

Tax Policy, Tax Competition and Fiscal Rules: Insights from a Classroom Experiment and Surveys of Politicians

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Abstract: This paper reviews and extends recent attempts to better understand fiscal policy decision making. Surveys of politicians are complementary to traditional empirical analyses and can be used to extract beliefs of policymakers. There is much heterogeneity across and also within parties. Often ideology plays an important explanatory part in the beliefs of policymakers, even for questions that appear to be non-ideological. Furthermore, I report on a classroom experiment, in which student subjects play a simple tax competition game. In one treatment subjects know about the political preferences of other players. In contrast to simple Nash predictions, left-leaning students choose significantly higher tax rates on capital.

Keywords: Surveys, Ideology, Tax Competition, Experiment

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1. Introduction

In democratic countries fiscal policy is decided by politicians in parliament and carried out by the executive branch of government. The economic's discipline has advanced its understanding of the induced behavioural effects from government interventions (as in the literature on program evaluation) and the determinants of fiscal policy decisions. More sophisticated theoretical models, partly originating in political science, as well as more detailed data and better empirical strategies to identify causal effects are at the heart of this advancement. Yet our understanding of political decision making regarding fiscal policy making still appears to be incomplete. At the empirical level analyses are typically restricted to past policy decisions for which data are available. Even then identification of causal effects and channels of interaction is difficult. This is particularly true for economic environments in which fiscal policies in multiple jurisdictions are interdependent.¹ At the same time theorists face the challenge that realistic models of fiscal policy making must be rich in terms of the underlying economic model, and at the same time must capture the essence of the political process that describes how decisions are reached.²

Against this background, I ask questions that are not easy to address within traditional analyses: how do policy makers form expectations and beliefs regarding future events? How do politicians select information and distinguish among conflicting theories explaining the world? Answering these questions seems particularly difficult in parliamentary democracies with strong party discipline because actual voting behavior is often not very informative. Perhaps members of the same party share a similar view, and that is why they belong to the same party. But perhaps views are very different within parties, which - given the large number of policy issues - cannot be ruled out a priori. Which factors determine politicians' beliefs? Answering those questions seems important in its own sake, but also because it might help in advancing the efficiency of the political process. A better understanding could make it easier to design reform proposals that are more likely to pass, because the source of reform failure is better identified.

¹ At the empirical level it is often difficult to correctly identify the channel of fiscal interaction as the same reduced form is estimated, in which the tax rate of one region is a function of the neighboring regions' tax rates. As argued by Revelli (2005), this observation is compatible with any one of the following explanations: tax base mobility, public goods spillovers, yardstick competition, or autocorrelated shocks.

² Again, this holds particularly true for models of fiscal competition. The theoretical literature offers only few political economy models (e.g., Persson and Tabellini (1992), Keen and Edwards (1996), Eggert and Sorensen (2008), Janeba and Schelderup, 2009), and in those the political environment is still fairly simple.

The contribution of this paper is to answer these economic questions by discussing alternative approaches to studying fiscal policy: namely through surveys of politicians and a simple classroom experiment in which students simulate fiscal policy making. Surveys have been used extensively in social sciences to study beliefs of households or firms, but rarely for studying the views of politicians (in particular when economics questions are at the center stage). This is not too surprising given that it is difficult to systematically collect data from politicians, an issue that I will address further below in more detail. Laboratory experiments are a standard tool in economics. Often, however, experimentalists study the behavior of agents in particular market environments or the behavior of individuals, while ignoring often the importance of the public sector.³

While surveys and experiments are not new, they have not been used much by economists for the analysis of fiscal policy decision making. I do not argue that surveys and experiments should or will replace standard tools of empirical and theoretical analysis that I referred to above. Quite to the contrary. The main point instead is that these tools are complementary to the existing ones and may explain certain aspects that haven't been known or couldn't be measured before. In addition, these "new" tools will hopefully lead to novel questions and designs in the future, which can then further be advanced with more standard tools.

The plan of this paper is to describe the potential and limitations of surveys of politicians for economic analysis and to put forward a simple classroom experiment on tax competition to illustrate the working of these tools. The paper is structured along the "tools" dimension: surveys of politicians (section 2) and classroom experiment (section 3). However the paper can be read also along two "issue" dimensions, namely the role of ideology, which features prominently in sections 2.1 and 3.2, and the role of fiscal policy in open economies (important in sections 2.1, 2.3., and 3).

In the next section I first show that surveys have been used many times in the field of political science. Most of these studies do not focus on policy issues, but rather on other aspects such as the general ideological stance or practical aspects of a politician's life. Therefore the section reviews more closely surveys (and selective questions from these surveys) that have a focus on fiscal policy issues. In particular I discuss the role of ideology

³ To mention a few exceptions: Höchtel, Sausgruber and Tyran (2013) study experimentally voting over redistribution. Sausgruber and Tyran (2011) analyze in a laboratory environment whether subjects prefer taxes on sellers over taxes on buyers and point to the role of biases. For a general survey of experimental work in public economics see Riedl (2010).

of politicians for their perception of reality and its consequence for actual decisions. Survey evidence from German politicians suggests that perceived international mobility of firms and profits due to tax factors differs strongly by party membership. A second field of application for surveys is the compliance with a new fiscal rule in Germany's states (Länder), which became part of the constitution in 2009 but becomes effective only in 2020. This is an ideal testing ground for belief formation of politicians because the credibility of the fiscal rule is uncertain. Finally, I discuss the use of a survey of mayors in the German state of Baden-Württemberg to study the spatial structure of tax competition. I will argue that typical assumptions in the theoretical and empirical literature on tax competition are not consistent with the perceived structure of tax competition by policy makers.

In section 3, I present a classroom experiment which required students to act as government and select taxes on labor and capital in order to provide a public good. The experiment, while highly simplified, captures the nature of simple tax competition games and shares some of their elementary predictions.⁴ The experiment is designed in a specific way to study the role of ideology (party preference). Section 4 discusses concerns and avenues for future research relating both to surveys of politicians and experiments.

2. Fiscal policy making: Surveys of Politicians

Surveys of politicians have been rarely used in the economics discipline but are quite frequent in political science, there sometimes referred to as elite surveys. Typically, politicians in industrialized countries are surveyed. Studies have analyzed beliefs and perceptions of politicians in the US, Israel, Japan, Italy, Sweden and Norway. The topics differ widely. For example, several researchers study the role of and the relationship of politicians to mass media and lobby groups, such as Cohen et al. (2008) for Israel, Borge et al. (1995) for Norway, as well as Aalberg and Strömbäck (2013) for Sweden and Norway. Some studies focus on the type or nature of politicians such as Stone et al. (2004) for the US and Muramatsu and Krauss (1984) for Japan. Several papers deal with the ideological stance of politicians, such as Frensdreis et al. (2003) considering state politicians in the US and Putnam et al. (1979) in a classic contribution based on a survey of Italian politicians. Finally, two

⁴ The design and results from the classroom experiment are built on the unpublished paper Janeba (2011).

studies elicit answers from politicians in the US as to how they represent voters and organize their tasks (Kurtz et al. (2006) and Harden (2013)).

The work by Agren et al. (2007) is perhaps closest in spirit to the papers discussed further below. They study the congruence of preferences of voters and local politicians in Sweden regarding local welfare policies (including education and child care). In the remainder of this section, I summarize and discuss three surveys of politicians that have been used to i) get a better understanding of fiscal policy making, ii) inform theoretical modeling, and iii) to understand belief formation of politicians which concern future events.

2.1 Ideology and fiscal policy making

Ideology is an important part in the political process. We may define ideology as a set of ideas that constitute and determine an individual's goals, expectations, and actions. What makes the study of ideology interesting is that certain beliefs are maintained even if evidence speaks against the belief. Recent work provides two explanations. Caplan (2007), for example, argues that systematic belief errors are individually rational if the belief itself has consumption value and society is large. The latter is important because in that situation any individual is unlikely to be pivotal in decision making and thus faces vanishing costs of holding wrong beliefs. Benabou (2008) goes a step further and presents a model of collectively sustained misperceptions. Agents choose whether to ignore contrary evidence or not, and the incentives to do so depend on other agents' decisions. Thus social cognitions are endogenous, and in general depend on how they are reached.

