ESSAYS ON THE DECISION-MAKING IN REPRESENTATIVE DEMOCRACY

Jenni Jaakkola

Sarja/Series A-4:2015

Turun kauppakorkeakoulu
Turku School of Economics

Custos:	Professor Hannu Salonen University of Turku
Supervisor:	Professor Hannu Salonen University of Turku
Pre-examiners:	Professor Vincenzo Galasso Università Bocconi
	Dr. Essi Eerola Government Institute for Economic Research
Opponent:	Professor Hannu Vartiainen University of Helsinki

The originality of this thesis has been checked in accordance with the University of Turku quality assurance system using the Turnitin OriginalityCheck service.

ISBN 978-952-249-386-6 (print) 978-952-249-387-3 (PDF)
ISSN 0357-4652 (print) 1459-4870 (PDF)

Publications of Turku School of Economics, Series A

Suomen yliopistopaino Oy – Juvenes Print, Turku 2015

ABSTRACT

This doctoral dissertation is about economic policy making in a representative democracy. This dissertation comprises of the introductory chapter and three original essays.

The introductory chapter provides a literature review, and a framework for the three individual essays included in this dissertation. The introduction discusses the role of incentives in the public choice view to political economics, the importance of institutions, and the problems related to theory of collective decision making. It furthermore presents an overview of public elections as the most important institution in a representative democracy, both from the candidate/party and the voter perspectives.

Each of the three essays included in this dissertation present a theoretical model of economic policy making. All the three essays look at the politician-voter relationship from different perspectives. Central themes in the essays are the information the players possess, the ability of the citizens to hold policy makers accountable, and the motivation of the policy makers.

Essay 1 in this dissertation studies the tendency of a policy maker to pander to the public opinion. It presents a model of political accountability with a heterogeneous electorate under asymmetric information. The results show how the strength of the players' beliefs play a role in determining the condition for the incumbent to disregard his private information and set a policy the majority of the electorate thinks is the optimal one. Furthermore, this essay considers how some of the pandering outcomes can be avoided by enriching the voter behaviour by voter sophistication and expressive voting motives.

Essay 2 presents a framework for parliamentary politics, where parties are setting their political agendas prior to elections. The parties wish to be in the governing coalition to be able to affect policy outcomes directly, but they also value their true political ideologies. This essay analyses especially the role of minor parties in multiparty systems, and their ability to be part of governing coalitions. The results show the importance of secondary policy dimensions for minor parties, in this case the importance of a salient environmental dimension

for green parties.

Essay 3 analyses the delegation of a long-term public policy to one of two alternative policy making regimes, an elected politican or an appointed bureaucrat. The two policy makers have different incentives to perform well. The results show that while a bureaucrat can set a lower tax rate that benefits the citizens when he is motivated by a highly competitive private sector, the problem with bureaucracy is the inability of citizens to get rid of low quality bureaucrats. A politician, on the other had, might have insufficient incentives to set a lower tax rate, but the benefit of an elected policy maker is that the citizens can vote out a bad performing politician.

Keywords: Electoral accountability, asymmetric information, coalition formation, agenda-setting, electoral incentives.

TIIVISTELMÄ

Tämä väitöskirja käsittelee talouspoliittista päätöksentekoa edustuksellisessa demokratiassa. Väitöskirja koostuu johdantoluvusta ja kolmesta itsenäisestä esseestä.

Johdantoluku esittelee kirjallisuuskatsauksen ja taustakehikon väitöskirjan kolmelle erilliselle esseelle. Johdantoluku käsittelee kannustimien merkitystä poliittisen taloustieteen tutkimuksessa, instituutioiden tärkeyttä, sekä haasteita joita liittyy kollektiivisen päätöksenteon mallintamiseen. Lisäksi johdantoluku esittelee yhteenvedon yhdestä edustuksellisen demokratian tärkeimmästä instituutiosta, eli kansanvaaleista, sekä ehdokkaiden/poliittisten puoleiden että kansalaisten näkökulmasta.

Tämän väitöskirjan sisältämät kolme erillistä esseetä esittelevät kukin teoreettisen tavan mallintaa talouspoliittista päätöksentekoa. Jokainen esseistä tarkastelee päätöksentekijä-kansalainen -suhdetta eri näkökulmista. Esseitä yhdistäviä keskeisiä teemoja ovat osapuolten saaman informaation merkitys, kansalaisten kyky saada päätöksentekijät vastuuseen tekemästään politiikasta, sekä päätöstentekijöiden kannustimet.

Väitöskirjan ensimmäinen essee tarkastelee päätöksentekijän alttiutta populistiseen päätöksentekoon, kun äänestäjäkunta on heterogeenista ja informaatio on epäsymmetristä. Populismilla viitataan tilanteeseen, jossa päätöksentekijä asettaa politiikan sen mukaan mitä äänestäjäkunnan enemmistö pitää optimaalisena politiikkana vastoin omaa parempaa uskomustaan optimaalisesta vaihtoehdosta. Tulokset osoittavat että päätöksentekijän alttius populismiin riippuu eri osapuolten uskomusten vahvuudesta. Lisäksi esseessä tarkastellaan äänestäjäkunnan tietoisuuden ja ekspressiivisten äänestysmotiivien vaikutusta politiikkalopputulemiin.

Toinen essee tarkastelee parlamentaarista päätöksentekoa, kun poliittiset puolueet asettavat vaaliohjelmansa ennen vaaleja. Puolueet haluavat paikan koalitiohallituksesta, koska voivat sitä kautta vaikuttaa suoraan poliittisiin päätöksiin, mutta haluavat myös pitää kiinni todellisista ideologista arvoistaan. Tässä esseessä tarkastellaan erityises-

ti pienpuolueiden asemaa monipuoluejärjestelmissä, ja pienpuolueiden mahdollisuutta päästä mukaan koalitiohallituksiin. Esseen tulokset osoittavat toissijaisten poliittisten dimensioiden merkityksen pienpuolueille, kuten ympäristöpolitiikkadimension merkityksen vihreille puolueille.

Kolmannessa esseessä tarkastellaan pitkäaikaisen politiikan delegoimista kahdelle erilaiselle päätöksentekijälle, vaaleilla valitulle poliitikolle tai julkiseen virkaan valitulle virkamiehelle. Näitä kahta päätöksentekijää erottaa erilaiset kannustimiset hoitaa tehtäväänsä tehokkaasti. Tulokset osoittavat, että riittävän kilpailukykyinen yksityinen sektori kannustaa virkamiestä hoitamaan tehtäväänsä tehokkaasti, mutta ongelmaksi kansalaisten näkökulmasta osoittautuu tilanne jossa virkamies osoittautuu taidoiltaan huonoksi, jolloin kansalaisilla ei ole mahdollisuutta erottaa virkamiestä. Poliitikolla, toisaalta, ei välttämättä ole riittäviä kannustimia asettaa veroastetta kovin alhaiseksi, mutta tulokset osoittavat kansanvaalien tärkeyden, sillä matalan osaamisen poliitikko voidaan tarvittaessa vaihtaa vaaleilla uuteen poliitikkoon.

Avainsanat: Vastuuvelvollisuus, epäsymmetrinen informaatio, koalition muodostus, vaaliohjelma, vaalien kannustinvaikutus.

ACKNOWLEDGEMENTS

First and foremost I want to thank professor Hannu Salonen for all the advice, guidance and encouragement throughout this dissertation project. Despite reading a countless number of versions of these dissertation chapters, you never failed to maintain your optimism and you always found time to discuss my papers. I have learnt so much from our discussions. I am grateful for that.

Secondly, I want to thank professor Fabrizio Zilibotti of University of Zürich. During the year I spent in Zürich, I learnt a lot and I enjoyed the time spent at the chair for Macroeconomics and Political economics. It was a truly inspiring research environment.

The comments and suggestions given to the dissertation manuscript by the two external pre-examiners, professor Vincenzo Galasso of University of Bocconi, and Dr. Essi Eerola of Government Institute for Economic Research, as well as by professor Kaisa Kotakorpi helped to increase the quality of my dissertation. Thank you.

I have presented this work in various conferences and workshops, and I have received helpful comments from various people. During the years as a doctoral student, I have learnt to know many people with whom I have had fruitful discussions and who I am happy to call my friends. I wish to extend my gratitude to everyone who has helped me shape my thinking of the issues in this dissertation in particular, and in Economics in general. Thank you all!

For financial support I thank Turku School of Economics, Yrjö Jahnsson Foundation, Osuuspankki-Pohjola Foundation, Emil Aaltonen Foundation, The Finnish Concordia Fund, Turku University Foundation, Turun kauppaopetussäätiö, Turku School of Economics Support Foundation and Turku School of Economics Association.

I want to thank my parents for all the support and encouragement, and my friends for bringing fun to my life! Finally, I wish to thank Ismo for all the good you bring into my life. My gratitude is beyond words.

24.2.2015
Jenni Jaakkola

Contents

I Introduction to political economy of decision-making 12

1 INCENTIVES, INSTITUTIONS AND ECONOMIC OUTCOMES 15
- 1.1 Theory of collective decision making . . . 17
- 1.2 Effects of constitutions on economic policy outcomes and comparative research . . . 20
- 1.3 Endogeneity of institutions and state capacity . . . 22
- 1.4 Discussion of collective decision making . . . 23

2 VOTING AND ELECTORAL OUTCOMES . . . 24
- 2.1 Role of elections . . . 24
- 2.2 Voter motivation . . . 26
- 2.3 Candidate motivation . . . 29
- 2.4 Commitment and policy convergence vs. divergence: deterministic and probabilistic voting models . . . 32
- 2.5 Multiparty systems . . . 35
- 2.6 Discussion on voting . . . 37

3 SUMMARY OF THE ESSAYS . . . 38

II Essay I: Political accountability with voter heterogeneity: the role of information and voting motives 44

1 INTRODUCTION . . . 47

2 PREVIOUS LITERATURE . . . 50

3 FRAMEWORK . . . 55
- 3.1 Basic set-up . . . 55
- 3.2 Electorate . . . 57
- 3.3 Politician . . . 58
- 3.4 Timing . . . 59
- 3.5 Information . . . 60
- 3.6 Strategy for the electorate . . . 62

3.7 Strategy for the incumbent politician 63

4 ELECTORAL OUTCOMES 65
4.1 Simple instrumental voting 66
4.1.1 Electorate and politician agree 66
4.1.2 Electorate and politician disagree 67
4.2 Sophisticated instrumental voting 73
4.3 Expressive voting 75
4.4 Discussion 77

5 CONCLUDING REMARKS 80

III Essay II: Minor party's political power and policy outcomes - application to green parties and environmental policies 82

1 INTRODUCTION 85

2 PREVIOUS LITERATURE 88

3 FRAMEWORK FOR POLICY MAKING 92
3.1 Basic set-up 93
3.2 Policy preferences 94
3.3 Timing 95
3.4 Utility of coalition 96

4 COALITION FORMATION AND POLICY OUTCOMES . . . 99
4.1 No environment 99
4.2 Environment 105
4.3 Discussion of the framework 108

5 EUROPEAN GREEN PARTIES AND ENVIRONMENTAL POLICIES 109
5.1 Data 110
5.2 Empirical strategy 112
5.3 Results 115

6 CONCLUDING REMARKS 117

A APPENDIX 119

B APPENDIX 121
B.1 Agenda-setting when L adjusts its position 121
B.2 Agenda-setting when $E = 0$ 123
B.2.1 Right-wing major party R 123
B.2.2 Green minor party G 125
B.2.3 Condition for LG coalition 126
B.3 Agenda-setting when $E = 1$ 127
B.3.1 Green minor party G 127
B.3.2 Condition for LG coalition 128

IV Essay III: Delegation of long-term public policy: elected vs. appointed policy makers 130

1 INTRODUCTION 133

2 PREVIOUS LITERATURE 137

3 FRAMEWORK 140
3.1 Set-up 140
3.2 Citizens 141
3.3 Policy makers 141
3.3.1 Politician 143
3.3.2 Bureaucrat 144
3.4 Voting rule and hiring rule 146
3.5 Timing 150

4 SYMMETRIC INFORMATION ABOUT THE INCUMBENT TYPE150
4.1 Politician 151
4.2 Bureaucrat 152

5 ASYMMETRIC INFORMATION ABOUT THE INCUMBENT TYPE 154
5.1 Politician 154

5.1.1 Pooling equilibria 155
5.1.2 Separating equilibrium 159
5.2 Bureaucrat 165
5.2.1 Pooling equilibria 165
5.2.2 Separating equilibrium 170
5.3 Discussion 173

6 CONCLUDING REMARKS 176

A APPENDIX 178
A.1 Politician's expected utility 178
A.2 Bureaucrat's expected utility 178
A.3 Symmetric information 178
A.3.1 Politician 179
A.3.2 Bureaucrat 179
A.4 Asymmetric information 179
A.4.1 Politician 180
A.4.2 Bureaucrat 183

References 185

LIST OF ORIGINAL RESEARCH PAPERS

ESSAY 1: Political accountability with voter heterogeneity: the role of information and voting motives

ESSAY 2: Minor party's political power and policy outcomes - application to green parties and environmental policies

ESSAY 3: Delegation of long-term public policy: elected vs. appointed policy makers

Part I
Introduction to political economy of decision-making

INTRODUCTION TO POLITICAL ECONOMY OF DECISION-MAKING

This dissertation is about economic policy making in representative democracy. It comprises of this introductory chapter and three individual essays. This introductory chapter has two goals. First, I set the background for this dissertation by presenting a review of the previous literature. Since the chapters of this dissertation are mainly theoretical, I look at the previous literature mostly from the theory perspective. Second, I briefly summarise the individual essays that comprise this dissertation and put them into the context of the earlier research.

Each of the individual essays presents a model of economic policy-making in representative democracy, with the main research questions being:
i) What is the impact of voters' information and instrumental or expressive voting motivations on electoral outcomes, and the incumbent's incentives to pander to the voter opinion.
ii) How parties' political power is determined, what is their ability to affect policy outcomes, and what is the role of partisan politics.
iii) How and to whom policy making power is delegated, and how to hold policy makers accountable; what are the implications on citizens' utility of delegating decision-making power to alternative policy regimes.

This introductory essay proceeds as follows. The first section provides a broader framework for this dissertation by discussing the importance of incentives, the interrelatedness of economic and political institutions, and the challenges related to constitutional design. I also review literature on institutional research. In section 2, I focus on one important institution of representative democracy, namely public elections. I consider voting both from the perspective of voters and candidates. Furthermore, I discuss the basic Downsian electoral competition, and the problems related to it. Finally, I extend discussion to multidimensional policy problems and multi-party systems. Section 3 summarises the individual essays included in this dissertation.

1 INCENTIVES, INSTITUTIONS AND ECONOMIC OUTCOMES

Political economics is a field of study in the intersection between economics and politics. The main focus is on the analysis of the interaction of economic and political institutions, with key research themes focusing on the distribution of power, the functioning of societies, the individual-level welfare, as well as the distribution of welfare within society. Drazen (2000, p. 6) defines politics as the study of power and authority, with power being defined as an individual's ability to achieve outcomes that reflect his objectives. Questions of power and authority become relevant when there is a conflict of interest between economic actors in society (Drazen, 2000, p. 6). In representative democracy, citizens allocate decision-making power to policy makers, whose preferences do not necessarily coincide with those of their constituents.

Positive political economics aims at understanding and explaining the role and interrelatedness of economic and political institutions and their impact on policy outcomes, whereas normative research makes attempts at how the existing institutions could be made better. To be able to achieve the normative aspect to political decision making, one needs a positive theory of the political institutions that constrain political and economic decision making.

There is a clear connection between economics and politics, when one looks at the rationality of agents, their self-interested nature, and the importance of incentives. While much of economic theory assumes a benevolent government or a leader, who is willing to implement the best possible policy alternative - as long as they have policy expertise or advisors telling them what these optimal policies are, see e.g. Drazen (2000, p. 6) - the political economy approach, on the other hand, is to assume both the citizens and the incumbent leaders alike to possess private economic interests. There is a game played between them. The self-interested nature of the decision makers is central in the analysis of politician-voter relationship. As noted by Downs (1957b, p. 136)

> 'Any attempt to construct a theory of government action without discussing the motives of those who run the government must be regarded as inconsistent with the main body of economic analysis.'

Buchanan and Tullock (1962) take an individualistic approach to the political process, where the individual actor is similar to that of the economic actor in that he always prefers 'more' to 'less'. Buchanan (1989, p. 20) writes 'individuals must be modeled as seeking to further their own self-interest, narrowly defined in terms of measured net wealth position, as predicted or expected', or, as noted by Downs (1957b, p. 137)

> 'Every agent in the model - - behaves rationally at all times, that is it proceeds towards its goal with a minimal use of scarce resources and undertakes only those actions for which marginal return exceeds marginal cost.'

Due to individuals' conflicting preferences, and the uneven distribution of power, there is a need for institutions to define the rules of the game, constrain the self-interested behaviour of policy makers, and provide players with incentives to behave well. North (1991) defines institutions as the humanly devised constraints that structure political, economic and social interaction; they create order and reduce uncertainty in exchange.

Institutions can be either informal or formal. Formal institutions contain constitutions, laws and property rights. Institutions such as formal economic constraints or property rights help in reducing transaction costs or raising costs of defecting in cooperative relationships. These rules and constraints are specified and enforced by political institutions. To understand economic performance, one needs to understand the evolution of economic and political institutions (North, 1991). Good political institutions are essential for there to be good economic institutions, and thus there is a linkage from political incentives to economic incentives, and subsequently to economic outcomes.

1.1 Theory of collective decision making

Constitutions contain the most fundamental laws concerning the process of policy making, in that they dictate the rules for collective decision making. For instance, the rules for organising the society, how power is distributed in the society, and who can vote are dictated by constitutions (Drazen, 2000, p. 64-65). Even though constitutions present the fundamental laws with more stringent amendment procedures than other laws (Drazen, 2000, p. 65), institutional reforms are frequently on agenda, and thus there is a need both for frameworks as well as empirical studies to analyse and judge them (Besley and Case, 2003). Institutions can be studied at three distinct but interrelated levels. First is the study of existing institutions, second is comparative institutional analysis, and the third and the deepest level of institutional analysis is to explain how and why institutions have been structured in a particular way, and why some survive while others do not (Weingast and Wittman, 2006).

Therefore, to understand the whole picture, one needs a mapping from institutional rules to policy outcomes. Furthermore, since the policy advice by economists is mediated through the political system - what is optimal purely from the economics perspective might be suboptimal once we take into account the political equilibrium, and vice versa. This shifts the focus from analysing policy changes themselves to the rules by which policies are formed (Besley and Case, 2003).

Besley and Case (2003) refer to Buchanan who has suggested a two-stage policy analysis. The first stage is the constitutional design, which comprises of two components; a procedural constitution dictating the terms by which decisions are being made, such as term limits, separation of powers and so forth; and a fiscal constitution setting constraints for policies that can be adopted within the framework of procedural constitution. Once the constitution is chosen, policies can be chosen. The key role for the policy advisor is then to set stage one by anticipating what will take place in the second stage (Besley and Case, 2003). Drazen (2000, p. 78) presents a similar view on the policy procedure; representative democracy is a profound example of a principal-agent problem, by citizens allocation decision-making power

to delegates whose preferences may not completely comply with those of the citizens themselves. Thus one needs to look both at the choice of representatives and the choice of policy by these representatives, and how these two interact.

Buchanan and Tullock (1962) is among the first ones to formalise a theory of collective decision making by providing a model of collective action that would be similar to orthodox economic theory of markets. As they write, if all men were equal in interest and endowment, there would be no organised economic activity that needs to be explained. In the political sphere, if each individual's preferences are to be considered to represent his endowment, then if all individuals would share the same preferences, full information would lead to full support by all men, and thus some sort of truth would be achieved. However, the problem is that the preferences are not the same across individuals, and therefore there is a need for a theory of collective decision.

When analysing constitutional design from a normative perspective, one runs immediately into problems. First, as noted by Downs, an implicit assumption in the work of welfare economists and public finance theorists is that the 'proper' function of government is to maximise social welfare. There are two problems with this; it is unclear what is meant by 'social welfare', and there is no agreement on how to 'maximise' it (Downs, 1957b). First, Downs (1957a, p. 18) refers to Arrow who has noted that when there are more than two alternatives, and the citizens have sufficiently diverging preferences, no unique and transitive general welfare function can be constructed.

Besley (2006, p. 21-22) further discusses the choice of the social welfare function. While the concept of Pareto efficiency is useful in many economic applications to be used as a criterion for good policy, the definition for a common good hinges strongly on the degree on value judgements. For instance, there is no universally agreed upon level of inequality aversion, whereas there are potentially many Pareto efficient policies with varying degree of inequality associated with them.

When it comes to the issue of maximising the social welfare, one obvious question is, do the politicians have sufficient incentives to act in the public interest? There are two ways to approach this issue.

First, the starting point in majority of reseach in economic theory as well as in public economics is to assume a benevolent government. The focus is for instance on the optimal level of taxation, whether the government should mandate health insurances and so forth, as discussed in Drazen (2000, p. 6) and Besley and Case (2003). The idea is that once economists find out the optimal policy, there is a policy maker willing to implement it. From a welfare economic point of view, state is seen as a benevolent provider of public goods, regulator of externalities, as well as re-distributor of resources (Besley, 2006, p. 20-22).

The second approach is to view politicians as self-interested actors, with private motivations of doing policy. The self-interested nature of politicians has long been acknowledged; it has been mentioned for instance in Downs (1957b), and discussed in more length in Buchanan and Tullock (1962), and it is at the heart of the public choice approach. Majority of research in political economics takes this public choice view on the nature of the government with selfish intentions, and highlights the importance of sufficient incentives for decision makers. Thus, in addition to considering the optimality of alternative policies, one needs to take into account the optimality of policy makers and policy-making institutions as well.

Another inherent problem in the design of collective choice, as noted by Buchanan and Tullock (1962, p. 5) is that the selection of the decision making rule is itself a collective decision, and thus we are confronted with a problem of infinite regression. Unlike in the market context, where the ultimate decision maker is the individual himself, in the political context the individuals cannot competently choose between collective and individual action until the results of alternative choices are analysed. The theory of political choice is therefore plagued with the problem of fundamental interdependence of individual actions; a problem that seems to be absent in the analysis of market activity.

Finally, the endogenous nature of institutions poses a challenge on the analysis of their impact on policy outcomes. It is possible that decision making institutions are chosen strategically by incumbents to

affect future election outcomes (Besley and Case, 2003). In the following, I summarise some of the previous research taking institutions as given, as well as research analysing the endogeneity of institutions.

1.2 Effects of constitutions on economic policy outcomes and comparative research

As already mentioned, institutional analysis takes place at different levels; the first two levels covering the analysis of the impact of an existing institution on policy outcomes, and comparative research analysing policy outcomes under different existing institutions. Here I review some of this literature.

Both theoretical and empirical comparative analyses of constitutions are presented for instance in Persson and Tabellini (2000), Persson and Tabellini (2003), Persson and Tabellini (2004a), and Persson and Tabellini (2004b). Persson and Tabellini (2003, p. 11-12) focus on two aspects of constitutions; the rules for elections and the form of government. Electoral rules determine both how the voters' preferences are aggregated and how political representatives acquire powers to make decisions about economic policy. The two main electoral rules are plurality rule and proportional representation. Choice of the form of government, on the other hand, determines how the powers can be exercised and conflicts among representatives can be solved. The main forms of government are presidential and parliamentary systems.

When thinking about an optimal constitution, there are two desirable attributes of the political system: representativeness and accountability (Persson and Tabellini, 2003, p. 12). The former refers to the incumbent administration's ability to set policies that reflect preferences of a large amount of voters, whereas the latter refers to the electorate's ability to identify who is responsible for policy choices, and to reward or punish them accordingly. The problem is to find a combination of these two attributes, since achieving both at the same time is challenging.

According to Persson and Tabellini (2003) the tradeoff between the two is especially stark in the choice of the electoral rule; while plurality rule is geared towards holding politicians accountable, propor-

tional representation manages to represent a wider spectrum of voters. A similar, although a less stark tradeoff can be found in the form of the government as well. A presidential system makes accountability easier by allocating powers into a single office directly accountable to citizens. Parliamentary regimes, on the hand, lean towards representativeness through potentially having to hold together a heterogeneous coalition government.

In addition to theoretical analysis, there is a robust empirical literature showing how the constitutional rules affect economic outcomes. In a proportional system, each district chooses more than one representative, whereas under plurality rule, each district elects one representative. The electoral rule is thus directly related to the number of parties gaining seats in national parliaments, so that proportional systems tend to feature multiple parties, whereas the plurality rule usually results in two-party systems.

There is a vast empirical research focusing especially on the relationship between the electoral rule and economic policies. Persson and Tabellini (2004a) and Milesi-Ferretti et al. (2002) show how countries with proportional electoral systems tend to provide more public goods and have a larger government with larger redistributive programmes than countries employing plurality rule. Bawn and Rosenbluth (2006) find that countries with higher number of parties in the government typically have higher spending, but also lower inequality: levels of public spending that may appear inefficient in the short run may be beneficial in the longer term.

Results in Milesi-Ferretti et al. (2002) further indicate that proportional systems tend to target spending more to social groups which allows representation of a greater variety of interests, whereas plurality systems are more likely to spend on public goods, which makes them to be more grounded in local interests. Galasso and Nunnari (2010) relate this effect to electoral incentives of the incumbent, which in turn are related to the chosen electoral rule. Depending on the size of the electoral district, and the intensity of electoral competition the incumbents tend to favour broader transfers and general public goods, or focus on pork-barrel spending instead.

1.3 Endogeneity of institutions and state capacity

Research presented in the previous subsection has been mainly comparative in its nature. While Persson and Tabellini (2000) and Persson and Tabellini (2003) acknowledge the fact that institutions change over time, they take them as given and do not analyse how they have evolved over time. The third level of institutional analysis, on the other hand, focuses specifically on the endogeneity of institutions.

One relatively recent strand of research within economics that analyses the endogenous nature of institutions is that of state capacity. Research on state capacity is based on the observation that strong states and strong market economies tend to evolve in symbiosis. While research in economics has focused mostly on the latter, literature on state capacity analyses the former, and formalises the co-evolution of economic and political institutions. Theoretically, state capacity has been formalised in e.g. Besley and Persson (2009) and Besley and Persson (2010). They define state capacity to comprise of two aspects; i) legal capacity that refers to property rights and legal enforcement, and ii) fiscal capacity that refers to government spending and taxation. The key is that the power of the state to raise revenue and to support markets are investments under uncertainty; building a state capacity is thus a strategic play by the incumbents, and the capacity of the present day policy makers to make policy choices is restricted by the investments done by past incumbents.

This framework brings insight on the interdependence of the two forms of state capacity, and on why strong states and strong markets, or weak states and weak markets seem to coexist. Furthermore, it helps to understand the endogenous nature of political and economic institutions. Like noted by North (1991), the existence of today's economic and political organisations is dependent on the opportunities provided by yesterday's institutional framework.

The importance of institutions on economic development has attracted a lot of interest in the literature. For instance, the very divergent development paths in North America vs. South America have been contributed to the economic and political institutions that were imported and implemented in large part at the time of colonialism.

North (1991) writes that while in the U.S. we observe an institutional framework that allows impersonal exchange that is necessary to political stability, as well as the potential to capture economic benefits of modern technologies, in the Southern American countries there exists a culture where political and economic exchange is based largely on personal relationships.

Empirically, the relationship between sound institutions and economic outcomes has been tested in e.g. Acemoglu et al. (2001) and Acemoglu et al. (2002). They analyse the importance of sound political institutions as a precondition to having good economic institutions, by looking at the institutions and economic development in two distinct groups of former European colonial countries. In the first group are countries such as the U.S, Canada, Japan, Australia and New Zealand, whereas in the second group are countries in the Latin America, sub-Saharan Africa and India. The foundations for prosperity in former group of the countries were laid in how these economies have been organised. The introduction of inclusive economic and political institutions in the form vast property rights, and universal suffrage[1] enabled for instance the Northern America to prosper by providing the citizens incentives to work, own land and decide on they own things. In contrast, the introduction of extractive institutions in Latin America, much of Africa or India led to suppression and poorness of citizens, by centralising all the wealth to the hands of the small elite.

1.4 Discussion of collective decision making

In this section I have discussed the importance of providing both political and economic actors with incentives to perform well. How these incentives are provided is ultimately a question of the design of collective choice.

I have further reviewed some literature showing significant variation in policy outcomes due to different constitutional rules. The importance of constitutional design is thus obvious. While this section has highlighted the importance of economic and political institutions

[1] At the time of colonialism, only men were allowed to vote; universal suffrage referred to the extension of voting beyond the members of the elite.

at a broader level, in the next section I focus on the role of elections as the most important institution of representative democracy.

2 VOTING AND ELECTORAL OUTCOMES

Public elections is the most important institution of representative democracy. The idea of a representative democratic system is to elect candidates into the public office to represent their constituents' preferences. It is important to note that elections take always place in an environment of incomplete information on both sides of the politician-voter game. On the one hand, the candidates may not know the true preferences of voters, they are dealing with imperfect incentives to give their best effort, and are put to face uncertainty regarding their political future when subject to re-election every few years. Voters, on the other hand, do not know the true competence of candidates, effort or partisanship, or their true motivations to run for office. Alternatively, the voters simply cannot assess the optimality of policy alternatives to be able to vote for the best candidate accordingly. Therefore, voting and electoral outcomes are plagued by problems caused by both informational asymmetries as well as informational incompleteness on both sides of the voter-candidate game.

In this section, I discuss the role of elections, first on a more general level, and then from the perspective of both the voters and the candidates. Moreover, I discuss the role of commitment to proposed policy platforms, and the problems related to analysing multiple policy dimensions. I briefly present two alternative approaches to modelling voter-candidate game, deterministic and probabilistic voting models. Finally, since majority of research on voting has focused on the two-party systems, I extend discussion to multi-party systems.

2.1 Role of elections

There is a vast literature related to voting with the two most important questions being: i) Why do voters vote? ii) What is the role of elections? The answer to the first question has been addressed in the literature of voter turnout, trying to explain who votes, why and what

are the factors driving the decision to show up at the election day. The answer to the second question is much broader, taking two broad approaches; first is to take an *ex ante* approach by considering elections as a mechanism to either aggregate voters' preferences, or to aggregate information, and select the best possible candidates into the public office. The second approach takes an *ex post* approach by considering elections as a way to hold public policy makers accountable for their actions at the office.

First, public elections function to aggregate voters' preferences. This has been first formalised by Downs (1957b), and is also known as the spatial voting model of electoral competition. Downs' median voter theorem is still widely used and cited in the literature; it is based on the earlier work by Hotelling (1929) on spatial competition between firms, with Downs analogising political parties to firms of the original model (Dewan and Shepsle, 2011) by replacing the utility maximising individuals in the market context with vote maximising candidates in the political context.

Although the Downsian framework of voting is a simplified version of the actual voting process, it offers an important and broadly used basic result of voting behaviour by stating that in a unidimensional policy framework with two candidates or parties, the policy will converge to the median voter's preferred policy outcome.

The model assumes that the voters care about policy outcomes and that their utility functions representing their preferences are single-peaked; there exists an ordering of all possible platforms so that each voter's utility function is a single-peaked function of it (Wittman, 1973), and thus there is one clearly preferred policy in the set of possible policies.[2] This ordering of one-dimensional policy platforms can be considered to represent the left-right continuum (Wittman, 1973), or voter preferences on money supply or government spending Ansolahebere (2006, p. 30).

Second, elections aggregate dispersed pieces of information. Piketty (1999, citing Hayek), writes that information that is needed for indi-

[2]More specifically, each function has a local maximum, which is also the global maximum. See discussion of this, and of single-crossing property in Persson and Tabellini (2000, p. 21-24).

vidual decisions is never in a concentrated or integrated form, but individuals possess dispersed bits of incomplete and even contradictory information. Political institutions, such as voting, then provides a means to achieve efficient use of this information. The recent research on voting as a means of aggregating information has been extended from the study of jury decisions to study strategic behaviour in large elections (Dewan and Shepsle, 2011).

Although voters may know their own preferences, there is still some uncertainty related to elections; either concerning the optimal policies or the competence of candidates. Also, such information is dispersed in the economy, and therefore elections can function as aggregating the unequally dispersed pieces of information that individual citizens hold. It is assumed that citizens do not know the true state of the economy, but receive private, and possibly noisy, signals of the true state. Then, citizens make a voting decision based on the information they possess, and these votes are aggregated under some decision rule (Dewan and Shepsle, 2011). One problem is, whether individuals will cast their vote sincerely. It is also unclear, whether aggregating private signals will result in correct decision[3]

Finally, elections function as a selection mechanism and provider of incentives. Electoral accountability refers either to the electorate's ability to select the best candidates into office, or based on the incumbent's performance in office to reward them with re-election, or punish by not re-electing them. There are two main approaches to the electoral accountability; prospective voting based on electoral promises, and retrospective voting based on the incumbent's performance in the office. The former is a selection problem, whereas the latter is a monitoring problem (Besley, 2006).

