et al. (1984) to predict outcome variables with discrete values. I highlight the many attractive properties of the approach, including its simplicity, accuracy, scalability, and the fact that it can capture the types of complex interactive data structures that many political scientists are interested in. I also point to two important weaknesses of classification trees: their high variance and unsatisfactory treatment of collinear predictors. This leads me to random forests, an ensemble method which, by averaging over multiple trees, allows us to overcome the aforementioned problems.

Trees

Classification trees were introduced in Breiman et al. (1984) as a flexible algorithm for the prediction of dependent variables with discrete classes. The technique has been shown to perform remarkably well in a wide variety of applications, from astronomy and genomics to sociology. Classification trees' performance and ease of use help explain how the work of Breiman et al. (1984) could spawn a new field of study, and why it garnered nearly 24,000 citations over the past three decades.⁹ In short, trees are not a novelty item; they are one of the most basic and useful tools available to researchers who work with high-dimensional data.¹⁰

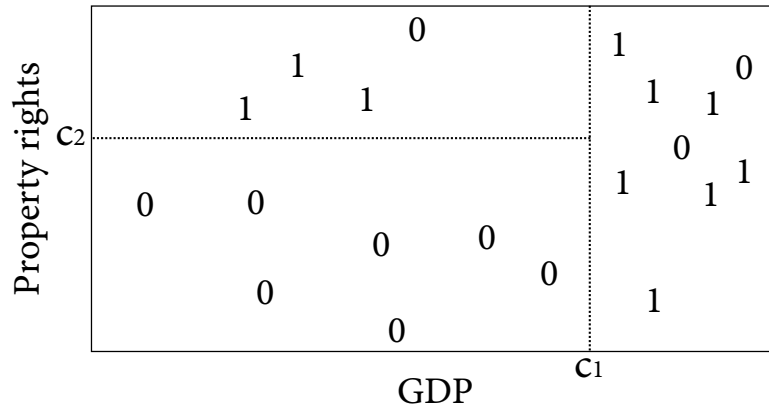
The core idea is simple: partition the predictor space recursively and assign the same predicted value to each of the observations that fall within a given subset of the data. Figure 1 illustrates this process in a hypothetical case with two predictors (*GDP* and *property rights*) and 20 observations on a binary outcome variable (e.g. the decision to invest in a given country). To begin, notice that if we naively predict 1 for all observations we will achieve 50% predictive accuracy (0s and 1s are represented in equal proportions in the data). One way to improve our guesses is to make different predictions in different subsets of the data. For example, we can split the sample space and predict 0 for every observation that falls to the left of the c_1 cut-point, and 1 for all others. This allows us to accurately classify 15 of the 20 observations. We can improve the model further by recursive partitioning: after the c_1 split, we make a second cut at c_2

⁹Google Scholar, 2014-02-26.

¹⁰My goal, in this paper, is to find out if political information, marshalled in the most efficient manner possible, can help us develop better expectations about previously unknown events. I chose to focus on random forests because they showed better out-of-sample performance than the alternative classification procedures I tried (logistic regression, extremely randomized trees (Geurts, Ernst and Wehenkel, 2006), AdaBoost (Freund and Schapire, 1996), and regularized (Lasso) logistic (Tibshirani, 1996)).

and predict 1 everywhere but in the lower-left section. This raises prediction accuracy to 85%.

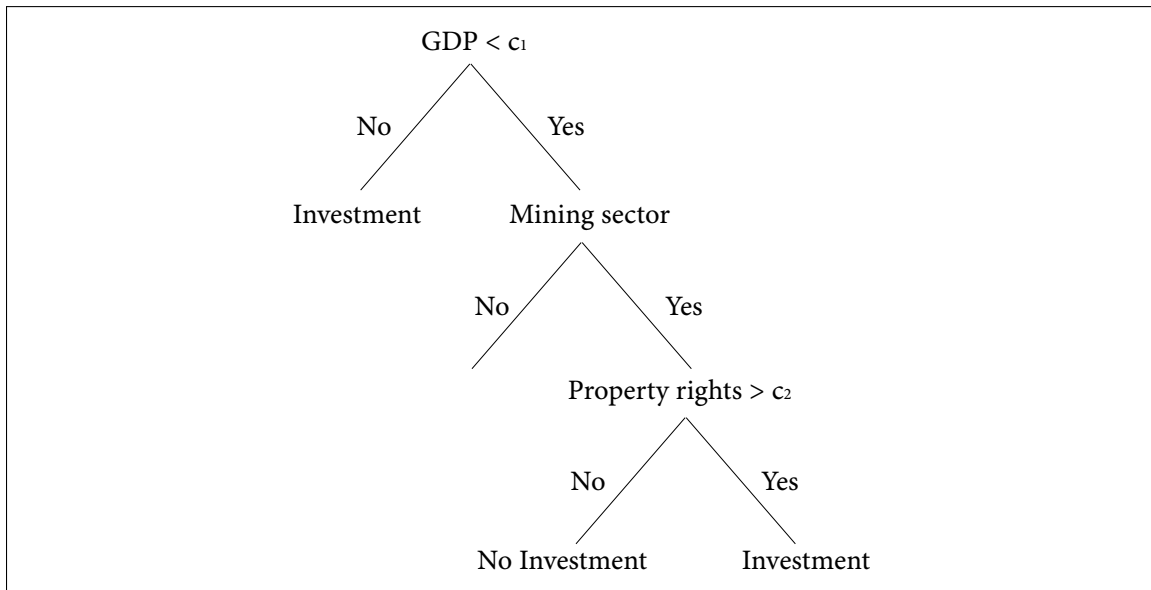
Figure 1: Partitioning a predictor space with two variables and a binary outcome.



In addition to their accuracy, one crucial benefit of classification trees is that they can capture the types of interactive data structures that many political scientists have in mind when they test arguments using multiplicative interaction models (Brambor, Clark and Golder, 2006). To see how, consider the alternative graphical representation in Figure 2. The sequence of partitions and the cut-points are the same as in Figure 1, but we add a new dimension related to industry type. This new tree allows us to account for two conditional arguments. First, firm behavior is only conditioned by institutional characteristics in the right-side branch, where investors consider whether they should invest in a low-income country. This reminds us of the broad vs. narrow distinction from Mosley (2003), where the author argues that international investors get more information value by monitoring politics in the developing world rather than in rich countries. Second, the tree in Figure 2 allows for the possibility that certain in-

stitutional characteristics (property rights protection) matter more in industries where ownership of the resource is crucial and fixed capital investments are large (mining). Both of these conditional/interactive arguments will be accommodated by the model I use, *as long as they improve fit*.

Figure 2: A hypothetical subtree for prediction of a binary outcome.



In the simple example I gave above it was easy to see that c_1 and c_2 were optimal cut-points. In practice, however, we often want to grow trees that include many more predictors.¹¹ To deal with high-dimensional data, software implementations¹² of the model use greedy algorithms¹³ that select appropriate partitions by minimizing some

¹¹Categorical and continuous variables are predicted as in the binary case, by fitting a constant to each partition.

¹²I use the Python implementation of Pedregosa et al. (2011), but easy-to-use programs are also available for the R environment (e.g. Liaw and Wiener, 2002).

¹³Greedy algorithms make a series of locally optimal decisions in hope of finding the global optimum.

loss function (e.g. gini impurity index). These algorithms are computationally efficient and they tend to perform well in most applications, but they also impart an undesirable property to the prediction model: when considering a set of correlated predictors, the algorithms tend to pick one variable greedily and to ignore its cousins. Since many of the political determinants of FDI described in Table 4 are correlated with one another, we risk growing a tree that relies on a somewhat arbitrarily chosen subset of predictors.

In addition to the difficulties that correlated predictors present, classification trees are also burdened with a second important drawback: they tend to have low bias but high variance. This, in turn, may reduce their ability to make accurate out-of-sample predictions.

Forests

Thankfully, both of these concerns can be assuaged by using ensemble methods like bagging. “The essential idea in bagging is to average many noisy but approximately unbiased models, and hence reduce the variance. Trees are ideal candidates for bagging, since they can capture complex interaction structures in the data, and if grown sufficiently deep, have relatively low bias Hastie et al. (2013, 587)”.¹⁴ In that spirit, Breiman (2001*a*) developed a modification of bagging which he named “Random Forests”. Forests are grown as follows: (1) draw observations with replacement to generate many bootstrap samples; (2) for each of these samples, randomly select a subset of predictor vari-

Readers will find a discussion of their properties in most reference books on algorithms (e.g. Cormen et al., 2009, Ch.16).

¹⁴“A necessary and sufficient condition for an ensemble of classifiers to be more accurate than any of its individual members is if the classifiers are accurate and diverse (Hansen and Salamon, 1990). An accurate classifier is one that has an error rate of better than random guessing on new x values. Two classifiers are diverse if they make different errors on new data points (Dietterich, 2000).”

ables and use them to grow a classification tree; (3) for each observation of the outcome variable, the ensemble prediction corresponds to the result of a majority vote amongst all the trees.

Random forests typically perform better than single trees in terms of variance and prediction accuracy. They also reduce the likelihood that a variable will be ignored when one of its correlates is greedily selected by the algorithm. This is because each tree is grown from a different subset of predictors, so each variable should in principle have the opportunity to be selected in absence of its close correlates.

In the next section, I assess whether we can use political information and the random forest model to build an accurate model of investment location decisions.

1.5 THE POLITICAL DETERMINANTS OF FDI: RESULTS

Table 3 reports the predictive accuracy of random forest classifiers in 18 split-sample tests. The “Variables” column indicates the maximum number of political predictors that were included in the model results from the corresponding row. Because of limited data availability, we can consider more host-countries by including fewer predictors. The “Income” column tells us whether the prediction model was trained on the full population of countries, or on income-based subsamples.¹⁵ The other column names indicate the set of predictors that were included in each model. The letter “F” refers to firm-level variables, “D” indicates that we include dyadic variables, “S” corresponds to size characteristics of the host-country (i.e. population and GDP), and “P” represents

¹⁵I refer to countries as “low income” when they fall below the high income threshold established by the World Bank (\$12,616 GNI per capita in 2012).

Table 3: Random forest prediction accuracy (%) in various out-of-sample tests.

Variables	Income	FD	FDS	FDSP
23	All	83.5	90.0	89.8
23	High	76.3	83.1	83.1
23	Low	88.6	92.9	92.7
45	All	83.7	87.9	87.9
45	High	76.8	82.0	82.1
45	Low	88.1	89.4	89.2

the full set of political predictors.

I draw four main conclusions from this table. First, using basic firm-level and dyadic variables to train the random forest classifier yields a substantively significant improvement over the 50% rate of correct classification we could expect in the naive model. Second, adding GDP and population size of the host-country also considerably improves the model, yielding as much as a 6.8 percentage point increase in predictive accuracy.

The third lesson we can draw from table 3 is most important: adding political variables to the model makes no contribution to its predictive power (i.e. the rates reported in the last two columns of Table 3 are essentially indistinguishable). In other words, information about the political environment and institutions in the host-country does not help us develop better expectations about MNCs' investment behavior.

Finally, I note that the preceding point does not appear to depend on the type of country we are looking at. Political predictors are as powerless in the sample of rich countries as they are in the developing world.

1.6 CONCLUSION

There are many mechanisms through which the political environment and political institutions could affect multinationals' propensity to invest in a given country. Most of them operate at the firm level. For instance, institutional constraints may reduce the risk of expropriation by a host government, thereby increasing firms' incentives to make capital investments that fall under that government's jurisdiction. In prior work, firm-level arguments of this type were typically tested in piecemeal fashion, using deeply flawed measures of aggregate international investment activity.

In this paper, I systematically assessed the predictive power of many "political determinants of FDI" using firm level data on the investment location decisions of a large number of multinationals. This exercise led me to conclude that the information carried by country level political indicators does not allow us to develop better expectations about firm behavior. This finding stands in sharp contrast with the conclusions drawn in many prior studies of the link between politics and international investment.