These theoretical contributions rationalize why ideological beliefs may be sustained. In principle they could apply to everybody, including policy makers. At the same time one may argue that policy makers differ from average citizens due to informational advantages. Empirical evidence suggests that beliefs among subpopulations do differ indeed. Caplan (2002) as well as Blinder and Krueger (2004) report that laypeople differ in their perceptions of economic phenomena relative to economists. Misperceptions play an important role in the context of tax policy. Referring to tax reforms and tax policy decisions, Birney et al. (2006) and Krupnikov et al. (2006) document misperceptions in the context of the US estate tax. Slemrod (2006) finds misperceptions among citizens regarding fundamental tax reform in the US (in the context of replacing the income tax by a sales tax).

Misperceptions and biases regarding fiscal policy are therefore fairly widespread and we should not rule out a priori that the same applies to politicians as well. But there exists little evidence. Surveys of policymakers in the context of tax policy are extremely rare, to the best of my knowledge. Ashworth and Heyndels (1997, 2000) are exceptions. In the first paper they show that politicians' ideological position influences their view on whether taxes in Belgian localities are considered too high or too low. In the second paper it is argued that ideology affects the preferences of politicians over tax cuts and tax hikes.

The only known survey of policymakers in the context of international tax policy is provided by Heinemann and Janeba (2011). They survey members of the German national parliament (Bundestag) during intensive debate about company tax reform in 2006/7. At that time Germany imposed above average tax burdens on (corporate) firms which partly escaped taxation by shifting profits abroad. The subsequent tax reform, passed only several months after the survey in the summer of 2007) reduced the tax burden on retained profits from 38% to 30%, and at the same time restricted the deductibility of interest payments on debt to prevent international profit shifting.⁵

To focus the discussion it is useful to restate one of the questions asked in the survey by Heinemann and Janeba: "The level of company taxation is mentioned as one factor for the location decision of companies. How important do you believe is the level of company taxation in this context?" This question is non-ideological in nature, at least at first glance. In the language of economics the question refers to the elasticity of a tax base (company profits), something that is an objective parameter in theoretical analysis. While there might be disagreement in the scientific literature about the responsiveness of (foreign) investment to taxation (de Mooij and Ederveen, 2001), it is clear that firms do respond to tax changes and tax differentials. One objective of the survey is to identify the determinants of beliefs of politicians. For this reason the survey is non-anonymous (while confidentiality is assured) and thus personal characteristics such as education, age, and professional experience can be controlled for.

A first interesting observation by Heinemann and Janeba (2011) is that the variance of answers is large both within parties and across parties. The discrete answer scale ranges from 1 to 9 (where 9 means very important/relevant). In almost all parties the lowest value

⁵ For a detailed analysis of this reform see Finke et al. (2013).

ticked off is 2 or 3, while the highest is always an 8 or 9. It is precisely this heterogeneity that is typically not revealed in votes in parliamentary democracies with strong party discipline. There is also a significant difference in party means. For example, for the question the mean for the most left-leaning party (The Left Party “Linkspartei”) is 3.93, while it is 7.41 for the most market oriented party (Free Democrat Party, “FDP”). This is surprising in so far, as the question is not directly normative.

Using ordered probit regression analysis, Heinemann and Janeba (2011) find strong evidence that answers are significantly driven by party membership which is taken to represent ideology. For example, left leaning politicians believe that taxation plays less of a role in firms’ investment location decisions than right-leaning politicians. In fact, ideology is quantitatively the main driver in explaining answers (besides some of the professional experience variables and gender). The results are not always monotone in the left-right spectrum however. Members of the center-left Social Democratic Party show the largest concern for profit shifting as opposed to the responsiveness of real investment (a survey question not shown here).

Heinemann and Osterloh (2013) provide an interesting additional analysis of political ideology by asking members of European Parliament about (corporate) tax policy. Politicians at this level are interesting to look at because they both represent political parties and at the same time also might be expected to have a bias towards their country of origin. Heinemann and Osterloh confirm the role of ideology besides country interest. Left-leaning politicians support minimum tax rates for corporate tax rates in the EU. In contrast to the above survey this is less surprising because a standard model of preferences for redistribution can explain this.⁶ Interestingly, German politicians in the European parliament do not differ systematically in their views from politicians in the German national parliament, who were also asked about minimum tax rates.

The findings from the surveys discussed in this section leave somewhat unclear as to how and why politicians believe the way they do, an aspect that is further discussed in section 4. The experiment presented in section 3 also addresses the role of ideology.

⁶ Note that the labels left- and right-leaning are not easily defined, in particular in multidimensional policy space. Debus and Osterloh (2012) use party manifestos to measure the stance of parties (via content analysis) and use this to explain ideological biases in corporate tax setting across industrialized countries over many years.

2.2 Fiscal rules and fiscal decentralization

The survey method has been used in two other areas of public finance. The first one is in the context of a new fiscal rule in Germany, the second one is directed towards identifying the spatial structure of tax competition. Ideology plays an important role in the first, while not in the second one. However, the latter survey is instrumental for developing a new theoretical model of tax competition.

Fiscal rules play an increasing role in many countries in order to reach sustainable public finances. The Fiscal Compact, which was recently passed by 25 European countries (EU without UK, Czech Republic and Croatia), calls for a maximum structural deficit of no more than 0.5% of GDP (among other things). The rule is inspired by the recent German fiscal rule (called *Schuldenbremse*), which was put in the German constitution in 2009. The German rule requires the federal government to run structural deficits of no more than 0.35% of GDP starting in 2016, and a zero structural deficit by all German states (*Länder*) beginning in 2020. What makes this rule interesting are the long delay between the constitutional implementation (2009) and the actual application (2016/2020). This is particularly true for the states, for whom no adjustment path towards the long run objective in 2020 is given (unlike the federal government which needs to make equal step adjustments towards the 2016 target).⁷

The credibility of the fiscal rule might thus be questioned.⁸ Further evidence supports this view. As part of Germany's fiscal equalization scheme the federal government grants vertical transfers to several states. Fink and Stratmann (2010) view these transfers as implicit bailout payments when budget constraints are weak and relate them to the bargaining power in the second chamber of Germany's parliament (Bundesrat) in which states are represented. More overrepresentation leads to softer budget constraints.

Against this background Heinemann et al. (2014) use a questionnaire addressed to members of parliaments in all 16 German states (*Länder*) to shed light on the credibility of the debt

⁷ An exception are those five states who obtain special transfers until 2019 (*Konsolidierungshilfen*), which were granted at the time of agreement about the fiscal rule. These transfers are conditional on respecting a defined adjustment path.

⁸ See Janeba (2012) for a theoretical analysis of the new institutional setup when the rule is assumed to be credible, but fiscal policy is subject to political distortions.

brake. An alternative strategy to asking politicians directly is to use financial market data. Bonds ratings of German states, however, are a very imperfect tool to gauge the likelihood of compliance with the debt brake for two reasons. First, a government may be solvent in the long run but unwilling to comply with the targets of a particular fiscal rule. Bond ratings data relate to solvency, but not directly to compliance with a fiscal rule. And, second, fairly positive ratings for most German states despite tight fiscal conditions in some of them may reflect the bailout expectations that financial market participants hold, anticipating significant future vertical fiscal transfers from the federal government.

In the survey politicians are asked to assess the likelihood of compliance of the federal government and their own state with the rules of the debt brake (among other items). Answers were given on a discrete scale from -4 (not likely at all) to +4 (highly likely). The survey was conducted non-anonymously in order to control for individual characteristics. Confidentiality of individual answers was guaranteed. The following three effects are of most interest in the current context:

- a. Party membership is in most cases not significant; the key explanatory variables are economic and fiscal variables of the state whose compliance is assessed.
- b. Members of the parties in the current (coalition) government are more optimistic than members of opposition parties.
- c. States with right-of-center governments are believed to be more likely to comply with the debt brake.