2.2 Voter motivation

A voter has two decisions to make. First, whether to vote or not, and second, how to cast one's vote. Literature on voter turnout starts from the calculus of voting approach (Riker and Ordershook, 1968), and

[3]The aggregation of information roots in the famous Condorcet jury theorem, see for instance Piketty (1999) on this.

has been further enriched by considering voting motivations, with the main lines focusing on instrumental and expressive aspects.

The basic 'calculus of voting' approach (Riker and Ordershook, 1968) states that the decision on whether to cast one's vote or not can be expressed as

$$R = BP - C$$

where R is the benefit of voting, B is the measure of the distance between one's utility of the preferred candidate's policy platform and the utility of the less preferred candidate's platform, P is the probability of affecting the outcome, and C is the cost of voting. It reasonable to vote if $R > 0$, and not to vote if $R < 0$. In mass elections, the probability of being the decisive voter, P, becomes arbitrarily small, meaning that the costs of casting one's vote must be greater than the benefit of it. This suggests that rational people would choose to abstain in mass elections.

Furthermore, informing oneself of the state of the economy and the proposed platforms is time-consuming and costly, and thus it is rational to be ignorant about politics. Therefore, if individuals are assumed to be private utility maximising agents, then the outcome of public elections would be rational non-participation and rational ignorance (Ansolahebere, 2006, p. 30). However, this is not what we observe in reality; people do bother to take the time and effort to go voting - this is the *paradox of voting*.

Since pure material utility of casting one's vote cannot explain voting in mass elections, and since voters' irrationality is not a sufficient explanation to why people vote, there must be some other ingredients to the voting decision than the material utility. Downs suggested that rational citizens understand that if nearly everyone chose abstention, it would lead to the inevitable destruction of democracy (Fiorina, 1976). Riker and Ordershook (1968), in turn, enrich the basic calculus by adding social-psychological ingredients, with D denoting the fixed benefits of voting, such as the voter's sense of citizen duty, affirmation of allegiance to the political system, or satisfaction of affirming a

partisan preference. Now the calculus of voting can be rewritten as

$$R = BP - C + D$$

While the basic formulation contains only an instrumental component - the voter votes only to get his preferred candidate elected - the latter formulation contains both instrumental and expressive components (Fiorina, 1976). By casting his vote, a voter can identify himself as being a good citizen, and derive utility of this (Drinkwater and Jennings, 2007).

Fiorina (1976) adds to the Riker-Ordershook framework the possibility that expressive pay-off varies across strategies. Furthermore, he allows voters to derive expressive utility of conforming to one's party allegiance. In Fiorina (1976) a *partisan* citizen gets some psychic gain of affirming to one's party identification, and a psychic cost from a departure from this; whereas an *independent* citizen does not make such a distinction between partisan ideologies. Therefore, the expressive factor D of the Riker & Ordershook model is not identical for both voting strategies. There are two classes of citizens; *consistents*, whose party identification and party differential are mutually reinforcing, and *cross-pressureds* whose party identification and party differential are in conflict.

As an example, consider a presidential election with a republican and a democrat candidate. The stronger the party identification of a citizen, the more likely he votes for the candidate of his preferred party and to vote for him if voting at all. However, a citizen with strong party identification is less likely to vote at all if he dislikes the proposed platform of the preferred party's candidate (Fiorina, 1976).

While the decision of whether to vote or not may contain both instrumental or expressive motivations, so does the decision on *who* to vote for. More recent analysis of expressive voting motivations focus more on the latter question, for instance Brennan and Hamlin (1998), Drinkwater and Jennings (2007) and Hillman (2010). Brennan and Hamlin (1998) see instrumental voting as a revelation of preference over alternative electoral outcomes, whereas expressive voting is akin to cheering at a football match; it is to show support to one of the

policy alternatives.

The identity of expressive voters is further discussed in Drinkwater and Jennings (2007), who find that voters with moderate political views are more likely to vote expressively than voters with more extreme political views. It is important to note that expressive voting is not necessarily non-rational. As Hillman (2010) notes, people are behaving rationally when voting against their material welfare in the sense that they seek expressive utility from acts or decisions that confirm personal identity. Or, as Ansolahebere (2006) notes, involvement in politics is rather a 'consumption' benefit than pecuniary benefit.

While theoretical literature has looked at the voting decision from the instrumental and/or expressive perspective, empirical literature has focused more on the voter characteristics in explaining voter turnout. For instance education, age, gender, or marital status can explain voting, as discussed for instance in Aidt (2000) and Matsusaka (1995). Furthermore, the importance of being informed has been linked to higher propensity to vote, both theoretically in Feddersen and Pesendorfer (1997) and McMurray (2013), as well as empirically e.g. in Lassen (2005) and Banerjee et al. (2010).

2.3 Candidate motivation

Elections can be also considered from the candidate perspective. It is especially important to consider candidate motivation. Office motivated candidates derive utility either of winning, or of maximising vote share Duggan (2006). In the Downsian model, candidates are pure office-seekers - they do not seek office to carry out specific policies or to serve some specific interest groups, they formulate policies strictly to gain votes (Downs, 1957b).

Candidate motivation can be linked to voter strategies; if voters use a *prospective* voting strategy, then political competition is close to what Downs depicted: candidates choose their policy platforms in order to maximise electoral success (Downs, 1957b), voters choose the platforms closest to their preferences, and the role of elections is to choose the platform that will be implemented. In two-party competition the voters make their voting decision based on the party differential in the

expected utility; if the electorate votes for the incumbent, it is a mandate to continue the current policy, whereas replacing the incumbent indicates a wish for change (Downs, 1957a, p. 38-42). This view hinges on the assumption that electoral promises are binding and enforceable (Persson and Tabellini, 2000, p. 10).

Another approach to candidate motivation is to assume that candidates derive utility of policy success, or they have partisan or ideological motivations. In Duggan (2006), policy motivated candidates have policy preferences represented by strictly concave, differentiable utility functions. With candidates who are not pure office-seekers, prospective voting according to Downs is not a very realistic depiction (Persson and Tabellini, 2000). Furthermore, when the assumption of binding electoral promises is dropped, the role for elections is to reward or punish the incumbent based on his performance in office, which can be based on his competence, effort or ideology. The voters thus employ a *retrospective* voting strategy.

The quality of candidates of running for political office is related to the rewards associated to the political career. Caselli and Morelli (2004) analyse the importance of providing politicians with sufficiently high compensation for trading private sector career and losing private life. Rewards can be financial and/or psychological, and who runs for a public office is a matter of self-selection. Under the assumption that market skills and political competence are correlated, low competence candidates have a lower opportunity cost of running - they have a comparative advantage at running for a political office. High quality candidates, on the other hand, gain less of holding office, which lowers the average quality of candidates. This brings the importance of sufficient compensation; high enough rewards motivate high quality candidates to run, and since they tend to win office more likely, the comparative advantage of low quality candidates is offset to some extent (Caselli and Morelli, 2004).

Candidate motivation, performance in office and rewards to performance have been empirically studied by Diermeier et al. (2005), Mattozzi and Merlo (2008) and Keane and Merlo (2010). To understand electoral incentives, it is important to study how politicians are com-

pensated for the effort they take, as well as how well rewards relate to personal attributes such as ability and effort. In addition to monetary compensation, political office provides ego rents that are rewards associated with social status and power (Caselli and Morelli, 2004). Diermeier et al. (2005), Mattozzi and Merlo (2008) and Keane and Merlo (2010) analyse politicians' response to both monetary incentives, such as salary or other pecuniary perks of office, and to non-pecuniary incentives, such as desire for public service or legislative achievements.

First, Mattozzi and Merlo (2008) make a distinction between career politicians and policy makers with political careers. They define career politicians as those who strive from politics, and who leave politics only to retire. They enter politics not only for monetary rewards but also for non-pecuniary rewards such as ego rents or the power of influencing policies. Policy makers with political careers, on the other hand, are those who use the political career to increase their chances of getting better paid jobs either in the private or in the public sector after they leave politics. They use politics as a showcase, where talented people get a chance to display their true talent, thereby increasing their chances of getting well-paid private sector jobs.

Diermeier et al. (2005) quantify the returns to a congressional career in the U.S. congress. Estimating the effect of a congressional career on private and public sector wages shows that most members of the congress leave politics to pursue careers in the private sector. Keane and Merlo (2010) apply the Diermeier et al. (2005) framework to assess congressmen's career choices. By defining politicians according to their 'political skill', and categorising them into 'achievers' and 'non-achievers', they study how changes in wages, other monetary rewards or non-pecuniary rewards affect congressmen's future career choices. Results indicate that a reduction in wages induces 'skilled' politicians to exit the congress, however, this effect does not exist for 'achiever' type politicians.

While majority of theoretical work depicts candidate motivation very straightforwardly to comprise of either office or policy motivation, results of empirical research suggest that depending on the motivation to run for the public office, politicians respond to different

incentives differently. It seems that policy success and ideological motivations play a role, however the idea of a purely office-motivated candidate does not seem to get much support in the empirical literature.

2.4 Commitment and policy convergence vs. divergence: deterministic and probabilistic voting models

A well-known problem in the voting literature is that with three or more policy alternatives, the voter preferences may be such that the outcome is a voting cycle under majority rule, known as the Condorcet paradox.[4] One of the main accomplishments of the median voter theorem, is in providing conditions under which the voting cycle can be avoided.[5] With one policy dimension, an equilibrium exists and it is unique, where candidates converge to the median voter's preferred policy. Duggan (2006) reviews the literature showing the uniqueness of the electoral equilibria both under office motivated or policy motivated candidates.

The Downsian framework is a deterministic voting model, in the sense that voters choose the candidate who is the closest to the voter's preferred policy with certainty. If the initially less preferred candidate moves closer to the voter's ideal point than the initially more favoured candidate, the voter is immediately ready to change his voting behaviour. The candidates, on the hand, choose their policy platforms so as to maximise their probabilities of winning the election (Persson and Tabellini, 2000, p. 50). Thus, in the basic formulation of the Downsian two-party competition in one policy dimension, political competition results in policy convergence towards the political centre under the existence of normally distributed[6] voter preferences (Downs, 1957b). Furthermore, policy change can be only expected as a result of change

[4] Intransitive voter preferences, see Wittman 1973.

[5] See a discussion of the conditions and the literature related to this e.g. in Coughlin (1992, p. 4), and Duggan (2006).

[6] Much less attention has received Downs' notion that with polarised voter preferences political competition does not result in policy convergence, but either in chaos if power is repeatedly shifted from one extreme to the other, or in tyranny if power remains in one extreme (Downs, 1957b, p. 143)

in the median voter's preferences. Therefore, the model in itself cannot predict policy change.

It is worth noting that expected policy convergence hinges on the importance of commitment to proposed policy platforms, and motivation of the policy makers (Dewan and Shepsle, 2011). As Besley and Case (2003) note, the results of the basic paradigm are very vulnerable to any deviations from them; convergence takes place only if the elected politician always implements the promised policies. Wittman (1973) proposes a model where the utility for the party is a sum of the utility of winning and the utility of implementing its preferred platform. So unlike in the Downsian competition, where parties only maximise the expected plurality, in the Wittman competition winning the election is a means to an end in implementing its preferred platform.

Formally, Alesina (1988) shows how the policy convergence hinges strongly on the assumption of policy commitment, and on the candidate motivation. In a one-shot electoral game without precommitment, there is no policy convergence when candidates care about policy outcomes. Instead, there is policy divergence; the elected politician simply ignores his promises as a candidate and implements his most preferred policy. However, when the game is extended into an infinite horizon the electoral outcome is full convergence, even without precommitment when reputational considerations make it too costly for elected policy makers to deviate from the cooperative policy.

Whether electoral competition results in policy convergence or policy divergence, provides two completely opposite views on the role of elections. These two opposing views also see the importance of electoral strength in a very different way, as discussed in Padovano (2013) who reviews theoretical literature, and Lee et al. (2004) who empirically test the claim; do voters *affect* policy choices, or *elect* policies. On the one hand, competition for votes induces politicians to move towards the political centre, thereby elections providing some degree of policy compromise. On the other, if politicians cannot credibly commit to set more moderate policies, then elections are a means to decide which of the two opposing policies will be implemented.

In the case of policy convergence, a higher support for say a left-wing candidate would allow him to pursue his preferred policy more freely than if his support was weaker when he would be induced to choose a more moderate policy. In the policy divergence case, the electoral strength plays a lesser role, since either candidate will implement his most favoured policy in any case. With data on U.S house elections, Lee et al. (2004) find that electoral strength of the winning candidate does not result in less moderate policy outcomes, meaning that voters merely elect policies - not affect them.[7]

A perhaps more serious problem related to deterministic voting models, is that if more dimensions are added, there is no equilibrium, or if an equilibrium exists, it is usually unstable (Burden, 1997), see a survey of literature discussing this in Coughlin (1992, p. 6).[8] As a response to this, a class of models called probabilistic voting models evolved. The idea in probabilistic voting theory is to place unpredictability on the voter behaviour from the candidates' perspective; after learning the candidates' positions, there is still uncertainty regarding the voter response.

Duggan (2006) presents two alternative models of probabilistic voting. First, is *stochastic partisanship* model. While voter preferences are known to the candidates, voters also have partisan preferences that are unrelated to their policy positions. Voters place a bias towards one of the candidates, and the intensity of the bias is unknown to the candidates. The second one is the *stochastic preference* model, where the assumption of voters' partisanship is dropped, but instead the voter preferences are not perfectly observable to the candidates.

In comparison to deterministic models, electoral competition becomes less stiff, since the probability of winning is a smooth function of the distance between candidates' platforms (Persson and Tabellini, 2000, p. 54). Assuming a less than perfect ability to predict voters' ultimate choices has more realism in large elections (Coughlin, 1992,

[7]The two-party system in the U.S. allows for direct testing of policy convergence/divergence, whereas in multiparty system matters become more complicated when it comes to testing the same thing.

[8]Despite the problems related to deterministic models in mass elections, they may well be suited to analysing voting in small committees etc., as noted by Coughlin (1992, p. 21).

p. 21). Furthermore, probabilistic models are relevant when candidates care about policy, not only of winning office (Persson and Tabellini, 2000, p. 58). The uncertainty inherent in probabilistic voting models raises the questions of how the candidates can secure winning the elections, and hence what are the optimal candidate strategies. Duggan (2006) reviews the conditions for the existence of equilibrium in these two classes of probabilistic voting models, and under alternative candidate motivations. While equilibria can be proven to exist in probabilistic models, they are sensitive to the formulations of the objective functions of the candidates. Furthermore, while probabilistic voting models may deal better with more dimensions than the Downsian framework, it seems that adding more than two dimensions results often in unstable equilibria.

2.5 Multiparty systems

Political parties emerge as a response to policy preferences of different constituencies in the society. One important role for political parties is to allow compromise over conflicting policy objectives, since a single candidate cannot alone provide a satisfying compromise over multiple dimensions, as shown by Levy (2005). The number and significance of parties depends on the chosen electoral rule, which determine how votes are aggregated and who is elected. As already discussed, the two most prominent electoral rules are plurality rule and proportional representation (Persson and Tabellini, 2003). The former tends to result in two-party systems, whereas the latter results in multiparty systems. The connection between electoral rules and the effective number of parties was noted by Maurice Duverger, so that the first result is known as Duverger's law and the second as Duverger's hypothesis (Riker, 1982).

So far, most discussion has concerned two-party systems with two candidates. This is due to the fact that majority of theoretical research starting in Downs on political competition assumes a two-party system with two competing candidates, with each candidate trying to maximise the expected plurality of votes. Empirical research testing the hypotheses generated by theory focuses mostly on two-party sys-

tems as well, most notably using data on U.S elections. The benefit of analysing two-party or two candidate competition is that one can make clearer predictions about candidate behaviour, which makes empirical testing somewhat easier. Research on proportional representation systems, on the other hand, is somewhat scarcer. Proportional electoral systems are, however, quite common in Europe as is for instance in Israel, New Zealand, Australia or Japan. Therefore, analysis of voter and candidate behaviour, as well as of electoral outcomes in multiparty systems is important.

One obvious difficulty in analysing political competition or candidate behaviour in multiparty systems is that maximising expected plurality becomes more complicated, since no party can usually expect to win a clear majority of seats, and the final seat shares depend not only on the vote share for one party, but on vote shares for all parties, and on the rule used to allocate the seats to parties based on their vote counts. Secondly, predicting the governing coalition that will form after the elections is difficult, although pre-electoral coalition formation takes place in some countries (with different degrees of commitment though).

Uncertainty of the post-electoral coalition might also induce some voters to vote strategically if they wish to affect the potential coalition formation. The role of strategic voting especially in multiparty systems was discussed already in Downs (1957a, p. 47). Finally, contributing policy changes to individual parties is plagued by problems of omitted variable bias or reverse causality etc. The link from proposed policy platforms to voter response to post-electoral commitment is thus not very straightforward to model, let alone to identify empirically.

Perhaps related to these problems, majority of research on multiparty systems starting in Hibbs (1977) has focused on analysing the role of the largest party in the parliament or in the governing coalition, or grouped parties into party blocs on the political left-centre-right dimension, see survey in Cusack and Fuchs (2002). It seems that the role of minor parties, which are characteristic of proportional systems has been ignored to some extent. The role of minor parties, is perhaps not so obvious when the aim is to study the size of the government bud-

get or the amount of public debt, which makes the use of party blocks a sufficient measure to studying the relationship between economic outcomes and the colour of the political leadership. However, when it comes to the analysis of secondary policy dimensions, such as immigration issues, environmental or religious issues, the role of minor parties becomes more obvious, since typically minor parties emerge as single-issue parties.

In two-party systems, secondary policy outcomes are many times portrayed as a result of an interaction between decision makers and various interest groups. The literature on lobbying and its impact on secondary policy outcomes is reviewed in e.g. List and Sturm (2006). While this may be a natural approach in two-party systems,[9] where the candidate competition focuses more on broader economic issues that can be analysed as a one-dimensional policy problem, multiparty systems, on the other hand, provide a natural framework to study the determination of secondary policy issues directly as a result of electoral competition. There is a growing literature analysing the role of individual parties, and their importance especially on the secondary policy issues, most notably with Scandinavian data by Folke (2014) and Fiva et al. (2013) or with German data by (Freier and Odendahl, 2012). The results do suggest that also individual parties are important players both in local and national parliaments.

2.6 Discussion on voting

This section has discussed voting both from the perspective of voters and candidates/parties. Majority of previous research has focused on two-party systems both in theoretical and empirical literature.

To understand the whole picture of electoral competition from voter preferences to policy outcomes one needs to take into account two as-

[9] Another approach is provided by Roemer (2006) who models two-party competition in two-dimensional policy; redistribution and a non-economic issue, such as religion or immigration. Each party consists of three factions; i) Downsian office-seekers; ii) the reformists who maximise the expected utility of the average party member; and iii) the militants who are concerned only about the ideology. While parties compete against each other strategically, factions within these parties bargain with each other over policy. Empirical evidence on this, see Roemer et al. (2007).

pects. First, there is a need for a theory of pre-election politics; platform setting, voter preferences and voter behaviour and the resulting seat allocation to parties. Second, one needs a theory of post-election politics with coalition formation and final policy outcomes. Achieving a unifying theory is especially challenging in multiparty systems. In two-party systems, the winner of the election can commit to proposed policy platforms, which makes it easier to empirically test how changes in power distribution affect policy outcomes.

When it comes to modelling multiparty systems, there is much more uncertainty in the whole electoral process, for instance due to strategic voting, or unpredictability of who forms the governing coalition. Also empirically identifying how changes in policy outcomes can be attributed to individual parties is less straightforward in multiparty systems. Finally, as discussed, adding more policy dimensions results in the non-existence of equilibria or unstable equilibria.

Perhaps due to these reasons, majority of literature on multiparty systems has focused on one stage of the electoral process at the time taking other stages as given. For instance research on coalition formation takes parties' seat shares as given, whereas research on political competition focuses on strategic agenda-setting at the pre-electoral stage, and ignores what happens after elections when seat shares are realised.

3 SUMMARY OF THE ESSAYS

In the following I provide short descriptions of the essays, after which I briefly discuss the essays in the light of the literature review provided in this introductory chapter.

Essay 1: Political accountability with voter heterogeneity: the role of information and voting motives

The first essay analyses a model of political accountability with a heterogenous electorate. There is asymmetric information between the politician and the electorate, but also within the electorate. The politician's task is to set a state-dependent policy, and he is motivated both

by making good policy and holding office. When the electorate uses a simple instrumental retrospective voting strategy, the condition to pander to the public opinion depends on the accuracy of the players' information. The more accurate the incumbent's private information is, the higher is the utility of policy success, and the higher the office benefits have to be for him to deviate from what he thinks is the optimal policy. Furthermore, the results show how the existence of educated and informed voters is enough to reduce the incumbent's incentives to pander to the opinion of a non-educated majority, even if their share is not high enough to ensure the incumbent's re-election. Finally, I show how some of the pandering equilibria of the baseline model can be avoided by enriching the voter behaviour with sophisticated instrumental voting and expressive voting.

Essay 2: Minor party's political power and policy outcomes - application to green parties and environmental policies

The second essay studies the role of a minor party in parliamentary politics by assessing how changes in its programmatic policy positions affect its political power, and subsequently ideological policy outcomes. First, I show the importance of agenda-setting in a two-dimensional policy framework, where policy outcomes are determined at the post-election stage. The results show that while minor parties find it difficult to compete against major parties at agenda-setting on the frontline dimension of overall political ideology, the inclusion of the secondary dimension helps them gain political power. Thus the secondary dimension that defines the minor party, such as environmental policy dimension for a green party, is of importance regarding their role in coalition politics. Then, I calculate parties' political power based on their left-right positions to empirically test the relationship between green parties' programmatic positions and environmental policy outcomes with data from 9 European countries in 1990 to 2010.

Essay 3: Delegation of long-term public policy: elected vs. appointed policy makers

The third essay analyses long-term decision making with two alternative policy-making regimes. Decision making is allocated either to an elected politician or to an appointed bureaucrat. The incumbent's task is to finance a long-term public good, and the policy choice in each period is to set the income tax rate. There are high and low competence policy makers. An incumbent of high talent can set a lower tax rate, but he also has incentives to engage in excessive rent-seeking. The politician and the bureaucrat are distinguished by having different incentives to perform well. The aim is to look at how the different accountability mechanisms affect policy choices, and the utility of the citizens. The results show that having different incentives do play a role, when it comes to finding such conditions that the incumbent can be induced to set a lower tax rate that benefits the citizens. While a highly competitive private sector can motivate a bureaucrat to set a low tax rate, a problem emerges if the bureucrat proves to be of low competence, since the citizens have no means to get rid of him. Thus, while it may be difficult to motivate a politician to set a very low tax rate, the direct disciplining mechanism of public elections is important when there is uncertainty of the incumbent's competence.

Discussion of the essays

The three essays in this dissertation all present a model of economic policy-making in representative democracy. They all look at the politician-voter relationship from different perspectives. A common theme is the ability of the electorate to hold policy makers accountable, which is related to their ability to understand policy processes.

The first essay analyses the voter-politician relationship from the perspective of voter information and voting motivations. It focuses on the election stage, and considers politician's incentives to make good policy, or to pander to the electorate's opinion under asymmetric information. Since the idea of majority voting is an important analytical tool in the literature of political economy tracing all the way back to the

famous ideas by Condorcet, see for instance Austen-Smith and Banks (1996) and Piketty (1999), and is also a widely used in reality, it is important to consider the identity of the decisive majority, their ability to understand the relationship between policy alternatives and policy outcomes, as well as their voting motivations. The first essay thus focuses on analysing the role of information and voter sophistication on incumbent behaviour and final policy outcomes.

The second essay, in turn, takes the election stage as exogenous, and focuses on the post-electoral stage when parties negotiate on the coalition formation. The basic model of Downsian competition suggests that party leaders are immediately ready to respond to changes in the electorate's preferences, or more specifically, in the median voter's preferences, to gain electoral support (Downs, 1957a). In contrast to Downsian electoral competition, an underlying assumption in this essay is that the party leaders acknowledge the electorate's inability to fully understand pre-election politics, and the strategic play is shifted from the politician-voter play to the strategic game between political parties. Instead of party leaders responding to changes in voter preferences, shifts in parties' programmatic positions are regarded as strategic moves by party leaders in their expectation of the winner of the election in a hope to become members of the governing coalition. This essay considers especially the role of a minor party, and its ability to affect policy outcomes.

Finally, the third essay looks a the the politician-voter relationship from a slightly different perspective by considering whether the allocation of some long-term policies should be shifted away from politically elected policy makers. The idea is to look at the incumbent performance at the public office, when there are two types of available policy making regimes that are distinguished by having difference incentives to perform well. The role for the decision maker is very simplified; there are no ideological bias or pre-electoral promises he needs to fulfil. Instead, the only question is in setting the rules of the game such that taking full advantage of the authority over the public finances is restricted. This essay then analyses the importance of the electorate to retain well-performing incumbents, and the implications on the voter

utility of the alternative policy-making regimes.

The idea of the median voter, or the existence of the representative voter in holding the incumbent accountable is dropped in the first two essays, while the median voter is present in the third essay. Essays 1 and 3 look directly at the politician-voter relationship, with the electorate employing a retrospective voting strategy. For instance, Persson and Tabellini (2000) find retrospective voting strategy to feature more realism since electoral promises are not enforceable. Even though in reality voters might not use a purely retrospective voting strategy, it is useful in the sense that voters look at information of past behaviour to make predictions about candidate's future behaviour as noted in Ashwort (2012) and Besley (2006). Especially the results of essay 3 suggest the importance of public elections as a provider of incentives, and as a mechanism of getting rid of bad-performing incumbents. Essay 1, in turn enriches the basic retrospective voting with voters possessing both instrumental and expressive voting motivations.

The essays are also related to research on candidate objectives. In the first essay, the policy maker is motivated both by good policy and staying in office. The incumbent is thus balancing between his desire to make good policy, and staying in office. The motivations for political parties are similar in essay 2. The parties, and thus their members, derive utility of the two policy dimensions, and of being in power. Their problem is reduced to the comparison of gaining direct political power but having to make ideological compromises against the utility of staying in the opposition and keeping to their ideological values. Finally, in essay 3, the policy makers derive utility only of staying in power, i.e. they are maximising the expected utility of extracting rents by taking into account their accountability mechanisms. All the essays relate to the importance of compensation of holding public office. While in all the papers the office benefits are for simplicity assumed to comprise of 'rents' of office, it is important to recognise that in reality the compensation of holding office takes many forms; in addition to monetary rewards, the incumbents derive utility of policy success, or of ego rents related to the social status of holding power (Caselli and Morelli, 2004).

Part II

Essay I: Political accountability with voter heterogeneity: the role of information and voting motives

POLITICAL ACCOUNTABILITY WITH VOTER HETEROGENEITY: THE ROLE OF INFORMATION AND VOTING MOTIVES

Jenni Jaakkola, University of Turku*

Abstract

This paper presents a model of political accountability with a heterogenous electorate. There is asymmetric information between the politician and the electorate, but also within the electorate. The politician's task is to set a state-dependent policy, and he is motivated both by making good policy and holding office. When the electorate uses a simple instrumental retrospective voting strategy, the condition to pander to the public opinion depends on the accuracy of the players' information. The more accurate the incumbent's private information is, the higher is the utility of policy success, and the higher the office benefits have to be for him to deviate from what he thinks is the optimal policy. Furthermore, the results show how the existence of educated and informed voters is enough to reduce the incumbent's incentives to pander to the opinion of a non-educated majority, even if their share is not high enough to ensure the incumbent's re-election. Finally, I show how some of the pandering equilibria of the baseline model can be avoided by enriching the voter behaviour with sophisticated instrumental voting and expressive voting.

JEL Classification: D72, D81, P16
Keywords: Electoral accountability, asymmetric information, instrumental and expressive voting

*I would like to thank Essi Eerola, Kaisa Kotakorpi and Hannu Salonen, as well as participants at EPCS 2014, FEA XXVI Annual Meeting, FDPE Public Economics workshop, and ACE seminar for helpful comments.

1 INTRODUCTION

This paper studies electoral accountability and electoral outcomes in a framework where the incumbent politician has to make a policy choice that affects directly citizens' economic welfare, but also features an ideologically sensitive aspect. The framework is a political economy agency model featuring asymmetric information not only between the politician and the voters, but also within the electorate, thus adding voter heterogeneity into the common accountability problem. The aim is to analyse the role of information and different voting motivations on electoral outcomes.

In this framework, the condition for the incumbent to pander to the majority's opinion boils down to the amount of office benefits, the exact level of which depends on the difference between the expected utility for the incumbent of following his private information, and the utility of pandering to the electorate. The utility for the incumbent of following his private information depends on the strength of the player's beliefs, so that the stronger is the incumbent's own belief of the optimal policy, the higher the office benefits have to be for him to discard his private information, whereas the stronger is the electorate's belief, the incumbent panders for lower office benefits.

The previous literature has looked at the asymmetric information problem from the perspective of adverse selection, either in the form of uncertainty of the politician's competence as in Prat (2005), Canes-Wrone et al. (2001) and Fox and van Weelden (2012), or his ideological congruence with the electorate, as in Fox (2007) and Warren (2012), or from the perspective of moral hazard, i.e. whether the incumbent is corrupt or not, as in Frisell (2009) and Jennings (2011). With electoral incentives, popular but inefficient policies are chosen as the incumbent attempts to act like a competent or non-corrupt policy maker is expected to act to ensure re-election. This kind of behaviour is what Morelli and van Weelden (2013) define as pandering; the policy maker is induced to ignore policy-relevant information, and takes an action that is *ex ante* preferred by the majority of voters to increase his re-election prospects.

In contrast to previous literature, this paper shows how the exis-

tence of pandering equilibria or populist policy outcomes do not have to hinge on the assumption of incumbent quality. Here the incumbent panders to the voter opinion simply because the electorate's voting decision is based on their insufficient ability or ignorance to properly assess the underlying state of the economy, when the voters fail to understand that in fact they all have the same policy preferences.

The key here is that none of the players have a perfect understanding of the optimality of policy alternatives. The policy maker, however, has policy expertise the electorate lacks, which arises for example through the existence of political advisers. He has a better understanding of the underlying state of the economy than the electorate, which translates into his ability to make more informed policy decisions. When analysing electoral accountability, the assumption of a policy maker possessing policy expertise is obviously of relevance. If the voters had better knowledge than the incumbent then pandering to voters would improve social welfare, and the whole game would become uninteresting, as noted by Frisell (2009).

In this framework, the incumbent disregards his own private information if he knows the electorate's beliefs do not match his beliefs, and if he values office holding more than making optimal policy. The electorate, on the other hand, has incentives to replace the incumbent if they know that the incumbent cannot perfectly evaluate the state of the economy due to his incomplete information, but they do not know *how* incomplete it is; i.e. the voters cannot observe the accuracy of the incumbent's private information. Furthermore, the electorate does not know how much the incumbent values the utility of office-holding against the utility of making optimal policy. Thus, there is a classic coordination problem in government policy, even if everyone would agree on the optimal policy under full information.

Second, the previous literature on this type of agency problems has assumed the existence of a representative voter,[2] while this paper introduces an electorate where all voters are not equally able to assess the optimality of the chosen policy. There is voter heterogeneity, in that the electorate consists of educated and non-educated citizens with

[2] Ashwort (2012) reviews the literature of electoral accountability.

the former having more accurate information than the latter. As is known in the literature on voting, collective decision is better than any individual decision.[3] How good the collective decision is, depends on how informed the individuals are.

In addition to informational asymmetries within the electorate, some voters may have biased beliefs about optimal policy. Voting can thus feature both instrumental and expressive motivations. An instrumental voting motive is based on what the voter believes is economically best for him, whereas with expressive voting, e.g. Jennings (2011), Hillman (2010), voter votes according to some ideology even if this conflicts with his material welfare. To get benchmark results of incumbent behaviour, I first present the electoral outcomes when the electorate uses a simple instrumental retrospective voting rule, and then I enrich the framework to include sophisticated and expressive voters. The idea is to analyse the role of the educated and informed voters, as well as expressive voting motivations in re-electing or replacing the incumbent.

Immigration policy is an example of a policy choice that can feature both voting motivations, and the principal-agent problem in this paper is centred around a choice of optimal immigration policy under uncertainty of the true underlying state of the economy. The idea is that to be able to make optimal choice regarding immigration policy, one needs to make a correct assessment of the underlying state of the economy. Consider the following cases. In a growing economy, immigration can be seen as having a positive impact on the economy, for instance as a response to sector-specific unemployment, or as a positive contribution to the state treasury. On the other hand, if the economy is doing bad, increasing immigration may result in worsening economic conditions, by burdening public finances or increasing unemployment.

Optimal immigration policy is thus dependent on the underlying state of the economy, but it may also be an ideologically sensitive issue for some voters weighing into their voting behaviour. The voters may oppose immigration due to ideological reasons, for instance a fear that

[3]Known as the Condorcet jury theorem.

increasing immigration leads into immigrants stealing jobs from the natives resulting in higher unemployment among the natives.[4] Electoral incentives may induce the incumbent government then to tighten immigration policies, if the public sentiment is against immigration, and opposing immigration seems like an effective campaign strategy. For instance, before the 2011 parliamentary elections in Finland, the incumbent prime minister Kiviniemi accused opposition parties of 'flirting with racism' as a way of gaining electoral support.