While the lack of predictive power of political explanators could be taken as an indictment of the real-world relevance of extant theories, the results described herein must ultimately be assessed as a function of the reader's substantive interest and purpose. If we are mainly interested in the mechanism that links political variables to investment behavior, either because this mechanism is intrinsically interesting or because it may carry over to other contexts, then it makes little sense to adopt predictive accuracy as a criterion of substantive importance. In contrast, if we motivate our inquiry by pointing to politics as an driver of FDI, then it becomes incumbent on the researcher to demonstrate that the proposed model fits the data well enough to have

practical significance. In that context, I argue computing the out-of-sample prediction accuracy (or cross-validation) imposes itself as a best practice from model assessment.

My findings have important implications for our assessment of the current state of knowledge in the field, and I hope they can help direct future research efforts on politics and FDI. The results also hold lessons for the way we think about the politics of international investment. If we accept that the macro-level political indicators I consider play a marginal role in the investment location decisions of multinationals, then it may be reasonable to conclude that nations enjoy great latitude in the design of their governing institutions.

I.7 APPENDIX

Table 4: Data variables and sources for the *Political sources of investment location decisions*.

Source	Description
Alesina et al.	Ethnic fractionalization
Bormann & Golder	Average district magnitude
Cingranelli & Richards	Physical Integrity Rights Index
Crowe & Meade	Central Bank Independence 2003
Database of Political Institutions	Maximum difference of orientation
Database of Political Institutions	Party of chief executive: Right Left or Center
Database of Political Institutions	Proportional Representation
Database of Political Institutions	Regime type
Database of Political Institutions	Total fractionalization
Environmental Performance Index	Environmental Performance Index
Fraser Institute	Size of government
Freedom House	Civil Liberties
Freedom House	Political Rights
Henisz	Independent Sub-Federal Unit
Henisz	Political constraints Index III

Heritage Foundation	Business freedom
Heritage Foundation	Labor freedom
Heritage Foundation	Property rights freedom
Heritage Foundation	Trade freedom
Polity IV	Revised Polity Score
PRS Group	Bureaucracy quality
PRS Group	Corruption
PRS Group	Ethnic tensions
PRS Group	External conflict
PRS Group	Government stability
PRS Group	Internal conflict
PRS Group	Investment profile
PRS Group	Law and order
PRS Group	Military in politics
PRS Group	Religion in politics
PRS Group	Socioeconomic conditions
Reporters Sans Frontières	Press Freedom Index
Transparency International	Corruption Perceptions Index
UNDP	Gender inequality index
UNDP	Human development index
World Bank	GDP
World Bank	GDP/Capita
World Bank	GDP/Capita growth
World Bank	Population
World Bank	Rule of law
World Economic Forum	Judicial Independence

Chapter 2

Network externalities and interdependent policymaking: The case of international withholding taxes

Abstract

Multinational firms often use sophisticated corporate structures that span multiple countries in order to minimize their tax liabilities. Yet, studies of tax competition in political science tend to focus exclusively on simple patterns of interdependence between jurisdictions. This paper takes the (in)famous “Double Irish Dutch Sandwich” tax optimization strategy as a motivating case to argue that the ability of MNCs to route profits through multiple countries implies that the broader network structure of the international tax system must be at the center of our analyses. In particular, I argue that bilateral policies can generate network externalities that constrain individual countries’ tax policies with respect to cross-border flows of royalties, interest and dividends. Using data on applicable withholding tax rates between every pair of countries in the world, I present evidence in support of the idea that the relative position of a country in the international tax system and vis-à-vis its negotiating partners can affect the design of bilateral tax treaties.

Multinational firms often use sophisticated corporate structures that span many countries in order to minimize their tax liabilities. Yet, studies of tax competition and capital taxation in political science tend to focus on simple patterns of interdependence between jurisdictions, or ignore that interdependence altogether. This paper takes the (in)famous “Double Irish Dutch Sandwich” tax optimization strategy as a point of departure to claim that the network structure of the international tax system is critical to our understanding of tax policy today.

I argue that two structural factors, in particular, condition states’ policies: (1) a country’s position vis-à-vis negotiating partners, and (2) the network externalities produced by bilateral agreements. The idea that economic and power asymmetries can shape inter-governmental cooperation is a recurrent theme in international political-economy, but it has not been assessed empirically in the important case of bilateral tax treaties (BTTs). The argument that these treaties produce network effects that constrain state policies is novel, and it could have significant implications for the way we think about international tax policy.

Section 2.1 traces the historical origins of BTTs, the main legal mechanism currently in use to allocate the tax base between jurisdictions. I explain that BTTs can have considerable distributional implications, and I draw on archival documents to show that (a) these distributional implications were known to the negotiators who designed the templates on which most treaties are based, and that (b) power asymmetries between developed and developing countries have influenced the substantive legal provisions of BTTs.

Section 2.2 narrows the scope of investigation by introducing one of the core legal

provisions of BTs: withholding tax rates. Using two motivating case studies and a systematic quantitative analysis of applicable rates, I show that withholding taxes can affect both firm behavior and inter-governmental relations, and that bilateral agreements in the tax domain can produce important network externalities.

In section 2.3, I offer a synthesis of the insights gained in 2.1 and 2.2, and lay down explicit expectations with respect to the design of BTs. I then assess these expectations empirically using data on the tax rates that apply to cross-border flows of dividends, royalties, and interest between most pairs of countries in the world.

2.1 SPLITTING THE BASE:

A BRIEF HISTORY OF THE TAX TREATY NETWORK

I now present a brief history of the international tax system, tracing the origins of the core principles and laws that now guide the taxation of multinational enterprises. My focus is on the two main issues that arise when multiple jurisdictions claim the authority to tax a single base: the problems of double taxation and of tax base allocation. As we will see, solutions to these problems can have important distributional implications, especially when we consider dyadic relationships between developed and developing nations.

Many of the central features of the current international tax system find roots in policies and treaties from the 19th century. Clearly, the challenges that tax administrations face today are anything but new, and the institutions that are in place now have a long history. For example, one of the ideas that will prove important for the arguments I develop below, the principle of reciprocity, was anticipated by the Netherlands

in 1819 when it stopped levying taxes on merchant ships from countries that also let Dutch ships through without taxing them (Gregg, 1947). Today, this principle is reflected in the strong norm that BITs include *symmetrical* concessions, even if flows of investment and fiscal sacrifice are unbalanced.

The Dutch policy was unilateral, but early instances of tax cooperation also took the form of international treaties. These treaties were usually concluded between neighboring countries, and tended to address issues arising in the administration of property, estate, or trade taxes, rather than income tax (Jogarajan, 2011). This makes sense because even if William Pitt the younger introduced a tax on income to the UK in 1799¹⁶, income taxes did not become major sources of revenue for European states until the late-19th century. In effect, the coordination of income tax policies across borders did not become imperative until the 20th century.

One of the earliest examples of such coordination, an 1899 treaty between Prussia and the Austro-Hungarian empire, came in response to the enactment of a series of revenue-raising reforms to the tax system of Austria-Hungary. As a result of these changes, officials from the two states grew concerned about the prospect that citizens with double nationality, or companies that were active outside their country of origin, would see their revenues taxed twice (Jogarajan, 2011).

Their concern over double taxation is easy to understand. If, for example, the host and the home country of a MNC both tax its revenues at 30% without making allowances for the other country's policy, then the company's income could be taxed at 60%. Obviously, this would put the MNC at a competitive disadvantage relative

¹⁶Pitt's tax was adopted to finance the Napoleonic wars and was repealed in 1816. See Hope-Jones (1939) for a detailed account.

to firms that operate in a single country, and it would reduce incentives to conduct efficiency-enhancing international investments.

The problem of double taxation became particularly salient in the interwar period, when states witnessed a renewal of international investment while feeling great pressure to raise revenue in order to service war debts and begin reconstruction. Recognizing that the poor state of government finance in many countries may lead them to take actions that would be inimical to economic recovery, the League of Nations convened several rounds of consultation between representatives of national tax authorities. The chairman of these proceedings, Mitchell B. Carroll illustrated the problem as follows:

“Perhaps the most burdened organisations were the steamship companies that loaded and unloaded passengers and freight in a number of different countries, each of which attempted to claim its share of the entire net income, earned for the most part for transport services on the high seas and therefore not within the jurisdiction of any of the taxing States. While many countries were in desperate need of capital, whether in the form of loans to the Government or loans or investment in local enterprises, their Governments often sought to impose such high taxes on interest or dividends as to constitute a serious barrier to the influx of wanted funds. In short, the grasping for revenues was tending seriously to obstruct efforts to restore trade, and business enterprises were so restricted by the network of tax liabilities that they hesitated to assume the risks of foreign commerce, which were serious enough apart from any question of tax liability (Carroll and Adams, 1928, 7-8).”

Thomas Sewall Adams, a Professor of economics at Yale University, arranged for the Rockefeller Foundation to fund an extensive survey of national tax policies, and groups of economists and technical experts were brought in to provide analysis and recommendations (Carroll and Adams, 1928, 27). A 1925 “Report of Technical Experts” notes that “the survey of the whole field of recent taxation shows how completely Governments are dominated by the desire to tax the foreigner” and that “States, especially

those which are developing, and new countries would find it difficult to dispense with” taxes on foreign nationals (Carroll and Adams, 1928, 17). These quotes highlight the central tension that animates this field: the need to reduce MNCs’ exposure to double taxation in the context of a severe budgetary crisis in the aftermath of WWI.

The League of Nation technical experts raised a crucial question, whose answer carried important distributional implications: who should have taxing rights over the profits of internationalized firms? More precisely, should a firm’s tax liabilities be determined by the location of its headquarters/mind and management (i.e. residence), or should it be taxed where the economic activity occurs (i.e. source)?

The welfare implications of taxation at source or residence have been the topic of much work, and a new assessment lies outside the scope of this paper (but see Musgrave, 1969; Desai and Hines, 2003). The effect on government revenue generation in host and home countries are slightly clearer, however, and it is useful to consider them here. Most importantly, the choice to tax at source or based on residence should not have important distributional implications in terms of tax base allocation when the two countries hold balanced investment positions toward each other, but the situation is different in the case of unbalanced relationships, such as developing-developed country pairs. There, a move toward residence-based taxation represents a transfer of the tax base from the less developed to the more developed partner, because most multinationals are headquartered in rich countries.¹⁷

These distributional concerns were on the minds of negotiators at the League of Nations, but did not take center stage until 1940. Before that year, most of the meetings

¹⁷This ignores general equilibrium effects related to the potential increase in investment that may result from lower of taxes.

of the international working group on international taxation were held in The Hague, but proceedings moved to Mexico City after the Netherlands was invaded. Many of the fighting countries could not send representatives to America, so the Mexico meetings were attended by a relatively large contingent of Latin American and debtor countries (Gregg, 1947).

By that point, it had become clear that a multilateral agreement would not be possible, and international meetings were largely focused on the development of a treaty model that pairs of countries could customize in bilateral negotiations.¹⁸ Unsurprisingly, the features of this document reflected the composition of the discussion group: the Mexico Model Treaty draft put a strong emphasis on the primacy of source-based taxation, and reaffirmed the right of host countries to withhold taxes on outflows of interest, royalties, and dividends made by subsidiaries to their parent companies (Gregg, 1947; Picciotto, 1992).