Unlike in the survey of national politicians in Germany reported above, ideology does not play a leading role in the sense that opinion is not clearly divided by party lines. Instead economic fundamentals play an important role. Perhaps this is not surprising. One may argue that the economic and fiscal situation of states is more objective than the elasticity of a tax base, which was the object of interest in the first survey. While this is superficially correct, it may not be at a closer look. For example, the comprehensiveness of government debt accounting may be wide or narrow. Similarly, the consideration and quantification of implicit government debt is debatable.

The second statement b. suggests that being a member of governing parties elevates the likelihood of compliance. This could be for a number of reasons such as having more information, which will be discussed later in more detail. Perhaps not too surprising is

statement c.: center-right parties in government are expected to be more compliant, which holds true in the view of all politicians not only those who are to the right of the political spectrum.

The survey of state politicians in Germany addressed not only issues of compliance with a fiscal rule but also covered the preferences of politicians regarding state tax autonomy and the reform of Germany's fiscal equalization system. Germany's states have little own taxing power and instead obtain a large portion of their revenues from shared sources with the federal government (income and value added tax). A reform of this system is often discussed and promoted by some economists, partly because many other federal countries do grant substantial taxing power to lower levels of government, such as Switzerland and the US. So far more state tax autonomy has never been a majority proposition in Germany's political arena. The introduction of the national debt brake in Germany, requiring the states to have a structurally balanced budget in 2020, may change the majority however. Without tax autonomy fiscal balance must be restored mainly via the expenditure side, which may be politically difficult. Similarly, fiscal equalization plays an important role in Germany, something that has been popular in the majority of states. There is significant redistribution of tax revenues both vertically (from federal to state governments) and horizontally (among states). Among the states there are only a few net payers who have been opposed to the present degree of redistribution among states.

Against this background an additional advantage of the survey is to better understand the reform potential of Germany's fiscal federalism. Heinemann et al. (2013) use the existing 639 answers about tax autonomy and fiscal equalization to construct the reform preferences of all state politicians in Germany (1861). This is done by estimating from the answers the role of individual characteristics such as education, age, membership in committees, etc. From public sources the characteristics of all politicians are known, including those that did not answer. The two pieces of information are then used to predict the preference of all politicians. From this emerges the median view within a state which could be seen as predictor for the voting behavior of state governments in Germany's chamber at the federal level (Bundesrat). Thus the survey is instrumental in gauging the political support for important reform questions.

2.3 Spatial structure of tax competition

The final example of a survey is useful for an entirely different objective. Janeba and Osterloh (2013) use a survey of mayors in the German state of Baden-Württemberg to study the spatial structure of tax competition among local jurisdictions (*Gemeinden*). The existing theoretical and empirical literature often makes one of two extreme assumptions. In most of the theoretical literature on tax competition it is assumed that all regions compete with all other regions (see Wilson (1999) for a survey). Space does not really play a role. By contrast, the empirical literature often uses spatial weights when modelling the relevant interdependence of government tax rates (Bruckner 1998). The strength of competition is declining in geographic distance, often sharply (for example, competition takes only place among jurisdictions with common borders). Competition is assumed to be mostly local.

In the survey, mayors are asked to identify the degree of competition on a discrete scale in three dimensions: competition with i) local jurisdictions in the same state, ii) local jurisdictions in other German states, and iii) local jurisdictions in other countries (e.g., in neighboring countries France and Switzerland). The survey reveals that the spatial pattern of competition depends on the size and nature of the local jurisdiction. Large cities (or cities which serve a hub function) typically compete both with other distant cities and with their neighboring communities. Mayors from small, often rural localities, by contrast, perceive the main competitors to be geographically close. Distant communities do not matter (much).

A concern is that the survey design does not allow the authors to disentangle the city size effect from the border effect because some communities are small and near a border. To shed more light on this issue, Janeba and Osterloh (2012) use a seemingly unrelated ordered probit regression model. The dependent variable is the response to each of the three survey questions mentioned above. Dummies for those municipalities which share a border with another German state (Bavaria, Hesse or Rhineland-Palatinate) or another country (France or Switzerland) are used. Several control variables capture other observable differences.

The results from the regression analysis confirm and extend the descriptive findings (significant effect of jurisdiction size; only large jurisdictions perceive competition with more distant jurisdictions; municipalities near a state border find that competition with municipalities from other German states is significantly higher than the perception in non-border municipalities). Moreover neighbors to an international border perceive stronger

international competition. Quantitatively the effect is smaller though than competition across states within Germany. The results are in line with Geys and Osterloh (forthcoming) who - using the same survey data – argue that the change in the perceived structure of competition sets in about 20km (12.5km) from a national (international) border.

The insights from this survey can be used in two directions. The first one is the direction taken by Janeba and Osterloh (2013) who build a novel sequential tax competition model that captures the essence of the two-dimensional structure of spatial competition: local competition by all jurisdictions, but distant competition only by and among big cities. The second direction is empirical. Fossen, Freier and Martin (2013) modify the spatial weighting matrix (and allow for long distance competition by cities) when estimating debt policy reactions functions for German municipalities. In fact, it would be useful to systematically compare empirical models with traditional weighting matrices with ones that are in line with the structure arising from the survey. Going a step further, one could think of generating the weighting matrix directly from survey answers of politicians when they were asked about the identity of their competitors. Obviously this would require a large and consistent database, and thus a comprehensive response rate.

3. Ideology and Fiscal Policy Making: A Classroom Experiment

An alternative, complementary approach to the survey of politicians is to make use of experiments, in which the economic environment is better controlled for and incentives to answer truthfully can be strengthened through monetary awards. Ideally one would like to conduct an experiment with politicians in order to better understand fiscal policy making. However this is logistically difficult, at least with politicians at higher levels of government. The following experience from a classroom experiment represents a first step. The experiment was not conducted with politicians but with students. The experiment is a test of the standard tax competition model with two tax instrument but in addition seeks to understand better the role of ideology and thus relates to the survey approach presented in section 2.1. I am aware of only one other experimental study of tax competition. Gunessee (2010) explores the role of public good preferences (level and symmetry across countries) in a tax competition model with capital taxation only. Like the present paper, Gunessee directly

tests for one specific channel of fiscal interdependence, namely tax base mobility opposed to yardstick competition or public good spillovers.

The classroom experiment described below partially resembles a duopoly game under price competition, as tax competition for capital is modeled as a Bertrand game. Bertrand games have been examined experimentally many times before (see, for example, Dufwenberg and Gneezy, 2000 and 2002, and the literature cited therein). The following tax competition game, however, differs from this existing literature in several ways. First subjects decide not only on the tax on capital but simultaneously also on one on labor income. This allows me to test the nested prediction on the direction and mix of taxes. Moreover, a possible important determinant of the actual play in the tax competition experiment is an individual's political preference, something that is irrelevant in standard duopoly games. Economic or political context matters.

3.1 The Model

3.1.1 The tax competition game

The basic tax competition game is similar to a standard model with two tax instruments (Bucovetsky and Wilson, 1991), albeit with some simplifications (technology of producing goods, the separation of ownership of factors of production, a reduced form of capital supply, and a specific (linear) form of preferences) to make it appropriate for a classroom experiment. The key comparison is between a closed economy, where capital is not mobile, and a two country model, where capital is costlessly mobile.

Each subject in the experiment acts as the government of a country which is inhabited by a representative worker and a capital owner. The worker consumes a private (numeraire) good, whose price is normalized to one, supplies elastically labor which causes disutility, and consumes a public good provided by the government. One unit of the private good can be transformed into one unit of the public good. The utility function of the worker is given by

$$U(C, L, G) = C - \frac{1}{2}L^2 + \frac{3}{2}G \quad (1)$$

where C denotes consumption of the private good, L is labor and G stands for the public good. The marginal utility of the public good is constant and greater than the marginal utility

of the private good. Still, private consumption is nonzero in equilibrium as the deadweight loss from taxation limits the supply of public goods.