While the previous literature on electoral incentives has largely focused on explaining populist equilibria through the incumbent's desire to look competent, ideologically congruent or non-corrupt in the eyes of the electorate, this paper focuses on showing the role of information asymmetries concerning optimality of policy alternatives in inducing the incumbent to choose popular policies over the optimal one. The results show that the stronger is the incumbent's own belief on the optimal policy and the stronger is the support for the incumbent through the electorate's beliefs, the less inclined the incumbent is to choose a populist policy. Moreover, the role of the educated voters in affecting the incumbent's incentives to pander is shown.

This paper proceeds as follows. Section 2 presents previous literature, section 3 presents the theoretical framework with the players and their information and strategies. Section 4 presents the electoral outcomes and section 5 concludes.

2 PREVIOUS LITERATURE

Politician-voter relationship is often represented as a principal-agent problem, with asymmetric information between the electorate and the incumbent policy maker with the latter possessing more accurate information called policy expertise. The electorate, on the other hand, votes oblivious to either the competence of the policy maker, the effort his exerting at office, or purely unable to assess the consequences of the policy actions. Asymmetric information is central in all expert-

[4] According to Jean and Jimenez (2011) this a common belief held especially by Europeans. Empirical evidence on immigration having an adverse impact on domestic labour markets, however, is weak.

principal problems, as shown for instance by Prat (2005), and Fox and van Weelden (2012).

First, it is important to distinguish between different types of available information for the principal: i) information on the agent's *action*, and ii) information on the *consequences* of the agent's action. Prat (2005) shows that when the principal cannot observe the state of the world, and there is uncertainty of the expert's competence, transparency of action can be detrimental in some cases. If the principal observes the action, the agent may have incentives to disregard some useful private signals, and act instead as a competent expert is a priori expected to behave. Principal's welfare may be reduced and the agent's true competence becomes impossible to detect. In Prat (2005) information of consequence is always beneficial, whereas Fox and van Weelden (2012) consider cases when this type of information may decrease the principal's welfare. When the optimal policy depends on the underlying state of the world, there is a strong prior on some of the states, and some mistakes are more costly than others, then transparency of the consequence induces a low type agent to disregard his signal and act according to the prior belief which reduces the principal's welfare. This result is sensitive to the assumption of asymmetric costs, whereas when mistakes cost the same, transparency always increases the principal's welfare.[5] In this paper, there is full transparency of action, however the consequences are not yet known when the voters make their voting decision. Furthermore, the accuracy of information the players possess is interpreted to reflect their understanding of the probable consequences of each policy alternative.

In both Prat (2005), and Fox and van Weelden (2012), the expert is the only active player, who wishes to appear competent to the principal. The politician-voter relationship, where the principal is also an active player has been analysed by Canes-Wrone et al. (2001), Fox (2007), and Frisell (2009). In these papers information is crucial in determining the electorate's ability to hold policy makers accountable for their

[5] An example of asymmetric costs of making mistakes is the belief on Iraq possessing weapons of mass destruction, and whether to invade in Iraq or not. The costs are different if after invading it turns out they did not possess WMD vs. after of not invading finding out they did possess WMD.

policy actions. In Canes-Wrone et al. (2001) the policy maker has better knowledge about the consequences of different policies. If he knows that a popular policy is not optimal, he can either practise true leadership by following his private information, or he can pander to public opinion and disregard this information. Fox (2007) shows that when there is uncertainty on whether the incumbent is biased or not, an incumbent with re-election wishes who would choose the voter welfare maximising policy behind closed doors, fails to do so if policy making is made public. Therefore, with systemically biased voters' beliefs, more transparent policy process can negatively affect voter welfare.

Frisell (2009) provides an explanation for populism as a self-fulfilling prophesy, in a framework with corrupt and normal politicians. When voter expectations and politician's incentives are mutually reinforcing, populism improves re-election chances by signalling that the incumbent does not serve special interests, but is responsive to voter interests.

The baseline agency problem has been enriched by Warren (2012), and Ashwort and Shotts (2010), who show how the presence of a third party (media) can mitigate the problems related to asymmetric information. In Ashwort and Shotts (2010) when pandering to voter opinion arises due to an asymmetric burden of proof for the incumbent - voters re-elect the incumbent who chooses the popular action, unless proven wrong, but the incumbent who chooses the unpopular action, will be re-elected only if proven right - the presence of a newspaper can affect pandering incentives by revealing information on the underlying state of the economy, or on the policy choice by the incumbent. In Warren (2012), voters try to discriminate between politicians with congruent and non-congruent interests, and media may or may not reveal what information the politician actually had at the time a policy choice was made, and it can aid the voters to maintain political control over the politicians.

Similarly to the previous literature, this paper analyses the incumbent's responsiveness to electoral incentives under asymmetric information. Whereas in the previous literature inefficiencies and populist equilibria hinge on the assumption of incompetent, ideologically in-

congruent or corrupt politicians, this paper shows that electoral game can result in populist equilibria for the simple reasons of voters' ignorance, or their inability to assess the underlying state of the economy. The main shortcoming of the previous literature is in the assumption of a representative voter, who given his (incomplete) information of the state of the economy and the incumbent action, is able to infer the incumbent's competence or ideological congruence, and reward or punish him at the election day. What is missing in the literature on electoral accountability, is that in reality, voters' ability to assess optimality of different policy alternatives is less than perfect, and they may possess biased beliefs about policies.

First, the ability to assess optimality of policies is not equal among the electorate. It is more realistic to assume asymmetric information not only in the politician-voter relationship, but also within the electorate. Not all citizens are equally capable or interested in assessing the optimality of alternative policies. For instance Aidt (2000) discusses how the voter knowledge not only on economic facts but also on economic systems is poor on average. Bendor et al. (2011), in turn, discuss the poor voter knowledge of politics and ideologies. In addition to citizens who do not understand economics or politics, many choose to abstain; information is the key in formal models of voter turnout, such as Feddersen and Pesendorfer (1997), and McMurray (2013), and also has empirical support in e.g. Banerjee et al. (2010), and Lassen (2005) that educated and informed citizens vote more likely than non-educated citizens.

Second, majority of previous work assumes voters to possess unbiased beliefs about the public policy. In reality rational voters' beliefs may be biased concerning the optimality of public policy; voting may feature expressive motivations. The idea that casting one's vote has both instrumental and expressive motivations, goes back to Riker and Ordershook (1968) and Fiorina (1976). Expressive voting has been further defined and discussed e.g. in Schuessler (2000) and Hillman (2010). The former argues that voting is used to express political preferences and beliefs, and to reaffirm one's political identity. The latter discusses expressive behaviour in a more general setting, by defining

it as a self-interested quest for utility through actions and declarations confirming one's identity. Hillman further surveys different expressive aspects of behaviour.

In Jennings (2011), expressive voters are fully informed voters who vote expressively even if it leads to outcomes that are against their instrumental interests. In a market context people choose instrumentally because the costs of choosing expressively are too high, whereas in mass elections, due to the very low probability of casting the decisive vote, people vote according to their expressive interests even if they are in conflict with instrumental interests. Both theoretical and empirical evidence on voting against one's material interest is in Roemer et al. (2007), who show how it takes place especially in multidimensional policy issues.[6]

Closest to this paper in its formulation of the politician-voter relationship is Jennings (2011). By relaxing the assumption of a fully informed and instrumentally rational electorate, he provides an explanation for populism and electoral inefficiency as a result of some voters possessing emotional attachments towards some policies, and acting against their instrumental well-being knowing the negligible impact of an individual vote in mass elections. He further shows how the government can provide credible information on the optimality of policy alternatives. However, in Jennings (2011), the optimal policy is not state-dependent, and therefore it is not clear where the optimality of policy alternatives comes from. Also, in his framework, the educated voters perfectly understand the link between the optimal policy and their own welfare, whereas this paper more realistically assumes none of the players to possess complete information.

The existence of a representative voter who is both able and willing to analyse the incumbent behaviour and to make inferences of his competence has dominated the literature of electoral accountability. However, taking into account all the before-mentioned aspects of voter

[6]For instance, in the U.S people who would benefit from redistribution and thus would vote for the Democrats, end up voting for the Republicans because the latter's views on immigration are closer to their own. Moreover, even though the actual share of immigrants is relatively low, e.g. around 7 per cent in Denmark, their presence can cause very strong reactions in the natives thus resulting in voting behaviour that may contradict purely material interests.

behaviour makes the concept of a representative voter insufficient to capture the preferences of the electorate as a whole.

This paper has somewhat less faith in the electorate's ability to truly understand the policy mechanisms than majority of the previous literature, and explains why populist equilibria take place so easily. It is important to analyse the electoral outcomes when there are different types of voters with different levels of ability to understand the political game, and this is the research gap this paper is trying to fill.

3 FRAMEWORK

3.1 Basic set-up

The framework features a two-period $t = 1,2$, principal-agent problem where the incumbent politician represents the agent, and the electorate represents the principal. The size of the electorate is normalised to 1. The electorate has allocated policy making power to the politician, whose task is to set a state-dependent policy in period 1 that affects players' utilities in both periods.

In period 1, the economy can be in one of two possible exogenously given states; $s_1 \in \{0,1\}$, where $s_1 = 1$ is 'good times', and $s_1 = 0$ is 'bad times'. There are two policy choices $x_1 \in \{\frac{1}{2},1\}$. The policy choice has an instrumental aspect by correlating with the underlying state of the economy thus directly affecting voter welfare. Moreover, the policy choice is interpreted to be an ideologically sensitive issue such as immigration policy, thus bringing an expressive aspect to voting. Policy choice $x_1 = \frac{1}{2}$ is interpreted as a moderate immigration policy, and $x_1 = 1$ as increasing immigration. The first period utility function for the electorate reads as

$$v_1(s_1, x_1) = x_1 s_1 + (1 - x_1)(1 - s_1) \tag{1}$$

It is easy to see how policy choices are correlated with the underlying state of the economy; in good times, the optimal policy choice is $x_1 = 1$, and in bad times optimal policy is $x_1 = \frac{1}{2}$. All the policy-state outcomes

are

$$v_1(1,1) = 1 \cdot 1 + (1-1)(1-1) = 1 \tag{2}$$
$$v_1(0,\frac{1}{2}) = \frac{1}{2} \cdot 0 + (1-\frac{1}{2})(1-0) = \frac{1}{2} \tag{3}$$
$$v_1(1,\frac{1}{2}) = \frac{1}{2} \cdot 1 + (1-\frac{1}{2})(1-1) = \frac{1}{2} \tag{4}$$
$$v_1(0,1) = 1 \cdot 0 + (1-1)(1-0) = 0 \tag{5}$$

As it is clear, the moderate policy choice $x_1 = \frac{1}{2}$ produces a fairly good economic outcome independent of the underlying state of the economy, whereas the policy choice $x_1 = 1$ is more risky. While in good times the latter policy results in a good performance of the economy, choosing this policy in recession results in bad economic performance. Assuming that each citizen has the same level of utility depending on the chosen immigration policy is of course a simplification; in reality different policies affect individuals in a different way. However, if the immigration policy is regarded as a broader policy aiming for instance at achieving economic stability, increasing employment, or affecting public finances, it should hold a unanimous appeal within the electorate; a similar argument is made in McMurray (2013).

The first period policy has a long-term impact; if the correct state-matching policy is chosen in the first period, the next period state of economy is good, $s_2 = 1$, whereas the incorrect policy results in bad state of economy, $s_2 = 0$. The second period utility is directly given by the second period state, $v_2(s_2) = s_2$ so that $v_2(1) = 1$ and $v_2(0) = 0$.

A similar kind of set-up with a binary state and a binary policy choice is common in the literature; e.g. in Canes-Wrone et al. (2001), Prat (2005), Fox (2007), Frisell (2009), Ashwort and Shotts (2010), and Fox and van Weelden (2012). Despite the similarity in the formulation of the policy problem to previous literature analysing asymmetric information in principal-agent relationship, there are four main differences, however, in comparison to previous work.

First, this paper assumes an asymmetric consequence of state-dependent policy action. For instance, in Prat (2005) or Canes-Wrone et al. (2001) succeeding/failing in either state has a symmetric benefit/cost. In Fox and van Weelden (2012) the asymmetric cost is related only to making

a mistake, whereas in this paper, there is asymmetry of both actions in either state. In Jennings (2011), the policy choice is continuous, however, in his model it is not dependent on the state of the economy, and thus it is not clear why one policy choice would be preferred over another, whereas in this paper the optimality of each alternative depends on the underlying economic conditions.

Secondly, in this framework none of the players possess complete information; the key factor driving pandering outcomes in the model is the incompleteness and asymmetry of information between players. For instance, Canes-Wrone et al. (2001) and Ashwort and Shotts (2010) assume the existence of 'perfect' politicians who always observe a perfect signal of the state of the world. Thirdly, there is no uncertainty of the incumbent competence, unlike in Canes-Wrone et al. (2001), Prat (2005), Fox and van Weelden (2012) who all assume the pool of politicians to comprise of high quality and low quality candidates. Finally, this paper assumes a heterogeneous electorate, which has been absent in the previous electoral accountability models. The features of the electorate will be described in the following subsection.

3.2 Electorate

Share a of the electorate is educated, and share b is non-educated, so that the size of the electorate is $E = a + b = 1$ with $a < b$. The distinguishing factor between these two subgroups is in the information they possess regarding the state of the economy; the educated voters are assumed to have more accurate information than the non-educated voters about the underlying economic conditions. The information is described in more detail in section 3.5.

Furthermore, share α of the former and share β of the latter show up a the election day, whereas the rest abstain so the part of the electorate who votes is expressed as $E^v = \alpha a + \beta b$. All a, b, α and β are exogenously given, with $\alpha > \beta$ so that the share of citizens who vote is higher in the group of educated voters, whereas the share of absentees is higher among non-educated citizens. This assumption is in line with Feddersen and Pesendorfer (1997), and McMurray (2013), who show that information is one of the main determinants of voter turnout.

3.3 Politician

The incumbent politician is motivated by doing good policy, i.e. matching policy to the underlying state, but also of holding office according to the utility function for the politician

$$u_1(s_1, x_1; \rho) = v_1(s_1, x_1) + \rho \tag{6}$$

where ρ is a payoff of being in the office. The incumbent gets the same utility as an ordinary citizen depending on the state of the economy, and the policy choice, as well as a payoff of ρ of being in the office. It is important that the incumbent's payoff depends both on the policy outcomes, and on office benefits to see how his behaviour is driven by electoral incentives. For instance, in Fox and van Weelden (2012) politician's payoff does not depend on the chosen policy, which makes it unclear how the politician's incentives to perform well and enjoy office benefits are related.

As will be discussed shortly, the incumbent is making the first period policy decision based on his own private incomplete information about the first period state of the economy with the true policy consequences not unfolding until the next period. If the incumbent politician is re-elected, he will enjoy office holding benefits ρ in the second period as well. If he is not re-elected his second period utility is that of the common citizen. The politician discounts the next period by a factor δ. Since the first period policy choice x_1 determines the utility in both periods, and forms the basis for the citizens' voting decision, the objective function for the politician can be written as

$$\max_{x_1} v_1(s_1, x_1) + \rho + \delta(v_2(s_2) + P\rho) \tag{7}$$

Since policy-making takes place only in the first period, with nothing active taking place in the second period, voting is used purely to either reward or punish the incumbent. If he is replaced at the end of the first period, a new incumbent will be elected into office. The role of the challenger is not specified in more detail. It is important to note that the electorate is indifferent between the identity of the incumbent vs. a prospective challenger; if they do not agree with the incumbent's

policy choice, he will be voted out of office.

Thus, while the model refers to a politician as a single decision-maker, a more realistic interpretation for the incumbent in this paper is to take him to represent the incumbent administration at a broader level. As s real-life example think of 2008 presidential elections in the U.S. People were dissatisfied with the second Bush/Republican administration and replaced him with the Obama/Democrat administration. Obama inherited the legacy of the previous administration, and could not immediately change the course of the policy-making. Similarly, in this model the new incumbent inherits the economy from his predecessor if the electorate is not satisfied at the performance of the first period incumbent.

3.4 Timing

Period 1:

1. $s_1 \in \{0,1\}$ is exogenously given with a common prior belief $\text{Prob}(s_1 = 1) = \pi$ and $\text{Prob}(s_1 = 0) = 1 - \pi$.

2. A public signal $\sigma^p \in \{0,1\}$ is received by the educated electorate and the incumbent politician with accuracy of $\text{Prob}(\sigma^p = 1 \mid s_1 = 1) = \text{Prob}(\sigma^p = 0 \mid s_1 = 0) = q > \frac{1}{2}$.

3. A private signal $\sigma^i \in \{0,1\}$ is received by the incumbent politician with accuracy of $\text{Prob}(\sigma^i = 1 \mid s_1 = 1) = \text{Prob}(\sigma^i = 0 \mid s_1 = 0) = p > \frac{1}{2}$.

4. Educated voters update their information according to the public signal, the incumbent updates twice according to the public and private signals.

5. The incumbent politician makes the policy choice x_1.

6. Electorate observes x_1, and makes a voting decision P; re-elects the incumbent or elects a challenger.

7. First period state is revealed and the related utilities are realised.

Period 2: Based on x_1 and realisation of s_1, the second period state of the economy s_2, and the related utilities for both the electorate and the politician are realised.

Because of this timing, the voters are making the election decision based on observing the policy choice - before the outcome of the policy choice is realised. In a sense, the voting rule is retrospective since it is based on the incumbent's policy action, however, it is done under uncertainty of how the incumbent in fact performed. See discussion on Key's (1966) ideas about retrospective voting in Bendor et al. (2011, p. 109-111); voters' electoral response to the incumbent behaviour is based on how the voters see their own welfare has been affected by the current administration.

3.5 Information

The common prior states that with probability π the first period economy is in the good state, $s_1 = 1$, and with probability $1 - \pi$ it is in the bad state, $s_1 = 0$. There are two independent signals, one public received by the educated voters and the politician, and one private received only by the politician. The public signal $\sigma^p \in \{0,1\}$ corresponds to the true state of the world with $\text{Prob}(\sigma^p = s_1) = q > \frac{1}{2}$. The educated electorate and the incumbent politician update their beliefs according to the Bayes rule, giving them posterior beliefs denoted by $\pi^p(s_1 \mid \sigma^p)$. After receiving a signal $\sigma^p = 1$, the posterior belief that the economy is in the good state is

$$\text{Prob}(s_1 = 1 \mid \sigma^p = 1) = \frac{q\pi}{q\pi + (1-q)(1-\pi)} = \pi^p(1 \mid 1)$$

and with complementary probability the economy is in the bad state $\pi^p(0 \mid 1) = 1 - \pi^p(1 \mid 1)$. After receiving a signal $\sigma^p = 0$ the posterior belief that the economy is in the bad state is

$$\text{Prob}(s_1 = 0 \mid \sigma^p = 0) = \frac{q(1-\pi)}{q(1-\pi) + (1-q)\pi} = \pi^p(0 \mid 0)$$

and the complementary probability that the economy is in the good state is $\pi^p(1 \mid 0) = 1 - \pi^p(0 \mid 0)$.

Since the incumbent politician observes the public signal, he knows what the educated electorate knows. He further updates his private information according to a private signal $\sigma^i \in \{0,1\}$, which is correct with $\text{Prob}(\sigma^i = s_1) = p > \frac{1}{2}$. His posterior belief of the state given the two independent signals is denoted by $\pi^i(s_1 \mid \sigma^i, \sigma^p)$. First, if the incumbent's private signal coincides with that of the public signal stating $\sigma^i = \sigma^p = 1$, the posterior beliefs for states $s_1 = 1$ and $s_1 = 0$ are

$$\begin{aligned}\text{Prob}(s_1 = 1 \mid \sigma^i = 1, \sigma^p = 1) &= \frac{p\pi^p(1 \mid 1)}{p\pi^p(1 \mid 1) + (1-p)(1-\pi^p(1 \mid 1))} \\ &= \frac{pq\pi}{p(q+\pi-1) + (1-q)(1-\pi)} = \pi^i(1 \mid 1,1)\end{aligned}$$

and $\pi^i(0 \mid 1,1) = 1 - \pi^i(1 \mid 1,1)$ respectively. Similarly the posterior beliefs after receiving signals $\sigma^i = \sigma^p = 0$ are

$$\begin{aligned}\text{Prob}(s_1 = 0 \mid \sigma^i = 0, \sigma^p = 0) &= \frac{p\pi^p(0 \mid 0)}{p\pi^p(0 \mid 0) + (1-p)(1-\pi^p(0 \mid 0))} \\ &= \frac{pq(1-\pi)}{p(q-\pi) + (1-q)\pi} = \pi^i(0 \mid 0,0)\end{aligned}$$

and $\pi^i(1 \mid 0,0) = 1 - \pi^i(0 \mid 0,0)$.

The second possible case is when the private and the public signals do not coincide. After receiving a signal $\sigma^i = 1$ when the public signal states $\sigma^p = 0$, the posterior beliefs held by the incumbent for states $s_1 = 1$ and $s_1 = 0$ are

$$\begin{aligned}\text{Prob}(s_1 = 1 \mid \sigma^i = 1, \sigma^p = 0) &= \frac{p(1-\pi^p(0 \mid 0))}{p(1-\pi^p(0 \mid 0)) + (1-p)\pi^p(0 \mid 0)} \\ &= \frac{p(1-q)\pi}{p(\pi-q) + q(1-\pi)} = \pi^i(1 \mid 1,0)\end{aligned}$$

and $\pi^i(0 \mid 1,0) = 1 - \pi^i(1 \mid 1,0)$ respectively. The posterior beliefs after receiving a signal $\sigma^i = 0$ while the public signal states $\sigma^p = 1$ are

$$\begin{aligned}\text{Prob}(s_1 = 0 \mid \sigma^i = 0, \sigma^p = 1) &= \frac{p(1-\pi^p(1 \mid 1))}{p(1-\pi^p(1 \mid 1)) + (1-p)\pi^p(1 \mid 1)} \\ &= \frac{p(1-q)(1-\pi)}{p(1-q-\pi) + q\pi} = \pi^i(0 \mid 0,1)\end{aligned}$$

and $\pi^i(1 \mid 0,1) = 1 - \pi^i(0 \mid 0,1)$.

To sum up the information the players possess; the non-educated citizens' information is restricted to the prior belief on the state of the economy π, the educated electorate updates their prior beliefs once, according to which their posterior beliefs are $\pi^p(s_1 \mid \sigma^p)$, and the incumbent politician who updates the prior twice giving him the posterior belief of $\pi^i(s_1 \mid \sigma^i, \sigma^p)$.

In contrast to previous work, this paper assumes that while all the players have some information, none of them has complete information. For instance, in Prat (2005), or Fox and van Weelden (2012) the principal does not know the state of the world, but is trying to infer the expert's competence based on his actions. In Jennings (2011), on the other hand, well-informed voters fully understand the connection between a policy and its outcome, and hence understand which would be the optimal policy. Canes-Wrone et al. (2001), or Ashwort and Shotts (2010), in turn, assume high quality experts to always observe a perfect signal, whereas here also the incumben't information is less than complete. I believe this information structure features more realism.

3.6 Strategy for the electorate

The electorate has different abilities to assess the optimality of available policy choices. Better knowledge on the first period state of the economy can be interpreted as the electorate understanding the justifications for the incumbent's policy choice. If they do not understand the current state of the economy, they cannot make correct inferences about the optimality of the policy alternatives. The information for the non-educated voters is given by the common prior π, whereas the educated voters receive the public signal σ^p according to which their posterior beliefs are $\pi^p(s_1 \mid \sigma^p)$.

First, consider the simple instrumental election rule, when the electorate re-elects the incumbent politician if his policy choice x_1 matches with the electorate's beliefs on what is optimal, otherwise they vote for the challenger. More formally, the re-election rule for the the non-

educated electorate is based on the prior belief

$$P^{\beta} = \begin{cases} 1 & \text{if } x_1 = 1 \mid \pi \geq \frac{1}{2} \text{ or } x_1 = \frac{1}{2} \mid \pi < \frac{1}{2} \\ 0 & \text{otherwise} \end{cases}$$

And for the educated electorate it is based on posterior belief $\pi^p(s_1 \mid \sigma^p)$.

$$P^{\alpha} = \begin{cases} 1 & \text{if } x_1 = 1 \mid \pi^p(1 \mid \sigma^p) \geq \frac{1}{2} \text{ or } x_1 = \frac{1}{2} \mid \pi^p(1 \mid \sigma^p) < \frac{1}{2} \\ 0 & \text{otherwise} \end{cases}$$

If the beliefs of the educated and the non-educated voters are in conflict, they vote differently. To be re-elected, the incumbent needs at least half of the votes. This simple re-election rule is used in section 4.1.

Section 4.2 presents electoral outcomes when a share of the educated electorate uses a more sophisticated voting strategy; they update their beliefs based on the public signal and on the observed policy choice x_1. Let us denote the beliefs of the educated and sophisticated voters as $\pi^{p_s} = (1 \mid \sigma^p, x_1)$. The voting rule is otherwise similar to P^{α}. The non-educated are assumed to vote as in the baseline section.

It is important to note that since the electorate is indifferent between the current incumbent and a potential challenger, they will indeed replace the incumbent if they disagree with the incumbent's policy choice in period one.

3.7 Strategy for the incumbent politician

The incumbent politician benefits from making good policy and holding office according to his utility function (6); he is balancing between his desire to make good policy under asymmetric information on the true state of the economy and ensure re-election, which holds especially when there is conflicting information between the politician and the electorate on the optimal policy choice. If he is not re-elected, his second period utility is that of the common citizen. Before proceeding to write down the optimal strategy for the incumbent politician, let us consider the expected state-policy utilities based on the information

the incumbent possesses.

The politician updates the common prior belief of the true underlying state of the economy according to the two signals he receives. Since the posterior belief does not reveal the true state perfectly $\pi^i(s_1 \mid \sigma^i, \sigma^p) < 1$, the incumbent is making the first period policy choice under uncertainty.

The expected first period utility depends on the chosen policy action given the incumbent's posterior belief of the state of the economy expressed as $v_1(s_1 \mid x_1, \pi^i(s_1 \mid \sigma^i, \sigma^p))$, which can be rewritten for the two policy alternatives as

$$\begin{aligned} E(v_1(s_1 \mid 1, \pi^i(1 \mid \sigma^i, \sigma^p))) &= \pi^i(1 \mid \sigma^i, \sigma^p)v(1,1) + (1 - \pi^i(1 \mid \sigma^i, \sigma^p))v(0,1) \\ &= \pi^i(1 \mid \sigma^i, \sigma^p) \cdot 1 + (1 - \pi^i(1 \mid \sigma^i, \sigma^p)) \cdot 0 \\ &= \pi^i(1 \mid \sigma^i, \sigma^p) \qquad (8) \\ E(v_1(s_1 \mid \frac{1}{2}, \pi^i(0 \mid \sigma^i, \sigma^p))) &= \pi^i(0 \mid \sigma^i, \sigma^p)v(0, \frac{1}{2}) + (1 - \pi^i(0 \mid \sigma^i, \sigma^p))v(1, \frac{1}{2}) \\ &= \pi^i(0 \mid \sigma^i, \sigma^p) \cdot \frac{1}{2} + (1 - \pi^i(0 \mid \sigma^i, \sigma^p)) \cdot \frac{1}{2} \\ &= \frac{1}{2} \qquad (9) \end{aligned}$$

Where (8) represents the expected utility of choosing policy $x_1 = 1$ given his posterior belief on $s_1 = 1$. If the incumbent believes that the economy is more likely to be in the good state, $\pi^i(1 \mid \sigma^i, \sigma^p) \geq \frac{1}{2}$ then the expected utility acting according to this belief is greater than half. However, if the private information for the incumbent states that the bad state is more likely, $\pi^i(1 \mid \sigma^i, \sigma^p) < \frac{1}{2}$, then choosing policy action $x_1 = 1$ produces an expected utility less than half for the incumbent. (9) represents the utility of choosing the moderate policy choice given his posterior belief that the economy is in the bad state, $s_1 = 0$. As it can been, independent of the incumbent's private beliefs, policy choice $x_1 = \frac{1}{2}$ produces an expected utility of exactly half.

The second period expected utility is conditional on the probability with which the incumbent sets the correct policy in the first period, since the choice of x_1 together with the realisation of s_1 determines the second period state of the economy s_2. The second period expected

outcome can then be expressed as $v_2(s_2 \mid x_1, \pi^i(s_1 \mid \sigma^i, \sigma^p))$.

$$\begin{aligned} E(v_2(s_2 \mid 1, \pi^i(1 \mid \sigma^i, \sigma^p))) &= \pi^i(1 \mid \sigma^i, \sigma^p)v(1) + (1 - \pi^i(1 \mid \sigma^i, \sigma^p))v(0) \\ &= \pi^i(1 \mid \sigma^i, \sigma^p) \cdot 1 + (1 - \pi^i(1 \mid \sigma^i, \sigma^p)) \cdot 0 \\ &= \pi^i(1 \mid \sigma^i, \sigma^p) \qquad (10) \\ E(v_2(s_2 \mid \frac{1}{2}, \pi^i(0 \mid \sigma^i, \sigma^p))) &= \pi^i(0 \mid \sigma^i, \sigma^p)v(1) + (1 - \pi^i(0 \mid \sigma^i, \sigma^p))v(0) \\ &= \pi^i(0 \mid \sigma^i, \sigma^p) \cdot 1 + (1 - \pi^i(0 \mid \sigma^i, \sigma^p)) \cdot 0 \\ &= \pi^i(0 \mid \sigma^i, \sigma^p) \qquad (11) \end{aligned}$$

Where (10) and (11) represent the expected utilities of setting policies $x_1 = 1$ and $x_1 = \frac{1}{2}$ respectively, given the posterior beliefs of the first period state $s_1 = 1$ and $s_1 = 0$.

In addition to the utility of making good policy, the incumbent is guaranteed to get the office-holding benefit ρ in the first period. The second period utility depends on the discount factor δ, and the probability of being re-elected P. Knowing how his utility in the two periods is determined by the policy choice made in the first period, the objective function for the politician (7) can be rewritten as

$$\max_{x_1} v_1(s_1 \mid x_1, \pi^i(\cdot)) + \rho + \delta(v_2(s_2 \mid x_1, \pi^i(\cdot)) + P\rho) \qquad (12)$$

The politician knows the share of the educated electorate, a, and the non-educated electorate, b, and what they know. Furthermore, he knows the share of the electorate that votes $(\alpha a + \beta b)$, and the re-election rule that the two groups of voters use.

4 ELECTORAL OUTCOMES

In this section, I present how the electoral outcomes of the politician-electorate game depend on the information the different players possess, and on the different voting motivations for the electorate. The role of information is important; under instrumental voting, all voters would re-elect the incumbent for choosing the correct state-matching policy if everyone had the perfect ability to assess the underlying state of the economy and thus understand which of the policy choices is op-

timal. However, since (parts of) the electorate may be poorly informed about the true underlying state of the economy, they cannot perfectly assess the optimality of the incumbent's policy choice, and therefore electoral incentives can drive the incumbent to choose a popular but non-optimal policy.

This section proceeds as follows. First, in section 4.1, as a baseline case I consider the electoral outcomes under simple instrumental voting, when the electorate uses the simple re-election rule to re-elect the incumbent only if his policy choice matches with the electorate's belief on what is the optimal policy choice. The idea is the get benchmark results of the incumbent's tendency to pander to the electorate's opinion, or to follow his private policy-relevant information against what the electorate believes. In section 4.2, I include more sophisticated voters who can make further inferences of the optimal policy than the voters of the simple instrumental voting case. In section 4.3, I add expressive voting motivations, and in section 4.4, I discuss the results.

4.1 Simple instrumental voting

In this subsection I review electoral outcomes, when the electorate uses a simple voting strategy by re-electing the incumbent who sets the policy according to what the electorate thinks is the optimal policy, and replacing him if they see a deviation from that policy.

4.1.1 Electorate and politician agree

The most straightforward case is when all the players agree on the optimal policy, i.e. when everyone's beliefs coincide about the underlying state of the economy. Politician knows he will be re-elected with certainty, $P = 1$ if he sets the policy according to what the electorate believes. The only uncertainty is related to the possibility that everyone holds incorrect information thus leading to a bad state of the economy in the second period.