Equally unsurprising, is the fact that developed countries never endorsed the Mexico draft, moving instead to a new round of negotiations in postwar England. The 1946 London Model Treaty draft represented a swing of the pendulum in the other direction (Gregg, 1947; Picciotto, 1992). Although this new model recognized the right of host countries to tax the active income of firms with permanent establishments in their jurisdictions, it also protected the ability of capital-exporters to tax the worldwide income of their multinationals. In addition, it proposed deeper cuts in withholding taxes rates, and assigned primary taxing rights on interest from debt to the creditor's

¹⁸Carroll and Adams (1928, 33) write: "As the number of States which definitely pronounced themselves to be in favour of a multilateral convention was insufficient to justify calling an international conference, the draft Convention was again sent to the various Governments as a basis for negotiating bilateral treaties."

residence:

“According to the provisions of the London draft, interest on all kinds of indebtedness is to be taxed, in principle, exclusively in the State where the creditor has his fiscal domicile. This is the opposite of the rule contained in Article IX of the Mexico draft. Indeed, it was considered that, especially as regards interest, the country from which capital originated had a prior right to tax such interest wherever the capital was invested. Nevertheless, it was conceded that the State of the debtor could tax such interest in the same way as if it were paid to nationals or residents by means of deduction or withholding at source. At the same time, it was thought that this withholding tax should not exceed a certain percentage to be fixed by agreement.”¹⁹

These changes turned out to be crucial because they were carried forward when international negotiations moved to the OECD Committee on Fiscal Affairs after WWII. The OECD Model Treaty that this committee produced (1963) followed the London Draft closely, and would become one of the central documents of the international tax field, acting as template for the thousands of BTs in force today. Importantly, concerns over the distributional implications of tax treaties persisted, even after the move to a new negotiation forum. Indeed, OECD members were acutely aware of the issue, as is attested by this 1964 report by the Secretary of the OECD Committee on Fiscal Affairs:

“Existing treaties between industrialized countries sometimes require the country of residence to give up revenue. More often, however, it is the country of source which gives up revenue. Such a pattern may not be equally appropriate in treaties between developing and industrialized countries because income flows are largely from developing to industrialized countries and the revenue sacrifice would be one-sided.”²⁰

¹⁹OECD. 28th November 1958, Report on the Taxation of Dividends – Working Party no.12 of the Fiscal Committee. FC-WP12(58)1part2E.

²⁰OECD. 1964. Final Report on the Fiscal Incentives in Capital Exporting Countries Private Investment in Developing Countries. FC(64)2E.

This recognition, however, did not pull treaty provisions too far from the London Draft, and similar principles organize the international tax system as it stands now (Piciotto, 1992). In short, host countries hold primary jurisdiction to tax the active income that is generated within their borders by firms (domestic or foreign) with permanent establishments.²¹ Home countries can adopt a “worldwide tax” that imposes the active income that their MNCs earn abroad, but many governments exempt it altogether (“territorial tax”) or at least offer credits for taxes paid to foreign governments. Finally, and most importantly for the purposes of this paper, host countries retain the right to withhold a tax on outgoing flows of interest, dividends, and royalties payments. This right, however, is considerably restricted by BTs, which usually set explicit limits on permissible withholding tax rates.

To conclude this (too) brief history of international tax cooperation, I point to three important insights that we have gained thus far. First, there is a fundamental conflict between the desire to limit double taxation and governments’ revenue-generation needs. Second, BTs have been adopted as the main international mechanism for tax base allocation, and these treaties have been the object of heated debate in multiple rounds of negotiations over the design of a shared treaty “template”. Moreover, it appears that developed countries may have driven much of the design choices, first by rejecting the main innovations of the Mexico draft, and then by moving talks to the OECD, an organization where they hold a preponderant voice. Third, some of the standard legal provisions included in bilateral tax treaties (e.g. limits on withholding taxes) can have important distributional implications for tax base allocation, especially

²¹The definition of “permanent establishment” has itself been the subject of much debate (Avi-Yonah, 2007).

when we consider unbalanced investment relationships like those between developed and developing countries.

Taken together, these findings suggest that asymmetry between negotiating partners can have countervailing effects on the incentives to sign liberalizing tax treaties. On the one hand, developing countries may not want to sacrifice their tax base by signing tax treaties. On the other, developed countries may be able to leverage their economic power (Simmons, 2014) and the promise of increased investment to convince their partners in the developing world to sign “deep” treaties. The net effect of these two forces remains an open empirical question.

2.2 NETWORK EXTERNALITIES AND WITHHOLDING TAXES

While it is true that most BTTs follow the OECD Model closely, treaty texts still vary in important respects. In this section, I narrow the scope of investigation by focusing on one important source of difference between BTTs: withholding tax rates. These rates are interesting because they imply precisely the kinds of distributional effects that I described in the previous section. We will see that governments’ decisions with respect to withholdings are constrained in interesting ways by their position in the network structure of the international tax system.

Withholding taxes: Context and definitions

A state levies a withholding tax when it requires the payer to retain a portion of the payment before giving it to the seller. This differs from typical sales taxes, for example, where sellers collect taxes on behalf of government. In the context of international pay-

ments, withholding taxes are useful because they allow the government of the country where the economic activity occurs to collect taxes before money crosses the border, and so it obviates the need for government to interact with the foreign entities that receive payment. These taxes are applied to three categories of cross-border payments: interests, dividends and royalties. Governments publish statutory rates for each category, and preferential treatment is usually given to BTT partners.

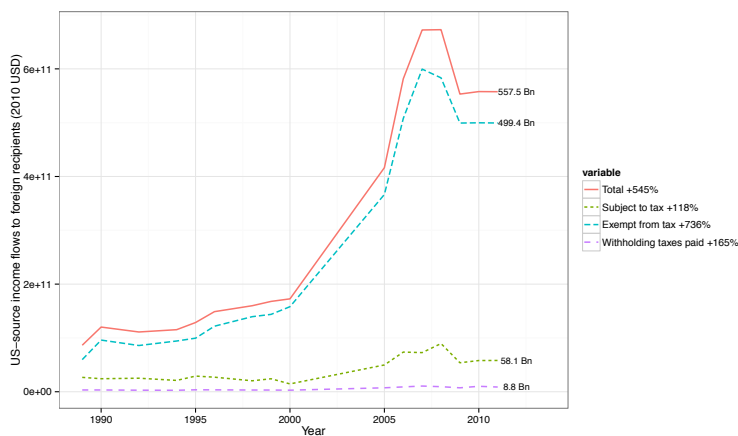
International withholding taxes have historically played a non-negligible role in revenue generation, and they have acted as bargaining chip in BTT negotiations (Picciotto, 1992). In 2010, tax withheld on payments from US-source income by foreigners amounted to about 4% of the \$223 billion that the US government collected in corporate taxes.²² This number, however, may understate the revenue potential because, as Figure 3 shows, growth in US-source income to foreigners far outstripped the increase in taxes collected (545% and 118% respectively over the 1989-2011 period). Although the paucity of data makes it difficult to ascertain, withholding taxes may hold a more important role in developing countries, where they sometimes act as complement to lower effective tax rates.²³

The impact of withholding taxes reaches beyond revenue generation. In the rest of this section, I show that they can also have major repercussions for inter-governmental relations, and that they influence firms' investment decisions.

²²Source: IRS. 2011. <http://www.irs.gov/pub/irs-soi/10corporatereturnsonesheet.pdf>

²³This was recognized early on by the OECD Committee on Fiscal Affairs (OECD. 1964. Final Report on the Fiscal Incentives in Capital Exporting Countries Private Investment in Developing Countries. FC(64)2E).

Figure 3: Tax withheld on US-source income to foreign recipients (Forms 1042S).
Source: IRS, Statistics of Income Division.



Withholding taxes as a bargaining chip: The case of FACTA

To motivate my focus on withholding taxes, it is useful to briefly consider an important recent development in tax policy in the U.S., and its impact on inter-governmental relations. In March 2010, Congress adopted the Foreign Account Tax Compliance Act, a law whose stated goal is to “halt offshore tax evasion” (U.S. Department of Treasury, 2014). The potential for tax evasion is a major concern in the American legal context, because the United States and Eritrea are the only two countries in the world who tax their citizens on worldwide income. Many American citizens are thought to earn revenues abroad without disclosing them to the IRS, and FACTA was designed to provide more information to the IRS on American citizens financial activities abroad.

To accomplish this goal, FACTA requires that foreign financial institutions collect information on the activities of American citizens abroad (e.g. bank account balances,

list of controlled corporate entities), and that they share this information with the IRS. But given that the U.S. Congress has no jurisdiction on the financial institutions that hold the requisite information in the first place, the implementation of FACTA needs the collaboration of foreign governments who can impose new standards on their own financial institutions.

To encourage cooperation by foreign governments, FACTA includes a very important provision, which requires American payors that they collect a 30% withholding tax on certain payments made to foreign financial institutions that do not share information with the U.S. government. The IRS publicly describes the role of this withholding tax in transparent (and somewhat ominous) terms: “The objective of FATCA is the reporting of foreign financial assets; withholding is the cost of not reporting” (Internal Revenue Service, 2014). As Christians and Cockfield (2014) point out, this requirement is in breach of international law and of American obligations under several bilateral tax treaties, including the *Convention and Protocol between Canada and the United States for the Avoidance of Double Taxation* (1942). In effect, the FACTA withholding tax overrides the limits on withholding taxes that are specified in all U.S. BTs.²⁴

Eventually, the threat of this withholding tax pushed several countries to conclude inter-governmental agreements with the U.S. to supplement existing exchange of information agreements, and to bring the reporting standards of their financial institutions into conformity with U.S. law. The fact that these agreements impose highly asymmetrical costs and benefits (Christians and Cockfield, 2014) serves to highlight the fact that withholding taxes can serve as a potent diplomatic weapon when they

²⁴This type of override is legal with respect to U.S. constitution, but it is atypical in comparative perspective.

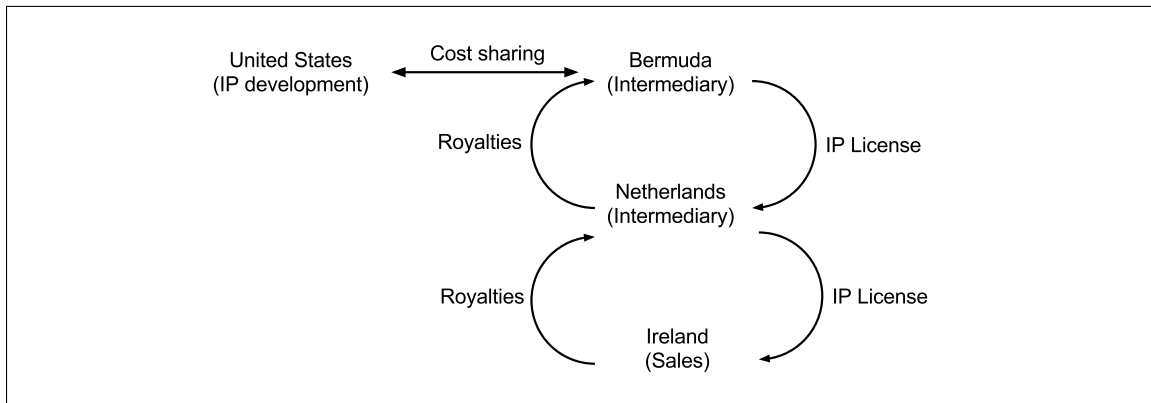
are wielded by a powerful country. In sum, withholding taxes can matter for revenue generation, but the FACTA case also suggests that they can play an important role in inter-governmental negotiations. In the next section, I use a motivating case study to show that withholding taxes also shape firm behavior.

The Double Irish Dutch Sandwich

I now use a motivating case study to show that (a) political scientists who study tax policies need to consider the network structure in which they are embedded, and (b) withholding taxes can have important effects on the way MNCs structure their international operations. I consider the “Double Irish Dutch Sandwich”, a supply-chain structure that Google used in the late-2000s to limit its tax liabilities on foreign-earned income. Drucker (2010) reports that, using this strategy, the company was able to reduce its effective tax rate on non-U.S. income to 2.4% in 2010. The Dutch sandwich is particularly interesting because it highlights a fact whose importance is rarely noted in research on capital taxation: countries’ unilateral and bilateral tax policies generate network externalities that, in turn, can bind countries’ future policies in the domain.

Google’s strategy has four main components (Figure 4).²⁵ The parent company *Google Inc.* is based in California, where it develops most of its search and advertising technology. This entity sells ads and other products to american customers but makes few direct sales outside the United States. Instead, *Google Inc.* enters into a cost-sharing agreement with *Google Ireland Holdings*, a fully-owned subsidiary which, despite its name, has its mind and management in the tax haven of Bermuda. In exchange for financial contributions to R&D activities, this tax-exempt subsidiary obtains the right

Figure 4: Google's Double Irish Dutch Sandwich in 2009.



to manage and exploit *Google Inc.*'s intellectual property worldwide.