The worker finances private consumption out of labor income net of the labor tax (T_L). The budget constraint reads

$$C = (W - T_L)L = (10 - T_L)L. \quad (2)$$

The wage rate W is constant and set equal to 10. In contrast to typical tax competition models the technology is linear and the wage is independent of the amount of capital employed in the country. This makes the model simpler to understand.

The behaviour of the capital owner is modelled in a reduced form. Capital supply is endogenous and depends on the return to capital net of capital taxed. When capital is internationally immobile (= closed economy) the capital owner invests an amount I equal to the domestic net of capital tax return, that is

$$I = R - T_K = 10 - T_K, \quad (3)$$

where the gross return to capital R is set equal to 10, and (T_K) is the capital tax rate.

When capital is mobile internationally, the capital owner invests in the country with the lowest capital tax, as gross returns $R = 10$ are assumed to be constant and identical across countries. The investment amount equals the maximum of the net of tax returns $I = \max\{10 - T_K^i, 10 - T_K^j\}$, where i and j are country indices. In a two country setting the total investment in country i depends on whether country i has the higher or lower tax rate compared to country j , that is,

$$I^i = \begin{cases} 0 & \text{when } T_K^i > T_K^j \\ 10 - T_K^i & \text{when } T_K^i = T_K^j \\ 2(10 - T_K^i) & \text{when } T_K^i < T_K^j \end{cases} \quad (4)$$

There is a discontinuity in (4) at the point of equal tax rates: Investment jumps from twice the highest net of tax return to zero. The investment function for country j is simply the reverse image of (4). The radical nature of competition for capital seems consistent with the bidding process for a discrete investment project such as an individual plant or a headquarter location. The setup makes the strategic nature of the interaction very transparent.

The government is assumed to maximize the utility of the representative worker (1) subject to the government budget constraint

$$G = T_L L + T_K I, \quad (5)$$

where the amount of investment is given by (3) or (4), respectively, and taking the optimal behaviour of workers and capital owners in both countries into account.⁹

3.1.2 Rational Behavior

The game is considered in two settings: closed and open economy. The difference lies in the investment opportunities of capital owners. In the closed economy capital owners must invest in their own country and hence there is no strategic interaction among countries. In the open economy, strategic interaction takes place among governments and the equilibrium concept is Nash. The sequencing of moves is standard. In the first stage, the governments choose tax rates on labor and capital, with the public good level adjusting endogenously. In the second stage the worker and capital owner in each country maximize utility and net income, respectively, taking the fiscal policy vector (tax rates and G) of both countries as given.

The game is solved by backward induction. The worker maximizes utility (1) subject to the budget constraint (2), taking factor prices and fiscal policies as given. This gives optimal consumption $C^* = (10 - T_L)^2$, optimal labor supply $L^* = 10 - T_L$, and after inserting these into (1), the indirect utility function

$$U^* = \frac{1}{2}(10 - T_L)^2 + \frac{3}{2}G. \quad (6)$$

The government maximizes indirect utility (6) subject to (5), taking in the open economy the fiscal policy vector of the other country as given. In the closed economy public good provision equals

$$G = T_L(10 - T_L) + T_K(10 - T_K), \quad (7)$$

⁹ The government's objective function does not include the utility of the capital owner. The reason is twofold. First, this assumption makes the analysis simpler, as the induced indirect utility function doesn't have to include an additional income term from capital (which would have to be derived explicitly from an intertemporal consumption-saving model). Second, as one objective of the analysis is to study the role of ideology in tax competition, the objective function gives a clear ideological underpinning.

where the term in brackets represents the tax base for labor and capital, respectively. The tax revenue functions for both tax bases are the same, quadratic, and correspond to well-known Laffer curves. In the closed economy the optimal tax rates are

$$T_L = 2.5, \quad T_K = 5. \quad (8)$$

The induced level of public good provision is 43.75 and the indirect utility level amounts to 93.75. The optimal tax rate on labor is smaller than the tax rate on capital as the government considers the labor tax's distortion of labor supply, whereas for capital the tax's depressing effect on capital supply matters only for via the government budget.

In the open economy with two countries the optimization problem of the government of country i differs because the investment function is (4), and thus the government budget (5) now reads

$$G^i = T_L^i(10 - T_L^i) + T_K^i \begin{cases} 0 & \text{when } T_K^i > T_K^j \\ (10 - T_K^i) & \text{when } T_K^i = T_K^j \\ 2(10 - T_K^i) & \text{when } T_K^i < T_K^j \end{cases} \quad (9)$$

A Nash equilibrium in the simultaneous tax rate game is considered $(T_L^i, T_K^i, T_L^j, T_K^j)$.

Unlike most models in the literature on tax competition, the optimal labor tax is independent of the amount of investment and thus capital tax revenue, due to the linearity of the production function. Hence the optimal labor tax in the open economy is the same as in the closed economy ($T_L = 2.5$). This is an attractive feature in the context of an experiment, as it makes the model less complex. As competition for capital resembles a Bertrand game, the pure strategy equilibrium tax rates are zero. For a government capital matters only as source of fiscal revenue. Hence subsidizing capital is never optimal. The equilibrium tax vector under rational behavior is thus

$$T_L = 2.5, \quad T_K = 0. \quad (10)$$

The public good level is 18.75 and indirect utility of the worker is 56.25. Clearly, a worker is worse off and the capital owner better off compared to the closed economy. The model captures the basic elements of the classic tax competition framework. Mobility of capital leads to lower tax rates on capital and thus less (and under) provision of public goods.

3.2 Experimental Details and Hypotheses

The experiment was conducted as a classroom experiment at the University of Mannheim in a compulsory class in public finance. Students came from Economics (Bachelor and Diploma level) and Business Administration (Diploma level) backgrounds. The large majority of students were second year Bachelor students in Economics who had at the point of the experiment about 10 weeks of intensive lectures on issues in public economics, including the effect of taxes on investment and labor supply, though not on the issue of tax incidence in open economies.¹⁰ The experiment was completely voluntary and anonymous, and thus could have no repercussion on the course grade. The winning prize was a €20 voucher for Amazon's online store in Germany. In total 121 students returned answer sheets, of which 5 were incomplete or faulty, resulting in 116 usable answer sheets. This amounts to about 85% of those who took the exam one month later.

In a first session students were told about the experiment as such and about the general framework in a non-technical way. The following week the experiment was conducted. An intensive handout including the response sheet was distributed. The information was read and explained by working through the handout, which was simultaneously projected on a big screen. Then students were given ample time to complete the questionnaire, before they were collected. Anonymity was guaranteed through a coding system, under which students were identified by a number and would allow the winner to pick up the prize from a secretary's office. The questionnaire included questions regarding personal characteristics which are used in the empirical analysis below. Personal characteristics included: study major, average grade, gender, and political preference.

The handout explained both the worker's decision problem (equations (1) and (2)) and the government's problem (maximizing (6) subject to (7) and (9), respectively). In addition, the handout provided a series of (hypothetical) numerical examples for the closed and open economy in order to show how aggregate investment, public good levels and utility are computed for given tax rates. As shown below, in the closed economy students selected on average tax rate values close to the optimal values. This suggests that subjects understand the main economic issue at hand. In addition, students were presented graphs for Laffer

¹⁰ Diploma students in Economics had about one additional year of training in economics and a bit more advanced standing in public economics. Business students had only about 4 weeks of teaching in public economics and overall a bit less background in economics compared to the Bachelor students.

curves showing government revenue from taxing capital. In particular, for the open economy the discrete jumps at the point of equal tax rates were visualized, once on the upward sloping and once on the downward sloping portion of the Laffer curve. This should have made clear that tax competition is like a Bertrand game.