First, if everyone believes that the economy is in the good state $s_1 = 1$, i.e. $\pi \geq \frac{1}{2}$, $\pi^p(1 \mid \sigma^p) \geq \frac{1}{2}$, and $\pi^i(1 \mid \sigma^i, \sigma^p) \geq \frac{1}{2}$, so that incumbent will be re-elected $P = 1$ for setting $x_1 = 1$, and incumbent's expected

two-period utility (12) can be written as

$$\pi^i(1 \mid \sigma^i, \sigma^p) + \rho + \delta(\pi^i(1 \mid \sigma^i, \sigma^p) + \rho) \tag{13}$$

If the incumbent, on the other hand, sets $x_1 = \frac{1}{2}$ resulting in being replaced, $P = 0$, (12) can be written as

$$\frac{1}{2} + \rho + \delta(1 - \pi^i(1 \mid \sigma^i, \sigma^p)) \tag{14}$$

It is easy to see that whenever the electorate and the incumbent agree on the optimal policy, there is no incentive for the incumbent to deviate from the policy $x_1 = 1$ by setting $x_1 = \frac{1}{2}$, since when $\pi^i(1 \mid \sigma^i, \sigma^p) \geq \frac{1}{2}$,

$$\pi^i(1 \mid \sigma^i, \sigma^p) + \rho + \delta(\pi^i(1 \mid \sigma^i, \sigma^p) + \rho) \geq \frac{1}{2} + \rho + \delta(1 - \pi^i(1 \mid \sigma^i, \sigma^p)) \tag{15}$$

holds for any $\rho \geq 0$.[7]

It is easy to note that the payoff to the politician is increasing in the strength of his belief. Consider for instance the following case. When the the two signals confirm the prior belief on the likelihood of one of the states, e.g. $\pi^i(1 \mid 1,1)$, then the more accurate the prior belief and the public and private signals are, the higher is the payoff of setting the policy according to what the incumbent thinks is the optimal policy, whereas if the public signal states in the opposite direction, resulting in belief $\pi^i(1 \mid 1,0)$, it is easy to show that $\pi^i(1 \mid 1,1) > \pi^i(1 \mid 1,0)$ holds whenever $p \geq q$.

4.1.2 Electorate and politician disagree

The case of more interest is when the information the incumbent politician possesses contradicts with the information the electorate possesses. The electorate as a whole can have information that contradicts the incumbent's information, or one of the subgroups can have contradicting information, while the other subgroup's information matches

[7] Similarly, when the information states that the more likely state is $s_1 = 0$; the incumbent follows his information $\pi^i(0 \mid \sigma^i, \sigma^p) \geq \frac{1}{2}$, and sets policy $x_1 = \frac{1}{2}$ instead of $x_1 = 1$ since $\frac{1}{2} + \rho + \delta(\pi^i(0 \mid \sigma^i, \sigma^p) + \rho) \geq 1 - \pi(0 \mid \sigma^i, \sigma^p) + \rho + \delta(1 - \pi^i(0 \mid \sigma^i, \sigma^p))$ holds for any $\rho \geq 0$.

that of the incumbent's. Then it is the subgroup that forms a majority that matters. Let us start with the case when the information the electorate as a whole possesses differs from that of the incumbent politician.

Let us consider the case when the electorate believes $s_1 = 0$ is more likely, i.e. $\pi < \frac{1}{2}$ and $\pi^p(1 \mid \sigma^p) < \frac{1}{2}$, whereas the incumbent's private information states that $s_1 = 1$ is more likely, $\pi^i(1 \mid \sigma^i, \sigma^p) \geq \frac{1}{2}$. The incumbent politician knows the electorate's beliefs of the underlying state of the economy, and thus knows that setting a policy according to the public opinion, $x_1 = \frac{1}{2}$ will secure his re-election $P = 1$, and (12) can be written as

$$\frac{1}{2} + \rho + \delta(1 - \pi^i(1 \mid \sigma^i, \sigma^p) + \rho) \tag{16}$$

Acting according to his private information but against the public opinion, on the other hand, will result in being replaced, $P = 0$, so that (12) can be written as

$$\pi^i(1 \mid \sigma^i, \sigma^p) + \rho + \delta\pi^i(1 \mid \sigma^i, \sigma^p) \tag{17}$$

The condition for the incumbent politician to pander to the public opinion by choosing the popular policy and securing his re-election while disregarding his private information is then given by

$$\frac{1}{2} + \rho + \delta(1 - \pi^i(1 \mid \sigma^i, \sigma^p) + \rho) \geq \pi^i(1 \mid \sigma^i, \sigma^p) + \rho + \delta\pi^i(1 \mid \sigma^i, \sigma^p) \tag{18}$$

Solving the minimum level for the office-holding benefit ρ such that the incumbent finds it beneficial to disregard his private opinion and pander to the electorate's opinion from (18) gives

$$\rho \geq \frac{1 + 2\delta}{\delta}(\pi^i(1 \mid \sigma^i, \sigma^p) - \frac{1}{2}) \tag{19}$$

The condition to pander, given as the minimum amount of office benefits, depends on the difference between the expected utility of policy $x_1 = 1$, and the utility of policy $x_1 = \frac{1}{2}$, as given within the brackets in (19). Since the former is given by the incumbent's posterior belief $\pi^i(s_1 \mid \sigma^i, \sigma^p)$, which comprises of the prior belief, the public and the

private signals, let us look more closely how the politician's incentives to pander to the public opinion depend on the accuracy of each of these.[8]

I. With beliefs $\pi < \frac{1}{2}$, $\pi^p(1 \mid \sigma^p) < \frac{1}{2}$, and $\pi^i(1 \mid \sigma^i,\sigma^p) \geq \frac{1}{2}$, the condition for the incumbent to pander to the opinion of the whole electorate depends on the accuracy of the signals as follows.
a) For all public and private signals $\sigma^p = \sigma^i = 1$ with accuracies of $p,q > \frac{1}{2}$, and $q < 1 - \pi$ so that the posterior beliefs are $\pi^p(1 \mid 1) < \frac{1}{2}$ and $\pi^i(1 \mid 1,1) \geq \frac{1}{2}$. The smaller is π, the stronger is the prior belief that $s_1 = 0$. Now the accuracy of the public signal q is low enough to keep the public posterior belief on the likelihood of state $s_1 = 1$ less than half. The politician's posterior, after his private signal of accuracy p, however, turns the likelihood of state $s_1 = 1$ to be over half. The incumbent's updated belief is $\pi^i(1 \mid 1,1) = \frac{pq\pi}{p(q+\pi-1)+(1-q)(1-\pi)}$, and the RHS of (19) is increasing in the accuracy of both signals, and decreasing in the strength of the prior belief.
b) For a private signal $\sigma^i = 1$, and a public signal $\sigma^p = 0$ with the accuracy of the private signal strictly higher than the accuracy of the public signal, $p > q$, and $q > \pi$, so that the posterior beliefs are $\pi^p(1 \mid 0) < \frac{1}{2}$ and $\pi^i(1 \mid 1,0) \geq \frac{1}{2}$. The closer π is to half, the weaker is the prior belief of the likelihood of state $s_1 = 0$. When the accuracy of the public signal q confirming the prior is sufficiently weak, whereas the accuracy of the private signal for the politician p contradicting the electorate's beliefs is high enough, the incumbent's posterior belief of $s_1 = 1$ is over half. The incumbent's updated belief is $\pi^i(1 \mid 1,0) = \frac{p(1-q)\pi}{p(\pi-q)+q(1-\pi)}$, and the RHS of (19) is increasing in the accuracy of the politician's private signal, and decreasing in the strength of the prior and in the accuracy of the public signal.

The second possible case is when the beliefs of the underlying state of the economy are in conflict *within* the electorate, and the educated and the non-educated citizens disagree on the optimal policy. Whether

[8]Similarly, if the incumbent's private information states that $s_1 = 0$ is the more likely state, but the electorate believes $s_1 = 1$, the politician panders to the public opinion by setting $x_1 = 1$ if $1 - \pi^i(0 \mid \sigma^i,\sigma^p) + \rho + \delta(1 - \pi^i(0 \mid \sigma^i,\sigma^p) + \rho) \geq \frac{1}{2} + \rho + \delta\pi^i(0 \mid \sigma^i,\sigma^p)$, which gives $\rho \geq \frac{1+2\delta}{\delta}(\pi^i(0 \mid \sigma^i,\sigma^p) - \frac{1}{2})$. Since the two cases are symmetric, I only discuss one of the cases in more detail.

the incumbent sets the optimal policy or not, depends on the beliefs of the two subgroups, and on their relative size. Since the incumbent needs a majority of the electorate to vote for him, whenever $\alpha a \geq \beta b$, the educated voters form a majority, and thus their vote counts. Recalling that since $a < b$, the educated voters form a majority either if the share of the educated citizens a is very close to the share of the non-educated citizens b, or if the number of voters within the educated citizens α, is clearly higher than the share of voters within the non-educated citizens β, i.e. a society where only a relatively small fraction of the non-educated citizens vote. On the other hand, if $\beta b \geq \alpha a$ the non-educated voters form a majority, which is a case of a society where the share of non-educated citizens is significantly higher than the share of educated citizens.

Whenever the majority agrees with the incumbent, the incumbent sets the optimal policy, and will be re-elected. The condition for this is essentially the same as described in subsection 4.1.1. Therefore, let us consider the potential cases when the majority does not agree with the incumbent to see how the condition to pander to the opinion of the majority is determined.

First, perhaps the more realistic case is when the educated voters better understand the state of the economy. The educated voters and the incumbent believe that the state is $s_1 = 1$, whereas the non-educated voters believe $s_1 = 0$. If the educated voters form a majority, incumbent sets the optimal policy and will be re-elected. If, however, the non-educated voters are a majority, the electoral outcome is the pandering equilibrium, where the incumbent sets policy $x_1 = \frac{1}{2}$ to please the non-educated majority against his belief that $x_1 = 1$ would be the optimal policy for high enough office benefits according to condition (19).

II. Now the beliefs are $\pi < \frac{1}{2}$, $\pi^p(1 \mid \sigma^p) \geq \frac{1}{2}$, and $\pi^i(1 \mid \sigma^p, \sigma^i) \geq \frac{1}{2}$, and the condition for the incumbent to pander to the opinion of the non-educated voters depends on the accuracy of the signals as follows.

a) For all public and private signals $\sigma^p = \sigma^i = 1$, with accuracies of $p, q > \frac{1}{2}$, and $q \geq 1 - \pi$, so that the posterior beliefs are $\pi^p(1 \mid 1) \geq \frac{1}{2}$

and $\pi^i(1 \mid 1,1) \geq \frac{1}{2}$. The smaller is π, the stronger is the prior belief that $s_1 = 0$, and the higher the accuracy for the public signal q has to be for the public posterior belief for $s_1 = 1$ to be over half. The incumbent's updated belief is $\pi^i(1 \mid 1,1) = \frac{pq\pi}{p(q+\pi-1)+(1-q)(1-\pi)}$, and the required level of office benefits given by (19) for the incumbent to pander to the non-educated voters' opinion is decreasing in the strength of the prior belief, and increasing in the accuracy of the public and private signals. Now the incumbent's belief is stronger than in case I.a), meaning a stronger incumbent; he is willing to pander to the opinion on the non-educated voters only if office benefits are very high.
b) For a private signal $\sigma^i = 0$, and a public signal $\sigma^p = 1$ with the accuracy of the private signal strictly lower than the accuracy of the public signal, $p < q$, and $q \geq 1 - \pi$, so that the posterior beliefs are $\pi^p(1 \mid 1) \geq \frac{1}{2}$ and $\pi^i(1 \mid 0,1) \geq \frac{1}{2}$. Now the public and private signals are in conflict; the private signal for the incumbent indicates that the economy is indeed in the bad state, however, this signal is too weak to change his posterior belief. The incumbent's updated belief is $\pi^i(1 \mid 0,1) = \frac{(1-p)q\pi}{p(1-q-\pi)+q\pi}$, and the RHS of (19) is decreasing in the prior belief and in his private signal, and increasing in the accuracy of the public signal. This case can be interpreted to represent a weak incumbent; he panders to the opinion of the non-educated even for low level of office benefits. On the other hand, if the signal received by the educated voters is strong enough, the minimum amount of office benefits becomes larger and thus may prevent the incumbent from pandering to the non-educated voters.

Finally, it is possible - although perhaps not so realistic - that the non-educated voters understand the state of the economy and thus agree with the incumbent, whereas the educated voters disagree. While the non-educated voters and the incumbent believe that $s_1 = 0$, the educated voters believe $s_1 = 1$. If the non-educated are a majority, optimal policy will be chosen and incumbent will be re-elected. However, if the educated voters are a majority, the incumbent panders to the opinion of the educated voters by setting $x_1 = 1$ against his private belief stating that $x_1 = \frac{1}{2}$ would be the optimal policy, according to condition (19).

III) With beliefs $\pi < \frac{1}{2}$, $\pi^p(1 \mid \sigma^p) \geq \frac{1}{2}$, and $\pi^i(1 \mid \sigma^i, \sigma^p) < \frac{1}{2}$, the condition for the incumbent to pander to the educated voters' opinion depends on the accuracies of signals as follows.
a) For a private signal $\sigma^i = 0$, and a public signal $\sigma^p = 1$ with accuracies of $p, q > \frac{1}{2}$, and $q \geq 1 - \pi$, so that the posterior beliefs are $\pi^p(1 \mid 1) \geq \frac{1}{2}$ and $\pi^i(1 \mid 0,1) < \frac{1}{2}$. Again, the two signals contradict each other. The incumbent's updated belief is $\pi^i(1 \mid 0,1) = \frac{(1-p)q\pi}{p(1-q-\pi)+q\pi}$, and the required level of office benefits in (19) is decreasing in the strength of the prior belief and in the accuracy of this private signal, whereas it is increasing in the accuracy of the public signal.

To sum up, there are three cases where the incumbent and the electorate have conflicting information about the state of the economy. When the voters use a simple retrospective voting strategy, the behaviour of the incumbent depends on who forms the majority.

The condition for the incumbent to pander to the public opinion while acting against his own information about the optimal policy depends on the strength of the beliefs all the parties possess, and on the share of the educated and non-educated voters. If the strength of the incumbent's posterior belief is interpreted to measure the strength of his leadership, then the stronger the incumbent is as a leader, the higher the office benefits have to be for him to stray him from behaving in the optimal way. A weak incumbent, on the other hand, is ready to pander to the majority's opinion even for low levels of office benefits. The posterior belief held by the incumbent is the same in cases I.a) and II.a), the difference being that in the former all of the electorate disagrees with him, whereas in the latter the educated voters agree with him. When the educated voters agree with him, the question is whether the subset of the informed electorate is large enough to overcome the ignorance by uneducated voters who do not possess sufficient information to make rational and informed voting decisions, as discussed in Aidt (2000).

The results furthermore show that even if the majority is not formed of the educated and informed voters, for signals of high enough accuracy the incumbent is stronger in the latter case, meaning that the office benefits have to be higher for him to deviate from what he thinks is

the optimal policy. Furthermore, the incumbent's belief is the same in cases II.b) and III.a), here the difference being that in the former the educated voters agree with him, whereas in the latter it is the non-educated voters that agree with him. The condition to pandering to the majority's opinion hinges again on the strength of the beliefs.

4.2 Sophisticated instrumental voting

The question one might ask based on the baseline model of the previous subsection, is that are voters really so naive or irrational that they do not understand why the incumbent would choose a policy that would end his political career unless he was more informed than the citizens about the state of the economy?

In this subsection I consider the electoral outcomes with a more sophisticated electorate. The non-educated voters are assumed to vote as in the baseline case, i.e. they do not consider why the politician would choose a policy they think is the wrong one. In a sense they are still assumed to be irrational. The educated part of the electorate, on the other hand, reasons that if the incumbent's policy choice differs from what they think would be the optimal policy given their belief of the underlying state of the economy, they understand that this conflict is because the incumbent politician has more information than the electorate. Let φ denote the share of the educated voters that understands the whole electoral game. This share is known only by the incumbent, but not by the voters.

If the electorate were fully sophisticated, in the sense that each voter would understand that the incumbent would only choose the optimal policy, then the game would become trivial. Also, a perfectly rational and sophisticated electorate is hardly what we observe in reality. Whether the educated and sophisticated voters have an impact on the electoral outcome, depends on their relative share. If the non-educated voters form a majority of the electorate, then depending on the level of office benefits the incumbent will choose either the true or the pandering strategy. There is nothing the educated and sophisticated voters can do, but the electoral equilibrium is determined by the beliefs of the players and the level of office rents. The pandering

conditions are determined as in the previous case in I) and II) of the previous subsection.

Therefore, it is of more interest to look at the electoral equilibria, when the educated voters form a majority. Recall that the sophisticated voters' updated belief consists of the public signal and the observed policy choice, as defined in section 3.6.

First, consider case I) when the electorate as a whole has different beliefs than the incumbent; both the non-educated and the educated voters believe $s_1 = 0$ is more likely, and hence that $x_1 = \frac{1}{2}$ would be the optimal policy. The private belief of the incumbent, on the other hand, states that $s_1 = 1$ is more likely, so that $x_1 = 1$ would be the optimal policy. The sophisticated voters understand that if the policy choice they observe is in conflict with the information conveyed by the public signal, it must be because the incumbent has better information than them, and in fact $x_1 = 1$ must be the optimal policy. The sophisticated voters will vote for the incumbent's re-election. For them to form a majority of the electorate, it has to hold that $\frac{\varphi\alpha a}{\alpha a+\beta b} \geq \frac{1}{2}$, which gives $\varphi \geq \frac{1}{2} + \frac{\beta b}{\alpha a}$ which shows that the share of the sophisticated voters has to be greater than half of the educated voters for the incumbent to gain the support of the majority. Therefore, only if there are enough educated and sophisticated voters within the electorate, the pandering equilibria of case I) can be avoided.

Next, let us discuss the case when the beliefs within the electorate are in conflict. First, consider the case when the non-educated voters believe the state to be $s_1 = 0$, and hence that $x_1 = \frac{1}{2}$ would the optimal policy, whereas the educated voters believe the state to be $s_1 = 1$, and that $x_1 = 1$ would be the optimal policy. Now, an interesting result arises; if the electorate observes policy choice $x_1 = 1$, and the educated voters are a majority, the sophisticated voters cannot make any further inferences of the optimality of the policy. Either $x_1 = 1$ is indeed the optimal policy, or it is not the optimal policy, but due to high enough office benefits the incumbent wishes to pander to the educated voters' opinion. This condition is determined in II).

On the other hand, if the electorate observes policy choice $x_1 = \frac{1}{2}$, which is against what the educated voters believe is the optimal policy,

the sophisticated voters can infer that this must be because the incumbent has better information than them. Now the incumbent will be re-elected if the non-educated and the sophisticated voters together form a majority, if $\frac{\varphi\alpha a+\beta b}{\alpha a+\beta b} \geq \frac{1}{2}$, i.e. $\varphi \geq \frac{1}{2} - \frac{\beta b}{\alpha a}$ which shows that less than half of the educated voters that are sophisticated together with the non-educated minority are enough so that pandering to the opinion of the educated voters, case III), can be avoided. This last case shows that even a small share of educated voters who are sophisticated enough, may be able to have an impact on the electoral outcome.

These last two results are sensitive to the assumption that the sophisticated voters know that $\alpha a > \beta b$, that is, there is more educated voters than non-educated voters, but they do not observe the share of the sophisticated voters, φ.

4.3 Expressive voting

In this section, I contrast the results of the baseline case when parts of the electorate votes expressively. The idea of expressive voting goes back at least to Fiorina (1976), where expressive voters are used to refer to those *who* vote, instead of describing of *how* or *whom* to vote. In Jennings (2011) there are rationally irrational and expressive voters who both are 'emotional', the difference being that the former are uninformed, whereas the latter are informed and understand that voting according to beliefs might produce outcomes that are against their material utility.

Here, expressive voting is defined as some of the voters possessing ideological bias on the optimal policy, and voting accordingly. The biased belief can either be based on misconceptions about effective economic policies or on some personal beliefs. More specifically, the expressive voters have ideological reasons to vote for the moderate policy choice $x_1 = \frac{1}{2}$, despite what their information states about the state of the economy. Either they can be considered to hold racist views, or have pessimistic bias about the state of the economy as discussed in Caplan (2007).[9]

[9]Caplan (2007) presents empirical evidence of how people tend to see the current state of the economy worse than before, and hold pessimistic views about the future.

Since the non-educated voters have a pessimistic belief about the state of the economy, and hence vote for the moderate policy anyway, it is the share of the educated voters possessing expressive motives against increasing immigration that is decisive in changing the electoral outcomes. A share $\mu\alpha a$ of the educated voters vote for the moderate immigration policy regardless of the information they possess. This is close to Jennings' classification of voter types, although here they are named differently. The important difference to the previous subsections is that that the expressive voters ignore their information about the state of the economy, but vote according to their personal belief. Now, let us consider how the electoral outcomes are affected by the existence of the expressive voters.

First, in case I) when the prior belief states that $s_1 = 0$ and the public signal confirms this, then all the voters believe the economy to be in the bad state, and the expressive voters do not play a role. The incumbent panders to the electorate's opinion as in case I) of subsection 4.1 according to condition (19).

Second, consider case II) of subsection 4.1 when the non-educated voters believe the economy to be in the bad state, whereas the educated voters and the incumbent believe it is in the good state. Furthermore, let us assume that the educated voters form a majority; if the non-educated are a majority, they vote for policy $x_1 = \frac{1}{2}$ anyway and the expressive motivations do not play a role. Since the non-educated vote against policy $x_1 = 1$, the share the expressive educated voters, i.e. share $\mu\alpha a$, are decisive. The critical share of them is given by $\mu \geq \frac{1}{2} - \frac{\beta b}{\alpha a}$. If there are enough expressive voters within the educated electorate that vote against policy $x_1 = 1$, and the electoral outcome is the pandering equilibrium according as in case II). If there are not enough expressive and educated voters, then the incumbent set the optimal policy and will be re-elected by the instrumental and educated voters.

Finally, in case III), when the non-educated voters and the politician agree on the optimal policy, but the non-educated disagree, the decisive role of expressive motivations become clear if the educated form a majority. Now, if $\mu \geq \frac{1}{2} - \frac{\beta b}{\alpha a}$ there are enough expressive voters

within the educated electorate that together form a majority to re-elect the incumbent for setting the optimal policy. However, if $\mu < \frac{1}{2} - \frac{\beta b}{\alpha a}$, there are not enough expressive and educated voters, but the the electoral outcome is that the incumbent panders to the instrumental and educated voters' opinion as in case III) of subsection 4.1.

The results in the simple and sophisticated voting would be symmetrical if the prior would state that the economy is in the good state, whereas the incumbent's information states the economy is in the bad state. However, with expressive motivations, the results are not symmetric, so let us briefly discuss at least two cases where it plays a role of who holds the biased belief and towards which policy alternative.

First, I assumed that the expressive voters have a bias against immigration, and thus vote for the moderate policy. It would, however, be realistic to assume that the educated and expressive voters would instead have a bias for immigration, thus voting for increasing immigration. This would change the outcome in case I, if there were enough expressive voters.

Secondly, if the electorate would hold the belief that the economy is in the good state, but the incumbent had information stating that it is in the bad state, then the role of voters opposing immigration independent of what their beliefs state, would play a role. Thus, if a large enough share of voters would vote for the moderate immigration policy, pandering to the opinion of voters who think increasing immigration would be the optimal policy could be avoided. However, since the (uninformed) voters tend to have rather a pessimistic belief of the state than an optimistic belief, this case is not so realistic, as is discussed in the next subsection.

4.4 Discussion

In this framework it is never optimal for the incumbent to choose the wrong policy when the optimal policy would ensure his re-election. If the incumbent has the majority's support, he will never choose the non-optimal policy, and the so-called 'fake leadership' equilibria (Canes-Wrone et al., 2001) can be ruled out. In the baseline case of the simple instrumental voting presented in subsection 4.1 the voters

do not understand why the politician would choose a policy that is against what the electorate believes is the optimal policy, and thus replace him for setting a policy against their beliefs.

Essentially the condition whether the incumbent panders to the majority's opinion or not, depends on the office benefits. As given by condition (19) the exact amount depends on the strength of the players' beliefs and whether the beliefs match or not. The stronger is the public's belief, the incumbent panders to the electorate's opinion and disregards his own private information even for low office benefits when all voters disagree with the incumbent's policy choice; this is a case of a weak incumbent. On the other hand, the stronger is the incumbent's own belief about the optimal policy, the higher the office benefits have to be for him to pander to the voters' opinion. If the beliefs within the electorate are in conflict, then the incumbent chooses either the true or the pandering strategy, depending on who forms the majority and what the majority believes.

I have considered a pessimistic electorate; the prior belief states that the economy is in the bad state. This gives a lot of weight to the role of educated voters and their motivations. First, in the baseline case of simple instrumental voting, if the educated voters form a majority, the pandering equilibrium of cases I and II can be avoided. However, when the educated voters mistakenly believe the economy to be in the good state, in case III, the electoral outcome is that the incumbent panders to the educated voters' opinion. Furthermore, an important finding is that even when the educated voters are a minority, their mere existence affects the incumbent's incentives to pander to the non-educated majority's opinion, as shown in case II.

Next, in subsection 4.2, I considered the possibility that parts of the educated voters have a higher sophistication. Only if there are enough sophisticated voters who understand why the incumbent would choose a policy against what they think is the optimal one, the coordination problem resulting in the pandering equilibria of cases I and III can be avoided.

Finally, in subsection 4.3, I introduced voters with biased beliefs of immigration policy. The main finding is that when the educated

voters are a majority, but high enough share of them vote expressively the case of pandering to the educated voters' opinion of case III can be avoided. However, while with instrumental voting motivations the electoral outcome of case II would be to set the optimal policy, with expressive motivations, the outcome is pandering to the opinion of the expressive voters. This is an example of expressive voting traps as discussed in Hillman (2010), where the society ends up with policy outcomes that the majority would not choose if they voted according to their material interests.

Since the non-educated voters[10] vote according to the prior belief, in this framework they are always pessimistic and vote for the moderate immigration policy. The assumption of pessimistic voters can be linked to the idea retrospective voting. Since the true implications of policies are not necessarily known at the time of the election, the voters find it hard to evaluate the performance of the incumbent (Bendor et al., 2011). Especially, in this framework, the true implications of the immigration policy are not known until the second period, meaning that the voters have to make inferences of the incumbent performance based on the private information or ideological beliefs. Since people tend to have pessimistic bias about the current state of the economy (Caplan, 2007), it is realistic to assume the non-educated voters to either have a pessimistic evaluation of the state of the economy, or to use personal beliefs about immigration as a basis for voting.

As a final remark, it is important to note, that all the results in the simple and sophisticated voting would be symmetrical if the prior would state that the economy is in the good state. The only case, where results are not symmetric, is that of voters with expressive voting motivations.

[10]In the section of the simple instrumental voting rule, the non-educated voters are assumed to be along the lines of rationally ignorant voters (Downs 1957) who do not have incentives to acquire information about the optimality of policies due to he unlikely chance of being the decisive voter. In the section of expressive voting, the non-educated are more like the rationally irrational but expressive voters (Jennings 2011), who hold beliefs that may run against their instrumental utility.

5 CONCLUDING REMARKS

This paper has analysed electoral outcomes under different assumptions about information, and voting motivations for the electorate. The electorate votes retrospectively, upon observing the policy choice but before the true consequence of the policy is unfold. The electorate is indifferent between the incumbent and a potential challenger, so if they do not agree with the incumbent's policy choice, there is a real threat of being replaced. The focus in this paper has not been on the competence or the effort of the incumbent politician, but has looked at electoral outcomes when none of the players possess complete information. While previous papers on electoral accountability have focused on incumbent characteristics in explaining populist equilibria, this paper shows how the incumbent's tendency to pander to the electorate's opinion can be analysed even when there is no moral hazard regarding the incumbent's competence or ideological congruence with the electorate.

This paper shows that when the assumption of the representative voter, or the median voter is dropped, the incumbent's incentives for pandering to the public opinion are not so straightforward to analyse. When the politician cares both about policy outcomes, and holding office, the condition for him to discard his private information and pander to the public opinion depends on the level of office benefits. The incumbent's 'demand' for office benefits, in turn, depends on the accuracy of his private information, the accuracy of the electorate's information, and whether there is an agreement or disagreement of the optimal policy within the electorate. The more accurate the incumbent's own information, the higher the office benefits have to be for him to discard his private information, and to pander to the public opinion, whereas the more accurate the electorate's information is the incumbent is ready to choose the popular policy over the optimal one even for low office benefits.

Interestingly, when the electorate disagrees over the optimal policy, the existence of an educated electorate who understands policy justifications is enough the decrease the incumbent's incentives to pander to public opinion - even when the size of the educated electorate is not

large enough to ensure re-election for the incumbent.

If the incumbent politician in this paper is taken to represent the incumbent administration at a broader level than just the single policy maker, the electorate's incentives to replace the incumbent for policy choices the majority does not agree with can be related to pandering tendencies caused by electoral incentives in reality. For instance, the performance of coalition governments can be affected by (biased) public beliefs of the optimal policies, when the voters potentially vote for opposition parties at the next election. In the U.S. presidential elections, on the other hand, the electorate expresses their dissatisfaction towards current administration by voting for the challenger. Incumbents are thus weighing policy options against their wish to stay in power, like in the model presented in this paper.

Part III

Essay II: Minor party's political power and policy outcomes - application to green parties and environmental policies

MINOR PARTY'S POLITICAL POWER AND POLICY OUTCOMES - APPLICATION TO GREEN PARTIES AND ENVIRONMENTAL POLICIES

Jenni Jaakkola, University of Turku*

Abstract

This paper studies the role of a minor party in parliamentary politics by assessing how changes in its programmatic policy positions affect its political power, and subsequently ideological policy outcomes. First, I show the importance of agenda-setting in a two-dimensional policy framework, where policy outcomes are determined at the post-election stage. The results show that while minor parties find it difficult to compete against major parties at agenda-setting on the frontline dimension of overall political ideology, the inclusion of the secondary dimension helps them gain political power. Thus the secondary dimension that defines the minor party, such as environmental policy dimension for a green party, is of importance regarding their role in coalition politics. Then, I calculate parties' political power based on their left-right positions to empirically test the relationship between green parties' programmatic positions and environmental policy outcomes with data from 9 European countries in 1990 to 2010.

JEL Classification: D72, D78, P48
Keywords: Minor party, coalition formation, agenda-setting

*I would like to thank Vincenzo Galasso, Kaisa Kotakorpi, Hannu Salonen and Fabrizio Zilibotti, as well as participants at EPCS 2013, ISNIE 2013, Silvaplana workshop in Political Economy 2013, IIPF 2013, ZWE 2013, UZH doctoral seminars and FDPE workshop in Public Economics for helpful comments.

1 INTRODUCTION

This paper studies parliamentary policy making in a proportional electoral system, especially the role played by a minor party and its policy positions on ideological policy outcomes. More specifically, the aim is to study how a minor party can strategically position itself in relation to other parliamentary parties, how its political power is determined, and what is its ability to affect final policy outcomes. Policy making takes place in a two-dimensional framework, where the frontline policy relates to a party's position on the overall left-right dimension, whereas the secondary dimension relates to the defining feature of the minor party, such as environmental issues for green parties or immigration issues for extreme right parties. In this paper the minor party is a green party, and the ideological dimension is represented by an environmental policy.

First, this paper presents a theoretical framework where parties first state their preferences on the two policy dimensions, and once the seat allocation is realised, parties enter post-electoral coalition formation stage, the result of which determines policy outcomes. Coalition outcomes are analysed in two scenarios. In the first, only the frontline policy dimensions enters into coalition negotiations, while in the second case, the secondary policy dimension becomes salient.

The results show that when the negotiations take place only on the frontline dimension and with symmetrical political conditions, the minor party finds it difficult to compete against the major parties at coalition formation. However, with the secondary dimension included, the political power of the minor party is considerably increased. This shows the importance of the environmental policy dimension for a green minor party. Then, the relationship between green parties' political power and environmental policy outcomes are tested with data on European parliaments for the past twenty years.

The existence of a number of different sized parties is typical for proportional electoral systems, according to the so-called Duverger's law (Riker, 1982). The importance of political parties is especially evident in multidimensional policy problems in allowing compromises over conflicting policy views as shown by Levy (2004). Previous pa-

pers analysing two-dimensional policy problems are for instance List and Sturm (2006), Anesi and de Donder (2011) and Bräuninger (2005). Despite theoretical interest in explaining the role of parties in multi-dimensional policy issues, the majority of empirical research starting from Hibbs (1977) on partisan politics, has however focused on two-party systems, or grouped parties into blocs or party families in proportional systems to study one-dimensional policy problems. There is only a very recent strand of empirical literature by Freier and Odendahl (2012), Fiva et al. (2013) and Folke (2014) showing how individual parties matter at the local level by estimating party effects through changes in the seat allocation between parties.

These previous results are important contributions in identifying causality from individual parties to policy outcomes. This paper, however, argues that especially at the national level, the role of individual parties is not necessarily as clear and cannot be simply contributed to individual parties gaining or losing a seat.

The ability to affect policy outcomes comes mainly through a party's presence in the governing coalition, which is especially true for proportional systems, where it is not so clear which of the parties enter the governing coalition. Therefore an analysis focused on changes in the seat shares may not be able to dissect the true power of parties at the national level, especially when it comes to minor parties. This paper argues that the main determinant of minor parties' political power is driven by their ability to be attractive coalition parties, and through their presence in the governing coalition they can affect policy outcomes.

To motivate this paper, the following observations of the environmental politics in Europe can be made. In the past twenty to thirty years, green parties have established stable minor party roles at national parliaments in many European countries, during which period there have been two parallel developments in green politics.