From Bermuda, the technology rights are sub-licensed to a third entity in the Netherlands (*Google B.V.*) which has very few employees and does not appear to contribute meaningfully to the development or use of Google's technology. As a Dutch company, *Google B.V.* benefits from advantageous tax rates on cross-border payments thanks to the Netherlands' low tax policy and extensive network of BTTs. In particular, *Google B.V.* can pay for its license by sending royalty payments to Bermuda without paying a withholding tax to the Dutch government.

The fourth and final component of the Double Irish Dutch Sandwich is *Google Ireland Ltd.*, another subsidiary with a workforce of a few thousands in Ireland. The Dutch *Google B.V.* sub-sub-licenses the technology rights to *Google Ireland Ltd.*, which in turn sells advertising and other products directly to customers in Europe, the Middle East, and Africa.

²⁵My simplified sketch of the Double Irish Dutch Sandwich strategy owes much to Drucker (2010) and to Kleinbard (2011).

Now consider the tax implications. *Google Ireland Ltd.* generates billions of dollars in revenue every year, and its profits are subject to the (comparatively low) Irish corporate tax rate of 12.5%. However, since most of the economic value that Google produces can be traced back to the development of intellectual property rather than to the act of sale, *Google Ireland Ltd.* must make large royalty payments to *Google B.V.* in order to pay for the technology rights it exploits. These royalty payments are tax-deductible costs, so *Google Ireland Ltd.* ends up paying little income tax to the Irish government. The royalty payments themselves are not subject to a withholding tax when they leave Ireland either, because they are sent to the Netherlands, a member of the European Union. They would have been subject to a 20% tax had they been paid directly to Bermuda²⁶, so a stopover in the Netherlands has important tax benefits. Because little economic value is produced by Google in the Netherlands, the Dutch government collects little tax on *Google B.V.*'s income; the royalties are re-routed almost in whole toward the Bermuda entity to pay for the intellectual property rights. And since the Dutch government's policy is not to tax outbound royalty payments, no withholding tax is taken at this point either.

Kleinbard (2011) asserts that a large portion of Bermuda-bound royalties are deemed to be "reinvested permanently" offshore, that they will never be subject to U.S. taxation, and that the "end result is a near-zero rate of tax on income derived from customers in Europe, the Middle East, and Africa". He also notes that the strategy does not rely on any particular feature of Google's business model, such that there are few obstacles

²⁶This description refers to Google's corporate structure in the year 2009. Since July 26 2010, Ireland no longer collects a withholding tax on outbound royalty payments for patents (Irish Tax and Customs, 2010). This means that the Dutch Sandwich component has now become superfluous.

in the way of other multinationals who would want to emulate the process. In fact, recent news reports suggest that similar corporate structures have been adopted by other prominent technology companies (e.g. Smyth, 2013).

The precise value of these tax benefits, however, is difficult to corroborate because it depends on (a) the confidential and IRS-approved terms of the cost-sharing agreement between *Google Inc.* and its Bermudan subsidiary, and (b) the company's ability to continually reinvest profits abroad in order to benefit from American rules on tax deferral. What is important to note, for my purposes, is that Google's tax planning strategy relies on multiple interconnected features of the international tax system. Indeed, the Double Irish Dutch Sandwich requires more than just the existence of low tax jurisdictions like Bermuda and Ireland. Two sets of agreements must also be in place to ensure that royalty payments can be made from Ireland to the Netherlands, and from the Netherlands to Bermuda without triggering costly withholding taxes.

And while political scientists who study capital taxation have all but ignored the structured effects of these relationships, the implications were not lost on the experts who designed the OECD Treaty Model. For instance, in their 1967 report to the Fiscal Committee of the OECD, representatives of the American and Danish governments expressed concerns over the income-shifting strategies that are made possible by a network of bilateral tax policies:

“A resident of [State C] may have investments in State A, the income from which is subject to a given withholding tax. If there is a convention between A and B that provides for reduced withholding taxes on income flowing from either State to the other, a [State C] resident may use an intermediary in State B, a holding company or a nominee or other agent, through which to make his investments in State A.”²⁷

Network effects in practice

To see if the concerns of these OECD members were well-founded, we need to assess empirically the extent to which reductions in applicable withholding taxes can be attributed to BTTs and to the type of network effect exemplified by the Dutch Sandwich. To do this, I draw on information collected by the International Bureau of Fiscal Documentation (IBFD), and assemble a dataset of withholding tax rates between every pair of countries in the international system.²⁸

For every directed dyad, I record the withholding tax rate that the host country would apply in the absence of a BTT (“base rates”), and I do so for each of the three relevant flow categories (royalties, dividends, interest). If a treaty is in place, I also record the rates it specifies (“treaty rates”). The lowest value between base and treaty rate is the “applicable rate”.²⁹

To assess whether network effects diminish the potency of taxes on cross-border flows, I compute a measure of “indirect rates”: the lowest tax rate that can apply to payments between a pair of states if a firm uses an intermediary in a third country. If we define τ_{ij} as the tax on flows from country i to country j , then the indirect rate τ'_{ij} is constructed by iterating over every third-party country to find³⁰

²⁷Organisation for Economic Co-operation and Development. Paris, 1967-12-21. FC/WP21(67)1 Working party no. 21 of the Fiscal Committee (United States - Denmark). Third Report on Tax Avoidance Through the Improper Use or Abuse of Tax Conventions.

²⁸The only other study I am aware of to have considered BTTs as more than a dichotomous variable was conducted by Rixen and Schwarz (2009), who analyzed withholding tax rates in the subset of German BTTs.

²⁹Note that even if these data are only available for a cross-section (2012), I was able to match treaty rates with the date at which the relevant treaties were ratified.

³⁰This measure ignores the transaction costs that arise when firms establish intermediaries in third-party countries. Also, it only allows for a single indirect link in the path. In alternative specifications, I use an adapted version of the Floyd-Warshall algorithm (Cormen et al., 2009, 25.2) (Appendix) to

$$\tau'_{ij} = \min_{k \notin \{i,j\}} \{1 - (1 - \tau_{ik})(1 - \tau_{kj})\} \quad (1)$$

Figure 5 compares the distributions of base, applicable, and indirect withholding tax rates for every dyad in the international system. We can draw two main insights from this plot. First, BTTs tend to reduce the applicable withholding tax rates by a considerable amount. In all three categories of income, the density of “applicable” rates (i.e. $\min(\text{treaty}, \text{base})$) is concentrated to the left of the “base” density. Second, the rate reduction appears even greater when we allow for arrangements like the Dutch Sandwich. Indeed, most of the weight of the “indirect rate” densities lie to the left of the graph, with modes at 0% in all three income categories. In sum, BTTs lead to deep cuts in applicable tax rates, both through direct bilateral reductions, and because they allow firms to route funds cheaply through intermediaries in third-party countries.³¹

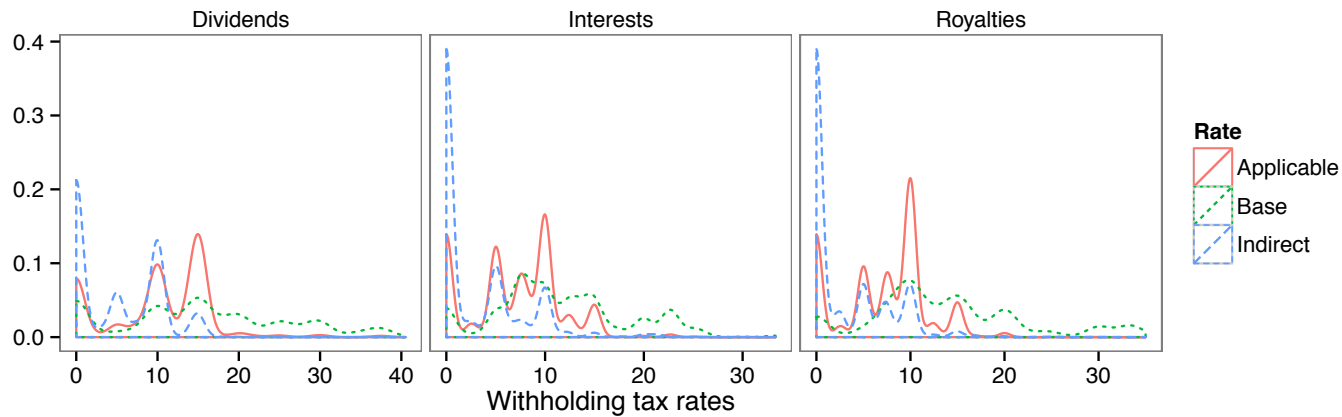
2.3 ASSESSMENT

I now lay down expectations based on the above discussion, and verify if the tax rates embedded in BTTs conform to those expectations.

In section 2.2, I used the Dutch Sandwich to illustrate the fact that bilateral policies can have important network effects. By routing funds through third-party countries, MNCs can greatly reduce the effective tax rates that apply to them. This, in turn, may find the “cheapest path” that firms can find by going through an unlimited number of intermediate countries. The results were substantively similar, though effective withholding taxes could be further cut by extending the number of intermediaries.

³¹Of course, this analysis does not take into account the transaction costs that may be involved by setting up an intermediary in a third country.

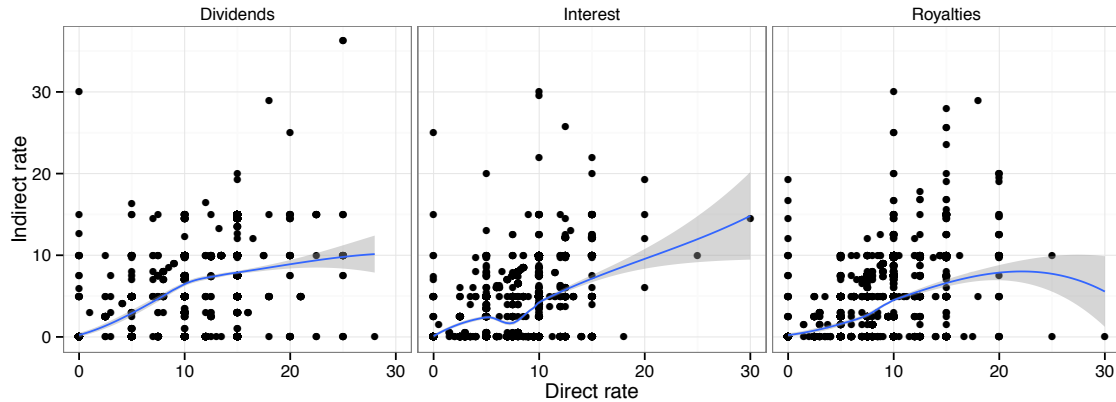
Figure 5: Base, applicable, and indirect withholding tax rates to and from 196 countries.



have constraining effects on state policies. Indeed, if there exists a cheaper indirect route to repatriate funds from country i to country j (i.e. via k), then the revenue-maximizing rate for government i will obviously be lower because many MNCs will create intermediaries in k to minimize the taxes they owe. When bilateral withholding rates are set above the tip of the Laffer curve, less revenue is collected, and transaction costs are imposed on the MNCs who choose to create the complex corporate structures required to benefit from indirect repatriation. Since governments do not benefit from imposing these costs, they should be expected to adjust their policies accordingly, and so we should find that bilateral rates will be positively related to indirect rates.

This is in fact the general pattern we observe in Figure 6, where I plot the rates inscribed in BTs against indirect withholding tax rates. For all three categories of flows, the LOESS line slopes upward, suggesting that indirect rates are positively associated with bilateral rates.

Figure 6: Direct vs. indirect withholding tax rates.