At the end of the handout students were asked to provide a pair of values for the labor and capital tax rates from the interval $[0,10]$ for three different experiments (Part A) and answer to five questions concerning personal characteristics (Part B). The three experiments represent the closed economy and twice the open economy with capital mobility. Tax rates had to be given in absolute values with two decimal digits. Thus the smallest unit was Cent.¹¹

The three experiments were designed as follows. **Experiment 1** simulates the closed economy, as capital owners cannot invest outside their country. The students task of selecting tax rates means solving a constraint optimization problem. There is no strategic interaction. Among the personal characteristics only competence should matter. In Experiments 2 and 3 students were matched with one other student in the classroom for the purpose of calculating payoffs. Students were told about the matching process. The setting thus represents a two-country framework with strategic interaction and the Nash equilibrium in tax rates involves labor taxes in both countries of 2.5 and capital tax rate pairs (0,0) or (0.01,0.01). In **Experiment 2** the matching was done randomly. **Experiment 3** repeated Experiment 2 albeit with a different, publicly announced matching process. Students were told that they are matched with another student who has the same political preference.

The linearity of technology for labor and capital implies that the optimal labor tax rates should be the same regardless of the matching process and the degree of openness. For the capital tax rate rational behaviour in Experiments 2 and 3 predicts a fall to 0 or near 0 compared to Experiment 1. Since exact Nash behaviour is rarely observed in experiments a weaker prediction is that tax rates on capital fall when opening up the economy for capital mobility. This leads to the first hypothesis.

¹¹ This assumption avoids artificial fine tuning of answers, but introduces multiple Nash equilibria in the open economy. On top of the Nash equilibrium with zero capital tax rates, there exists a second Nash equilibrium in which both players choose capital tax rates of 0.01€. For practical matters, however, the multiplicity seems of little relevance, as revenues from taxing capital are negligible in both equilibria.

Hypothesis 1: a) The labor tax rates in the closed and open economy are the same. b) The capital tax rate in the open economy is lower than in the closed economy.

One may question whether capital tax rates in the open economy drop to zero. The extreme incentive structure (only the highest score overall wins the prize) makes it unlikely that one could win the prize for the experiment if rational behavior is followed strictly. As long as one can expect that some other students deviate substantially from the zero tax rate on capital, either because of lack of understanding of the experiment or for ideological reasons, choosing a strictly positive capital tax rate might be expected to give a better chance of winning the prize. The experimental literature on Bertrand competition has shown that the number of players, the amount and type of repetition, as well as information about previous payoffs to affect outcomes (see Dufwenberg and Gneezy, 2000 and 2002).

The role of political ideology is not clear under random matching in the open economy. If a student expected that political ideology were to matter in the choice of tax setting by others, subjects would need to know the probability of being matched with a student of the same or similar party preference. To validate the hypothesis the prior beliefs of students about their fellow students' political preferences need to be known (but were not). Political preferences among students in this class (as obtained from the questionnaire) are similar to German society as a whole, although a bit to the left and roughly split half between a left and right block (details below). Therefore it is likely that political ideology should not play a significant role in explaining actual tax rate choices in the open economy with random matching.

In a rational world political preferences should also play no role in the open economy with political matching. In section 2, I provided evidence that ideology plays a role in a survey of German members of national parliament about globalization and tax policy, and discusses theoretical models consistent with such behavior. We may therefore expect the following:

Hypothesis 2: a) Political ideology plays no role in explaining capital tax rates under random matching. b) In the open economy with political preference matching, the tax rate on capital is monotonically increasing from right to left.

We now turn to the results of the experiment.

3.3 Results

3.3.1 Descriptive Statistics

I begin with a summary of descriptive statistics. *Table 1* provides a summary of key variables, including grades, the means and variances of tax rates and payoffs for all student participants, and sliced according to individual characteristics.

Grade/Competence: Grades in Germany are given on a scale from 1.0 (best) to 5.0 (lowest/fail). The average grade for all participants is 2.40. There is little variation in grades with respect to gender and party membership (the exception are supporters of the Left Party, which could be due to a small number effect). In the empirical implementation it is difficult to properly control for competence as measured by grades. For instance, the optimal tax rate on labor is 2.5. Better students should be expected to play closer to this value, but this could be from above or below. I use a grid of four grade ranges to measure and control for knowledge.

Gender: Female students show different behaviour on average. They choose a slightly higher tax rate on labor than men in the closed economy, but the reverse is true in the open economy. Note that capital tax rates in the open economy chosen by female students (3.66 and 3.72 in Experiments 2 and 3) are significantly higher than those for men (2.72 and 2.80).

Political preference: Students were asked to indicate their political preference for one of six parties/groups. The Christian Democrats (CDU/CSU) are a center-right party with moderately pro market views. The Free Democrats (FDP) is the most pro-market oriented party in Germany. On social and cultural issues the party is rather liberal and thus to the left of the CDU/CSU. The Social Democrats (SPD) are a center-left party with moderate pro to skeptical views about the advantages of a market economy. The Green Party (Bündnis 90/Grüne) puts emphasis on environmental and social issues and is left of center. The Left Party (Die Linke) represents mostly unemployed and socially disadvantaged individuals and has a strong base among as among former communists in East Germany. It is the least market friendly party in Germany. The remaining group is Other. All five parties (except for Other) are represented in the German national parliament (Bundestag) at the time of the experiment. For some purposes it will be useful to group the five major parties into two blocks. The right block

consists of Christian Democrats and Free Democrats, while the left block comprises Greens, Social Democrats and the Left Party.¹²

Figure 1 provides first insights. In the closed economy the average tax rates for labor and capital (2.46 and 5.02) are close to the optimal values given in (8), which are 2.5 and 5, respectively (not statistically different). This points to a good understanding of the economic problem underlying the experiment. In fact, in the first experiment 66 students choose the rationally optimal labor tax (2.5) and 96 students choose the rationally optimal capital tax.

The tax rate on labor increases substantially from the closed economy to the open economy regardless of the matching procedure (2.46 to 3.01/2.95), which is in contrast to Hypothesis 2a (difference is statistically significant). Still, in the last two experiments 57 students choose the correct optimal labor tax of 2.5. Tax rates on capital are clearly positive (average 2.96 and 3.04, respectively, which is statistically different from zero). In Experiments 2 and 3 the number of students who choose tax rates for capital equal to zero or very close to zero (i.e., no more than 0.1) is six and seven, respectively. Capital taxes are much smaller in the open economy (2.96/3.04) than in the closed case (5.02), and the difference is highly significant. The latter observations confirm Hypotheses 1b, and thus are in line with general tax competition theory.

There is a lot of interesting variation, however, in particular when tax rate choices are conditioned on the basis of party preference. In the open economy with random matching, tax rates on capital chosen by supporters of the Green Party (3.50) and the Left Party (3.35) are substantially higher than those chosen by all other parties (SPD 2.96, CDU/CSU 2.72, and Free Democrats 3.00), although the difference is not statistically significant. This does not exactly correspond to a clean left-right division, as supporters of the Social Democrats choose relatively low tax rates.

Tax rate choices in open economy setting with political preference matching, however, suggest the relevance of political ideology. Compared to the open economy with random

¹² The distribution of political preferences among students is different from the general public at the disaggregated level, but is fairly similar at a more aggregated level (source: Forschungsgruppe Wahlen, Politbarometer Mai 2009). Supporters of the Green Party and the Free Democrats are strongly overrepresented among students, while supporters of the Christian Democrats are heavily underrepresented. Yet, when aggregated into two blocks (right and left), proportions are roughly representative, although with a slight left-leaning bias among students.

matching there is an increase in capital tax rates for supporters of left of center parties: Social Democrats (2.90 to 3.20), Green Party (3.50 to 3.85) and Left Party (3.35 to 4.04). Declines are found for more market friendly parties right of center: Christian Democrats (2.72 to 2.54) and Free Democrats (3.00 to 2.71). All differences are not significant however.