First, party manifestos show that the general trend on the emphasis the green parties attach to environmental protection has been, with a few exceptions, mostly downwards (fig. 1 in the Appendix A), while at the same time the overall left-right positions have been changing quite

considerably from one electoral term to the next (fig. 2). Secondly, at the same time as the amount of total environmental taxation has been steadily increasing, looking at environmental tax revenue as a share of total revenues from taxes and social contributions, or GDP reveals significant yearly variation (fig. 3).

With the premise that despite becoming somewhat more mainstream over the decades,[2] the main policy goal for the green parties is still to affect environmental policy outcomes, and it is therefore of interest to look at the relationship between the green's programmatic positions and environmental policies. This paper shows that the announced political programmes play a role through determining parties' real political power, with the secondary policy dimensions being of importance to minor parties. The idea is that policy positions can be regarded as strategic choices by parties, however in contrast to List & Sturm (2006), not to attract votes[3], but to increase bargaining power at the post-electoral stage.

Since the green parties have had relatively small seat shares in national parliaments, their true impact on national politics in Europe may have been underestimated.[4] The question asked in this paper is of importance not only due to an increase in the popularity of minor parties, such as green parties or extreme right parties in many European countries. More importantly, most research on partisan politics has focused on the traditional left-right dimension, with only few pa-

[2]An extensive overview of the development of the green movement in the West from the 1970's into the 2000's is provided in Dalton (2009); it started as a self-proclaimed new ideological orientation, which promoted not only environmental values but also multiculturalism, women's rights or foreign policy. In the early days, this new political dimension was seen as orthogonal to the traditional left-right dimension. Over the decades, the greens have however adopted ideologies on the traditional left-right dimension.

[3]The argument that shifts in policy positions result in changes in vote shares has only weak and inconsistent empirical support Adams (2012). In fact, it is unclear if voters even notice parties' positional changes

[4]The European Greens in power has been analysed in a special issue of European Journal of Political Research, Vol. 45, 2006; the analysis covers time period from the 1970's until the early 2000's. The main results are not very convincing that the greens have been very successful. However, perhaps the most significant years of the green politics have been left out of the analysis, leaving a need to cover also the first decade of the 2000's as well.

pers focusing on the role of individual parties as already mentioned. This paper contributes to the existing literature by studying the role of minor parties at the national level through strategic changes in their programmatic positions on two policy dimensions.

The organisation of this paper is the following. In section 2, relevant literature is reviewed. Section 3 presents theoretical framework, and section 4 presents results. Section 5 presents the empirical part with main results, and section 6 concludes.

2 PREVIOUS LITERATURE

First, this paper relates to very profound issues of policy-making. The traditional Downsian framework of purely office-motivated candidates leads to policy convergence into the median voter's preferred policy outcome.[5] However, with more than one policy dimension, this spatial model of voting is insufficient. Levy (2004) studies the role of political parties, and finds that in a unidimensional policy setting the equilibrium policies are the same regardless of the existence of them; in a framework of only right-wing or left-wing politicians no party can win against the median; the median wins even if no parties existed. However, in a multidimensional policy space, the formation of parties allows politicians to achieve compromises within parties, for instance in a case of two conflicting policy choices. The resulting political outcome therefore differs in the existence of political parties compared to their absence.

The political power of extremist candidates/parties has been studied by Bordignon et al. (2010) in a pluralist system by allowing partly endogenous party formation. They contrast single-round and runoff elections, and test their model with data on Italian mayoral elections. They find that a single-round system gives higher bargaining power to extremist candidates.

Policy making in a two dimensional policy framework is studied for instance by List and Sturm (2006), Anesi and de Donder (2011), and

[5]For example, Duggan and Fey (2005) discuss the median voter paradigm, and some of its central results.

Bräuninger (2005). List and Sturm (2006) use a two-dimensional policy framework where the environmental policy is a secondary dimension to the frontline issue of redistribution, and show that when politicians' preferences on the environmental policy are not known to citizens, there is an incentive for some politicians to utilise the existence of the single-issue voters to secure re-election.

Anesi and de Donder (2011) study electoral competition in a similar framework, and their somewhat surprising finding is that the emergence of green parties is not due to an increase in the number of green voters, but is related to a large enough income polarisation compared to the saliency of environmental issues. I take the existence of parties as exogenously determined leaving party formation outside of this paper's scope.

Closest to this paper in its framework is Bräuninger (2005) who studies budgetary policy-making when partisan actors differ in their preferences regarding the total amount of public expenditure and its allocation on different budget items, and estimates the potential for fiscal policy change in i) a median voter model, and ii) a veto player model. With data from 19 OECD countries for 1971 to 1999, he finds that it is not the left-right position but rather the stated policy preferences that matter for policy outcomes. Although his framework is similar to this paper, the aim here is somewhat different; the interest here is in how a minor party can utilise its policy positions to be able to have an impact on the ideological policy outcome.

Literature on coalition formation and electoral bargaining is vast. Baron and Diermeier (2001) study coalition formation and policy choice in a two-dimensional model, and Diermeier et al. (2002) and Diermeier et al. (2003) study how different institutions affect government formation and dissolution in a coalition bargaining model. Schofield (1993) shows how different types of coalition governments can be explained by locating parties in a two-dimensional model into core or peripheral parties. For a more thorough survey on the literature of coalition formation, see Bandyopadhyay et al. (2011, p. 6-9).

Second, from the perspective of empirical research this paper relates to an extensive strand of literature studying partisan effects on

public policies, which goes back to at least Hibbs (1977), who was among the first ones to study the relationship between political orientation of governments and their macroeconomic policies. Since Hibbs, there has been an abundance of studies on partisan effects on budget politics, see survey e.g. Cusack and Fuchs (2002). The results of this line of research have been somewhat mixed; some papers find clear evidence on leftist governments' policies resulting in excessive deficits while rightist governments exercise more prudent policies, others find only modest or no impact of ideological orientation on budget deficits.

Literature on partisan effects on some specific form of taxation shows that leftist parties tend to promote more taxation than right-wing parties, such as Osterloh and Debus (2012) on the level of corporate taxes in Europe, or Allers et al. (2001) on local taxation in the Netherlands. This literature often groups parties into broader blocs thus ignoring the role of individual parties. However, the existence of minor parties is characteristic for proportional electoral systems, whose role has not been very widely addressed in the previous literature.

More recent empirical assessments of partisan effects on policy outcomes are by Freier and Odendahl (2012), Fiva et al. (2013), and Folke (2014) who study specifically the role of individual parties in proportional systems. Freier and Odendahl (2012) study the voting power of political parties in German municipalities in the state of Bavaria, and find that individual parties matter on different tax categories. Folke (2014) applies a modified regression discontinuity design to local politics in Sweden. His results suggest a positive relationship between environmental policy and green party, and a negative relationship between immigration policy and extreme right party. Fiva et al. (2013) study local politics in Norway, and find e.g. that larger left-wing parties lead to higher property taxation, higher user charges and more spending on child-care. All these three papers are purely empirical, and assess the role of individual parties in municipal level. Furthermore, they assume parties to possess fixed policy positions from one electoral term to the next, as well as between municipalities.

Finally, I briefly discuss the concept of political power, for finding

an appropriate measure for it is a complex issue. First, the use of election results is dependent on the electoral system; the number of votes does not always translate directly into parliament seats, making cross-country comparisons difficult. The use of seat share is also problematic, since winning or losing a seat does not necessarily change coalition options for parties or a party's vote share remains the same, but the vote shares for other parties change considerably. Furthermore, as already discussed, estimating partisan effects based on changes in the seat allocation may be sufficient at the local level, however at the national level parties' true political power is a more complex issue.

A more sophisticated way to approach is to use power indices. Based on a party's seat share, the Banzhaf index (BI) calculates the coalition formation power for each party.[6] With n parties, a normalised Banzhaf index is defined as the number of times party k is pivotal divided by the sum of the times all other parties are pivotal

$$\beta_k^n = \frac{\eta_k}{\sum \eta_n}$$

which measures the relative power of party k.

One problem with power indices is that they assume all coalitions equally likely (Snyder et al., 2005). Moreover, they do not take into account differences in the actual political power due to a party's role as a coalition formateur. Furthermore, the importance of ideological ties between parties, such as loyalty to other members of the same party family potentially restricts the actual coalition formation power of parties, as noted by Stenlund et al. (1985), distinguish formal voting power from real voting power. The former is related to the capacity of a party to be decisive (Banzhaf), whereas the latter is restricted by the realistic opportunities defined by ideology and other circumstances to actually be a decisive player.

The last issue, related to empirical testing of political power is that majority of theoretical work uses the concept of voting weight to calculate the potential coalitions, whereas the empirical literature has largely relied on the use of seat shares as a measurement for po-

[6] Another approach to political power is presented in the literature of veto players, e.g. Tsebelis and Chang (2004).

litical power. Although the voting weights and seat shares do correlate, the relationship between the two is not completely linear causing problems when relating theoretical frameworks with empirics (Ansolabehere et al., 2005).

Freier and Odendahl (2012) weigh the normalised Banzhaf index by the likelihood of coalition formation between parties; coalitions form more likely between parties that are closer to each other on the left-right policy space, than between parties holding very different ideological views. Even if parties at the extreme ends of the left-right dimension could form a (winning) coalition, the weight on this coalition would be zero. In this paper's theoretical part it is shown how ideological closeness affects parties' political power at the post-electoral stage, whereas in the empirical part, following Freier and Odendahl (2012) a measure for political power is calculated using data on election outcomes and parties' ideological positions. Whereas Freier & Odendahl assume policy positions to be fixed over time and between states, here they are allowed to change from one term to the next as well as between countries.

3 FRAMEWORK FOR POLICY MAKING

This section presents a simplified model of parliamentary policy making, where parties state their preferences on two policy dimensions; the frontline policy dimension relating to the overall political ideology of a party, and the secondary dimension relating to environmental policy. Once the seat allocation realises, parties enter the stage of coalition formation as a result of which policy outcomes are determined. The problem for a party is to set its political programme prior to elections by taking into account the belief of the identity of the winner of the election, the state of the environment, the costs associated to programmatic adjustments, and the potential utility being in the governing coalition.

Defining parties' political power in a framework of post-electoral coalition formation makes sense, since in proportional electoral systems, it is not *ex ante* clear which of the parties enter the governing

coalition. However the aim is not to provide a full-fledged model of coalition formation; I do not discuss the allocation of government posts or the division of surplus between the coalition members, see e.g. Baron and Diermeier (2001) or Diermeier et al. (2002, 2003) on this. Instead, the aim is to illustrate the importance of parties' agenda setting in the political process.

This paper takes the election results to be exogenous to the model, in the sense that it does not provide a detailed analysis of voter behaviour. Instead, voter preferences are taken into account in the form of a preference shock shifting the role of the largest party to one of the major parties on the left-right dimension; furthermore the state of the environment introduced later can also be interpreted as a shock representing voter preferences on the environmental dimension.

The main reason for simplifying the role of voters is that as long as the political power of minor parties comes mainly through their ability to be potential coalition partners, gaining or losing a seat does not dramatically change their ability to affect policy outcomes. Instead, as this paper argues, it is the programmatic positions that matter in determining minor parties' real political power at the national level. Moreover, anticipating voter response is difficult, for instance due to strategic voting; if voters do not vote for the party closest to their ideal points, policy outcomes do not reflect policy preferences in a very accurate way (Baron and Diermeier, 2001). Finally, the link from voter preferences on parties' policy positions and back to voting behaviour is not clear, see survey by Adams 2012; voters do not even necessarily notice any changes in parties' policy positions.

3.1 Basic set-up

There are four political parties that are elected into the national parliament, $k = L, R, G, X$, with L=Left, R=Right, G=Greens and X=Extreme right-wing party. The seat shares for the four parties are the following: $S(L) = \overline{\kappa} - \eta$, $S(R) = \overline{\kappa} + \eta$, $S(G) = S(X) = \underline{\kappa}$, with $\overline{\kappa} - \eta > \underline{\kappa}$, $\overline{\kappa} + \eta < \frac{1}{2}$, and $\overline{\kappa} + \underline{\kappa} = \frac{1}{2}$ i.e. none of the parties has a majority of the seats.[7] L and R are called major parties, whereas G and X are referred to as minor

[7] Following Bordignon et al. (2010, p. 4-5).

parties.

To simplify matters, the seat allocation in the parliament is determined exogenously. The winner of the election with the largest seat share is determined by a shock η on voter preferences on the left-right scale that shifts the role of the largest party to one of the major parties, L or R. This preference shock can take either a positive or a negative value, and the realisation is observed at the election day. The largest party becomes the formateur of the government. Hence, parties do not know the identity of the coalition formateur when they set their agendas, but they have an expectation on the realisation of the shock, so that with probability $P(\eta < 0) = \pi$ the largest party and formateur is L, whereas with $P(\eta > 0) = 1 - \pi$ it is R. This prior belief can be based for instance on opinion polls about a likely shift of voter preferences on the left-right scale. The prior likelihood can then be interpreted as the polls suggesting that L is the largest party, whenever $\pi > \frac{1}{2}$

The seat shares for the minor parties, G and X, on the other hand are independent of the election results in this simplified setting. Allowing variation in their exact seat shares would add complexity to the framework without bringing more insight, which is to examine coalition formation and agenda setting where minor parties' role in national politics is driven by their potential to be coalition partners to the major parties.

Since none of the parties holds a majority of the seats, once the seat allocation is realised, parties enter the stage of coalition formation. The largest party is the coalition formateur, and it can form a winning coalition with the other major party, or with one of the minor parties.

3.2 Policy preferences

The task for the governing coalition is to set a two-dimensional policy. The frontline policy is to set the total size of the government budget B, whereas the secondary policy dimension of interest is the environmental policy denoted by b_e. The parties express their preferences both on the size of the budget and the ideological importance of the environmental policy dimension. These stated policy preferences are what constitute the pre-electoral political manifestos. Let us look more

closely at these policy positions.

First, each party $k = L, R, G, X$ has a 'true' initial position on the left-right scale denoted by B^k. The left-right scale is defined to run from 0 to 1, so that $B^k \in [0,1]$. The 'true' political identities for the four parties are taken as given and are $B^G = 0$, $B^L = \frac{1}{3}$, $B^R = \frac{2}{3}$ and $B^X = 1$, so that initially they are evenly distributed on the left-right dimension.

When considering their coalition potential, parties are allowed to adjust their true frontline positions, based on the anticipation of the election winner and state of the environment. The 'announced' policy position is denoted by β^k for each party. The movements from the true positions are restricted so that the parties' order on the left-right scale has to be preserved.

Secondly, parties state their position on the environmental dimension, given by e^k, which denotes the ideological importance of the environmental dimension for party k. This can be interpreted as the weight the party puts to environmental issues on its programme, thus $e^k \in [0,1]$. The weight a party assigns to the environmental policy is assumed to correspond to its environmental policy expertise, and for simplicity, let us assume that only the environmental party G puts a positive weight on the environmental dimension, $e^G > 0$; while the other parties attach a zero weight on it, $e^L = e^R = e^X = 0$.

3.3 Timing

For each electoral term the timing is the following.

1. State of the environment is determined by an exogenous shock, $E = \{0,1\}$, which is observed by parties. Parties have a prior belief on the election winner, denoted by π.

2. Based on the observed state of the environment E, and on the prior belief of the election winner π, parties set their policy positions on the frontline and secondary policy dimensions: β^k and e^k. The order of adjustments is as follows

   (a) The expected winner of the election sets its programme first. If $\pi > \frac{1}{2}$, L sets its programme first.

(b) The other major party observes this and sets its own programme.

(c) The minor parties observe the major parties' programmes and set their own programmes, with G first and then X.

3. A second exogenous shock (=election) takes place, as a result of which seat shares are realised and observed by parties.

4. Parties enter post-electoral coalition formation stage. Coalition formateur makes a take-it-or-leave-it offer to the party closest to it on the frontline dimension. Policy outcomes are determined.

Agenda-setting can be regarded as an extensive form game between parties. Under the expectation on the identity of the coalition formateur, parties assess their coalition potential, and set their policy positions prior to elections. To clarify the importance of agenda-setting, the political programmes stated at the pre-electoral state are assumed to hold at the coalition formation stage.

The formateur proposes a coalition to a party that provides the largest utility. There are two tie-breaking rules. i) When the formateur is indifferent to proposing to a major party or to a minor party, it proposes to the minor party. ii) For a party to accept a coalition proposal, the utility of joining the coalition has to be strictly higher than the utility of being in the opposition, i.e. a party that is indifferent between the two, chooses opposition.

3.4 Utility of coalition

The problem for each party k is to set its political agenda prior to elections so that its expected utility is maximised. The parties gain utility of being in the governing coalition; they have both office motivation and policy motivation. Coalition membership is thus worth pursuing for, and in order to increase their chances of being in the coalition, each party can adjust its position from its 'true' political ideology. There is, however, a cost attached to programmatic adjustments on the frontline dimension.

The objective function for each party thus comprises of the utility of being in the coalition, the costs associated to programmatic adjustments, and the value of the outside option which is to be at the opposition. Each of these are discussed in the following.

First, recall the distinction between a party's *true* overall political ideology B^k and its *announced* position β^k. A movement from the true position is costly, according to a cost function

$$-c(B^k - \beta^k)^2 \tag{1}$$

where c is a cost parameter. The quadratic form of this function means that a shift on the left-right scale becomes increasingly more costly the larger is that shift. Note that the movement from the true position is made before the election, so that these costs become sunk after the election result realises, since they are independent of whether k makes it to the coalition. Interpretation for these costs are that in their attempt to become more coalition eligible the party is making some ideological sacrifices without any guarantee of coalition membership.

Let us discuss the utility of coalition politics on a general level for any two parties i, j. The utility for party i of being in the governing coalition with party j is denoted by v_i^{ji} where the superscript refers to the two parties forming the coalition with the formateur listed first. The utility is defined as

$$v_i^{ji} = P^{\beta^i \beta^j}(1 - |\beta^{ij} - B^i| + e^{ij}E) \tag{2}$$

where $P^{\beta^i \beta^j}$ denotes the weight for the coalition; the first term within the brackets $1 - |\beta^{ij} - B^i|$ denotes the utility of the frontline policy, with β^{ij} representing the frontline position taken by the coalition; and $e^{ij}E$ denoting the utility of the environmental policy with e^{ij} representing the combined environmental policy expertise of i and j, and E denoting the state of the environment. Let us discuss each of these in more detail.

The utility of the coalition has two components depending on the ideological closeness of the two coalition parties. First, $P^{\beta^i \beta^j}$ denotes the weight for the coalition given by the coalition parties' *announced*

positions on the left-right dimension. The ideologically closer the coalition parties are on the frontline dimension, the higher is the utility of being in the governing coalition, $P^{\beta^i\beta^j} = 1 - |\beta^i - \beta^j|$. This represents the fact that once entering the coalition decision-making is easier if the coalition parties' announced frontline programmes are close to each other.

The second component of utility is given by the policy choices taken by the governing coalition that is represented by the terms within the brackets in (2). The first term inside the brackets, $1 - |\beta^{ij} - B^i|$, is the utility of the frontline policy dimension. The formateur has the power to make a take-it-or-leave-it offer to the potential coalition partner, which is a convex combination of the announced policy positions of the coalition parties, $\beta^{ij} = a\beta^i + (1-a)\beta^j$, with $a \in [0,1]$. This is to make programmatic announcements binding; the best policy any party can offer is restricted by the announcements made before the election. The further away the left-right position of the coalition is from i's *true* frontline policy position B^i, the less utility i gets from it, thus $1 - |\beta^{ij} - B^i|$.

The second term $e^{ij}E$ within the brackets in (2) represents the utility of the environmental policy. To understand the role of the secondary policy dimension, and the need for the environmental expertise in the governing coalition, the state of the environment is determined by an exogenous shock $E \in \{0,1\}$, with e^{ij} representing the sum of environmental expertise of the coalition parties.

The utility of non-governmental parties is not completely discounted,[8] so that i's utility of being left outside of the coalition is given by the utility of the opposition

$$v_i^{NC} = r < 1 \tag{3}$$

To make sure a coalition is always formed it has to hold that the utility of joining the coalition is higher than the utility of the outside option, even if none of the parties adjusts its position, i.e. for a party i it has to hold that $v_i^{NC} < v_i^{ji}$. With parties i and j at their original positions $\beta^i = B^i$ and $\beta^j = B^j$, and with j being the formateur proposing

[8] Kedar (2005, p. 188) discusses this more broadly; opposition parties gain utility e.g. from proposal making power, or veto power.

a frontline policy $\beta^{ij} = B^j$ this condition is given by

$$r \leq P^{B^i B^j}(1 - \mid B^j - B^i \mid + e^{ij}E) = P^{B^i B^j}(P^{B^i B^j} + e^{ij}E) \tag{4}$$

The final policy outcomes on the two dimensions are determined as follows. The frontline policy, i.e. the size of the government budget is determined by the frontline position taken by the coalition; β^{ij}, and the environmental policy outcome is given by the average environmental position of the coalition parties; $b_e = \frac{e^{ij}}{2}$.

4 COALITION FORMATION AND POLICY OUTCOMES

In the following, potential coalitions and policy outcomes are studied in two scenarios. First in section 4.1, $E = 0$, the general interest in environmental issues is very low or non-existent, such as when the economy is doing bad, unemployment is increasing, etc. In section 4.2, $E = 1$, the environmental interest is high, for instance due to a natural disaster, or a break-down of a nuclear power plant, which can be interpreted as a shift in voter preferences on the importance of the environmental dimension. The idea is to look at coalition formation when the greens have policy expertise that can be used strategically in comparison to other parties who do not possess similar expertise.

4.1 No environment

Before elections take place, parties write down their political manifestos. They can adjust their positions based on the prior belief on the identity of the election winner, by weighing the cost associated to the programmatic adjustment on the frontline dimension against their potential of being in the governing coalition. Recall the timing of programmatic adjustments. First, the expected winner of the election sets its political programme, followed by the other major party, after which the minor parties set their agendas. Due to the extensive form of this game, the agenda-setting by parties can be solved by using backwards induction.

Let us consider the case when $\pi > \frac{1}{2}$. If L wins, it becomes the coalition formateur with the power to make a take-it-or-leave it offer to one of the potential coalition partners; to the environmental minor party G, or to the right-wing major party R. The offer is a convex combination of the coalition members' announced frontline positions, denoted by β^{LG} for the greens and β^{LR} for the right-wing party. Electoral promises are thus binding.

Proposition 1 *When $E = 0$, $\frac{1}{2} < \pi < 1$, and $c \geq \pi(6 - 9r)$, the equilibrium outcome is the following. Assuming that L announces $\beta^L = \frac{1}{3}$, the announced frontline positions for G and R are $\beta^G = 0$ and $\beta^R < \frac{2}{3}$. If L wins, LR coalition forms with frontline policy set at $\beta^{LR} = \beta^L = \frac{1}{3}$. If R wins, RL coalition forms with frontline policy set at $\beta^{RL} = \beta^R < \frac{2}{3}$. Environmental policy $b^e = 0$.*

The proof for Proposition 1 proceeds as follows. When $\pi > \frac{1}{2}$, L is the expected winner of the election. To simplify the analysis, it is assumed that L stays at its original position, and announces its true frontline position $\beta^L = B^L = \frac{1}{3}$. If we allow L to optimise its frontline position, the outcome of the game is that the political competition is reduced to agenda-setting between the two major parties, with no role for the minor parties. Thus this simplifying assumption does not change the qualitative results. See Appendix B.1 on further details on optimal agenda-setting by L.

Taking L's position $\beta^L = B^L = \frac{1}{3}$ we consider the rule L uses in choosing the coalition partner; L knows that both G and R have incentives to adjust their positions closer to L. The choice for the coalition partner then reduces to a comparison of which of the two parties positions itself closer to L. Both R and G check what are the maximum adjustments they are willing to make so that these adjustments will guarantee a place in the governing coalition. Which of the potential coalition partners manage to move closer to L depend on the underlying parameters regarding political competition; c, r and π.

The proof ends by showing that there are no parameter values that allow G to win R on the coalition membership; when the costs of programmatic adjustments are sufficiently high with $c \geq \pi(6 - 9r)$, R

announces a position $\beta^R < \frac{2}{3}$ that is strictly less than its true position, but greater than the position L announces. In effect, R takes a position that just excludes G from the competition. G in turn stays at its true position $\beta^G = 0$. The equilibrium outcome is that L and R form a coalition, and the frontline policy set by the governing coalition is determined by which of them wins the election.

This equilibrium outcome is due to the extensive form of the game, the proposal making power of the coalition formateur, and the fact that R may win the election thus having more power than G who can never win the election.

Parties know that the weights for coalitions are determined by the announced frontline policy positions of parties prior to elections; once the election result realises, the weights are fixed, and none of the parties can affect them any more. Let us note that if all the parties stay at their true frontline positions with $\beta^G = B^G = 0$ and $\beta^L = B^L = \frac{1}{3}$ and $\beta^R = B^R = \frac{2}{3}$, the weights for LG and LR respectively are $P^{B^L B^G} = P^{B^L B^R} = \frac{2}{3}$. To guarantee a coalition to form, the value of the outside option is restricted by condition (4), which is now rewritten as $r \leq (\frac{2}{3})^2 = \frac{4}{9}$. Furthermore, note that if all the parties stay at their true positions, L proposes to G due to the tie-breaking rule. This gives an incentive for R to consider its optimal position closer to L, which gives an incentive for G to consider whether it could move even closer to L than R. Thus, L knows that both potential coalition partners have an incentive to move towards L.

Proof 1 *The condition that L proposes a coalition to G over R is given by*

$$P^{\beta^L \beta^G}(1 - |\beta^{LG} - B^L|) \geq P^{\beta^L \beta^R}(1 - |\beta^{LR} - B^L|) \tag{5}$$

This is a weak inequality due to the tie-breaking rule i). According to condition (2) *the best policy L can propose to any potential coalition partner is its own announced policy β^L. When L announces its true position $\beta^L = B^L = \frac{1}{3}$, this is also the policy it proposes to either of the coalition partners; thus $\beta^{LG} = B^L = \frac{1}{3}$ and $\beta^{LR} = B^L = \frac{1}{3}$. Condition* (5) *then reduces to*

$$P^{B^L \beta^G} \geq P^{B^L \beta^R} \tag{6}$$

which can be rewritten as $1 - |B^L - \beta^G| \geq 1 - |B^L - \beta^R|$, *and*

$$|\frac{1}{3} - \beta^G| \leq |\frac{1}{3} - \beta^R| \tag{7}$$

The choice of the coalition partner thus boils down to which of the two parties move closer to L on the frontline dimension.

Next, let us consider the maximum adjustments for R and G upon observing $\beta^L = B^L = \frac{1}{3}$. *First, the equilibrium path for the right-wing major party R is given by (see Appendix B.2.1)*

$$\pi v_R^{NC} + (1-\pi)v_R^{RX} < -c(B^R - \beta^R)^2 + \pi v_R^{LR} + (1-\pi)v_R^{RL} \tag{8}$$

which can be rewritten as

$$\pi r + (1-\pi)P^{B^R B^X}(1 - |B^R - B^R|) < -c(B^R - \beta^R)^2 + \pi P^{B^L \beta^R}(1 - |B^L - B^R|) + (1-\pi)P^{B^L \beta^R}(1 - |\beta^R - B^R|) \tag{9}$$

This is a strict inequality due to the tie-breaking rule ii). When R moves towards the political centre by announcing $\beta^R < \frac{2}{3}$, *the weight for the LR coalition increases. Solving* β^R *from* (9) *gives*

$$\beta^R > \frac{4c + 3 - 5\pi - \sqrt{(1+\pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)}}{6(c + 1 - \pi)} \tag{10}$$

For the parties' order to be preserved, $\beta^R \geq \frac{1}{3}$, *which takes place when* $c \geq \pi(6 - 9r)$.

Second, since G can never be a formateur, its problem is different from R's, and is given by (see Appendix B.2.2)

$$v_G^{NC} < -c(B^G - \beta^G)^2 + \pi v_G^{LG} + (1-\pi)v_G^{NC} \tag{11}$$

which can be rewritten as

$$r < -c(B^G - \beta^G)^2 + \pi P^{B^L \beta^G}(1 - |B^L - B^G|) + (1-\pi)r \tag{12}$$

When G moves towards L by setting $\beta^G > 0$, *the weight for LG coalition*

increases. Solving β^G *from* (12) *gives*

$$\beta^G < \frac{2\pi + \sqrt{4\pi^2 + (16 - 36r)\pi c}}{6c} \tag{13}$$

For the parties' order to be preserved, $\beta^G \leq \frac{1}{3}$*, which takes place when* $c \geq \pi(6 - 9r)$*.*

Having solved the maximum adjustments for R and G, let us return to condition (7)*. Since* $\beta^G \leq \frac{1}{3}$*, and* $\beta^R \geq \frac{1}{3}$*,* (7) *can be rewritten as (see Appendix B.2.3)*

$$\beta^G \geq \frac{2}{3} - \beta^R \tag{14}$$

Plugging (10) *into the right-hand side of this inequality, we can solve* β^G *such that G is closer to L than R*

$$\beta^G \geq \frac{1 + \pi + \sqrt{(1+\pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)}}{6(c + 1 - \pi)} \tag{15}$$

Thus, for LG coalition to form, the frontline position β^G *that G announces has to satisfy both* (13) *and* (15)*, i.e.*

$$\begin{aligned} \frac{1 + \pi + \sqrt{(1+\pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)}}{6(c + 1 - \pi)} &\leq \beta^G \\ &< \frac{2\pi + \sqrt{4\pi^2 + (16 - 36r)\pi c}}{6c} \end{aligned} \tag{16}$$

Now, since condition (16) *depends on* π*, c and r, let us see when it holds.*

Since the announced positions have to satisfy $0 \leq \beta^G \leq \frac{1}{3}$ *for G, and* $\frac{1}{3} \leq \beta^R \leq \frac{2}{3}$ *for R, we can first consider the case when both parties make the maximum adjustments, so that their positions match that of L's with* $\beta^G = \frac{1}{3}$ *and* $\beta^R = \frac{1}{3}$*. Since the left-hand side states the condition when L proposes to G over R, and is essentially the same as condition* (14) *above, the left-hand side clearly holds for* $\beta^G = \frac{1}{3}$ *and* $\beta^R = \frac{1}{3}$*. The right-hand side states the condition for G to accept coalition over opposition. For* $\beta^G = \frac{1}{3}$*, the right-hand side holds for sufficiently low values of c, namely* $c < \pi(6 - 9r)$*.*

Due to the timing of the game, if R sets $\beta^R = \frac{1}{3}$*, G observes this and sets* $\beta^G = \frac{1}{3}$*, and due to the tie-breaking rule, LG coalition forms. Knowing this, R sets* $\beta^R = B^R = \frac{2}{3}$*, and observing this, G sets* $\beta^G = B^G = 0$*, i.e. none of the parties move when the cost of programmatic adjustment is sufficiently low,*

and as a result LG coalition forms.

Next, let us check whether there exist such conditions that (16) *holds when both parties take a position strictly away from L's position with* $\beta^G < \frac{1}{3}$ *and* $\beta^R > \frac{1}{3}$*. First, with* $r = \frac{4}{9}$ *condition* (16) *reduces to*

$$\frac{1+\pi+\sqrt{(1+\pi)^2}}{6(c+1-\pi)} < \frac{2\pi+\sqrt{4\pi^2}}{6c} \tag{17}$$

From which c can be solved as

$$c < 2\pi \tag{18}$$

However, as noted above, for the parties' order to be preserved, $\beta^G < \frac{1}{3}$ *and* $\beta^R > \frac{1}{3}$*, the costs have to be sufficiently high according to* $c \geq \pi(6-9r)$*, so that with* $r = \frac{4}{9}$*, c would have to satisfy* $c \geq 2\pi$*.*

Thus, when $r = \frac{4}{9}$*, there is no such* $\beta^G < \frac{1}{3}$ *and* $\beta^R > \frac{1}{3}$*, that condition* (16) *holds. Furthermore, the term* $(16-36r)$ *is on both sides of* (16)*, which increases as r decreases with* $r \leq \frac{4}{9}$*. Moreover, since* $(\pi c + \pi - \pi^2) > \pi c$*, it is easy to conclude that condition* (16) *never holds for any* $c \geq \pi(6-9r)$*, and* $r \leq \frac{4}{9}$*.*

Since there is no such c that condition (16) *holds for any* $\beta^G < \frac{1}{3}$ *and* $\beta^R > \frac{1}{3}$*, LG coalition never forms. The equilibrium outcome is that R announces a position* $\beta^R < \frac{2}{3}$*. In effect, R does not have to make the maximum adjustment according to* (10)*, instead R makes an adjustment that just excludes G from competition. As a result, LR coalition forms, with the size of the government budget determined by which of the two parties win the election. This ends the proof for Proposition 1.*

Proposition 1 thus states that when coalition formation is based only on the frontline policy dimension, the major parties dominate the political game, leaving no possibility for minor parties to compete of the coalition membership. Therefore, for a minor party to have a chance at the political competition, either the cost of programmatic adjustment, or the rents of the opposition have to be asymmetric, such that it is more costly for a major party to adjust its frontline position, or the rents of the opposition are lower for a major party.