One important problem for inference based on the bivariate relationships shown in Figure 6 is that the associations shown may simply reflect the fact that some countries adopt lower rates in most/all of their relationships. This tendency would be reflected both in bilateral rates for the dyad in question, but also in indirect rates. Accordingly, I estimate a set of linear regression models to assess the association between treaty and indirect rates, controlling for the average tax rates adopted by the signatory parties with third party countries. I also control for the year in which treaties were signed³², the geographic distance between signatory parties (Mayer and Zignago, 2006), and GDP growth in the host country (World Bank Development Data Group, 2013). Results are presented in Table 5.

While these partial correlations should of course not be interpreted as properly identified causal effects, it is still interesting to note that the observed patterns in BTT tax rates are broadly with the story I have told. All three of the coefficients associated

³²More recent treaties tend to include deeper cuts in withholding rates.

Table 5: Determinants of withholding tax rates in bilateral tax treaties.

	Royalties	Interest	Dividends
Royalties indirect	0.381 (0.017)		
Interest indirect		0.389 (0.020)	
Dividends indirect			0.094 (0.015)
Royalties avg. host	0.071 (0.012)		
Royalties avg. home	0.147 (0.010)		
Interest avg. host		0.046 (0.015)	
Interest avg. home		0.158 (0.012)	
Dividends avg. host			0.150 (0.010)
Dividends avg. home			0.110 (0.009)
GDP asymmetry	-0.194 (0.018)	-0.130 (0.018)	0.042 (0.020)
GDP growth	0.041 (0.013)	0.043 (0.013)	-0.039 (0.014)
Year	-0.050 (0.006)	-0.088 (0.006)	-0.090 (0.007)
Distance	0.158 (0.017)	0.144 (0.017)	-0.007 (0.017)
(Intercept)	114.125 (12.839)	187.961 (13.198)	187.428 (13.817)
R ²	0.259	0.249	0.216
Adj. R ²	0.258	0.248	0.215
Num. obs.	4063	3921	3984

Robust standard errors.

with “indirect” variables are positive and statistically distinguishable from zero. The magnitude of the relationship also seems substantively important, with an increase of 1 in the indirect withholding taxes on royalties or interest associated with an increase in treaty rates of almost 0.4. The association between treaty rates and indirect rates in the dividends case appears substantively weak, however, with a coefficient of about 0.1.

The regression models in Table 5 also provide tentative answers to another important set of questions. In section 2.1, I suggested that economic (and power) asymmetries between developed and developing countries were important during the crucial phases of development of the OECD Model Tax Treaty. This finding was not especially surprising, as the role of economic power in international relations has been well documented by political scientists. Allee and Peinhardt (2014) make the point in a context that is very close to the one that occupies me here: bilateral investment treaties (BITs). The authors find that the relative economic power of signatory countries is strongly associated with the legal provisions of BITs, with asymmetric dyads signing treaties with stronger dispute settlement provisions. The BIT case is a close analogue to the one that interests me here, in the sense that strong dispute resolution provisions in BITs and low withholding tax rates in BITs both constitute more or less unilateral concessions from capital importing to capital exporting countries.

In the models described in Table 5, I follow Allee and Peinhardt (2014), and represent the asymmetry in economic power between signatory parties by a measure of their relative GDP (log squared difference) (World Bank Development Data Group, 2013).³³ In two of the three cases (royalties and interest), GDP asymmetry appears

³³The results hold if we consider asymmetry in GDP per capita.

to be negatively associated with withholding tax rates. In the case of royalties, for example, an increase of one standard deviation in the value of GDP asymmetry (5.68) is associated with reduction of about 1.1 in the withholding tax rate. This is consistent with the idea that economic power allows developed countries to obtain favorable terms in the treaties they sign with smaller economies.

The dividends model shows a positive and statistically significant coefficient for the *GDP asymmetry* variable. This seems anomalous because our theories give no reason to expect differences in the direction of association between the regressors of interest and the tax rates that apply to the three categories of flows. To be sure, this anomaly enjoins us to be cautious when drawing conclusions from the withholding rates data, but it is important not to overstate the extent to which this positive coefficient should be taken as a falsifying case against the argument that economic asymmetries lead to “deeper” treaties. Indeed, as Avi-Yonah (2007) reminds us, the distinction between dividends and interest is not very meaningful in the practice of international tax; whether MNCs repatriate funds by making loans to their subsidiaries and charging interest or by requiring that subsidiaries pay dividends to their parent is a matter of choice for MNCs. Accordingly, for the effective tax rate on the repatriation of foreign-earned profits, MNCs only require that either dividends or interest rates be lowered.

In sum, the withholding tax rates that are agreed upon in BTTs follow patterns that match the theoretical expectations I have set above. For all three categories of income, treaty rates are positively associated with the minimum “indirect” rate that MNCs pay when they set up an intermediary in a third party country to route profits. This association is statistically significant, and the magnitude of the estimated coefficients suggests

that the relationship is substantively important. The evidence is also broadly consistent with the idea that asymmetries in economic power within a given dyad tends to be associated with “deeper” treaties. The relationship between asymmetry and tax rates appears substantively less important, however, and we find some conflicting evidence with respect to withholding rates on dividends.

2.4 CONCLUSION

In this paper, I argued that the network structure of international tax treaties allows MNCs to minimize their tax liabilities by moving funds between two countries indirectly. I also presented evidence consistent with the idea that governments consider their position in the international tax system when they design and conclude bilateral tax treaties. This result matters because, as I have shown, the withholding taxes I have focused on can affect both inter-governmental relations and firm behavior.

Perhaps even more importantly, my results point to a heretofore unexplored set of constraints on tax policy. Indeed, most studies of capital taxation and tax competition in political science have focused on relatively simple forms of dependency like those described in Neumayer and Plümper (2010). But the effects of corporate re-structuring strategies like the Double Irish Dutch Sandwich can only be captured by considering the ways in which MNCs leverage the network structure of the international tax system to devise optimal tax strategies. This, in turn, requires careful consideration of the properties of each of the many tax instruments that states have at their disposal.

The idea that unilateral or bilateral tax policies produce externalities that enable or constrain state policies; it finds application much beyond the BTs that I have studied.

For instance, Desai, Foley and Hines Jr. (2006) argue that tax havens may divert taxable income, but that they may also stimulate investment in high tax jurisdictions where investment may not have been profitable in the absence of the tax haven. One way to interpret this argument is that low tax jurisdictions enable states to maintain higher taxes without risking the flight of mobile firms. Similar considerations could be relevant in other domains where for example, the policies of individual governments can undermine the coordinated efforts of other states (e.g. banking secrecy and exchange of information).

2.5 APPENDIX

Figure 7: Modified Floyd-Warshall algorithm (Python implementation).

```
def floyd-warshall-mod(W):
    n = W.shape[1]
    for k in range(n):
        for i in range(n):
            for j in range(n):
                W[i,j] = max(W[i,j], W[i,k] * W[k,j])
    for i in range(n):
        W[i,i] = 1
    return W
```

Chapter 3

Individual-specific uncertainty, political institutions, and treaty-making

Abstract

This paper presents a theory of policymaking in the face of individual-specific uncertainty. Following Fernandez and Rodrik (1991), I point out that two-party systems can fall prey to a status quo bias which prevents the adoption of socially efficient policies that have unclear distributional effects. I then extend the theoretical framework to cover the case of coalition governments, and conclude that this specific form of status quo bias can disappear where policy can be represented as a compromise between members of a governing coalition who represent diverse segments of society. This proposition is tested by comparing the rates at which different countries ratify international tax and investment treaties, policies which can be expected to promote investment and growth, but which also have unclear distributional consequences. I find that, somewhat counter-intuitively, coalitions sign more liberalizing treaties than single-party governments.

In this paper, I develop a theory of policymaking in the face of individual-specific uncertainty. My interest lies in the factors that explain why certain countries fail to adopt policies that can be expected to produce aggregate economic growth (e.g. foreign direct investment promotion). My explanation emphasizes the facts that such policies tend to produce both winners and losers within society, that the distribution of gains and losses can be difficult to predict before the policy is implemented, and that different political institutions provide different mechanisms to deal with this uncertainty.

More precisely, I remind readers that in the (idealized) two-party setting, a status quo bias may prevent the adoption of socially efficient policies that have unclear distributional consequences (Fernandez and Rodrik, 1991). This is because the median voter does not know whether he will benefit or be hurt by such policies before they are implemented; the potential losses can, in some cases, make the policy appear harmful to him *ex ante* even if it benefits a majority of voters *ex post*. I then argue that coalition governments face no such problem because political institutions give them incentives to woo a wider portion of the population, and because coalition systems provide mechanisms that facilitate the transmission of preference intensity into policy outcomes. These institutional features can allow coalition governments to pursue policies that generate aggregate economic growth, even if they are accompanied by individual-specific uncertainty.

Section 3.1 describes a very simple model which can be used to study the introduction of liberalizing reforms in a two sector economy. Using elementary algebra in an expected utility framework, I compare what happens when the decision to adopt or reject such a policy is made by a majority decision rule or via bargaining between

coalition partners. I find that the conditions for adoption are weaker in the coalition setting. Section 3.2 presents a richer institutional account of decision-making in coalition governments in order to justify the assumptions on which I build the simple model. Section 3.3 introduces two policies that can be expected to promote economic growth but whose distributional consequences are partially unpredictable, and compares the rates of adoption in coalition and single-party governments.

3.1 INDIVIDUAL-SPECIFIC UNCERTAINTY AND POLICYMAKING

In this section, I compare decision-making in coalition systems and in the pure Downsian context. In particular, I identify the conditions under which governments will adopt or reject a policy that produces aggregate gains but has uncertain distributional consequences.

The two key assumptions on which I build my theory are that policy outcomes in a two-party setting tend toward the preferences of the median voter, and that the policies produced by coalition governments can adequately be represented as a convex combination of the (diverse) preferences of the political parties in power. For simplicity, these assumptions are first taken as unproblematic; a richer institutional account is delayed until the next section, where I describe how preference averaging emerges naturally out of a plausible theory of decision-making in fractionalized governments.

A simple two sector model

The class of policies which produce both aggregate growth and individual-specific uncertainty is obviously very broad. To build intuition, however, it is useful to narrow

the scope of discussion by considering only one such policy: a tax liberalization reform that aims to make FDI cheaper and easier.

If this reform stimulates inward and outward flows of investment, it can be expected to have two main effects on the domestic economy. First, a wealth of empirical work suggests that FDI is socially beneficial in the sense that it promotes aggregate economic growth (see Table 12). Second, while these investments tend to benefit voters *on average*, they also have negative consequences on many *individual* firms and workers — jobs are outsourced and competition from foreign entrants crowds-out domestic investors. Moreover, while some of the winners of reform are clearly identifiable *ex ante*, most agents are unsure about whether they stand to gain or lose from the policy change. In other words, the policy is Kaldor-Hicks efficient, but not Pareto efficient, and the identity of the individual winners and losers is not fully known before implementation.

We can think about this situation by reference to a very simple and stylized two-sector economy.³⁴ The population is split into two groups: the “winning” sector W and the “losing” sector L . Members of W know that they are going to benefit from the policy; after implementation, they win with certainty. In contrast, the distribution of gains in the L sector is characterized by both heterogeneity and uncertainty. Some members of L will win while others lose, and the realized gains of each individual are only revealed after the policy is implemented.

With a population of one, define λ as the size of the L sector, and $1 - \lambda$ as the size of the W sector. Members of W get $w > 0$ with certainty. Member i of the L sector gets $l < 0$ with probability π , and w with probability $1 - \pi$. In practice, it is reasonable to

³⁴My simplified description of the Fernandez and Rodrik (1991) model owes much to the presentation of Acemoglu (2003).

assume that the share of the population who *know* they will benefit from liberalization is smaller than the share of the population who are uncertain about whether or not they will benefit ($\lambda > 1/2$).³⁵ Finally, assume that the policy produces aggregate economic gains:

$$\lambda[\pi l + (1 - \pi)w] + (1 - \lambda)w > 0. \quad (2)$$

Two-party system

We wish to determine whether or not the policy is accepted under a majority decision rule. Members of W always vote to adopt the policy because they are sure to benefit, but since they do not constitute a majority, the policy will only be adopted if members of L stand to gain in expectation. In other words, we know that the reform is supported by a majority of the population if

$$\pi l + (1 - \pi)w \geq 0. \quad (3)$$

Where this condition is violated, the policy is rejected by a majority of the population.