3.3.2 Econometric Analysis

The descriptive results are suggestive but a more rigorous analysis is warranted. In the following I use simple OLS regressions, in which the dependent variables are the labor and capital tax rate respectively. I use dummies for party preference (base category is Social Democrats) and student major (base category Bachelor Economics). *Female* is a dummy variable which takes on the value of 1 for female students and 0 for male students. Finally, a student's ability/knowledge is measured by the grade point average in his or her major. The grade grid is divided in four ranges (1-1.5, 1.5-2.5, 2.5-3.5, 3.5-4.0) to construct dummies. There is no student in the lowest grade category and hence I analyze how students with grades in the first and second range behave relative to the reference category which is grade range 3 (2.5-3.5). Most students have a grade point average that falls in categories 2 and 3, that is between grade 1.5 and 3.5. The tax rates are estimated independently, as the labor tax should not be influenced by the capital tax and (vice versa). Separate regressions are run for the three experiments.

Table 2 gives the results for the baseline regression. In the closed economy (**Experiment 1**) none of the personal characteristics is significant in explaining the labor tax. Many students (66) chose the "correct" value of 2.5. Somewhat surprisingly, this choice does not seem to be driven by ability when measured by grade point average. There is more explanatory power in explaining the capital tax in the closed economy. Diploma students in Economics and Business Administration choose a lower tax rate by about four percentage points compared to Bachelor Economics students. Most party dummies are insignificant. Only supporters of the Green Party choose a tax rate that is close to four percentage points and significantly lower than supporters of Social Democrats. The results for ability when measured by grades is close to significant for good students who choose about 2 percentage point higher tax rate on capital. However, the effect is not confirmed when considering top students (Grade 1).

In the open economy with random matching (**Experiment 2**) results do not change in an important way for the labor tax. The grade dummies as well as all other variables (except the constant) are not significant.¹³ For the capital tax the female dummy gains significance. Female students choose a capital tax rate that is almost 10 percentage points higher than male students. This variable is significant at the 1% level. The sign of the party dummies makes some sense (except for the Free Democrats for whom the coefficient is higher than for the Social Democrats), but none is close to being statistically significant.

In **Experiment 3**, Open Economy with Political Matching, none of the variables explains the labor tax in a statistically significant way. By contrast, the female students choose significantly higher tax rates on capital than male students. The coefficient size is comparable to the previous experiment with random matching. Interestingly, the party dummies show a reasonable pattern in terms of size and sign of coefficients. Supporters of the Green Party (about 6 percentage points) and the Left Party (about 10 percentage points) choose higher capital tax rates than Social Democratic supporters, while the opposite holds for more market friendly supporters of Christian Democrats (almost 7 percentage points) and Free Democrats (almost 4 percentage points). The Christian Democratic dummy is marginally significant, while the other dummies are not far away from being significant. The reason may be the small sample size. The Grade dummies are not significant.

To highlight the role of political ideology that became apparent in Figure 1, I modify the regression to create a left block dummy for supporters of the Social Democrats, Greens, and Left Party. In the last two columns of Table 2 the sample has been reduced by those 7 students who checked the party „other“, leaving 109 observations. Without changing the matching to determine payoffs, this new regression shows in the last column that supporters of left leaning parties (Green Party, Social Democrats and Left Party) choose a capital tax rate that is close to 8 percentage points higher than supporters of right of center parties (Christian and Free Democrats). The dummy is significant at the 5% level. Grouping political parties in the same way has no impact in explaining the labor tax in Experiment 3 or tax rates in Experiment 2 (not shown). Note also that the introduction of a left-right block dummy has little effect on other variables.

¹³ The analysis is also done with a different measure of student competence without affecting results much. Competence in this approach is calculated on the basis of how close students choose tax rates to the optimum in Experiment 1, which is then an explanatory variable in Experiments 2 and 3.

4. Discussion of Results and Future Agenda

In this paper I have reviewed and suggested “new” tools to the study of fiscal policy: surveys of politicians and experiments. Both offer additional insights for better understanding about how politicians form beliefs about the future, understand economic constraints and might be influenced by ideology in their decision making. These tools come with their own problems, which so far have only been partially addressed. It is worth considering them now in more detail before thinking about a future agenda.

Surveys of politicians have rarely been used by economists until recently. Three areas of concerns may be identified for explaining this. The first one arises from the limited number of responses and thus the quality of the empirical data base. Politicians are busy and often they do not answer to surveys. The response rates in the surveys reviewed in this paper range between approximately 25% and 60%. There seems to be a fairly clear relationship between the participation rate and the (vertical) level of government to which politicians are elected. Politicians at higher levels of government tend to participate less. At higher levels of government the number of legislators or jurisdictions tend to become smaller as well, so that surveys of politicians at the local level are perhaps most promising.

A second concern relating to surveys is that politicians may fear about the (mis-) use of their answers. The surveys reviewed were non-anonymous in order to identify determinants of individual beliefs. At the same time politicians were assured that their individual answers are treated confidentially and only aggregate data would be released. It is difficult to assess whether politicians find these reassurances credible. Not answering is an option if credibility is questioned. Econometric non-response analysis is a first step in addressing this concern and this has been done, for example, by Heinemann et al. (2013). Politicians may respond in another direction though and answer strategically. This could be done in order to influence the potential outcome of the study in a particular direction (for example, when a politician believes that other parties are better represented in the survey, and thus pulling the simple average to a survey question away from their own true position). Alternatively, politicians might worry about being out of line with their party’s official position, or to the contrary, want to be seen as not mainstream within their party.

These concerns must be taken seriously and cannot be easily dismissed. They must also be weighed against the shortcomings from analyzing data that come from recorded votes,

which may also suffer from strategic behavior. Several aspects suggest, however, that the problem of strategic answering in surveys should not be overstated. An interesting observation in the data from the surveys is the large heterogeneity of answers within (and not only in the means across) parties. If politicians were concerned about the relative position to the party leadership, more uniform answers should be expected. The same is likely to be true if politicians were acting strategically (unless only some politicians act strategically, and they differ in their true position from the non-strategic politicians). The extent of strategic answering most likely depends on the nature of the question being asked. Non-ideological questions are better suited than politically sensitive questions. However, it is not always a priori clear what an ideological question is. At first glance a question concerning how responsive capital is to taxation may appear non-ideological because it relates to an objective matter (i.e., how many firms move a plant due to taxes). But in fact it apparently is ideological. Similarly, the beliefs about the likelihood of compliance with a fiscal rule could be party driven, but apparently are not.

A third broad concern with surveys of policy makers is the need to limit the number of questions being asked. This follows directly from the goal of having a high response rate. The surveys reviewed in this paper have asked no more than 10 questions, which fit on at most two pages. The design of the questionnaire is thus a crucial exercise. Having more questions could be helpful in filtering the exact view of the politician on a particular issue. An orthogonal question to the issue at hand could clarify whether a certain position of a politician is context-specific or reflects a general view (e.g., a politician favoring higher tax rates does so because of general equity concerns, which could be identified with other questions, or because of differences about the efficiency costs of taxation).

The last two concerns lead me to suggest and consider a second tool, namely the use of experiments. A laboratory environment provides a much cleaner framework in which answers are provided and decisions are made. An analytical framework, as the one suggested in section 3, gives little room for differential understanding of questions and tradeoffs. For instance, while Heinemann and Janeba (2011) only indirectly try to identify the perceived elasticity of real capital in an international context, this is formally modelled in the experimental setup. Similarly, the incentives to answer truthfully can be strengthened in an experiment as monetary incentives can be allowed to operate.

These considerations suggest that laboratory experiments could play a much larger role, a point that is also made and documented by Riedl (2010). A traditional concern regarding experiments is the lack of external validity. At least two additional issues come to mind in the particular context of the present paper. First, if the goal is to understand better policy making experiments should be conducted with politicians. This is probably even more difficult than getting politicians to answer questionnaires because the time commitment is larger. A second issue relates to the complexity of the environment tested in the lab. The classroom experiment considered in section 3 clearly requires some advanced math skills which can be expected from economics students but not generally from politicians. In order to avoid this, the decision problem would need to be simplified. For example, one could think of a simple model in which the set of feasible tax rates is discrete and limited in number, as opposed to the continuous setup considered above. But even then one might be concerned about the incentive structure in a laboratory environment. Perhaps monetary incentives may play less of a role for politicians compared to others, and instead expressive behavior is more relevant.