Here I have only considered the case of political competition between *G* and *R*, when *L* is the formateur. The case would be symmet-

rical if R would be the formateur, and the political competition would take place between L and the right-wing minor party X.

4.2 Environment

When $E = 1$, the environmental policy dimension enters into the coalition negotiations. Recall the assumption that $e^G > 0$, and $e^L = e^R = e^X = 0$, i.e. only the green party can credibly offer a political programme with environmental emphasis. Since e^G represents the weight for the environmental issues in the party manifesto, it is restricted to be less than one, $e^G < 1$.

Let us again consider the case when L is the expected winner of the election, with political competition taking place between G and R. Now L weighs the utility of forming the coalition with R that is closer to L on the frontline policy dimension, or with G that brings environmental policy expertise into the government.

Proposition 2 *When $E = 1$, and $\frac{1}{2} < \pi < 1$, the equilibrium outcome is the following. Assuming that L announces $\beta^L = \frac{1}{3}$, there exists $e^G < 1$, so that the announced frontline positions for G and R are $\beta^G = 0$ and $\beta^R = \frac{2}{3}$. If L wins, LG coalition forms with frontline policy set at $\beta^{LG} = \beta^L = \frac{1}{3}$, environmental policy $b^e = \frac{e^G}{2}$. If R wins, RL coalition forms with frontline policy set at $\beta^{RL} = \beta^R = \frac{2}{3}$, environmental policy $b^e = 0$*

Proposition 2 states that when the environmental policy dimension enters the coalition negotiations, the green party can always provide such an environmental programme that when L wins, it will be chosen as a coalition partner over R, since R does not adjust its frontline position. With G in the coalition, it can directly affect the environmental policy outcomes.

With the simplifying assumption that L announces its own frontline position, the agenda-setting for the major parties is symmetric to the no-environment case, with the solution to R's problem given by (10). The proof for proposition 2 then starts with showing how the inclusion of the environmental policy dimension changes G's agenda-setting on the frontline dimension. Then we consider the rule for L to choose the coalition partner. The proof concludes by showing that G can always

provide such an environmental programme e^G that in the case of L winning the election, LG coalition forms.

Proof 2 *With the environmental policy dimension, G's problem* (11) *is now written as (see Appendix B.3.1)*

$$r < -c(B^G - \beta^G)^2 + \pi P^{B^L \beta^G}(1 - |B^L - B^G| + e^{GL}) + (1 - \pi)r \quad (19)$$

With $e^{GL} = e^G$, the maximum adjustment on the frontline dimension G is willing to make can be written in terms of e^G as

$$\beta^G < \frac{(2 + 3e^G)\pi + \sqrt{((2 + 3e^G)\pi)^2 + (16 + 24e^G - 36r)\pi c}}{6c} \quad (20)$$

Since β^G is increasing in e^G, G has an advantage in the agenda-setting in comparison to the one-dimensional case as given by (13).

The condition for L to propose to G due to its environmental expertise is given by (see Appendix B.3.2)

$$P^{B^L \beta^G}(1 - |B^L - B^L| + e^{GL}) \geq P^{B^L \beta^R}(1 - |B^L - B^L \mid + e^{LR}) \quad (21)$$

with $e^{LG} = e^G$ and $e^{LR} = 0$ this reduces to

$$(1 + e^G)P^{B^L \beta^G} \geq P^{B^L \beta^R} \quad (22)$$

and finally to

$$\beta^G \geq \frac{2 - 3\beta^R - 2e^G}{3(1 + e^G)} \quad (23)$$

Plugging in R's solution β^R given by (10), *β^G can be solved such that G is closer to L than R*

$$\beta^G \geq \frac{1 + \pi + \sqrt{(1 + \pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)} - e^G(4c + 4 - 4\pi)}{6(c + 1 - \pi)(1 + e^G)} \quad (24)$$

Conditions (20) *and* (24) *together form the condition that LG coalition forms*

$$\frac{1+\pi+\sqrt{(1+\pi)^2+(16-36r)(\pi c+\pi-\pi^2)}-e^G(4c+4-4\pi)}{6(c+1-\pi)(1+e^G)} \leq \beta^G < \frac{(2+3e^G)\pi+\sqrt{((2+3e^G)\pi)^2+(16+24e^G-36r)\pi c}}{6c} \tag{25}$$

Let us check whether there exists $0 < e^G < 1$ *such that condition* (25) *holds for* $\beta^G = 0$, *i.e. when G stays in its true frontline position. With* $\beta^G = 0$, *the right-hand side holds for any* $e^G > 0$. *Left-hand side, on the other hand, reads as*

$$\frac{1+\pi+\sqrt{(1+\pi)^2+(16-36r)(\pi c+\pi-\pi^2)}-4e^G(c+1-\pi)}{6(c+1-\pi)(1+e^G)} \leq 0$$

Solving e^G *gives*

$$e^G \geq \frac{1+\pi+\sqrt{(1+\pi)^2+(16-36r)(\pi c+\pi-\pi^2)}}{4(c+1-\pi)} \tag{26}$$

Recall that $e^G < 1$. *Note that the numerator in* (26) *increases as r decreases, with the value of the numerator the highest when* $r = 0$. *Thus it is sufficient to check that* $e^G < 1$ *when* $r = 0$.

$$\frac{1+\pi+\sqrt{(1+\pi)^2+16(\pi c+\pi-\pi^2)}}{4(c+1-\pi)} < 1$$

which holds when $c > \frac{5\pi-1}{4}$

Thus there exists such e^G *that when G remains in its initial frontline position with* $\beta^G = 0$ *it becomes a more favourable coalition partner to L than R. G could also adjust its position on the frontline dimension needing to put less emphasis on the secondary dimension, so that condition* (25) *is satisfied; the closer to L on the left-right scale G moves, the less of its environmental expertise is required for a coalition to form. This ends proof for Proposition 2.*

To conclude, while in the one-dimensional case, the minor parties find it difficult to compete against the major parties at the coalition formation stage, the inclusion of the environmental dimension helps *G* win *R* by enabling it to set a political programme that is more attractive

to the formateur L.

Proposition 2 states that when the only restriction on the environmental policy dimension is that the emphasis the green party attaches to it has to be less than one, $e^G < 1$, then for any frontline position taken by R, G can always respond by putting enough emphasis on the environmental dimension, while staying in its initial frontline position, and win coalition membership.

This section has shown the importance of the secondary policy dimension for minor parties, like the environmental policy dimension for green parties in gaining political power in coalition politics in times when environmental expertise in the governing coalition is valued. This model has made some simplifying assumptions about the agenda-setting; only the green party has been assumed to attach a positive weight to the environmental issues, and the announcements on the secondary dimension have been assumed to be costless. A more realistic approach would be to restrict e^G to be less than for instance 0.5 or 0.25. Furthermore, imposing a cost also on the secondary dimension would restrict G's willingness to attach a very large weight on environmental issues. These would make agenda-setting more realistic, since they would require G to adjust also its frontline position.

4.3 Discussion of the framework

This section has analysed how parties' programmatic positions affect their coalition potential. The parties weigh the utility of being in the governing coalition against the cost of adjusting their programmatic positions from their 'true' ideological positions. The model thus brings the comparison of enjoying pure office rents of being in the opposition to having more direct influence on policy outcomes, but having to make some ideological sacrifices in the process. Since the final policy outcomes are affected only by preferences of government parties, as in Baron and Diermeier (2001), parties have an incentive to be in the governing coalition.

In the one-dimensional case, the coalition outcome is based on the parties' announced left-right positions on the frontline dimension. The formateur always proposes to the party closest to it, which creates po-

litical competition to the two potential coalition partners. Which of the parties wins the competition and forms the coalition with the formateur, depends on the underlying factors defining political competition. A minor party can be pivotal in the sense that it can never form a governing coalition alone or with another minor party, but together with a major party it can turn a coalition into a winning one. The main result shows that under symmetric conditions for all parties, minor parties find it difficult to compete against major parties, and thus the political game is dominated by the major parties.

On the other hand, when the secondary policy dimension in the form of an environmental (preference) shock is added, it gives a clear benefit to the green minor party. The ideological dimension can thus be regarded as a strategic tool for the minor party that the major parties lack that increases their coalition potential at times when environmental expertise is at demand.

To conclude, minor parties need some sort of competitive advantage, either in the form of asymmetric competition, or policy expertise, to gain more power in comparison to the major parties, and to ultimately have the power to affect policy outcomes. This paper has only analysed the environmental policy dimension and an environmental minor party. The framework could however be easily generalised to other minor parties and policy dimensions as well, such as extreme right parties and immigration issues, or regionalist parties with their agendas.

5 EUROPEAN GREEN PARTIES AND ENVIRONMENTAL POLICIES

This section tests empirically the role of the green parties' policy positions on environmental policy outcomes. I use a sample of 9 European countries with proportional electoral systems; Austria, Belgium, Finland, Germany, Iceland, Ireland, Luxembourg, the Netherlands and Sweden. Time period is 1990 to 2010 during which there have been altogether 55 national parliamentary elections, and in each country there has been an environmental party (almost) throughout this period.

Since it is impossible to measure to what extent parties' positional changes can be contributed to strategic agenda-setting, the coalition formation model presented in the previous section cannot be tested directly. Instead, I test the relationship between the green parties' programmatic positions as they have been announced in their party manifestos, and the environmental policy outcomes. First, adjustments on the frontline dimension are measured through changes in the green parties coalition ability, measured as a modified Banzhaf index. The green parties' 'greenness' is measured as the share of their party manifestos dedicated to environmental issues.

5.1 Data

As the indicator for the national environmental policy, environmental data from Eurostat is used. The dependent variable is the share of environmental taxation of total revenues from taxes and social contributions (ETR of TSC), since it allows comparison across countries; even though there might be other objectives to collecting environmental tax revenue than environmental protection, the availability of an environmental policy measure that would be available for a long period time and comparable across countries is scarce.

Parliamentary election results and green parties' policy positions are from the Comparative Manifesto Project (CMP) database (Volkens et al., 2013). The CMP data is quantitative content analysis of party manifestos. There are fifty-six categories that are grouped under seven major policy areas. Each data entry represents the percentage of quasi-sentences of the total length of the manifesto.

To capture the front-line policy position of a party this paper uses CMP category *Rile*, which is the right-left position of a party as given in Laver and Budge (1992). This is calculated as a share of sentences having a right-wing connotation minus the share of sentences having a left-wing connotation. Since this category can have negative values, I have normalised it between 0 and 100 so that 0 corresponds to extreme left-wing party and 100 corresponds to extreme right-wing party. The secondary policy dimension, a party's environmental policy position is captured by the CMP variable *Environmental Protection* (per 501).

This includes the following topics in the party manifesto: 'Preservation of countryside, forests, etc.; general preservation of natural resources against selfish interests; proper use of national parks; soil banks, etc.; environmental improvement'.

Papers using CMP data include e.g. Jensen and Spoon (2011), Osterloh and Debus (2012), Neumayer (2003a), Neumayer (2003b), and Bräuninger (2005). The benefit of the CMP data is that it allows comparisons across time and space. For instance, social democratic parties in different countries may have different emphasis on certain policy objectives, or, a party's stress of policy objectives might change over time (Osterloh and Debus, 2012). The problem with CMP data is the reliability of party manifestos in defining parties' policy positions; the party elites writing them may have multiple objectives in mind. However, since the party manifestos are strategically written official documents, in case of failing to deliver what has been promised in them party leaders can be held responsible (Budge and Garry 2000). Furthermore, the party manifestos provide a history of how a party's policy positions have changed over time.

As a final remark, it is important to note the difference between *policy emphasis* and *policy position*. Two parties may have different positions on a policy dimension, but still have the same emphasis on this policy matter (Budge and Garry 2000). Even though the CMP data is in terms of policy emphasis, there are some coding categories that deal more directly with positional issues, such as the category for environmental protection. A party not promoting environmental values does not put any emphasis on environmental policies in its manifesto - no party surely puts policy emphasis on the degradation of nature.

The data on the coalition government compositions is gathered from the Political Data Yearbooks published annually by the European Journal of Political Research.

Table 1 presents descriptive statistics for the dependent variable, and for the green parties in the 9 sample countries. The construction of the weighted BI will be discussed in the next subsection. Table 2 presents further statistics for the sample countries; the average number of parties in each legislature, the average number of parties in the

governing coalition, and the number of occasions the green party has been in the governing coalition.

Table 1: Descriptive statistics environmental taxation and green parties in sample countries

	N	Mean	Std. dev.	Min	Max
ETR % of TSC	184	6.8	1.6	4.0	10.5
Green party vote share	55	6.8	3.2	1.2	21.7
Green party seat share	55	6.2	3.4	0	22.2
Weighted BI	55	6.6	6.7	0	33.6
Share of (%) manifesto sentences on environmental protection	55	17	10	3	40
Position on the left-right scale 0=left, 100=right	55	42	6	31	60

5.2 Empirical strategy

Estimating party representation effects on policy outcomes is problematic due to the difficulty of differentiating the underlying voter preferences from the actual policy choices. When it comes to environmental policy, for instance, it might not be the increased seat share for the green party that has a positive impact in environmental protection policies; instead it might be a result of the voters becoming greener thereby affecting policy choices by all parties, not only environmental parties. The problems of reverse causality or omitted variables are more broadly discussed in Folke (2014) and Freier and Odendahl (2012). To estimate how changes in seat allocation at the municipal level affect policy outcomes Folke (2011) and Fiva et al. (2013) use a

Table 2: Average no. of parties in parliament (1), average no. of parties in governing coalition (2), no. of times greens in the government (3).

	(1)	(2)	(3)		(1)	(2)	(3)
Austria	4.5	2.6	0	Ireland	6.2	2.3	1
Belgium	10.2	4.3	1	Luxembourg	5.6	2	0
Finland	8	4.5	3	Netherlands	7	2.6	0
Germany	4.8	2	2	Sweden	7	2.2	0
Iceland	5	2.2	1				

modified regression discontinuity design solve the identification problem.

The aim in this paper is not to assess how changes in policy outcomes can be contributed to a certain party gaining or losing a seat at the parliament, but to analyse the importance of programmatic positions. To do this, I test the relationship between the green parties' programmatic positions, and environmental policy outcomes. The dependent variable is the amount of environmental taxation as a share of total revenue from taxes and social contributions, $Etax_{i,t}$ in country i in year t.

The main result in the theoretical section was to show that when it comes to the green parties' ability to affect environmental policy outcomes, it is their attractiveness as coalition partners that matters, since a presence in the governing coalition enables them to affect policy outcomes directly. While the theoretical model was very simplified, and analysed strategic movements only on one of the dimensions, in reality parties adjust their positions on multiple dimensions.

In this section, to link the data to the theory, I use the following variables. First, to test the importance of the adjustments on the frontline policy dimension, I construct a modified Banzhaf index, which is based on the green parties' realised seat shares, and their left-right positions as stated in the party manifestos. The normalised Banzhaf index is weighed by the probability of coalition formation between the parliamentary parties. Following Freier and Odendahl (2011), the political power of green party g is defined as

$$WBI^g = \beta_g^w = \frac{\eta_g^w}{\sum \eta_n^w}$$

where η_g^w is the number of coalitions where party g is pivotal weighted by the likelihood of coalition formation, i.e. the distance between g and the other coalition parties.[9] The difference to Freier & Odendahl, who

[9]In practice the WBI calculated as follows. First, based on the realised seat allocation, all the potential winning coalitions are counted using the simple majority rule. Then the number of potential coalitions where a party is a critical player is divided by all the potential winning coalitions (normalised BI). Finally, all these coalitions are weighed by the probability of coalition formation between the parties. In case

take parties' left-right positions to be fixed over time and space[10], is that the overall policy positions are let to change from one electoral period to the next. This index is then taken to represent the green parties' political power at the post-electoral stage. It is expected to be positively correlated with environmental policy outcomes.

ENV^g, is the variable capturing the green party's environmental policy position. Finally, I add an interaction term $WBI \times ENV$[11], since a positive effect on the dependent variable might take place if the two independent variables interact. The basic model to be estimated then reads as

$$Etax_{i,t} = \alpha + \beta_1 WBI^g_{i,t-1} + \beta_2 ENV^g_{i,t-1} + \beta_3 (WBI^g_{i,t-1} \times ENV^g_{i,t-1})_{i,t-1} + \beta_4 \mu_{i,t} + \varepsilon_i \quad (27)$$

where $\mu_{i,t}$ is a country fixed effect. I add country fixed effects to hold constant potential unobserved country specific characteristics, such as different attitudes towards environment across the sample countries. Since government budgets are usually decided in the previous year, I use the explanatory variables in year $t-1$ to predict the impact on the dependent variable in year t. For example, to see the effect of the green party's political power on the environmental policy in year 1990, the political power it has in 1989 is used. Furthermore, since the budgets are decided every year, whereas parliamentary elections are held every three to five years, the political power measure based on the seat share for every year between two consecutive elections is used.

An underlying assumption in the theoretical section was that only the green party can credibly provide a political programme with environmental dimension. However, in reality it is not only parties that have been classified as environmental parties that may have an interest in environmental policies; in fact, most political parties put some emphasis on environmental protection issues. Therefore, I test what

of three or more parties, the ideological distance between the two parties that are ideologically the farthest from each other is used.

[10]Freier and Odendahl take policy positions for German parties as derived in F.U. Pappi & G. Eckstein (1998) *Public Choice*, 97(3).

[11]Note, the interaction term is based on centred variables WBI and ENV.

is the role of an environmental party representation in the parliament and/or in the government, in comparison to parliaments/governing coalitions formed of only non-environmental parties. To do this, I calculate an environmental position index, I^{ENV} for each legislative period by weighing the environmental position of each parliamentary party as stated in party manifestos by their relative seat shares. To the 9 sample countries with green party representation in the parliament, I add Denmark, Italy, France, Spain and Portugal, where environmental parties are non-existent or have relatively low seat shares in national parliaments. The second estimation then reads as

$$Etax_{i,t} = \alpha + \beta_1 I^{ENV}_{i,t-1} + \beta_2 \mu_i + \varepsilon_i \tag{28}$$

where μ_i is a country fixed effect.

5.3 Results

Results of the first regression are presented in table 3. The dependent variable is the share of total environmental tax revenue of total revenues from taxes and social contributions (ETR % TSC). The first column (1) presents the results for the regression without the interaction term; the coefficient for both WBI and ENV are insignificant. The second column (2) adds the interaction term. One can see that the coefficient for WBI is now significant at 1% level. This means that for a green party with an average environmental position, an increase in its political power through an adjustment on the frontline dimension has a positive impact on the amount of environmental taxation. This result holds when adding a dummy indicating whether the greens are in the government (3) to (5), and adding a dummy for a government with a left-wing party as the head of the government (4), or a right-wing party as the head of the government (5). Thus, according to these results, the political power of the green parties, in the form of the weighed Banzhaf index, has a positive correlation with the amount of environmental taxation. On the other hand, the 'greenness' of the green parties, i.e. how much emphasis they put on the environmental dimension does not have a statistically significant relationship with

the dependent variable.

Table 3: Dependent variable=ETR % TSC.

	(1)	(2)	(3)	(4)	(5)
WBI	0.021 ’	0.036**	0.032*	0.029*	0.032*
	(0.011)	(0.012)	(0.013)	(0.013)	(0.013)
ENV	0.006	0.011	0.013	0.015’	0.015’
	(0.008)	(0.008)	(0.008)	(0.009)	(0.008)
WBI*ENV		0.363**	0.367**	0.374**	0.422**
		(0.134)	(0.134)	(0.134)	(0.135)
Dummy for Greens in gov’t			yes	yes	yes
Dummy for Left lead gov’t				yes	
Dummy for Right lead gov’t					yes
Country FE	yes	yes	yes	yes	yes
N	179	179	179	179	179
Adj. R-squared	0.788	0.796	0.796	0.799	0.801

Std. error in parenthesis. *** p< 0.001, ** p<0.01, * p<0.05, ’p<0.10

Next, the results for the relationship between the legislature’s average environmental position and outcome variable are presented in table 4. Surprisingly the coefficient for the average environmental position of the legislature has a negative coefficient. To interpret, the higher is the average environmental emphasis of the parliamentary parties, the lower is the amount of environmental taxation. Furthermore, the presence of the green party in the parliament seems to be negatively correlated with the amount of environmental taxation. The dummy variable indicating the presence of the greens in the governing coalition, has however a positive but insignificant sign. The identity of the largest party in the government, does not change the results.

It is important to note that these results report only correlations between the political power of environmental parties and the outcome variable, and does not claim to say anything of the causality. The results however support the hypothesis that the overall political position of the green parties matters through determining their coalition ability, although of course this measure is complementary to changes in their seat shares. There is a a positive correlation between the political power of the green parties and the outcome variable. On the other hand, there is no significant correlation between the greens’ environ-

Table 4: Dependent variable=ETR as % of TSC.

	(1)	(2)	(3)	(4)	(5)	(6)
Average env. position	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***	-0.0007***
of the legislature	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dummy for G in gov't		0.001		0.001	0.002	0.001
		(0.002)		(0.002)	(0.002	(0.002)
Dummy for G in parl			-0.011***	-0.012***	-0.011***	-0.011***
			(0.002)	(0.002)	(0.002)	(0.002)
Dummy for L lead gov't					yes	
Dummy for R lead gov't						yes
Country FE	yes	yes	yes	yes	yes	yes
N	289	289	289	289	289	289
Adj. R-squared	0.789	0.788	0.810	0.809	0.812	0.812

Std. error in parenthesis. *** p <0.001, ** p <0.01, * p<0.05

mental position and environmental taxes. Furthermore, since the average environmental position of the legislature is negatively correlated with environmental taxes, it seems that environmental positions of parties are not crucial in determining environmental policies. Finally, since the coefficient for the presence of the greens in the parliament has a negative sign, it supports the assumption of the theoretical part that only parties in the governing coalition matter when it comes to policy outcomes.

6 CONCLUDING REMARKS

This paper has studied parliamentary politics from the perspective of a minor party. In the theoretical part of the paper, I show that in a two-dimensional policy framework, when the coalition formation is based only on the frontline dimension, the minor parties find it difficult to compete against the major parties. When the secondary dimension becomes of importance, due to for instance an environmental shock, the minor party's secondary policy expertise becomes valuable to other coalition parties as well. By observing the state of the environment prior to setting its policy positions, the green party can choose them strategically to increase its chances of being in the governing coalition.

The framework has been built on the idea that when the parties are

defining their political programmes, it is mainly done as a strategic game vis-a-vis to other parliamentary parties. The role of voters and their voting behaviour have not been formalised here, but the role of voters have been taken into account in the form of a preference shock shifting the role of the largest party, as well as a shock on the electorate's environmental preferences. I believe this simplification manages to describe the reality, since in reality no party can respond to any single voter's preferences, but respond to changes in voters' preferences as a whole, and as a response to programmatic positions of other parties.

In the empirical part of the paper I test the relationship between green parties' programmatic positions and environmental tax revenue with data from 9 European countries for a twenty year period. When the adjustments on the left-right dimension are measured through a modified Banzhaf index, the results show a positive correlation for the political power of the green parties and environmental policy outcomes. The correlation between the green party's environmental policy position and policy outcomes turns out to be insignificant. When adding a set of five countries with no (significant) green representation in the parliament, the results indicate a negative correlation between the average environmental position of the legislature and the amount of environmental taxation.

This paper provides one explanation for parties' changing policy positions over the years as discussed in the introduction; changes in the green parties' overall left-right positions, as well as in the emphasis they attach to environmental issues can be regarded as strategic moves aimed at achieving political power; not because the greens have become less environmental.

A APPENDIX

Figure 1: The share of sentences on environmental protection issues by green parties in 9 European countries, vertical axis=% (CMP).

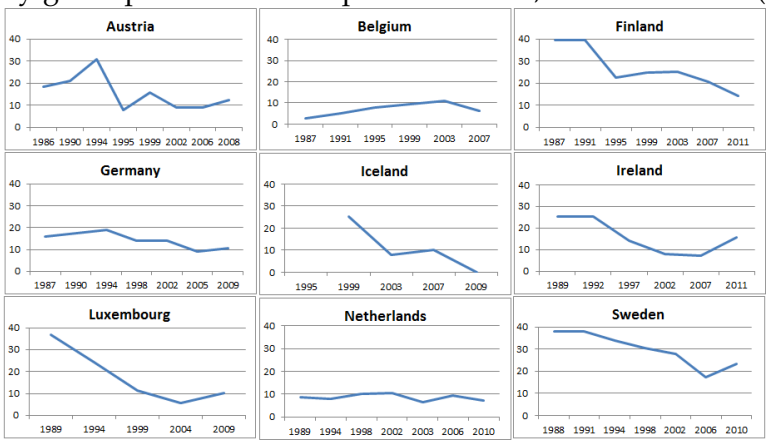


Figure 2: Left-right programmatic position of green parties in 9 European countries. 0=left, 1=right (CMP).

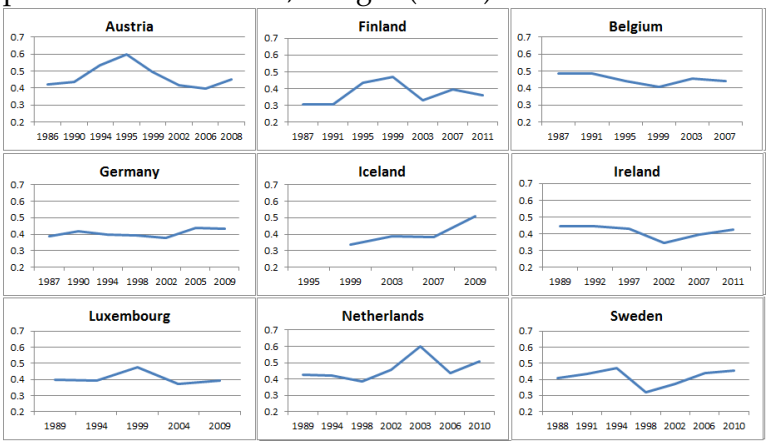
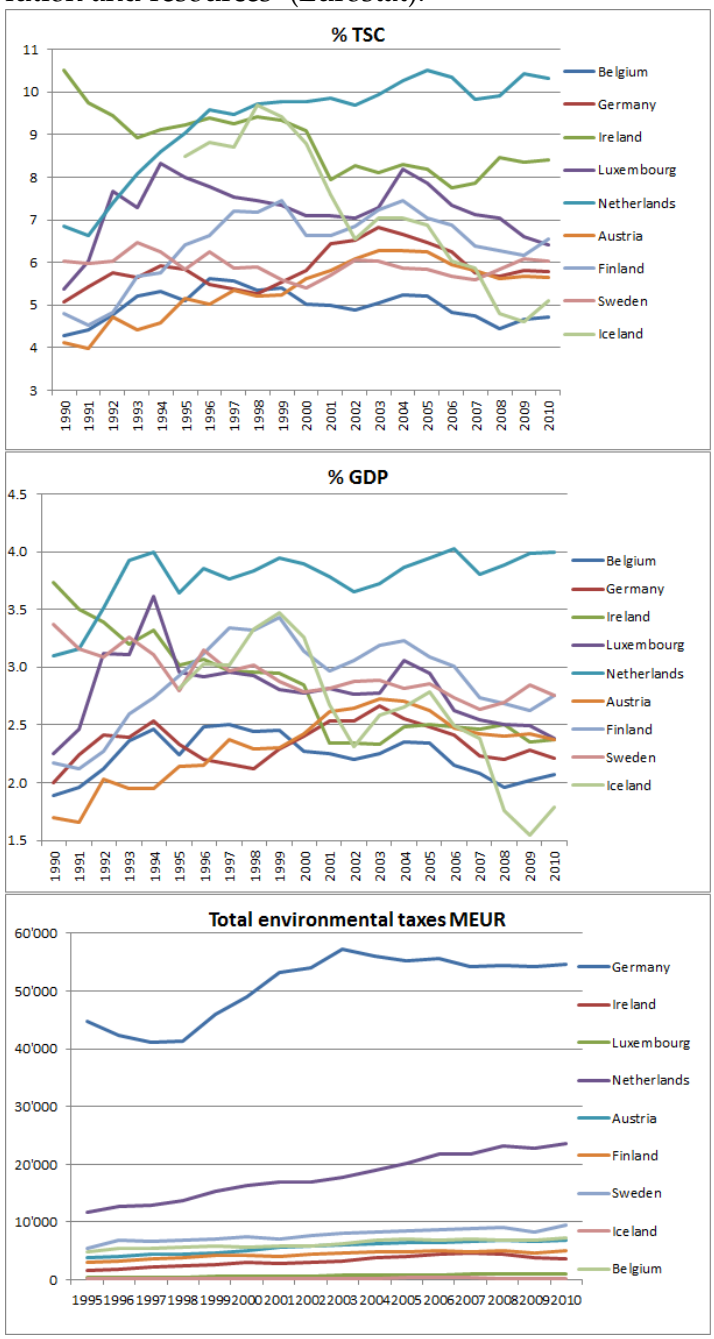


Figure 3: Environmental taxation: 'An environmental tax is a tax whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific negative impact on the environment. Total revenues for environmental taxes include taxes on transport, energy, pollution and resources' (Eurostat).



B APPENDIX

B.1 Agenda-setting when L adjusts its position

In the main text, it is assumed that L stays at its true position, and thus announces $\beta^L = B^L = \frac{1}{3}$. Let us consider what the outcome would be if this assumption was relaxed, so that L would also optimise its position prior to election.

If there is any uncertainty of the winner of the election, if L is to change its own position, it is towards R; if L loses the election, it can still be a member of the coalition with R as the formateur. If L moves towards G, in the case of losing the election, it will be in the opposition. Similarly, if R is to change its positions, it is towards L. Thus, in the following let us denote the announced positions for L and R as $\beta^L = B^L + d^L$ and $\beta^R = B^R - d^R$, with $d^L, d^R \geq 0$.

First, let us note that it has to hold that $\beta^L \leq \beta^R$ for the parties' order on the left-right scale to remain. Since $\beta^L = B^L + d^L$ and $\beta^R = B^R - d^R$ this can be written as $\frac{1}{3} + d^L \leq \frac{2}{3} - d^R \Rightarrow d^L \leq \frac{1}{3} - d^R$. Thus, $d^L + d^R \leq \frac{1}{3}$.

The optimal agenda-setting for the major parties can be analysed as a Stackelberg style of game; L is the leader, with its optimal position depending on R's position. Upon observing d^L, R announces d^R, which depends on d^L. The agenda-setting of the major parties can be solved by backwards induction. When both parties move closer to each other, the weight for their coalition increases to $P^{\beta^L \beta^R} = 1 - \mid (\frac{1}{3} + d^L) - (\frac{2}{3} - d^R) \mid = \frac{2}{3} + d^R + d^L$. First, the optimisation problem for the follower R can be written as

$$\begin{aligned}
\Pi^R &= -c(B^R - \beta^R)^2 + \pi P^{\beta^R \beta^L}(1 - \mid \beta^L - B^R \mid) + (1-\pi) P^{\beta^R \beta^L}(1 - \mid \beta^R - B^R \mid) \\
&= -c(\frac{2}{3} - (\frac{2}{3} - d^R))^2 + \pi(\frac{2}{3} + d^L + d^R)(\frac{2}{3} + d^L) \\
&\quad + (1-\pi)(\frac{2}{3} + d^L + d^R)(1 - d^R)
\end{aligned}$$

Taking a partial derivative with respect to d^R and equating it to zero, we can solve R's reaction function as

$$d^R(d^L) = \frac{1 + \pi - (3 - 6\pi) d^L}{6(c + 1 - \pi)}$$

Now, we see that the R's reaction function is increasing in d^L. While this might seem counterintuitive, in this model, the parties gain more utility of the coalition the closer their announced positions are to each other due to the increased weight for the coalition.

Next, the optimisation problem for the leader L reads as

$$\begin{aligned}\Pi^L &= -c(B^L-\beta^L)^2+\pi P^{\beta^L\beta^R}(1-\mid \beta^L-B^L\mid)+(1-\pi)P^{\beta^L\beta^R}(1-\mid \beta^R-B^L\mid)\\ &= -c(\frac{1}{3}-(\frac{1}{3}+d^L))^2+\pi(\frac{2}{3}+d^L+d^R(d^L))(1-d^L)\\ &\quad +(1-\pi)(\frac{2}{3}+d^L+d^R(d^L))(\frac{2}{3}+d^R(d^L))\end{aligned}$$

Taking a partial derivative with respect to d^L, and solving d^L gives

$$d^{L*}=\frac{2\pi c-5c-4c^2+4\pi c+3\pi^2-3\pi}{24\pi c-18c-12c^2-24\pi^2c+36\pi^3-42\pi^2+3\pi-3}$$

Recall that $d^L+d^R\leq\frac{1}{3}$. Plugging R's reaction function into the left-hand side of this inequality, we see that

$$d^L\leq\frac{2c+1-3\pi}{6c+3}$$

which holds when $c\geq\frac{3\pi-1}{2}$.