Now consider what would happen if we raised the veil of uncertainty and revealed to each member of L what his individual payoff would be after implementation. In this context, the reform would be adopted if

³⁵Note that if this condition is violated, the policy is trivially adopted by majority rule.

$$(1 - \lambda) + \lambda(1 - \pi) \geq 1/2. \quad (4)$$

This is a considerably weaker condition than the one described in equation 3. The fact that there is heterogeneity in the payoffs to members of L and uncertainty in the distribution of those payoffs makes policy adoption more difficult. Under certain conditions, a welfare-enhancing policy might be rejected by the median voter *ex ante* even if a majority of voters would end up benefiting from its adoption *ex post*. This happens when these two conditions are met:

$$\begin{aligned} \pi w + (1 - \pi)l &< 0 \\ (1 - \lambda) + \lambda\pi &> 1/2 \end{aligned} \quad (5)$$

Coalition system

I now invite you to consider a different decision rule which I design to roughly approximate the basic institutional features of coalition governments. Here, the policy will be accepted if, on average, the members of the coalition government expect to benefit (this assumption is motivated in section 3.2). The model remains as described above, except that we must now pay attention to the type of members that compose the coalition government of interest. Normalize the coalition size to 1 and let $1 - \theta$ equal the share of coalition members who are drawn from sector W . θ corresponds to the share of coalition members who represent the interests of L voters.

We can develop intuition about what this model tells us by considering the expected gains of coalition members in three meaningful special cases:

1. If the coalition only represents members of L (i.e. $\theta = 1$), the policy will be adopted if $\pi w + (1 - \pi)l \geq 0$ and rejected otherwise. This is exactly the same condition we found in the majority rule.
2. If the coalition only represents members of W (i.e. $\theta = 0$) the policy will be, trivially, adopted.
3. If the coalition is constituted of L and W in the same proportions as the general population, then the policy is also adopted because it is socially optimal (equation 2) and, as a consequence, it will be beneficial to coalition members *on average*.

This suggests that, in the coalition configuration where the policy is *least* likely to be adopted, the condition for adoption is no stricter than with majority rule. Where coalition members more closely approximate the makeup of the general population, the condition for adoption is considerably relaxed.

In sum, if the view of policymaking that I described above is realistic, then the status quo bias that Fernandez and Rodrick identify may pose less of a constraint in coalition governments. In section 3.2, I argue that the preference averaging view of policymaking in coalition governments is, in fact, realistic.

A little bit of intuition

Before moving forward, it is useful to pause in order to develop some more informal intuition about the arguments presented above. We have seen that, with rule by ma-

majority, a status quo bias can prevent the adoption of socially optimal policies that have uncertain distributional consequences. This is because, as I explained, there are circumstances under which over half of voters expect to lose if the policy is adopted, even if a majority eventually benefits after implementation. This problem is in large measure assuaged in the coalition context, where policy can be thought of as a compromise position between diverse interests in society. We can think of the difference in these outcomes in two related ways.

First, policymaking in my idealized coalition governments is not guided by the expected gains of a narrow portion of the population. Instead, political institutions force coalition governments toward policies that represent compromises between the preferences of diverse segments of society. In a sense, coalitional bargaining provides a layer of aggregation between the many people whose interests are represented in negotiation, and the policy outcomes that obtain. In forcing this negotiation to occur, political institutions can thus break the link between the individual-specific uncertainty that proved problematic in the majority rule case, and the decision to adopt or reject the policies in question.

Second, the averaging process that I use to represent bargaining in coalition settings not only allows the preferences of a larger set of actors to be weighted into decision-making, it also lets the *intensity* of those preferences play a role. This is a realistic feature of the theory, insofar as intense preferences can be expected to provide leverage in coalitional bargaining³⁶. This question of preference intensity also creates a bridge between my understanding of policymaking in coalition governments on the one hand, and the theory of Fernandez and Rodrik (1991) on the other. Indeed, as the

authors point out in conclusion to their paper [p.1154], the existence of a status quo bias is contingent on the absence of a mechanism that “translates the intensity with which individuals favor the proposed reform into outcomes.” I argue below that the institutional features of multiparty systems and coalition governments provide such a mechanism.

3.2 INTEREST REPRESENTATION

The preference aggregation rules that I compared in section 3.1 were designed to approximate the core features of two different political systems, but my description of these systems was skeletal. In this section, I paint a richer portrait of the institutions and processes that guide policymaking. My goal is to suggest that, although very simple, the theoretical framework that I proposed above is both useful and empirically reasonable.

Because the virtues and drawbacks of the pure Downsian model are well known, I do not expand on them here. My treatment of policymaking in the coalition setting is slightly unusual, however, so it demands a more detailed exposition. In particular, I need to make a strong case that the outcome of legislative bargaining between coalition partners can plausibly be represented as a compromise position between the ideal points of the (diverse) parties who take part in that negotiation. To make this point, I articulate a “compromise view” of coalition bargaining and emphasize the importance

³⁶As Achen (2006*b*) has noted, the idea that intensity often generates influence in bargaining has long roots in political science, dating back to the works of Bentley (1908); Banfield (1964); Lindblom (1965), etc. It is also reflected in works on social theory, such as those of Coleman (1994), as well as in the sociological tradition which stems from this work. See Achen for a discussion.

of swing/marginal voters for the electoral prospects of representatives.

A compromise view of legislative bargaining

The idea that outcomes from coalitional bargaining can effectively be represented as a weighted combination of the representatives' preferences (the "compromise view") is supported by important theoretical results from the bargaining literature, by a host of empirical evidence in comparative politics, and it is consistent with usual practice by academic researchers in the field. I address these points in turn.

To begin, it is interesting to note that the compromise view is consistent with a number of influential game theoretical treatments of governance in coalition systems. For example, Austen-Smith and Banks (1988) and Baron and Diermeier (2001) develop models that yield joint electoral and legislative equilibria: voters choose who to elect by anticipating the eventual composition of a governing coalition, and elected officials must negotiate over the content of legislation. In both models, the legislative equilibria tend to fall between the ideal points of coalition members; negotiations force partners to find an acceptable middle ground between their positions. This result is not terribly surprising, insofar as it falls in line with outcomes from several classic bargaining models.³⁷ It is also intuitively appealing, because it mirrors the common belief that proportional systems foster compromise between diverse segments of society (or their representatives) (Lijphart, 2012; Powell, 2000).

Empirically, the compromise view can be understood as a challenge to the strong forms of departmentalism that emphasize decision-making by ministers (e.g. Laver and Shepsle, 1990). I submit that, even though ministers do have important decision-

making and agenda-setting powers, they cannot be assumed to hold full authority over their portfolios. Indeed, a growing empirical literature on the limits of ministerial power suggest that the preferences of multiple members of government are taken into account when making policy. For example, Hallerberg (2000) and Kim and Loewenberg (2005) study the role of parliamentary committees in checking the powers of ministers, Carroll and Cox (2007); Thies (2001); Falco-Gimeno (2012); Lipsmeyer and Pierce (2011) explore the role of junior ministers as oversight mechanisms, and Martin and Vanberg (2004, 2005) look at legislative review of ministerial decisions. These studies suggest that while “[p]ortfolio allocations do indeed make some initial difference as a stage through which all coalition negotiations must pass [...], their empirical significance for a coalition’s eventual policy stance is greatly exaggerated” in the departmentalist model (Dunleavy and Bastow, 2001). In fact, Martin (2004) finds, in his study of 800 government bills in four European democracies, that “coalition governments pursue a largely ‘accommodative’ agenda.” In sum, ministers do not simply implement the policies that match their own ideal points, they must strike deals with other coalition members and consider their preferences as well.

Against this theoretical and empirical background, it is no surprise to see that many students of comparative politics have chosen to represent the joint policy position of coalition governments as the average of their members’ individual positions. The preference averaging assumption has implicitly or explicitly been taken up in both theoret-

³⁷The idea that policy represents some weighted average of the governing members’ preferences arises naturally from many of the most well-known game theoretic models of bargaining. For example, Binmore, Rubinstein and Wolinsky (1986) show that the equilibria produced by the alternating offers bargaining model of Rubinstein (1982) and its extensions with time preference (Fishburn and Rubinstein, 1982) and uncertain termination can be viewed as approximations to the famous Nash (1953) bargaining solution.

ical³⁸ and empirical work³⁹, and the political processes that it implies agree with my argument from section 3.1.⁴⁰

Interest representation and marginal voters

So far, I argued that policy outcomes in coalition governments can effectively be represented by averaging the preferences of those who participate in legislative bargaining. The question of how representatives form these preferences was bracketed-out. Here, I open the black box and address this question directly.

Much of recent work on distributive politics is organized around the crucial distinction between electoral appeals to “core” or “swing” voters (Cox and McCubbins, 1986; Lindbeck and Weibull, 1987; Dixit and Londregan, 1996). Proponents of the swing voter model emphasize candidates’ need to persuade unaligned voters to win the election, while core voter models focus on the importance of a party’s constituency for coordination and mobilization in the run up to the election. There are compelling theoretical arguments in support of both positions and, as Cox (2009) points out, empirical studies have found evidence of appeals to both types of voters.⁴¹ But even if this literature does not provide definite guidance for the problem at hand — reality must lie between the two poles — the stark conceptual distinction between core and swing

³⁸E.g. Persson, Roland and Tabellini (2007); Duch and Stevenson (2008).

³⁹E.g. Franzese (2002); Martin and Vanberg (2004); Blais et al. (2006); Golder and Stramski (2010).

⁴⁰Another (more pragmatic) reason to adopt the averaging model of coalitional politics is offered by Achen (2006*a*), who evaluates the predictive accuracy of a vast array of bargaining models in the context of European Union politics. Achen found that a simple average of the negotiating parties’ ideal points proved to be one of the best ways to predict which policies will be adopted.

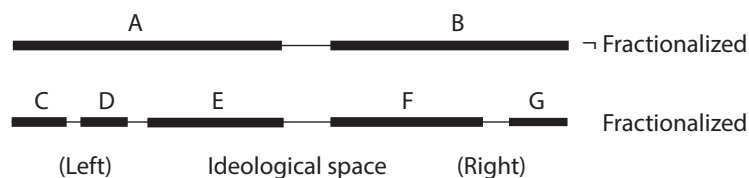
⁴¹On evidence of transfers to swing voters, see for example Bickers and Stein (1996); Dahlberg and Johansson (2002); Herron and Theodos (2004); Stokes (2005). On evidence of transfers to core voters, see for example Balla et al. (2002); Calvo and Murillo (2004); Ansolabehere and Snyder (2006).

voters has the benefit of clarifying the vision of politics that the ideas from section 3.1 commit me to.

Importantly, the pure Downsian model that I used to think about policymaking in the two-party case focuses exclusively on the importance of swing voters for the electoral prospects of candidates. For the theory to be internally consistent, similar incentives must also be reflected in my treatment of interest representation in coalition governments. There, politicians who wish to maximize their vote shares must court those unaligned voters who, because they sit outside any party's core constituency, can be persuaded to change their allegiance.

Figure 8 illustrates how electoral competition may play out on a one-dimensional policy space where two or more parties compete for votes. In the two-party case (top line), parties A and B benefit from captive constituencies (bold lines) who cannot credibly threaten to defect, and they compete to attract the votes of a narrow set of voters that includes the median (thin line). In a fractionalized political system (bottom line), parties C-D-E-F-G also enjoy captive constituencies (bold lines), but parties can increase their vote shares by wooing unaligned voters on each "side" of their core. As a result, there are many more electoral "battlegrounds" in the fractionalized system, and the set of citizens who are actively targeted for persuasion by politicians tends to be larger and more diverse than in the two-party system. Readers will note that these are the conditions I identified in section 3.1 to explain why coalition governments may not be subject to the same status quo bias as political systems which, as in the Downsian case, are governed by majority rule.