The classroom experiment is thus a natural starting point to test models of fiscal competition, which hopefully can be adapted to simpler environments in which politicians eventually participate. The simple experiment described in this paper suggests that the tax base mobility channel of fiscal interaction is active. Participants lower tax rates on the mobile factor when the economy becomes more open, although not as much as theory predicts, and increase the labor tax more than efficiency would dictate. The result is interesting because it is difficult to properly identify the channel of interaction in standard econometric analyses of fiscal competition. Tax base mobility, public good spillovers and yardstick competition models give rise to the same reduced form empirical approach (see Revelli, 2005).

This paper has not only reviewed and suggested “new” tools but also tried to contribute in our understanding of the role of ideology in fiscal policy making. There is a large literature in the public choice tradition that has looked at this issue. The presented evidence suggests that ideology plays a role: Left-leaning politicians believe in lower mobility of firms across borders, and left-leaning students choose higher tax rates on capital when matched with their political peers compared to right-leaning students. Traditional economic analysis would trace these differences back to different constraints and induced preferences. For example,

a person with few savings and little capital income tends to favor higher taxes on capital income out of own interest. The survey suggests, however, that the beliefs about how the world operates may differ among politicians from various parties. The mobility of capital, or its elasticity more generally, is not an easy concept. Economists may disagree as to empirical estimates of such elasticities. Ideology may then serve a legitimate role in selecting information about how the true world functions.

Ideology may matter for other reasons. Perhaps, the different beliefs about the extent of firm mobility are the cause for becoming a member of a particular party. This would turn the causality that was assumed implicitly upside down. I don't think that reverse causality is particularly likely, as many politicians become member of their parties early in life when tax policy is probably not a major concern. But we cannot rule out that the beliefs on the responsiveness of firms to taxes are highly correlated with other beliefs that indeed drive party membership decisions.

With these concerns and problems at hand the tools need to be refined and extended in the future. One logical step is to repeat the survey of the same politicians over time in order to see how robust views are (when the economic environment changes little) but also how beliefs are updated and interact with changes in the institutional and economic context. Do beliefs update quickly or very slowly? A good example is the study of fiscal rules, as presented in section 2.2. The application of the German debt brake at state level kicks in in 2020. Views of politicians change as this date approaches and the number of years for economic adjustment becomes smaller. At the same time some states in Germany have introduced additional state fiscal rules which should influence the beliefs of politicians as well, and which should be explored through a repeated survey. Repetition should also play an important role in the experimental setup studied in section 3. The classroom experiment implied that students selected pairs of tax rates for all three experiments without knowing how they did in the previous experiments. Effects from repetition and end-game behaviour couldn't be studied, but are clearly worth doing so.

Further experiments are necessary to understand better why left-leaning students behave different from right-leaning students by selecting capital tax rates that are 8 percentage points higher. It is critical to disentangle whose political ideology is responsible for the results, as in the political matching game both players have the same party preference. A

simple way to tackle this issue is to have an experiment with random matching, matching on same party preference, and – a new way – matching of supporters from opposing parties. More generally, one may hypothesize that voters knowing about the above results would vote for a left-leaning politician as a commitment device (similar to Persson and Tabellini, 1992).

Figure 1

Labor and capital tax rate choices

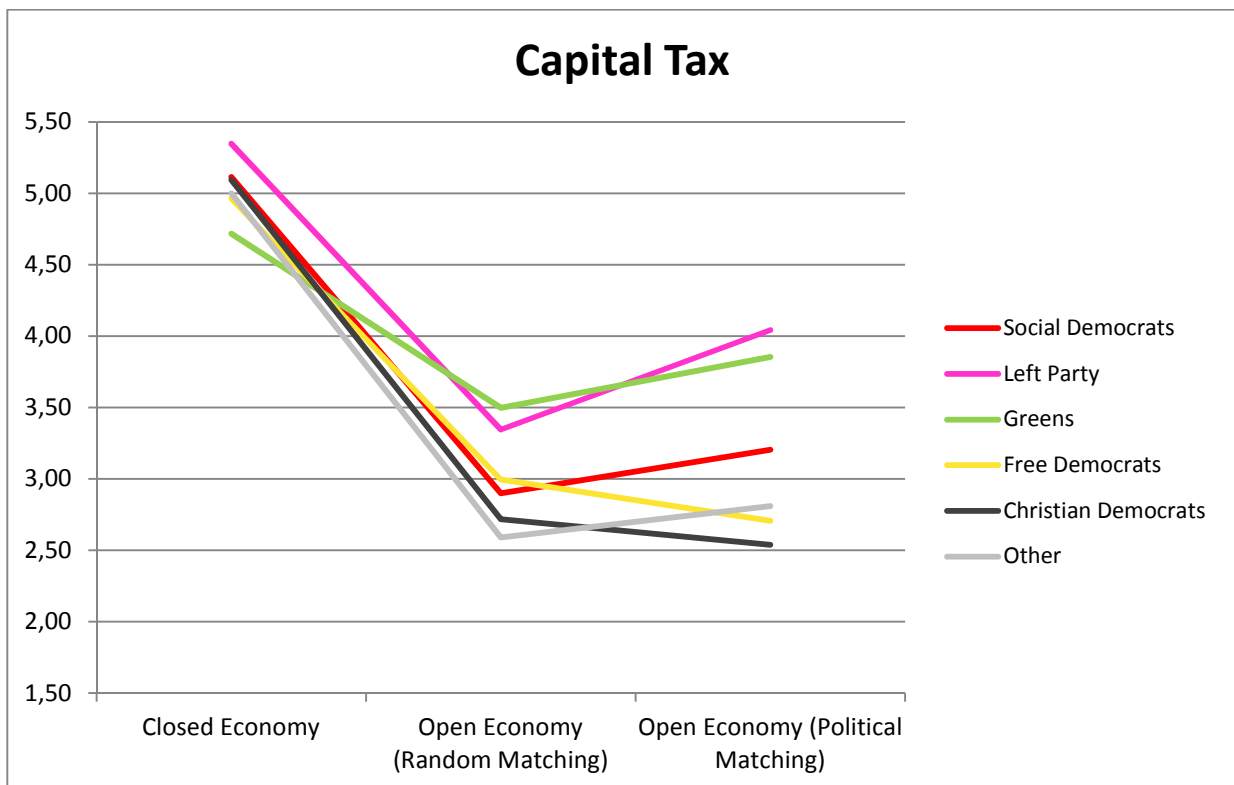
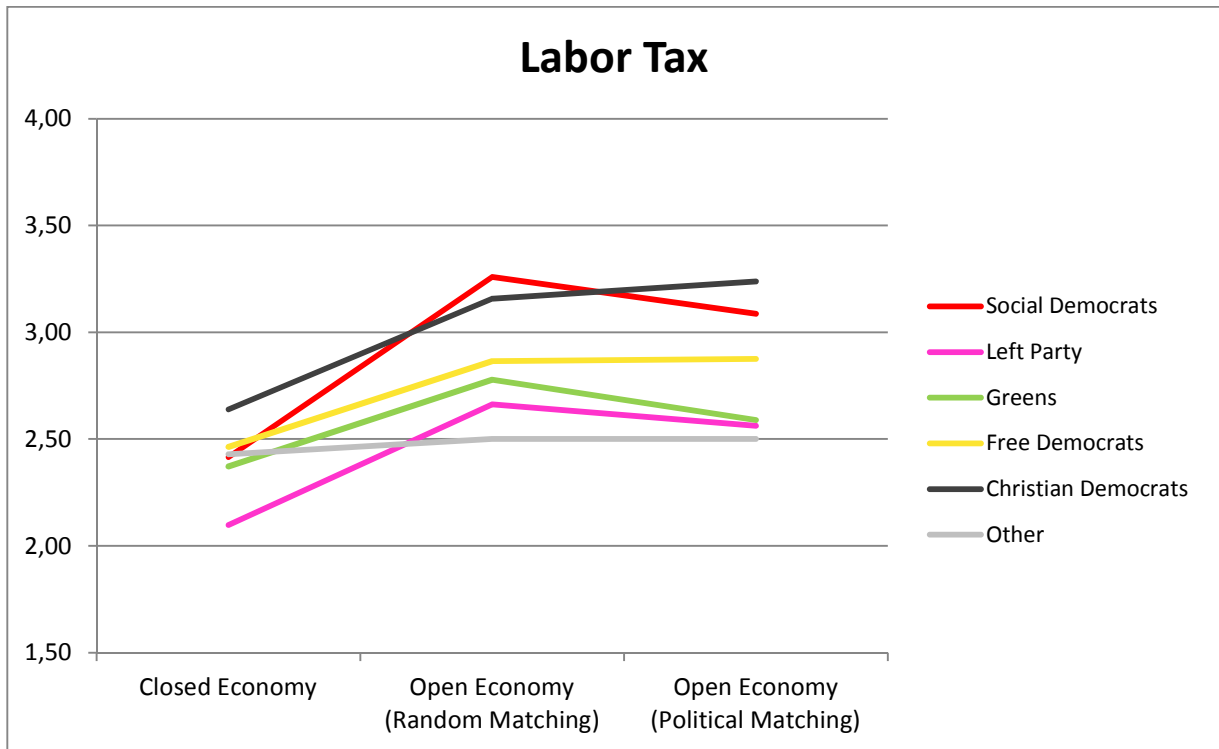