Let us consider d^{L*} when $c=1$. It is easy to see that as $\pi\to 1$, $d^{L*}\to\frac{1}{12}$, and when $\pi\to\frac{1}{2}$, $d^{L*}\to\frac{9}{42}$.

Now, allowing L to optimise its position means that the political competition reduces to agenda-setting between the major parties with no role for the minor parties; as L and R both move towards the political centre, the minor parties have no chance in the competition with the major parties.

Thus, assuming that L announces its true position is a simplification, however, when the political competition between the coalition partners is such that it allows them to position themselves close to L, this assumption does not alter the qualitative results of the game.

B.2 Agenda-setting when $E = 0$

In this section I provide a more detailed analysis of how the announced positions are derived for R and G, that constitute the proof for Proposition 1 in the main text, when we assume that L does not adjust its position, i.e. other parties observe $\beta^L = B^L = \frac{1}{3}$.

In the following, I solve the maximum movements for R in subsection B.2.1, and for G in subsection B.2.2. When both parties take a position towards L, their announced positions as presented in the main text are given by $\beta^R = B^R - d^R$ and $\beta^G = B^G + d^G$, with $d^G, d^R \geq 0$. In subsection B.2.3 I present the rule for L to choose the coalition partner, and check the conditions when this condition holds.

B.2.1 Right-wing major party R

When setting its own agenda, R has observed L's announced position $\beta^L = B^L = \frac{1}{3}$. When R announces a position towards L, its adjusted position is denoted as $\beta^R = B^R - d^R = \frac{2}{3} - d^R$, with $0 \leq d^R \leq \frac{1}{3}$. The problem for R is to solve

$$\begin{aligned}
\pi v_r^{NC} + (1-\pi) v_R^{RX} &< -c(B^R - \beta^R)^2 + \pi v_R^{LR} + (1-\pi) v_R^{RL} \\
\pi r + (1-\pi) P^{B^R B^X}(1 - |B^R - B^R|) &< -c(B^R - \beta^R)^2 + \pi P^{B^L \beta^R}(1 - |B^L - B^R|) \\
&\quad + (1-\pi) P^{B^L \beta^R}(1 - |\beta^R - B^R|) \\
\pi r + (1-\pi) \cdot \frac{2}{3} \cdot 1 &< -c(\frac{2}{3} - (\frac{2}{3} - d^R))^2 + \pi(\frac{2}{3} + d^R) \cdot \frac{2}{3} \\
&\quad + (1-\pi)(\frac{2}{3} + d^R)(1 - d^R)
\end{aligned}$$

The left-hand side represents the utility if R stays at its original position, and thus announces $\beta^R = B^R = \frac{2}{3}$. With probability π, L wins, and R is in the opposition enjoying rents r. With probability $1 - \pi$, R wins the election and forms a coalition with the right-wing minor party X (due to the tie-breaking rule). The weight for RX coalition is $P^{B^R B^X} = \frac{2}{3}$. R has proposal making power, and it proposes $B^R = \frac{2}{3}$ giving R the full utility of the coalition. The right-hand side represents the utility of adjusting the frontline position from $B^R = \frac{2}{3}$ to $\beta^R = B^R - d^R = \frac{2}{3} - d^R$. The first term represents the cost attached to programmatic adjustment, the second term is the utility of forming the

coalition with L. The weight for LR coalition after R's adjustment is $P^{B^L\beta^R} = \frac{2}{3} + d^R$. L is the formateur with proposal making power, and proposing $B^L = \frac{1}{3}$. The last term represents the utility when R itself is the formateur with proposal making power; however having adjusted its own position the utility of proposal-making power is reduced by the size of the movement. Re-arranging terms we have

$$(c - 1 + \pi)d^{R^2} - \frac{1+\pi}{3}d^R - \frac{4\pi - 9r\pi}{9} < 0 \tag{29}$$

Which gives

$$d_1^R = \frac{1 + \pi - \sqrt{(1+\pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)}}{6(c + 1 - \pi)}$$

and

$$d_2^R = \frac{1 + \pi + \sqrt{(1+\pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)}}{6(c + 1 - \pi)}$$

So that (29) holds for $d_1^R < d^R < d_2^R$.

Recall that R's movement from its true position is restricted to be $0 \leq d^R \leq \frac{1}{3}$. Note that $d_1^R > 0$ only for $r > \frac{4}{9}$, whereas the analysis in the main text is restricted to cases when the value of the outside option is $r \leq \frac{4}{9}$. The lower limit for d^R thus is zero, with d_2^R representing the upper limit; $0 \leq d^R < d_2^R$. R's announced frontline position $\beta^R = B^R - d^R = \frac{2}{3} - d^R$ can thus be written as

$$\begin{aligned} \beta^R &> \frac{2}{3} - \frac{1 + \pi + \sqrt{(1+\pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)}}{6(c + 1 - \pi)} \\ \beta^R &> \frac{4c + 3 - 5\pi - \sqrt{(1+\pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)}}{6(c + 1 - \pi)} \end{aligned}$$

Furthermore, since R cannot set a programme more leftist that L, it has to hold that $\beta^R \geq \frac{1}{3}$. We can solve the value for c such that the parties' original order on the left-right scale is preserved

$$\begin{aligned} \frac{4c + 3 - 5\pi - \sqrt{(1+\pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)}}{6(c + 1 - \pi)} &\geq \frac{1}{3} \\ \Rightarrow c &\geq \pi(6 - 9r) \end{aligned}$$

B.2.2 Green minor party G

When setting its own programme, G has observed both L and R's programmes. When G announces a position towards L, its adjusted position is denoted as $\beta^G = B^G + d^G = 0 + d^G$, with $0 \leq d^G \leq \frac{1}{3}$. The problem for G is different from R's, since G can never be the formateur of the coalition with the power to propose the frontline policy. G solves the following problem

$$\begin{aligned} v_G^{NC} &< -c(B^G - \beta^G)^2 + \pi v_G^{LG} + (1-\pi)v_G^{NC} \\ r &< -c(B^G - \beta^G)^2 + \pi P^{B^L \beta^G}(1 - |B^L - B^G|) + (1-\pi)r \\ r &< -c(0 - (0 - d^G))^2 + \pi(\frac{2}{3} + d^G) \cdot \frac{2}{3} + (1-\pi)r \end{aligned}$$

The left-hand side represents the utility of staying in its initial position and hence being out of the coalition. The first term on the right-hand represents the cost of changing the front-line position, the second term the utility of forming a coalition with L. When G moves towards L, the weight for the LG coalition is $P^{B^L \beta^G} = \frac{2}{3} + d^G$. The last term represents the possibility that R wins the election, in which case G will be out of the coalition, and enjoys the rents of being in the opposition. Re-arranging terms gives

$$cd^{G^2} - \frac{2\pi}{3}d^G - \frac{4\pi - 9\pi r}{9} < 0 \tag{30}$$

Which gives

$$d_1^G = \frac{2\pi - \sqrt{4\pi^2 + (16 - 36r)\pi c}}{6c}$$

and

$$d_2^G = \frac{2\pi + \sqrt{4\pi^2 + (16 - 36r)\pi c}}{6c}$$

So that (30) holds for $d_1^G < d^G < d_2^G$. Again, G's movement from its true position is restricted to be $0 \leq d^G \leq \frac{1}{3}$. Since $d_1^G > 0$ only for $r > \frac{4}{9}$, the lower limit for d^G is zero; $0 \leq d^G < d_2^G$. G's announced position $\beta^G = B^G + d^G = 0 + d^G$ can thus be written as

$$\beta^G < \frac{2\pi + \sqrt{4\pi^2 + (16 - 36r)\pi c}}{6c}$$

For the parties' order on the left-right scale to be preserved, we can solve such c that $\beta^G \leq \frac{1}{3}$

$$\begin{aligned} \frac{2\pi + \sqrt{4\pi^2 + (16 - 36r)\pi c}}{6c} &\leq \frac{1}{3} \\ \Rightarrow c &\geq \pi(6 - 9r) \end{aligned}$$

B.2.3 Condition for LG coalition

L proposes a coalition to G, if the weight of LG coalition is higher than the weight of LR coalition

$$\begin{aligned} P^{B^L \beta^G} &\geq P^{B^L \beta^R} \\ 1 - |B^L - \beta^G| &\geq 1 - |B^L - \beta^R| \\ |\frac{1}{3} - \beta^G| &\leq |\frac{1}{3} - \beta^R| \end{aligned}$$

Since $\beta^G \leq \frac{1}{3}$ and $\beta^R \geq \frac{1}{3}$, this can be rewritten as

$$\begin{aligned} \frac{1}{3} - \beta^G &\leq \beta^R - \frac{1}{3} \\ \beta^G &\geq \frac{2}{3} - \beta^R \end{aligned}$$

Plugging β^R on the right-hand side, β^G can be solved as

$$\beta^G \geq \frac{1 + \pi + \sqrt{(1+\pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)}}{6(c + 1 - \pi)}$$

And thus, the condition for LG coalition to form is given by

$$\begin{aligned} \frac{1 + \pi + \sqrt{(1+\pi)^2 + (16 - 36r)(\pi c + \pi - \pi^2)}}{6(c + 1 - \pi)} &\leq \beta^G \\ &< \frac{2\pi + \sqrt{4\pi^2 + (16 - 36r)\pi c}}{6c} \end{aligned} \tag{31}$$

In the main text I discuss the case when both parties set their programmes to match that of L's, with $\beta^G = \frac{1}{3}$, and $\beta^R = \frac{1}{3}$. Let us consider if (31) holds for any $\beta^G < \frac{1}{3}$ and $\beta^R > \frac{1}{3}$, i.e. when both parties set their programmes strictly away from $\frac{1}{3}$.

First, with $r = \frac{4}{9}$ condition (31) reduces to

$$\begin{aligned}
\frac{1+\pi+\sqrt{(1+\pi)^2}}{6(c+1-\pi)} &< \frac{2\pi+\sqrt{4\pi^2}}{6c} \\
c(1+\pi)+c\sqrt{(1+\pi)^2} &< 2\pi(c+1-\pi)+(c+1-\pi)\sqrt{4\pi^2} \\
c+\pi c &< 2\pi c+2\pi+2\pi^2 \\
(1-\pi)c &< (1-\pi)2\pi \\
c &< 2\pi
\end{aligned}$$

Thus, when $r = \frac{4}{9}$, condition (31) holds for $c < 2\pi$. However, for $\beta^G < \frac{1}{3}$ and $\beta^R > \frac{1}{3}$, c has to be sufficiently high according to $c \geq \pi(6-9r)$, so that with $r = \frac{4}{9}$, $c > 2\pi$. Thus, when $r = \frac{4}{9}$, there is no such $\beta^G < \frac{1}{3}$ and $\beta^R > \frac{1}{3}$, that condition (31) holds.

Furthermore, since $(16-36r)(\pi c+\pi-\pi^2) > (16-36r)\pi c$ for any $r < \frac{4}{9}$ it is easy to conclude that condition (31) never holds.

B.3 Agenda-setting when $E = 1$

B.3.1 Green minor party G

The problem for G with the environmental policy dimension is stated as

$$\begin{aligned}
v_G^{NC} &< -c(B^G-\beta^G)^2+\pi v_G^{LG}+(1-\pi)v_G^{NC} \\
r &< -c(0-(0+\beta^G))^2+\pi P^{B^L\beta^G}(1-|B^L-B^G|+e^G)+(1-\pi)r \\
r &< -c(0-(0+d^G))^2+\pi(\frac{2}{3}+d^G)(\frac{2}{3}+e^G)+(1-\pi)r \\
0 &< -c(d^G)^2+\frac{2\pi+3e^G\pi}{3}d^G+\frac{4\pi+6e^G\pi-9r\pi}{9}
\end{aligned}$$

Solving d^G and recalling that $\beta^G = 0+d^G$

$$\beta^G < \frac{(2+3e^G)\pi+\sqrt{((2+3e^G)\pi)^2+(16+24e^G-36r)\pi c}}{6c}$$

B.3.2 Condition for LG coalition

$$\begin{aligned}
(1+e^G)P^{B^L\beta^G} &\geq P^{B^L\beta^R} \\
(1+e^G)(1-\mid \frac{1}{3}-\beta^G \mid) &\geq 1-\mid \frac{1}{3}-\beta^R \mid \\
(1+e^G)(1-(\frac{1}{3}-\beta^G)) &\geq 1-(\beta^R-\frac{1}{3}) \\
(1+e^G)\beta^G &\geq \frac{2}{3}-\beta^R-\frac{2}{3}e^G \\
\beta^G &\geq \frac{2-3\beta^R-2e^G}{3(1+e^G)}
\end{aligned}$$

Plugging β^R on the right-hand side of this inequality, and rearranging terms, β^G can be solved as

$$\beta^G \geq \frac{1+\pi+\sqrt{(1+\pi)^2+(16-36r)(\pi c+\pi-\pi^2)}-4e^G(c+1-\pi)}{6(c+1-\pi)(1+e^G)}$$

With the environmental policy dimension included, the frontline position β^G has to satisfy the following condition

$$\begin{aligned}
\frac{1+\pi+\sqrt{(1+\pi)^2+(16-36r)(\pi c+\pi-\pi^2)}-4e^G(c+1-\pi)}{6(c+1-\pi)(1+e^G)} &\leq \beta^G \\
&< \frac{(2+3e^G)\pi+\sqrt{((2+3e^G)\pi)^2+(16+24e^G-36r)\pi c}}{6c}
\end{aligned}$$

With $\beta^G = 0$, the left-hand side reads as

$$\frac{1+\pi+\sqrt{(1+\pi)^2+(16-36r)(\pi c+\pi-\pi^2)}-4e^G(c+1-\pi)}{6(c+1-\pi)(1+e^G)} \leq 0$$

Solving e^G gives

$$e^G \geq \frac{1+\pi+\sqrt{(1+\pi)^2+(16-36r)(\pi c+\pi-\pi^2)}}{4(c+1-\pi)}$$

Let us to check that $e^G < 1$ when $r = 0$.

$$\begin{aligned} \frac{1+\pi+\sqrt{(1+\pi)^2+16(\pi c+\pi-\pi^2)}}{4(c+1-\pi)} &< 1 \\ 2c^2+(3-7\pi)c+(5\pi^2-6\pi+1) &> 0 \\ \Rightarrow c &> \frac{5\pi-1}{4} \end{aligned}$$

Part IV

Essay III: Delegation of long-term public policy: elected vs. appointed policy makers

DELEGATION OF LONG-TERM PUBLIC POLICY: ELECTED VS. APPOINTED POLICY MAKERS

Jenni Jaakkola, University of Turku*

Abstract

This paper analyses long-term decision making with two alternative policy-making regimes. Decision making is allocated either to an elected politician or to an appointed bureaucrat. The incumbent's task is to finance a long-term public good, and the policy choice in each period is to set the income tax rate. There are high and low competence policy makers. An incumbent of high talent can set a lower tax rate, but he also has incentives to engage in excessive rent-seeking. The politician and the bureaucrat are distinguished by having different incentives to perform well. The aim is to look at how the different accountability mechanisms affect policy choices, and the utility of the citizens. The results show that having different incentives do play a role, when it comes to finding such conditions that the incumbent can be induced to set a lower tax rate that benefits the citizens. While a highly competitive private sector can motivate a bureaucrat to set a low tax rate, a problem emerges if the bureucrat proves to be of low competence, since the citizens have no means to get rid of him. Thus, while it may be difficult to motivate a politician to set a very low tax rate, the direct disciplining mechanism of public elections is important when there is uncertainty of the incumbent's competence.

JEL Classification: D72, D73, H30
Keywords: Accountability, fiscal policy, electoral incentives, career concerns

*I would like to thank Kaisa Kotakorpi, Samuli Leppälä and Hannu Salonen, as well as participants at FDPE Public Economics workshop, FEA XXXIV Annual meeting, 11th ESNIE session, and Silvaplana 21st Workshop in Political Economy for helpful comments.

1 INTRODUCTION

One central topic in the literature of political economy is how policy makers can be held accountable. Accountability relates to how policy makers' incentives are being set and monitored; what motivates them and how are they rewarded or punished for their behaviour. The ability of a society to hold their policy makers accountable boils down to choosing institutions that make policy making transparent and enable monitoring of policy makers' actions. Knut Wicksell noted already in 1896,[2] that improvements in public policy making could be achieved by shifting focus from alternative policy choices to changing the structure of political decision making (Buchanan, 1997, p. 24). This paper takes a similar approach by focusing on the optimality of the institution the society entrusts with policy choices, instead of assessing the optimality of the policy choices *per se*.

This paper analyses the allocation of decision-making authority regarding a long-term publicly financed project either to i) an elected politician or ii) a non-elected (appointed) bureaucrat, whose difference lies in their accountability mechanisms. The politician is motivated by his will for re-election, whereas the bureaucrat aspires for a well-paid private sector job. This paper thus relates to the literature discussing the incentives of accountable and unaccountable policy makers, and analysing their performance in public office, such as Maskin and Tirole (2004), Alesina and Tabellini (2007), Alesina and Tabellini (2008), and Borgne and Lockwood (2006).

The importance of an appropriate accountability mechanism is especially evident when long-term policy choices are in question. The problems of imperfect commitment and time-inconsistency are relevant in all public policy questions; especially broadly discussed they have been in the context of monetary policy, where the discussion of discretion vs. rules has been central for decades.[3] It is well accepted that the lack of commitment to inflation targeting is detrimental to economic performance. In practise, the commitment problem has been

[2]Knut Wicksell (1896) *Finanztheoretische Untersuchungen*.

[3]See e.g. Taylor (2011) for a recent overview of rules vs. discretion discussion in economic policy.

solved in many countries by separating political governments from independent central banks. According to Blinder (1997), central banks are more capable of dealing with monetary policy than politicians due to its technicality and requirement for professional knowledge that elected politicians may lack. Also, the effects of monetary policy take time to filter through the economy, whereas politicians' time horizons tend to be shorter; the painful part of implementing monetary policies usually comes well before the gains. Politicians with their eyes on the next elections may be incapable of implementing strict anti-inflation policies.

While monetary policy is usually delegated exclusively to independent institutions, fiscal policy, on the other hand, is usually decided by elected politicians and implemented by appointed bureaucrats. However, recent events for instance in Europe have questioned the optimality of this arrangement. For example, in Italy, the politically elected government was replaced by a technocratic government in November 2011 due to the instabilities in the country's political system. Also, fiscal policy committees have been set up in many countries as independent policy advisors to political governments.[4] Finally, the question of delegation is related to the prospect of increased integration in the European Union in the form of a common fiscal policy that has been discussed in recent years.

If political governments are unable to commit to hard policies in bad times, why do we not delegate public policies to appointed officials in the first place? Also, high officials are usually appointed due to their expertise in policy matters, instead of their popularity or political ideology as is the case with politicians. Therefore, it would seem natural to delegate policy authority to appointed officials. Alesina and Tabellini (2008, p. 429) write that "if society could write unrestricted optimal performance contracts with its policy makers, then the question [of optimal delegation] – would be utterly uninteresting: bureaucratic delegation under an optimal contract would always dominate political delegation – [however] this implication does not even come

[4]Of course, it is not very clear what is the ultimate decision making power of these independent committees. See discussion in Kopits (2011).

close to any observed institutional arrangement".

One important difference between monetary and fiscal policy is that the latter is closely related to the politically sensitive issue of redistribution. However, both forms of economic policy have some common goals such as economic stability or growth. Furthermore, the objective of both price stability and fiscal discipline is to be achieved in the long term, whereas short-term deviations may be desirable in the face of unexpected shocks (Wyplosz, 2011). This paper does not aim to suggest that all fiscal policy questions should be delegated exclusively to either type, but to analyse one case of policy delegation to one of the two alternative policy-making regimes.

This paper analyses how a decision maker's incentives affect his performance in office when the task is to provide a predetermined level of public good each period in an infinite horizon framework. Once it is decided that a tax funded public good will be introduced, the incumbent sets the tax rate, collects the tax revenue and after financing the public good, takes the rest as private rents for himself. There are high competence and low competence policy makers under either regime. The higher is the competence of the incumbent, the lower he can set the tax rate, finance the public good, and still take some rents for himself. Thus, having a high competence policy maker in the public office is ex ante preferred from the citizens' point of view. The problem is that instead of setting a lower tax rate, the incumbent has incentives to extract more rents for himself. This rent-seeking behaviour is constrained by the politician's wish to get re-elected, whereas the bureaucrat is motivated by the prospect of a private sector job.

The results of this paper show that the two incentive mechanism produce different outcomes. When the conditions are such that the high competence incumbents cannot be distinguished from the low competence ones, the results suggest the following. When the politician is the chosen regime, a high competence politician is more motivated to set a lower tax rate, than a low competence politician who is more likely to extract the maximum amount of rents despite this reducing his re-election chances. When bureaucracy is the chosen

regime, it is the low competence one who would benefit more of the private sector job, and thus is is the low type that is motivated to set the lower tax rate, whereas the high competence bureaucrat is more likely to take full advantage of his public sector job and extract the maximum private rents.

On the other hand, under the conditions when a high competence incumbent separates from a low competence one, the findings are the following. A high competence politician can be induced to reveal his true competence by setting a tax rate that is lower than what a low competence politician can set. However, due to the specification of the game, the signalling lasts only one period. Thus, within this framework, it is difficult to take full advantage of having a high skilled politician in office, since he cannot be induced to a long-term commitment to a tax rate that reflects his true competence. Moreover, this outcome is sensitive to the assumption about the electorate's commitment to the proposed voting rule.

For the bureaucrat, a highly competitive private sector can induce a high competence bureaucrat to reveal his true competence by setting a tax rate below any tax rate a low competence bureaucrat can ever set. The difference to the politician is that signalling stage lasts for several periods, until the bureaucrat receives the private sector job. Thus, from the citizens' perspective, a highly skilled bureaucrat in office who is motivated by a highly competitive private sector job is preferred. The problem, however, arises if the bureaucrat proves to be a low competence one, who extracts the maximum amount of rents in the public sector with the citizens having no way to dismiss him from office.

This paper is organised as follows. In section 2, the previous literature is presented. Section 3 presents the model and the players. Section 4 discusses the case of symmetric information about the incumbent competence, and section 5 adds asymmetric information to the framework, and discusses the main findings. Section 6 concludes.

2 PREVIOUS LITERATURE

This paper relates to the literature on policy maker's incentives. *Politicians* are directly accountable to citizens, so that bad behaviour can be disciplined by citizens voting them out of office. Politicians' hopes of re-election should motivate them to behave in an socially optimal way, i.e. to act on the behalf of the public and to avoid engagement in rent-seeking activities. The literature on elections as a disciplining mechanism is extensive; it has been discussed e.g. in Rogoff (1990), Berganza (2000), Maskin and Tirole (2004), Müller (2007), and Smart and Sturm (2013). On the one hand, the citizens can elect competent individuals in office (ex ante disciplining), on the other, they can control the behaviour of the elected officials by the threat of not being reappointed (ex post disciplining). This paper considers especially the latter role; the threat of not getting re-elected should act as a disciplining mechanism for the politician.

The problem with the use of elections as a disciplining mechanism is that it may result in policy distortions. Rogoff (1990) finds that politicians have stronger incentives to appear competent before up-coming elections; in pre-election periods, incumbents signal their competence through specific policy choices and by abstaining from rent-seeking to show their competence. This kind of strategic behaviour, however, can either increase or decrease voters' welfare (Persson and Tabellini, 2000, p. 82). The problem is that elected politicians may resort to pandering to the public before upcoming elections. Instead of committing to politically unpopular long-term policies, politicians may focus on maximizing their re-election chances. This is problematic since it is in conflict with the idea of representative democracy; decision makers are expected to make better decisions than ordinary citizens (Maskin and Tirole, 2004). For example, Müller (2007) finds that when long-term policies are socially optimal, then disciplining politicians with elections may lead to inefficiencies; politicians may prefer socially inefficient short-term policies in the hope of re-election.

Appointed officials, or *bureaucrats*, are not faced with such re-election incentives. They are appointed to office due to their competence, and their motivation is rather based on career concerns; Holmström (1999),

Dewatripoint et al. (1999), Alesina and Tabellini (2007) and Alesina and Tabellini (2008). The basic idea of the career concerns model is that if today's performance at a job is linked to tomorrow's wage, this creates an incentive for the agent to signal his ability to the employer. This is formalized in Holmström (1999). The key feature is that an agent with uncertain competence has to exert effort to convince his employer of his high talent, even in the absence of monetary incentives, since this might translate into good job opportunities later on (Dewatripoint et al., 1999). The benefit of bureaucratic policy making is that appointed policy makers do not need to please the voters, but can instead commit to long-term policies. The flip-side, however, is that the public cannot discipline a bureaucrat by ousting him out of office, which leaves room for misuse of power, like excessive rent-seeking.

Second, this paper relates to an important strand of literature comparing the performance of accountable vs. non-accountable officials; Maskin and Tirole (2004), Alesina and Tabellini (2007), Alesina and Tabellini (2008) and Borgne and Lockwood (2006). Maskin and Tirole (2004) study the optimal allocation of decision making power in a two-period model between three types of institutions; direct democracy, representative democracy (accountable officials), or judges (non-accountable officials). Their focus is on the policy maker's congruence with the citizens' preferences, and they find that technical tasks are best delegated to judges, especially when the electorate is poorly informed about what is optimal, information is costly, and feedback about the quality of decisions is slow. The most important decisions, on the other hand, are best allocated to politicians. Alesina and Tabellini compare politicians and bureaucrats in a single policy task (2007) and in multiple policy tasks (2008), in a model of task allocation with different incentives of policy makers. They find (2008) that from a normative perspective, politicians are preferred especially if flexibility is valuable. Bureaucrats, on the other hand, are preferred, if time inconsistency is a relevant issue, the stakes for organized interest groups are large, or corruption is not widespread.

Borgne and Lockwood (2006) study the learning motive of elec-

tions, i.e. how the concern of upcoming elections may motivate incumbents to raise effort to signal their high ability to voters in a two-period model. Their model features both moral hazard and symmetric but incomplete information about the incumbent's ability, and they compare two institutional settings; an appointed vs. an elected incumbent. When ability and effort positively interact, they find that the incumbent has an incentive to raise effort to signal high ability. They find that upcoming elections reduce this effect, and in fact, elections may even demotivate the elected policy makers, and thus in equilibrium, appointed officials may welfare-dominate elected ones. This is because the appointed incumbent has to stay in office regardless of the project success, and he has to carry the cost of the effort in the following periods, whereas an elected policy maker will be replaced in the event of project failure.

In addition to theoretical literature, there is some empirical research comparing the performance of different policy-making institutions. The results are however mixed on which of the regimes performs better. Whalley (2010), for instance, finds that when it comes to cities' debt management policies in California, appointed city treasures reduce borrowing costs by 13 to 23 % in comparison to elected city treasurers. Coate and Knight (2011) conversely find per capita public spending in the U.S. cities to be 9% lower in (elected) mayor-council run cities than (appointed) council-manager run cities.

As a summary, there is a number of papers studying policy makers' incentives, and how policy outcomes differ under alternative institutions, as well as some empirical support to the claim that policy making regimes matter on policy outcomes. This paper tries to fill a gap in the literature by introducing a model where a long-term fiscal policy is analysed from the perspective of two alternative policy makers. The literature on comparing fiscal policy choices of different institutions and on studying the welfare implications of different accountability mechanisms in the long run is scarce. A similar kind of principal-agent model is used in Persson and Tabellini (2000, ch. 4.5), and Rogoff (1990) to study political business cycles. However, in both of these papers, the policy choice by the incumbent is different, and

the policy making is studied only from the perspective of a politician, with results suggesting that the politician behaves well only in periods preceding elections. This paper in turn brings the comparison of alternative institutions with an infinite time horizon into an otherwise similar fiscal policy framework. Also, the timing is different to Persson and Tabellini (2000, ch. 4.5), in that here the incumbent observes his own competence before making the policy choice. There are similarities also to Alesina and Tabellini (2007, 2008) who discuss public policies at a more general level. The main difference to Alesina and Tabellini is in the formulation of policy goals; in Alesina and Tabellini the politician's goal is to provide the voter at least a predetermined threshold level of utility, whereas the bureaucrat's goal is to maximise his perceived ability in the eyes of his peers.

3 FRAMEWORK

3.1 Set-up

This paper analyses a political agency problem in an infinite horizon, discrete time framework. Before the beginning of period one, it is decided that a new public project will be implemented. The project is a public good, and it will be equally beneficial to all citizens by generating utility of g each period, so that $G = \sum \beta^t g$, with $0 < \beta < 1$ as the discount factor. The idea is that once the public good is introduced, it has to be produced each period with amount g, so each period there has to be an incumbent financing its production.

The new project will be financed by tax revenue, so the income tax rate, τ, is introduced. The income tax rate before the reform is $\tau_0 = 0$, and τ_t after the reform in period t; $0 = \tau_0 < \tau_t \leq 1$. There is no alternative way to finance the project except tax revenue.

The motivation for using an infinite-horizon model with no term-limits is that e.g Persson and Tabellini (2000), Berganza (2000), and Banks and Sundaram (1998) with finite frameworks show how in the second and final period the incumbent tends to extract all the possible rents to himself since there is no incentive not to; in other words if the incumbent decides upon a policy today but knows for sure that he

will not be in office in the next period, there is less incentive for him to act socially optimally. For instance, Alt et al. (2011) find that economic growth is higher and taxation lower under re-election eligible incumbents, than under those who face term-limits. Therefore re-election eligible incumbents tend to perform better than term-limited ones. See review on term limits and term lengths in Smart and Sturm (2013).

3.2 Citizens

In the economy, there are n private utility maximising citizens with homogeneous policy preferences. Citizen k derives utility both from the private consumption, c^k, and from the new public project, g, so that $u^k = c^k + g$, where $c^k = (1-\tau)y^k$. The public project generates the same utility to all citizens, independent of their private incomes. The utility function for a citizen with private income y^k in period t is then $u_t^k = (1-\tau_t)y_t^k + g$, and the expected discounted utility for citizen k

$$\sum_{t=1}^{\infty} \beta^t u_t^k = \sum_{t=1}^{\infty} \beta^t \Big((1-\tau_t)y_t^k + g \Big) \tag{1}$$

3.3 Policy makers

There are two policy makers available for the public office; an elected politician, $i = P$, and an appointed bureaucrat, $i = B$. The politician is motivated by his desire for re-election, whereas the bureaucrat strives for a well-paid private sector job. The distinction in the career motivations is purposefully stark to see how the different incentives affect the performance of the two separate decision-making regimes. Since only one type of the policy makers can be in power, the performance of each institution is analysed separately starting from period one.

Since the size of g for each period is fixed, the sole policy choice for the incumbent is to decide the income tax rate τ_t, in each period during his incumbency to finance the public good g. The government

budget constraint for each t is[5]

$$g = \theta_j^i(\tau_t^i y_t - r_t) \tag{2}$$

where y_t represents the tax base, r_t the per period rents for the incumbent, and θ_j^i is a parameter representing the incumbent's competence. The tax base is the sum of individual citizens' private incomes, $y_t = \sum y_t^k$. The policy maker $i = P, B$ can be of high or low competence, $j = H, L$ with θ_j^i representing the incumbent's competence in transforming tax revenue into the public good. θ_j^i is given by Nature with prior probabilities $\text{Prob}(\theta_H^i) = q$ and $\text{Prob}(\theta_L^i) = 1 - q$.

The size of g is predetermined, and independent of the policy maker's actions, so the full cost of the project is known in advance. From (2) one can see that in each period the financing of the public good g depends on the competence of the incumbent θ_j^i, and on the difference between the collected tax revenue $\tau_t^i y_t$ and the amount of private rents r_t the incumbent takes for himself. It is easy to see that a policy maker with high competence needs less tax revenue to finance g, and vice versa. Since the incumbent cannot affect his competence, and g is fixed, the only variables the incumbent can directly affect are the rate of the income tax and the amount of rents. Re-arranging (2), we see how the amount of per period rents depends on the policy choice τ_t^i, and on the incumbent's competence θ_j^i

$$r_t^i = \tau_t^i y - \frac{g}{\theta_j^i} \tag{3}$$

The incumbent has full discretion once in power, i.e. there is no predetermined tax rate he needs to commit to. Since the tax rate and the level of rents are associated with the policy maker's competence, the incumbent can abuse his power by setting the income tax rate too high and engaging in excessive rent-seeking. The upper limit for rent-seeking is the amount of tax revenue, $0 \leq r_t \leq \bar{r}_t$, where $\bar{r}_t = \tau_t^i y_t$.

[5]Following Persson and Tabellini 2000, ch. 4.5. In their model, however, the tax rate τ is fixed, and the policy choice is to choose the level of rents r, which in turn determines the amount of the public good g.

3.3.1 Politician

Politicians have explicit incentives to perform well, since they can be disciplined directly by the electorate in elections held after each period. For simplicity, I assume that the framework features only *career politicians*, whose aspirations lie in doing politics and who wish to make a career as an elected representative (Mattozzi and Merlo, 2008). Naturally, also elected politicians may aspire for a private sector job. To keep the two incentive mechanisms clearly separated, this paper features only career politicians.