Figure 8: Two hypothetical party systems. Letters indicate a party’s ideological location. Bold bars cover “captive” portions of the electorate and narrow bars correspond to regions of “independent” voters.



3.3 WHO SIGNS TAX AND INVESTMENT TREATIES?

Above, I suggested that coalitions may be more inclined to adopt a reform than single party governments when the change is efficiency enhancing and its distributional effects are *ex ante* unknown. Here, I introduce two policies that can be expected to produce aggregate growth, with individual-specific uncertainty as a by-product. I then put my theory to the test by comparing rates of adoption across party systems.

Tax and investment treaties

Thousands of bilateral tax treaties (BTs) and bilateral investment treaties (BITs) have been ratified since WWII. These treaties have already been the object of much research in political science, law and economics.⁴² BITs aim to bolster international investors’ rights by, for instance, defining procedures for investor-state dispute settlement. BTs aim to reduce impediments to FDI by allocating the tax base between home and host

⁴²On BITs, see for example Guzman (1998); Hallward-Driemeier (2003); Egger and Pfaffermayr (2004); Salacuse and Sullivan (2005); Neumayer and Spess (2005); Elkins, Guzman and Simmons (2006); Egger and Merlo (2007); Yackee (2008); Kerner (2009); Tobin and Busch (2009); Busse, Königer and Nunnenkamp (2010); Tobin and Rose-Ackerman (2011); Simmons (2014); Allee and Peinhardt (2014). On BTs, see Bacchetta and Espinosa (2000); Davies (2004); Chisik and Davies (2004); Egger et al. (2006, 2009); Blonigen, Oldenski and Sly (2011).

country, thereby reducing the likelihood that MNCs' income will be taxed twice. Both of these types of treaties aim to lower obstacles to international investments, and the governments that sign such treaties hope that they will contribute to an increase of bilateral investment flows between signatories.⁴³

For governments who contemplate the possibility of signing a BIT or a BTT, the overriding consideration must be the expected consequences of these agreements for their domestic economies. Since the main purpose of these treaties is to make FDI less risky or expensive, it follows that governments must weigh the potential effects of increased FDI flows. As I mentioned above, FDI is known to produce aggregate economic growth (Table 12), but we also know that outward flows of FDI can mean that local jobs will be outsourced, and that inward flows of FDI might crowd-out domestic investors. Exactly who the winner and losers will be, however, is very difficult to predict *ex ante*, that is, before the policy is implemented and changes in FDI flows are realized. In sum, BTTs and BITs are policies that exhibit precisely the characteristics that I outlined above: they are expected to promote aggregate economic growth but also have uncertain distributional consequences in the domestic economy.

Data and model specification

To determine if coalition governments are associated with a higher propensity to sign BTTs and BITs, I assemble a panel dataset which covers much of the world over the

⁴³Whether or not BITs and BTTs actually lead to increased investment remains a matter of debate in the empirical literature. For my purposes, the only thing that matters is that governments *believe* that ratifying these treaties will lead to more investment. That much, I think, is made clear by the rhetoric that surrounds every aspect of these treaties, from negotiation to the treaty preambles, to public statements by government officials.

1970-2011 period. My argument rests on a theory of interest representation in democratic contexts, so I restrict the analysis to the set of states that score 7 or more on the Polity IV scale (Marshall, Jaggers and Gurr, 2012). I only consider countries with over one million inhabitants in order to exclude island nations and small tax havens.

I look at two dependent variables: the counts of BTs and BITs that a country ratifies per year. The main regressor of interest is an indicator which takes a value of one if the country is governed by a coalition government and zero otherwise.⁴⁴

Before describing the empirical results, it is useful to briefly consider the main alternative causal pathways which may link the type of government to the ratification of FDI promoting treaties. Calling attention to these alternatives forces us to clearly identify the most important sources of omitted variable bias that threaten statistical inference.

Small states in world markets: The economies of small states are often very dependent on international trade and investment. As a result, these countries may adopt liberal, internationalizing policies in response to the structural characteristics of their economies rather than because of their institutions. In addition, Katzenstein (1985) pointed out 30 years ago that many of these small developed democracies have developed extensive welfare state systems that allow them to pursue liberal economic policies while protecting their domestic polities from fluctuations in world markets.

The arguments I have made above do not enter in conflict with this compensation hypothesis, but rather stands as a complement to it; my theory highlights an insti-

⁴⁴Unfortunately, the fact that many countries never experience both coalition and single-party governments precludes the use of unit fixed effects in my statistical analysis.

tutional mechanism that could prevent majoritarian governments from implementing just this type of liberalization-with-compensation. But since it is true that small states tend to be governed by coalition governments, our inference remains under threat of omitted variable bias. To account for this possibility, I control for a set of variables that aim to capture both the type of economy, the degree of internationalization, and the size of the welfare state system: *population size*, *share of trade to GDP*, *proportion of FDI flows to GDP*, the ratio of *government spending to GDP* (World Bank Development Data Group, 2013), and a *de jure* measure of *capital account openness* (Chinn and Ito, 2008).

Ideology: It is well established that proportional representation systems tend to produce both coalition and left-wing governments (Blais and Carty, 1987; Lijphart, 2012; Iversen and Soskice, 2006). In turn, left-wing governments and coalition governments spend more, on average, than right-wing or single party governments (Bawn and Rosenbluth, 2006; Persson, Roland and Tabellini, 2007), and they thus face more severe income constraints. This suggests that the coalition governments I am interested in might be less inclined to adopt tax reforms that favor capital and reduce government income. In other words, coalition governments may be associated with ratification of fewer liberalizing reforms that reduce government revenue and favor the interests of capital.

On the other hand, Pinto (2013) points to the fact that incoming flows of foreign investment may have a positive affect on wages in capital poor countries. If this is true, and if we believe that left-wing governments represent the interests of labor, we could expect them to adopt policies that make a country more attractive to FDI.⁴⁵ In

⁴⁵Of course, this expectation depends on the initial factor endowment of each country, which means

sum, it seems appropriate to include a control for the ideology of the executive in our regression models.

Veto players and treaty ratification procedures: Another important strand of literature in comparative politics explores the role of veto players in blocking changes to the status quo. This is obviously relevant to the discussion here, since I am interested in institutional factors that affect a government's propensity to adopt growth enhancing reforms, and because states with coalition governments tend to have more veto players than states with two-party systems. Following Tsebelis (1995, 2002), we should expect these countries to adopt fewer policies that alter the status quo.

A related concern is that political institutions in different countries may impose different requirements on the ratification of international treaties such as BTTs and BITs. Again, it seems plausible that political institutions that produce coalition governments also pose more obstacles to treaty ratification. To account for this, I control for whether or not international treaties must be ratified by one (or two) legislative chambers before coming into effect (Regan and Clark, 2013; Teorell et al., 2013).

Results

The results from estimation of a negative binomial regression model are reported in Table 6. I find that coalition governments are positively associated to the number of new BTTs that a country signs. The coefficient on *Coalition* is statistically significant, and large enough to be considered substantively important. On average, moving from a single-party government to a coalition is associated with an additional 1.27 (0.24

the expectation may not hold when considering the full population of countries.

log-counts) BITs signed per year. In the case of BITs, we see that, all else equal, coalition governments sign 1.38 more agreements than single party governments. The magnitude of these estimates suggests that the association is substantively important, and the small standard errors indicate that the relationship is also statistically significant at conventional levels.

Robustness

The results described above are robust to a host of alternative model specifications. I consider the most important ones here.

Time-invariant independent variable: The study design I described above shares with many published works one of the most fundamental problems of comparative politics: political institutions are sticky over time and are correlated with other relevant explanators. I have done what I could above to contain the threat of omitted variable bias, but the stickiness of my *coalition* variable remains problematic. Indeed, if most of the variation is cross-sectional, the country-year structure of the dataset may produce results that overstate our confidence in the strength of the relationship between coalition governments and policy outcomes.

To guard against this problem, I estimate two additional models. Tables 8 and 9 show results from a set of linear models estimated on country-wise five-year averages and on pure cross-sections. In three of the four cases, the relationship between coalition governments and treaty ratification maintains the expected sign and shows us as statistically significant. In the last (BIT Between model, Table ??, we see the “correct” sign, but the relationship no longer appears to be distinguishable from zero. Given

Table 6: BTT ratification and coalition governments. Negative binomial models with robust standard errors.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
(Intercept)	-7.158 (0.451)	-7.164 (0.450)	-7.923 (0.509)	-7.347 (0.455)	-7.804 (0.482)	-7.137 (0.450)	-7.387 (0.553)	-8.926 (0.689)
Coalition	0.241 (0.063)	0.256 (0.065)	0.213 (0.064)	0.242 (0.063)	0.278 (0.066)	0.212 (0.062)	0.249 (0.077)	0.176 (0.080)
(X+M)/GDP	0.009 (0.001)	0.009 (0.001)	0.009 (0.001)	0.010 (0.001)	0.009 (0.001)	0.007 (0.001)	0.011 (0.001)	0.009 (0.002)
Log(Pop)	0.265 (0.024)	0.267 (0.024)	0.270 (0.025)	0.271 (0.024)	0.286 (0.026)	0.270 (0.024)	0.310 (0.029)	0.347 (0.032)
Log(GDP/cap)	0.267 (0.023)	0.271 (0.024)	0.346 (0.028)	0.272 (0.023)	0.276 (0.026)	0.197 (0.026)	0.239 (0.026)	0.244 (0.044)
Veto players		-0.203 (0.226)						0.283 (0.303)
K openness			-0.092 (0.025)					-0.062 (0.033)
FDI inflow				-0.014 (0.006)				0.011 (0.009)
Left wing					0.138 (0.032)			0.131 (0.040)
Gvt spending/GDP						0.036 (0.006)		0.035 (0.008)
Treaty ratification							-0.153 (0.055)	-0.108 (0.060)
AIC	5896.715	5890.758	5656.855	5767.735	4961.117	5849.658	4247.791	3416.453
BIC	5929.681	5929.208	5695.090	5806.062	4998.394	5888.080	4283.796	3475.852
Log Likelihood	-2942.357	-2938.379	-2821.427	-2876.867	-2473.559	-2917.829	-2116.895	-1696.227
Deviance	1907.766	1904.255	1841.457	1866.454	1608.250	1888.511	1345.523	1092.357
Num. obs.	1798	1795	1741	1764	1518	1788	1266	1043

Table 7: BIT ratification and coalition governments. Negative binomial models with robust standard errors.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
(Intercept)	-4.945 (0.534)	-4.943 (0.538)	-5.011 (0.554)	-4.950 (0.538)	-5.355 (0.580)	-4.842 (0.532)	-4.823 (0.624)	-4.785 (0.684)
Coalition	0.331 (0.077)	0.309 (0.079)	0.402 (0.078)	0.338 (0.077)	0.368 (0.084)	0.329 (0.077)	0.345 (0.087)	0.418 (0.101)
(X+M)/GDP	0.006 (0.001)	0.006 (0.001)	0.005 (0.001)	0.007 (0.001)	0.005 (0.001)	0.006 (0.001)	0.007 (0.001)	0.004 (0.002)
Log(Pop)	0.221 (0.026)	0.219 (0.026)	0.228 (0.026)	0.220 (0.026)	0.244 (0.028)	0.220 (0.026)	0.195 (0.033)	0.195 (0.034)
Log(GDP/cap)	0.118 (0.024)	0.110 (0.024)	0.109 (0.027)	0.121 (0.024)	0.120 (0.028)	0.103 (0.029)	0.115 (0.027)	0.067 (0.045)
Veto players		0.293 (0.310)						0.970 (0.418)
K openness			0.057 (0.029)					0.114 (0.037)
FDI inflow				-0.013 (0.008)				0.035 (0.011)
Left wing					-0.009 (0.040)			-0.035 (0.046)
Gvt spending/GDP						0.006 (0.007)		0.004 (0.010)
Treaty ratification							0.150 (0.065)	0.122 (0.078)
AIC	6006.451	5995.420	5705.056	5881.920	4963.474	5992.679	4439.323	3555.504
BIC	6039.418	6033.869	5743.292	5920.247	5000.750	6031.101	4475.328	3614.902
Log Likelihood	-2997.226	-2990.710	-2845.528	-2933.960	-2474.737	-2989.339	-2212.661	-1765.752
Deviance	1770.488	1767.511	1701.469	1732.142	1465.743	1765.177	1283.198	1041.214
Num. obs.	1798	1795	1741	1764	1518	1788	1266	1043

Table 8: BTT ratification and coalition governments. Linear regression models with robust standard errors.