Table 1

Descriptive Data

	Obs.	Grade	Experiment 1 Closed Economy			Experiment 2 Open Economy Random Matching			Experiment 3 Open Economy Political Matching		
			T _L	T _K	U	T _L	T _K	U	T _L	T _K	U
Theoretical Prediction			2.50	5.00	93.75	2.50	0.00/ 0.01	56.25	2.50	0.00/ 0.01	56.25
All	116	2.41 (0.50)	2.46 (1.16)	5.02 (0.67)	91.73 (3.68)	3.01 (1.42)	2.96 (1.55)	76.96 (25.89)	2.95 (1.42)	3.04 (1.59)	76.98 (27.48)
Male	86	2.39 (0.51)	2.41 (1.13)	5.03 (0.73)	91.68 (3.97)	3.04 (1.48)	2.72 (1.40)	76.47 (24.89)	3.00 (1.52)	2.80 (1.50)	77.73 (27.65)
Female	30	2.46 (0.47)	2.60 (1.27)	5.02 (0.46)	91.88 (2.77)	2.92 (1.26)	3.66 (1.76)	78.36 (28.97)	2.78 (1.09)	3.72 (1.66)	74.86 (27.35)
Left Party	5	2.08 (0.55)	2.10 (1.08)	5.35 (0.61)	92.03 (1.91)	2.66 (1.12)	3.35 (1.65)	64.45 (21.25)	2.56 (1.07)	4.04 (1.28)	80.67 (36.07)
Social Dem	35	2.44 (0.48)	2.42 (1.31)	5.11 (0.52)	91.66 (3.58)	3.26 (1.45)	2.90 (1.17)	81.09 (28.19)	3.09 (1.41)	3.20 (1.43)	80.89 (28.01)
Green Party	16	2.53 (0.46)	2.37 (0.95)	4.72 (1.31)	90.34 (6.50)	2.78 (1.39)	3.50 (2.11)	79.02 (28.33)	2.59 (1.13)	3.85 (1.75)	80.99 (29.23)
Free Dem	26	2.47 (0.48)	2.46 (1.19)	4.96 (0.44)	92.11 (2.60)	2.87 (1.04)	3.00 (1.58)	73.12 (22.36)	2.88 (1.03)	2.71 (1.78)	72.66 (25.34)
Christian Dem	27	2.33 (0.53)	2.64 (1.07)	5.09 (0.56)	92.18 (2.84)	3.16 (1.80)	2.72 (1.60)	76.62 (27.19)	3.24 (1.94)	2.54 (1.36)	72.42 (28.50)
Other	7	2.30 (0.61)	2.43 (1.46)	5.00 (0.00)	91.93 (3.03)	2.50 (1.22)	2.59 (1.58)	76.12 (21.14)	2.50 (1.22)	2.81 (1.53)	79.32 (22.57)
Bachelor Econ	83	2.38 (0.51)	2.40 (1.15)	5.14 (0.54)	91.97 (3.19)	3.02 (1.53)	2.87 (1.49)	76.22 (26.02)	2.91 (1.52)	3.01 (1.65)	77.01 (27.58)
Diploma Econ	16	2.68 (0.29)	2.47 (1.40)	4.68 (0.60)	91.26 (2.69)	3.00 (1.00)	2.88 (1.10)	82.89 (25.89)	3.13 (1.12)	2.97 (1.15)	84.01 (27.86)
Diploma Bus	17	2.29 (0.51)	2.74 (1.00)	4.76 (1.08)	91.03 (6.12)	2.97 (1.24)	3.49 (2.08)	75.02 (26.05)	2.99 (1.17)	3.26 (1.71)	70.26 (26.55)

Table 2**Baseline Regression**

Variable	Closed Economy		Open Economy Random Matching		Open Economy Political Matching I		Open Economy Political Matching II	
	T _L	T _K	T _L	T _K	T _L	T _K	T _L	T _K
DEcon	-0.067 (-0.20)	-0.436** (-2.36)	-0.004 (-0.01)	0.051 (0.12)	0.267 (0.65)	0.087 (0.20)	0.198 (0.46)	-0.038 (-0.08)
DBus	0.275 (0.82)	-0.412** (-2.27)	-0.009 (-0.02)	0.454 (1.07)	0.086 (0.21)	0.190 (0.45)	0.023 (-0.06)	0.185 (0.42)
Female	0.160 (0.59)	0.136 (0.93)	-0.081 (-0.25)	0.977*** (2.85)	-0.175 (-0.54)	0.911*** (2.65)	-0.043 (-0.13)	0.805** (2.22)
Left Party	-0.180 (-0.31)	0.101 (0.32)	-0.749 (-1.06)	0.752 (1.02)	-0.698 (-0.99)	1.025 (1.38)		
Green Party	-0.094 (-0.26)	-0.372* (-1.89)	-0.525 (-1.19)	0.505 (1.09)	-0.546 (-1.25)	0.583 (1.26)		
Christian Democrats	0.240 (0.75)	0.051 (0.30)	0.105 (-0.27)	-0.205 (-0.51)	0.095 (0.25)	-0.674* (-1.66)		
Free Democrats	0.363 (0.11)	-0.086 (-0.51)	-0.379 (-0.99)	0.206 (0.52)	-0.211 (-0.56)	-0.355 (-0.89)		
Other	-0.001 (-0.00)	-0.063 (-0.23)	-0.691 (-1.13)	-0.670 (-1.05)	-0.556 (-0.91)	-0.732 (-1.14)		
Left Block							-0.194 (-0.67)	0.782** (2.55)
Grade 1	-0.328 (-0.70)	-0.002 (-0.01)	-0.658 (-1.17)	0.621 (1.05)	-0.567 (-1.01)	0.633 (1.07)	-0.541 (-0.92)	0.525 (0.84)
Grade 2	-0.231 (-0.94)	0.203 (1.53)	0.207 (0.70)	0.160 (0.52)	0.299 (1.02)	0.369 (1.19)	0.392 (1.32)	0.407 (1.29)
Observations	116	116	116	116	116	116	109	109
R ²	0.032	0.151	0.051	0.128	0.063	0.167	0.037	0.134

*/**/***: significant at 10/5/1 percent level; t-values in parenthesis; omitted category for dummy variables are Bachelor Economics (study major), Social Democrats (party preference) in columns 1 to 6, Free Democrats and Christian Democrats in columns 7 to 8; and Grade 3; constant not shown

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