	5 year avg.	Between
(Intercept)	-8.476 (1.095)	-7.882 (1.501)
Coalition	0.313 (0.152)	0.565 (0.250)
(X+M)/GDP	0.011 (0.002)	0.012 (0.003)
Log(Pop)	0.359 (0.059)	0.313 (0.079)
Log(GDP/cap)	0.354 (0.046)	0.347 (0.061)
R ²	0.240	0.481
Adj. R ²	0.232	0.453
Num. obs.	371	87

the drastic reduction in sample size that we must accept when estimating purely cross-sectional models, this finding does not seem too surprising. Overall, I conclude that the results are robust to alternative specifications that emphasize the (mostly) cross-sectional nature of the relevant variation.

Government/legislature fractionalization: The main regressor of interest in the above tests was the *coalition* indicator. But another plausible interpretation of the arguments developed above, especially as illustrated in Figure 8, could suggest an alternative operationalization of the explainer: government fractionalization. To measure fractionalization, I use the index published by Beck et al. (2001), which corresponds to the probability that members of government selected randomly will belong to different political

Table 9: BIT ratification and coalition governments. Linear regression models with robust standard errors.

	5 year avg.	Between
(Intercept)	-5.086 (1.364)	-6.233 (1.750)
Coalition	0.480 (0.198)	0.187 (0.291)
(X+M)/GDP	0.006 (0.003)	0.010 (0.004)
Log(Pop)	0.289 (0.074)	0.312 (0.092)
Log(GDP/cap)	0.132 (0.063)	0.208 (0.071)
R ²	0.077	0.238
Adj. R ²	0.066	0.224
Num. obs.	371	87

parties. As Laakso and Taagepera (1979) point out, this is a simple transformation of the “effective number of parties” measure that is commonly used in the comparative politics literature. Government fractionalization equals zero in countries like Canada where single party governments are the norm, and is about 0.65 on average in Finland where ruling coalitions tend to be large. Tables 10 and 11 replicate the results from Tables 6 and 7 using this measure of fractionalization. Again, the results remain broadly consistent with the results I showed using the simple coalition dummy.

Table 10: BTT ratification and government fractionalization. Negative binomial models with robust standard errors.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
(Intercept)	-7.205 (0.448)	-7.215 (0.447)	-7.990 (0.503)	-7.424 (0.452)	-7.852 (0.480)	-7.182 (0.447)	-7.417 (0.550)	-9.054 (0.687)
Gvt.Frac.	0.388 (0.110)	0.429 (0.123)	0.362 (0.111)	0.410 (0.111)	0.456 (0.121)	0.332 (0.105)	0.358 (0.140)	0.247 (0.156)
(X+M)/GDP	0.008 (0.001)	0.009 (0.001)	0.009 (0.001)	0.010 (0.001)	0.009 (0.001)	0.007 (0.001)	0.010 (0.001)	0.009 (0.002)
Log(Pop)	0.269 (0.024)	0.272 (0.024)	0.273 (0.025)	0.276 (0.024)	0.289 (0.026)	0.274 (0.023)	0.314 (0.030)	0.351 (0.033)
Log(GDP/cap)	0.270 (0.023)	0.275 (0.024)	0.352 (0.028)	0.275 (0.023)	0.282 (0.026)	0.200 (0.026)	0.241 (0.026)	0.254 (0.045)
Veto players		-0.260 (0.244)						0.280 (0.320)
K openness			-0.095 (0.025)					-0.069 (0.033)
FDI inflow				-0.013 (0.006)				0.010 (0.009)
Left wing					0.145 (0.032)			0.133 (0.041)
Gvt spending/GDP						0.035 (0.006)		0.034 (0.008)
Treaty ratification							-0.151 (0.057)	-0.104 (0.060)
AIC	5898.684	5892.257	5657.145	5768.581	4964.091	5851.719	4251.333	3418.357
BIC	5931.651	5930.707	5695.381	5806.908	5001.367	5890.141	4287.339	3477.755
Log Likelihood	-2943.342	-2939.129	-2821.573	-2877.290	-2475.046	-2918.859	-2118.667	-1697.178
Deviance	1911.005	1908.027	1843.462	1869.978	1612.441	1891.955	1348.691	1094.352
Num. obs.	1798	1795	1741	1764	1518	1788	1266	1043

Table 11: BIT ratification and government fractionalization. Negative binomial models with robust standard errors.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
(Intercept)	-4.956 (0.527)	-4.961 (0.529)	-5.051 (0.542)	-5.026 (0.531)	-5.340 (0.569)	-4.848 (0.524)	-4.848 (0.618)	-5.043 (0.681)
Gvt.Frac.	0.659 (0.125)	0.637 (0.134)	0.779 (0.129)	0.685 (0.127)	0.809 (0.142)	0.659 (0.125)	0.651 (0.146)	0.824 (0.186)
(X+M)/GDP	0.006 (0.001)	0.006 (0.001)	0.004 (0.001)	0.007 (0.001)	0.005 (0.001)	0.005 (0.001)	0.007 (0.001)	0.004 (0.002)
Log(Pop)	0.226 (0.026)	0.225 (0.025)	0.233 (0.026)	0.227 (0.025)	0.245 (0.027)	0.225 (0.025)	0.203 (0.032)	0.208 (0.033)
Log(GDP/cap)	0.115 (0.024)	0.112 (0.024)	0.109 (0.027)	0.120 (0.024)	0.121 (0.028)	0.099 (0.028)	0.115 (0.027)	0.088 (0.046)
Veto players		0.122 (0.313)						0.822 (0.415)
K openness			0.056 (0.029)					0.108 (0.037)
FDI inflow				-0.013 (0.008)				0.031 (0.011)
Left wing					0.005 (0.041)			-0.023 (0.047)
Gvt spending/GDP						0.006 (0.007)		0.002 (0.010)
Treaty ratification							0.123 (0.065)	0.103 (0.078)
AIC	5999.462	5989.622	5697.568	5874.324	4952.490	5985.414	4435.954	3551.692
BIC	6032.429	6028.071	5735.803	5912.651	4989.766	6023.836	4471.959	3611.090
Log Likelihood	-2993.731	-2987.811	-2841.784	-2930.162	-2469.245	-2985.707	-2210.977	-1763.846
Deviance	1773.231	1769.613	1704.587	1734.650	1468.863	1767.843	1285.389	1043.606
Num. obs.	1798	1795	1741	1764	1518	1788	1266	1043

3.4 CONCLUSION

I introduced a simple model which can be used to study the introduction of liberalizing reforms in a two sector economy. Comparing different preference aggregation rules led me to conclude that if decisions are made based on the expected utility of a median voter, individual-specific uncertainty may prevent the adoption of policies that promote aggregate growth. Where policy outcomes can be viewed as a compromise between more diverse segments of society, I showed why this status quo bias could be attenuated.

This result sheds new light on one of the most important debates in political-economy, by providing an institutional basis to answer the question of why certain states choose the “liberalization with compensation” approach. Indeed, even a well-developed welfare state system may not be sufficient to overcome the status quo bias that results when policies in a majoritarian system engender individual-specific uncertainty. Put differently, social insurance against the uncertainty produced by liberalization may be less costly in countries ruled by coalitions.

My theory also suggests a new way to assess the role of institutions in policy-making: based on whether or not the policies in question have clear or unpredictable distributional consequences. In this paper, I considered the ratification of international treaties that aimed to promote FDI, but there are many policies that exhibit similar characteristics. For instance, the original theory of Fernandez and Rodrik (1991) was developed with international trade policy in mind. Another issue area where the theory may apply is capital taxation. Indeed, it seems fair to characterize the (very large) literature on capital taxes as concluding that (a) corporate taxes produce deadweight loss, and (b) the incidence of capital taxes is very difficult to ascertain. This is in contrast with in-

come taxes, where the weight of taxation is clearly spelled out by the different income brackets. Hays (2003) offers evidence consistent with my argument when he shows that the ratio of capital tax to income tax is higher in consensual democracies than in majoritarian systems. In this way, my account can be seen as a complement to a series of important problems in political-economy.

Table 12: Effect of foreign direct investment on growth

Authors	Sample	Effect	Condition
Cipollina et al. (2012)	14 manufacturing sectors in developed and developing countries 1992-2004	+	stronger in capital intensive and high-tech sectors
Fillat and Woerz (2011)	35 countries OECD Asia 1987-2002	+	export oriented countries and sectors
McCloud and Kumbhakar (2011)	China	+	institutional quality
Mah (2010)	85 countries	0	economic freedom
Azman-Saini, Baharumshah and Law (2010)		+	
Kottaridi and Stengos (2010)		?	
Wijeweera et al. (2010)	45 countries 1997-2004	+	human capital
Lee and Chang (2009)	37 countries 1970-2002	+	capital markets
Alfaro, Kalemli-Ozcan and Sayek (2009)		+	
Chakraborty and Nunnenkamp (2008)	India	+	manufacturing vs. transitory services
Beugelsdijk, Smeets and Zwinkels (2008)	44 countries 1983-2003	+	
Federico and Minerva (2008)	103 Italian provinces 1996-2001 12 manufacturing industries	+	
Tang, Selvanathan and Selvanathan (2008)	China	+	
Wang and Sunny Wong (2009)		+	

Table 12: Effect of foreign direct investment on growth

Authors	Sample	Effect	Condition
Ford, Rork and Elmslie (2007)	American states	+	human capital
Haskel, Pereira and Slaughter (2007)	UK	+	
Basu and Guariglia (2007)	23 developing countries	0/+	trade openness allows for positive bidirectional relationship; closed economies see only an effect from GDP to FDI
Madariaga and Poncet (2007)	Chinese cities 1990-2002	+	
Qi (2007)	47 countries	0/+	country-specific growth patterns
Basu and Guariglia (2007)	119 countries	+	
Hansen and Rand (2006)	31 developing countries 31 years	+	
Lensink and Morrissey (2006)		0	
Li and Liu (2005)	84 countries 1970-1999	+	human capital
Vu Le and Suruga (2005)	105 countries 1970-2005	+	
Alfaro et al. (2004)	1975-1995	+	financial markets
Asheghian (2004)	American states	+	
Akinlo (2004)	Nigeria	0	
Durham (2004)	80 countries 1979-1998	0/+	absorptive capacity
Javorcik (2004)	Lithuania	+	
Bengoa and Sanchez-Robles (2003)	18 Latin American countries (1970-1999)	+	human capital
Hermes and Lensink (2003)	67 countries	+	financial system development

Table 12: Effect of foreign direct investment on growth

Authors	Sample	Effect	Condition
Choe (2003)	80 countries 1971-1995		
Kohpaiboon (2003)	1979-1999	+	trade openness
Chakraborty and Basu (2002)	India	0	
Oliva and Rivera-Batiz (2002)		+	
Barthélemy & Démurger (2002)	Chinese provinces 1985-1996	+	
Reisen and Soto (2001)	44 countries 1986-1997	+	human capital; domestic market size; competitive climate
Zhang (2001)	East Asia	+	trade openness; human capital
Girma et al. (2001)	UK	n/a	
Djankov and Hoekman (2000)	Czech enterprises 1992-1996	+	
Xu (2000)	40 countries 1966-1994	+	human capital; economic development
Balasubramanyam, Salisu and Sapsford (1999)		+	human capital; domestic market size; competitive climate
Makki and Somwaru (2004)	66 developing countries	+	human capital
Borensztein, De Gregorio and Lee (1998)	69 developing countries	+	human capital

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