The electorate is represented by a median voter, who makes the voting decision. If the median voter supports the policy made by the incumbent, then at least half of the electorate supports it too, see e.g. Persson and Tabellini (2000, p. 51). In this paper, the median voter is defined to be the citizen with the median income y^m.

The politician is of high competence with probability q, or of low competence with probability $1-q$. The electorate cannot observe the competence, so the the voting decision is based on the observed tax rate. At the end of each period t, the incumbent politician will be re-elected for the next period with probability $P_{t+1} \in [0,1]$. The fear of losing re-election should restrict rent-seeking behaviour (Persson and Tabellini, 2000, p. 69), thus encouraging the incumbent to behave well each period. The problem for the politician is to choose τ_t^P such that his expected lifelong utility is maximised

$$\max_{\tau^P} E(v^P(\tau^P)) = \beta r_1(\tau_1^P) + \sum_{t=2}^{\infty} \prod_{k=2}^{t} \beta^t P_k r_t(\tau_t^P) \tag{4}$$

where $r_t(\tau_t^P)$ is the amount of rents in period t determined by the chosen tax level, β is the discount factor, and P_k is the probability with which he is re-elected. The incumbent politician will receive rents in the first period with certainty. This is represented in the first term in (4). He is subjected to re-election at the end of each period, so that probability P_k tells whether the incumbent politician was re-elected after his performance at $k-1$ and is thus in office at period k. The second term in (4) represents the expected utility of the chosen tax policy starting in period 2 when he is subjected to re-election. The

voting rule P is specified below in subsection 3.4.

If the re-election probability is the same each period, $P_1 = P_2 = \ldots = P$, then (4) can be rewritten as (see Appendix A.1).

$$\max_{\tau^P} E(v^P(\tau^P)) = \frac{\beta}{1-\beta P} r(\tau^P) \tag{5}$$

For simplicity, the value of an outside option for the politician is zero. If he is not re-elected, a challenger from the pool of politicians is elected to replace him, who is of high competence with probability q, or of low competence with probability $1-q$.

3.3.2 Bureaucrat

Unlike the politically elected policy maker, the bureaucrat does not have re-election concerns; he can stay in the public office as long as he manages to finance the public project. His incentives to work diligently in the public office are driven by his hope of receiving a job offer from the well-paid private sector at some point of his incumbency. He is motivated by future career concerns, as formalised in Holmström (1999).

The setting is different also from the electorate's point of view; they do not have a direct mechanism to discipline the bureaucrat by dismissing him from office. Only in the case extracting too much rents for himself and failing to finance g at any period a bureaucrat will also be kicked out of office, and replaced by another one. The exact condition for this will be defined and discussed in the next subsection 3.4.

The bureaucrat is of high competence with probability q, or of low competence with probability $1-q$. There is a private sector employer who evaluates the bureaucrat's performance at period t, and who can employ him with probability $P_{t+1} \in [0,1)$. The only task for the private sector employer is to decide whether to offer the bureaucrat a job or not. He does not observe the competence of the incumbent, the hiring decision is based on the observed tax rate. If the private sector employer decides to employ the bureaucrat, this holds until the end of the game, so the employment decision is done only once.

To have incentives to aspire for the private sector job, the private sector salary has to exceed the amount of rents in office, $\rho_t > r_t$. The problem for the bureaucrat is to choose the tax policy such that his expected lifelong utility is maximised

$$\max_{\tau^B} E(v^B(\tau^B)) = \beta r_1(\tau_1^B) + \sum_{t=2}^{\infty}\prod_{k=2}^{t}\beta^t(1-P_k)r_t(\tau_t^B) + \frac{1}{1-\beta}\beta^2 P_2\rho_2 + \frac{1}{1-\beta}\sum_{t=3}^{\infty}\prod_{k=2}^{t-1}\beta^t(1-P_k)P_t\rho_t \tag{6}$$

where $r_t(\tau_t^B)$ is the amount of per period rents, β is the discount factor, and P_k is the probability with which he offered the private sector job, and ρ_t is the private sector salary. Again, the incumbent bureaucrat will get the first period rent with certainty, which is the first term in (6). After each period in office, the private sector employer evaluates his performance, with P_k representing the probability with which the bureaucrat has been offered the private sector job at the end of period $k-1$, and thus enjoying the private sector salary in period k. The second term in (6) is the discounted stream of public sector rents, if he is never offered the private sector job. The third and fourth terms represent his discounted utility when he will be offered the private sector job at period 2 or later. The private sector hiring rule will be specified in subsection 3.4.

If the private sector employment probability is constant each period, $P_1 = P_2 = \ldots = P$, then (6) can be rewritten as (see Appendix A.2)

$$\max_{\tau^B} E(v^B(\tau^B)) = \frac{\beta}{1-\beta(1-P)}r(\tau^B) + \frac{\beta^2 P}{(1-\beta)(1-\beta(1-P))}\rho \tag{7}$$

If the bureaucrat gets kicked out of the public office without receiving the private sector job offer, the value of the outside option for him is zero. A new bureaucrat will be hired, who is of high competence with probability q, or of low competence with probability $1-q$.

3.4 Voting rule and hiring rule

Since the politician is disciplined by his will for re-election, whereas the bureaucrat is motivated by his will for the private sector job, let us define the voting rule for the politician, and the hiring rule for the bureaucrat. These both rules are based on the observed tax rate.

First, the voting rule is based on idea that the median voter rewards the politician for setting a low tax rate, and punishes him for setting a higher tax rate. The simplest voting rule having this property is defined as

$$P = \begin{cases} 1 & \text{if } \tau^P \leq \underline{\tau}^P \\ \pi & \text{if } \underline{\tau}^P < \tau^P \leq \bar{\tau}^P \\ 0 & \text{otherwise} \end{cases}$$

where $\underline{\tau}^P$ and $\bar{\tau}^P$ represent the threshold tax rates that will be defined shortly. If the observed policy choice is at or below $\underline{\tau}^P$ the median voter re-elects the incumbent with certainty, $P = 1$. If the observed tax rate is higher than $\underline{\tau}^P$, but lower than or equal to $\bar{\tau}^P$, the re-election probability reduces from certainty to $P = \pi < 1$. Finally, if the observed tax rate is higher than $\bar{\tau}^P$, the incumbent will be replaced with certainty, $P = 0$.

The private sector hiring rule for the bureaucrat is defined as

$$P = \begin{cases} \sigma & \text{if } \tau^B \leq \underline{\tau}^B \\ 0 & \text{otherwise} \end{cases}$$

If the observed policy choice is below or at $\underline{\tau}^B$ the bureaucrat will be hired into the private sector with probability $P = \sigma < 1$. The private sector is interested in a bureaucrat that sets a low tax rate; either it is a sign of his competence, or at least he is not extracting too much rents into his own pocket. For any tax rate above $\underline{\tau}^B$, he will never be hired in the private sector, $P = 0$.

Now, let us define the threshold tax rates $\underline{\tau}^i$ and $\bar{\tau}^i$, $i = P, B$ that enter the voting and hiring rules. First, the lower tax threshold, denoted by $\underline{\tau}^i$. Recall that there are policy makers of high and low competence, θ^i_j, with $i = P, B$, $j = H, L$. The lower threshold tax rate has to be such that even a low competence incumbent under either regime has

incentives to part of the game.

Let us start by deriving the minimum tax rate for the politician, $\underline{\tau}^P$. Since the incumbent has full discretion once in office, we can solve the minimum amount of rents in the public office the politician has to be guaranteed, such that he is not tempted to set $\tau^P = 1$ in the first period, collect all the tax revenue y in the economy for himself, and get kicked out of office. Since in the later sections we look at equilibria where the voting probability P is constant on the equilibrium path, the reduced form of the politician's rent-maximising problem (5) can be utilised. Recalling the definition for per period rents given by (3), and plugging it into (5), the minimum tax rate $\underline{\tau}^P$ has to satisfy

$$\beta y \leq \frac{\beta}{1-\beta P}(\underline{\tau}^P y - \frac{g}{\theta_j^P}) \tag{8}$$

According to the voting rule, setting $\underline{\tau}^P$ guarantees re-election with $P = 1$, so that this reduces to

$$\beta y \leq \frac{\beta}{1-\beta}(\underline{\tau}^P y - \frac{g}{\theta_j^P}) \tag{9}$$

Similarly for the bureaucrat, we can check the lowest tax rate $\underline{\tau}^B$ that the bureaucrat does not have an incentive to set the tax rate to $\tau^B = 1$, and steal all the tax revenue for himself. For the bureaucrat the analysis is also restricted to equilibria where the hiring probability P is constant on the equilibrium path. Thus the reduced form of the bureaucrat's problem (7) can be utilised; the minimum tax rate $\underline{\tau}^B$ then has to satisfy

$$\beta y \leq \frac{\beta}{1-\beta(1-P)}(\underline{\tau}^B y - \frac{g}{\theta_j^B}) + \frac{\beta^2 P}{(1-\beta)(1-\beta(1-P))}\rho \tag{10}$$

By definition $\rho > r$, and according to the hiring rule, the bureaucrat will be hired with probability $P = \sigma$ if he sets tax policy $\underline{\tau}^B$. Now, (10) has to hold for any $\rho > r$, and any $P = \sigma > 0$, even when the hiring probability is close to zero. Thus, if the inequality holds for $P = 0$, it

holds for any $P = \sigma > 0$. With $P = 0$ the condition reduces to

$$\beta y \leq \frac{\beta}{1-\beta}(\underline{\tau}^B y - \frac{g}{\theta_j^B}) \tag{11}$$

Now, since (9) and (11) look identical, the minimum tax rate for both politicians and bureaucrats, denoted by $\underline{\tau}^i$, $i = P, B$ can be solved as $\underline{\tau}^i = \frac{g}{\theta_j^i y} + (1-\beta)$. Now it is clear that this minimum tax rate $\underline{\tau}^i$ depends on the incumbent competence θ_j^i, $i = P, B$, $j = H, L$, so that the higher the competence of the incumbent, the lower is the minimum tax rate. This is especially important in section 5, when incumbent competence is unobservable; it is important to define lowest tax rate so that the low competence policy makers have incentives to be part of the game. Thus, in the following the lower threshold tax rate is defined as the lowest acceptable tax rate for the low competence incumbent, and can be written as

$$\underline{\tau}^i = \frac{g}{\theta_L^i y} + (1-\beta) \tag{12}$$

It is important to note that this tax rate is naturally not binding for the incumbent of high competence. We will return to this in more detail in section 5.

Furthermore, (12) represents the threshold tax rate that both politicians and bureaucrats have incentives to be part of the game. It is clear from (10) that for the bureaucrat the lower threshold tax rate would be lower the higher is the private sector salary, ρ. However, since we are interested in the comparison of the two institutions, having a very high private sector salary in comparison to the rents in the public sector would mean that the bureaucrat could always set the tax rate significantly lower than the politician, making any comparison between the two institutions unnecessary. Therefore, throughout the paper, the tax rate defined by (12) represents the lower threshold tax rate for both policy making institutions.

Next, the maximum threshold level for τ^i, denoted by $\bar{\tau}^i$ can be solved from the perspective of the median voter. For the electorate to be willing to have the public good g introduced in the first place, the discounted expected utility for the median voter after the introduction

of g has to be at least as high as the discounted expected utility if no public good is introduced. Thus, it has to hold that

$$\frac{\beta}{1-\beta}((1-\tau^i)y^m + g) \geq \frac{\beta}{1-\beta}y^m \tag{13}$$

From (13) the maximum tax rate $\bar{\tau}^i$ the median voter is willing to accept each period can be solved as

$$\bar{\tau}^i = \frac{g}{y^m} \tag{14}$$

which is independent of the incumbent's competence.

Note that while the median voter can directly discipline only the politician, it is important that this maximum tax rate $\bar{\tau}^i$ concerns both the politician and the bureaucrat, $i = P, B$. If the incumbent is a politician, $\bar{\tau}^P$ enters into the voting rule, according to which the incumbent will be re-elected with less than certainty, $\pi < 1$ for setting tax rate $\bar{\tau}^P$, and replaced with certainty for setting a tax rate higher than that. If the incumbent is replaced at the end of the period, there is no cost to the voter himself. However, the next period incumbent has again full discretion in setting the tax rate. On the other hand, if the incumbent is a bureaucrat, he too can be dismissed from office if he fails the condition (13); if he sets a tax rate higher than $\bar{\tau}^B$ and thus fails to provide the median voter at least the level of pre-reform utility, the incumbent bureaucrat will be replaced, and thus the maximum tax rate $\bar{\tau}^B$ concerns also the bureaucrat. It is necessary to have this upper constraint on the bureaucrat behaviour, since otherwise there would be no control over the bureaucrat stealing all the tax revenue each period.

This section has derived the threshold tax rates that enter into the voting and hiring rules. When setting the tax rate the politician takes into account the voting rule, and the bureaucrat takes into account the private sector hiring rule to maximise their lifelong utilities as given by (5) and (7) respectively. The exact levels for the re-election probability π for the politician and the hiring probability σ for the bureaucrat that determine whether the incumbent will set the minimum tax rate $\underline{\tau}^i$, or the private rents maximising tax rate $\bar{\tau}^i$ will be solved in section 4 under symmetric information, and in section 5 under asymmetric

information about the incumbent's competence.

3.5 Timing

1. The Nature determines the competence $j = H, L$ of the policy maker $i = P, B$, with Prob$(\theta_H^i) = q$ and Prob$(\theta_L^i) = 1 - q$.

2. The policy maker observes his competence and makes the policy choice in $t = 1$; selects the income tax rate τ^i, which determines private rents for the incumbent, and the utility for the citizens.

3. The citizens observe the policy choice and their own utility. The incumbent politician will be re-elected by the median voter with probability P as defined by the voting rule. The bureaucrat will receive a job offer from the well-paid private sector with probability P, as defined by the hiring rule. If the bureaucrat does not receive the private sector job, he stays in the public office unless setting a tax rate above the upper threshold tax rate defined in section 3.4.

4. In the following periods, $t = 2, ..., \infty$, the procedure is similar. Again, both types of policy makers choose the tax rate in each period, after which their policy choices are being observed and they are either rewarded or punished for their behaviour.

In section 4, when symmetric information is considered, step 1 is omitted; the competence of the policy is common knowledge. In section 5, with asymmetric information, step 1 determines the competence of the incumbent.

4 SYMMETRIC INFORMATION ABOUT THE INCUMBENT TYPE

First, I consider the case when there is no uncertainty of the policy makers' competence; it is observable to everyone. The idea is to get a benchmark case of the decision makers' performance in office, and the welfare implications that can later be compared to the case of when there is asymmetric information on the incumbent competence.

4.1 Politician

Let us consider the optimal behaviour for a politician, when the electorate has no uncertainty of his competence. Since the competence of the incumbent is observable, the lower threshold tax rate can be written as $\underline{\tau}^P = \frac{g}{\theta^P y} + (1-\beta)$, whereas the maximum tax rate does not depend on the incumbent competence and is thus as given in section 3.4 by $\bar{\tau}^P = \frac{g}{y^m}$. The per period rents of these two policy choices are

$$r^P(\underline{\tau}^P) = (\frac{g}{\theta^P y} + (1-\beta))y - \frac{g}{\theta^P} = (1-\beta)y \tag{15}$$

$$r^P(\bar{\tau}^P) = \frac{g}{y^m}y - \frac{g}{\theta^P} = \frac{gy}{y^m} - \frac{g}{\theta^P} \tag{16}$$

Recall the voting rule defined in section 3.4, according to which the minimum tax rate $\underline{\tau}^P$ guarantees the incumbent's re-election with certainty $P = 1$, whereas any tax rate above this but less or equal to the maximum tax rate $\bar{\tau}^P$ reduces the re-election probability from certainty to $P = \pi < 1$. The expected discounted rents of the two policy choices are as follows. First, plugging the per period rents of the tax policy $\underline{\tau}^P$ given by (15) into the politician's problem (5) with $P = 1$, the expected future rents of this tax policy can be written as

$$E(v^P(\underline{\tau}^P)) = \frac{\beta}{1-\beta} r^P(\underline{\tau}^P) = \frac{\beta}{1-\beta}(1-\beta)y = \beta y \tag{17}$$

Second, plugging the per period rents of the policy choice $\bar{\tau}^P$ given by (16) into (5) with $P = \pi < 1$, the expected future rents can be written as

$$E(v^P(\bar{\tau}^P)) = \frac{\beta}{1-\beta\pi} r^P(\bar{\tau}^P) = \frac{\beta}{1-\beta\pi}\Big(\frac{gy}{y^m} - \frac{g}{\theta^P}\Big) \tag{18}$$

Since any tax rate below $\underline{\tau}^P$ does not increase his re-election chances, whereas any tax rate above $\underline{\tau}^P$ reduces the re-election probability from certainty to π, if the politician is to deviate from this tax policy, it is rational to set the tax rate all the way up to the maximum tax rate $\bar{\tau}^P$. Thus, the politician essentially has two policy choices; either he sets $\underline{\tau}^P$ and stays in office with certainty, or he sets the rent-maximising tax rate $\bar{\tau}^P$ but gets re-elected with less than certainty.

For the politician to be motivated to set the minimum tax rate $\underline{\tau}^P$,

it has to hold that $E(v^P(\underline{\tau}^P)) \geq E(v^P(\bar{\tau}^p))$. The re-election probability π such that this inequality holds can be solved from (17) and (18) as (see Appendix A.3.1)

$$\pi \leq \frac{\beta - \bar{\tau}^P + \underline{\tau}^P}{\beta} \tag{19}$$

The critical level for re-election that determines whether the politician extracts the maximum amount of rents by setting $\bar{\tau}^P$, or sets the minimum tax rate $\underline{\tau}^P$ depends on the two policy choices. Whereas $\bar{\tau}^P$ is independent of the incumbent characteristics, the tax rate $\underline{\tau}^P$ depends on his competence θ^P, as discussed in section 3.4. The higher is the competence of the politician, the lower he can set $\underline{\tau}^P$, which decreases the value of the numerator in (19). This means that for a politician with a high competence the condition (19) holds for low values of re-election probability π.

This gives the first result; the higher is the competence of the incumbent politician, the more likely he is to deviate from $\underline{\tau}^P$, and to set the private rents maximising tax rate. To motivate a very high competence politician to set $\underline{\tau}^P$, the cost of deviating from it has to be high enough, i.e. the probability of re-election has to be very low.

4.2 Bureaucrat

Next, let us consider the optimal behaviour for a bureaucrat, when his competence is known. Similarly as for the politician, when the competence of the incumbent is observable, the lower threshold tax rate for the bureaucrat can be written as $\underline{\tau}^B = \frac{g}{\theta^B y} + (1 - \beta)$, and again the maximum tax rate is given by $\bar{\tau}^B = \frac{g}{y^m}$. The per period rents of these two policy choices are

$$r^B(\underline{\tau}^B) = (\frac{g}{\theta^B y} + (1 - \beta))y - \frac{g}{\theta^B} = (1 - \beta)y \tag{20}$$

$$r^B(\bar{\tau}^B) = \frac{g}{y^m}y - \frac{g}{\theta^B} = \frac{gy}{y^m} - \frac{g}{\theta^B} \tag{21}$$

According to the hiring rule defined in section 3.4, if the bureaucrat sets the tax policy $\underline{\tau}^B$, he will be rewarded with a private sector job with probability $P = \sigma < 1$. If he sets any tax policy above $\underline{\tau}^B$, he will

never receive the private sector job offer, $P = 0$. Note, however, that while the bureaucrat's career in the public sector is not directly in the hands of the median voter, he will be dismissed from the office if he sets a tax rate higher than $\bar{\tau}^B$. Thus, $\bar{\tau}^B$ represents the maximum tax rate for the bureaucrat.

The expected private rents of the two policy choices $\underline{\tau}^B$ and $\bar{\tau}^B$ can be written as follows. First, plugging the per period rents of tax policy $\underline{\tau}^B$ given by (20), into the bureaucrat's problem (7) with $P = \sigma$, the expected future rents can be written as

$$\begin{aligned} E(v^B(\underline{\tau}^B)) &= \frac{\beta}{1-\beta(1-\sigma)} r^B(\underline{\tau}^B) + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \\ &= \frac{\beta}{1-\beta(1-\sigma)}(1-\beta)y + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \end{aligned} \tag{22}$$

Second, plugging the per period rents of the maximum tax rate $\bar{\tau}^B$, given by (21) into (7) with $P = 0$, the expected future rents can be written as

$$E(v^B(\bar{\tau}^B)) = \frac{\beta}{1-\beta} r^B(\bar{\tau}^B) = \frac{\beta}{1-\beta}\left(\frac{gy}{y^m} - \frac{g}{\theta^B}\right) \tag{23}$$

For the bureaucrat setting any tax rate above $\underline{\tau}^B$ results in the private sector job with probability zero. Similarly for the politician, if he is to deviate from this tax policy, it is rational to set the tax rate up to $\bar{\tau}^B$. Thus, there are again essentially two policy choices; $\underline{\tau}^B$ and $\bar{\tau}^B$.

For the bureaucrat to be motivated to set $\underline{\tau}^B$, it has to hold that $E(v^B(\underline{\tau}^B)) \geq E(v^B(\bar{\tau}^B))$. This inequality holds for high enough values of the private sector hiring probability, and σ can be solved from (22) and (23) as (see Appendix A.3.2)

$$\sigma \geq \frac{(1-\beta)(\bar{\tau}^B - \underline{\tau}^B)}{\beta(\frac{\rho}{y} - \bar{\tau}^B + \varphi^B)} \tag{24}$$

where $\varphi^B = \frac{g}{\theta^B y} < \underline{\tau}^B$. The bureaucrat finds the job opportunity tempting enough to behave well in the public office and sets $\underline{\tau}^B$, whenever the private sector employment probability is sufficiently high satisfying (24). For employment probability lower than this he will extract

the maximum amount of rents in the public office by setting $\bar{\tau}^B$.

As is the case with the politician, the tax rate $\underline{\tau}^B$ is lower, the higher is the policy maker's competence. The value of the numerator in (24) increases in the incumbent's competence, meaning that the higher is the bureaucrat's competence, the higher the probability of the private sector job has to be for him to set the $\underline{\tau}^B$.

Furthermore, the denominator at the right-hand side of (24) shows how the bureaucrat's willingness to aspire for the private sector job depends on the wage-gap between the private and the public sectors; by multiplying by y the term within the brackets we get $\rho - (\frac{gy}{y^m} - \frac{g}{\theta^B}) = \rho - r^B(\bar{\tau}^B)$. By definition, the private sector salary is larger than the rents in the public office, $\rho > r^B(\bar{\tau}^B)$. Thus, the second result states that the higher is the competence of the bureaucrat, the higher the private sector salary has to be, or the probability with which he will get the job, for the bureaucrat to have incentives to set $\underline{\tau}^B$ in the public sector.

5 ASYMMETRIC INFORMATION ABOUT THE INCUMBENT TYPE

This section extends the model to include uncertainty of the policy maker's competence, θ^i_j. The policy maker $i = P, B$ can be either of high or low competence $j = H, L$. The policy maker knows his own competence. The citizens know the two types, but cannot observe which type the incumbent is.

The idea is to look at conditions under which policy makers choose the alternative policy choices, and whether there are such conditions that the high competence decision makers can be induced to reveal their true competence in the benefit of the citizens.

5.1 Politician

In this section we first consider the existence of such equilibria where the politician of either competence sets the same tax rate. Since the citizens cannot detect the competence of the incumbent based on the observed tax rate at any of the pooling equilibria, we then consider the

existence of such separating equilibrium where the types are revealed.

5.1.1 Pooling equilibria

Recall that the lower tax rate for the politician as defined in section 3.4 represents the lowest acceptable tax rate that induces the low competence politician to be part of the game

$$\underline{\tau}^P = \frac{g}{\theta_L^P y} + (1 - \beta) \tag{25}$$

It is important to note that this tax rate is not binding for the high competence politician; he could set tax rate below $\underline{\tau}^P$, and still extract some rents.

The upper threshold tax rate, as defined in section 3.4 is independent of the incumbent competence and therefore is the same as in the symmetric information case

$$\bar{\tau}^P = \frac{g}{y^m} \tag{26}$$

The per period rents r_j^P for a politician of talent j when choosing tax policy τ^P are denoted by $r_j^P(\tau^P)$ and can be written for the two competence levels and the two policy choices as

$$\begin{aligned}
r_H^P(\bar{\tau}^P) &= \frac{gy}{y^m} - \frac{g}{\theta_H^P} && (27)\\
r_H^P(\underline{\tau}^P) &= (1-\beta)y + (\frac{g}{\theta_L^P} - \frac{g}{\theta_H^P}) && (28)\\
r_L^P(\bar{\tau}^P) &= \frac{gy}{y^m} - \frac{g}{\theta_L^P} && (29)\\
r_L^P(\underline{\tau}^P) &= (1-\beta)y && (30)
\end{aligned}$$

It is clear that the private rents are always higher for the high competence type at each tax rate. Especially, policy choice $\underline{\tau}^P$ generates higher per period rents for the high type, the larger is the gap between the competences of the high and the low type.

Based on the politician's policy choice, the median voter updates his belief of the incumbent's true type. The equilibrium consists of the politician's strategy τ_j^P, the median voter's strategy P, and the updated

beliefs of the competence of the politician.

In the following I consider two pooling equilibria; i) both types choose the minimum tax rate, $\underline{\tau}^P$; or ii) both choose the maximum tax rate, $\bar{\tau}^P$. Recall that according to the voting rule defined in section 3.4, a politician who sets tax policy $\underline{\tau}^P$ will be re-elected with certainty; $P = 1$, whereas a politician setting tax policy $\bar{\tau}^P$, will be re-elected with less than certainty, $P = \pi < 1$. For either of these two policy choices to constitute an equilibrium, the re-election probability has to be on a such a level that neither type has an incentive to deviate from the equilibrium policy.

Pooling 1 for politician

Let us start with the tax rate $\underline{\tau}^P$, which guarantees re-election with probability $P = 1$. First, note that the high competence politician could choose a tax rate lower than $\underline{\tau}^P$ due to his higher competence. However, a lower tax rate would lower his private per period rents without increasing his re-election probability, so it cannot be a rational strategy for him.

Therefore, it is sufficient to consider such a re-election probability π that neither type has an incentive to deviate from $\underline{\tau}^P$ by setting a higher tax rate. According to the voting rule, any tax rate above $\underline{\tau}^P$ will decrease the re-election probability from certainty to $P = \pi < 1$. Thus, if the politician of either competence is to deviate from $\underline{\tau}^P$ by setting a higher tax rate, it is rational to set the maximum tax rate, i.e. $\bar{\tau}^P$, since this generates the largest per period private rents.

Recall that due to his higher talent, the high competence politician receives a 'premium' of playing $\underline{\tau}^P$ as defined in (28), and is thus less inclined to deviate from it and risk his re-election chances, than the low competence politician.

Therefore, to prove that $\underline{\tau}^P$ is an equilibrium strategy for both types, it is sufficient to consider such re-election probability π that setting $\underline{\tau}^P$ is an equilibrium strategy for the low competence politician. For the low type it has to hold that

$$\frac{\beta}{1-\beta} r_L^P(\underline{\tau}^P) \geq \frac{\beta}{1-\beta\pi} r_L^P(\bar{\tau}^P) \tag{31}$$

On the left-hand side are the low type's discounted stream of private rents of playing strategy $\underline{\tau}^P$, and on the right-hand side are his discounted rents if he deviates from this strategy, which lowers his re-election probability from certainty to π. Solving the re-election probability such that inequality (31) holds (see Appendix A.4.1), and denoting it by π^{p_1} gives

$$\pi \leq \pi^{p_1} = \frac{\beta - \bar{\tau}^P + \underline{\tau}^P}{\beta} \tag{32}$$

When the re-election probability after a deviation from $\underline{\tau}^P$ is sufficiently low according to (32) the low type has no incentive to deviate from $\underline{\tau}^P$. Since the high type has no incentive to deviate either, we have thus proved that $\underline{\tau}^P$ is an equilibrium strategy for both types when $\pi \leq \pi^{p_1}$.

Since the competence of the incumbent cannot be detected based on his policy choice, the median voter's updated belief of the true type remains unchanged, as long as he observes $\underline{\tau}^P$. If the observed policy choice is something else than $\underline{\tau}^P$, the incumbent is believed to be of low competence. The pooling equilibrium 1 can be summed up as
P1: $\tau^P(\theta_H^P) = \tau^P(\theta_L^P) = \underline{\tau}^P$; $P(\tau^P = \underline{\tau}^P) = 1$; $Pr(\theta_H^P \mid \underline{\tau}^P) = q$, $Pr(\theta_L^P \mid \underline{\tau}^P) = 1 - q$, $Pr(\theta_L^P \mid \tau^P \neq \underline{\tau}^P) = 1$.

Pooling 2 for politician

Second, let us consider the condition when both types choose the private rents maximising tax rate $\bar{\tau}^P$. Setting this policy reduces re-election probability from certainty to π.

As already noted, the high competence politician is more likely to set the minimum tax policy $\underline{\tau}^P$, due to the 'premium' of this tax policy. Therefore, to prove that the maximum tax rate the median voter accepts $\bar{\tau}^P$ is an equilibrium strategy for both types, we can consider such a re-election probability that setting $\bar{\tau}^P$ is an equilibrium strategy for the high competence politician. For the high type it has to hold that

$$\frac{\beta}{1 - \beta\pi} r_H^P(\bar{\tau}^P) \geq \frac{\beta}{1 - \beta} r_H^P(\underline{\tau}^P) \tag{33}$$

On the left-hand side is the high type's discounted stream of private rents when playing $\bar{\tau}^P$, which reduces his re-election probability to π,

and the right-hand side are his rents when playing $\underline{\tau}^P$ throughout his career. Solving the condition such that the inequality holds gives (see Appendix A.4.1)

$$\pi \geq \pi^{p_2} = \frac{\underline{\tau}^P - (1-\beta)\bar{\tau}^P - \beta\varphi_H^P}{\beta(\underline{\tau}^P - \varphi_H^P)} \tag{34}$$

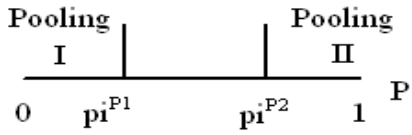
where $\varphi_H^P = \frac{g}{\theta_H^P y} < \underline{\tau}^P$. When the re-election probability is sufficiently high according to (34), the high type sets the rents-maximising tax policy $\bar{\tau}^P$ throughout his career. Since it is an optimal strategy for the low type as well, we have proved that $\bar{\tau}^P$ is an equilibrium strategy for both types when $\pi \geq \pi^{p_2}$.

Again, the median voter cannot detect the competence of the incumbent politician, as long as he observes tax policy $\bar{\tau}^P$, and thus the updated belief of the true type remain unchanged. If the observed policy choice is something else than $\bar{\tau}^P$, the incumbent is believed to be of high competence. The pooling equilibrium 2 can be summed up as

P2: $\tau^P(\theta_H^P) = \tau^P(\theta_L^P) = \bar{\tau}^P$; $P(\tau^P = \bar{\tau}^P) \geq \pi^{p_2}$; $Pr(\theta_H^P \mid \bar{\tau}^P) = q$, $Pr(\theta_L^P \mid \bar{\tau}^P) = 1 - q$, $Pr(\theta_H^P \mid \tau^P \neq \bar{\tau}^P) = 1$.

Let us discuss the two pooling equilibria. In the pooling equilibrium 1, both types choose $\underline{\tau}^P$, when the punishment of deviating from this minimum tax policy is hard enough. This takes place for a sufficiently low re-election probability $\pi \leq \pi^{p_1}$, and is represented as area I in figure 1. In the pooling equilibrium 2, both types choose the private rents maximising tax rate $\bar{\tau}^P$, when the re-election probability is sufficiently high with $\pi \geq \pi^{p_2}$. This is represented as area II in figure 1.

Figure 1: Pooling equilibria for politician



Since essentially π^{p_1} denotes the condition for the low type, and

π^{p_2} for the high type to deviate from the minimum tax rate $\underline{\tau}^P$, with $\pi^{p_1} < \pi^{p_2}$ for all $\theta_H^P > \theta_L^P$, this means that the low competence politician needs less certainty of being re-elected to be willing to risk his political career than the high competence politician. This result is in contrast with the result of section 4.1. Now, the higher is the competence of the high type, the less likely he is to risk his political career by choosing the tax policy that does not guarantee re-election. This is because of the premium for the high competence politician of playing $\underline{\tau}^P$ that is defined as the lowest acceptable tax rate for the low type. This premium is the larger the higher is the competence gap between the two types.

5.1.2 Separating equilibrium

Since the electorate cannot detect the true competence of the incumbent politician in either of the two pooling equilibria discussed above, let us consider the existence of such an equilibrium, where the two types of politicians are induced to play tax policies that reveal their true types to the electorate. Let us denote a type-specific signalling policy by $\tau_*^P(\theta_j^P)$.

One separating equilibrium where the competence of the incumbent is revealed is the following. The signalling takes place in the first period with the high competence politician signalling his competence by setting a first period tax rate below $\underline{\tau}^P$, i.e. $\tau_*^P(\theta_H^P) < \underline{\tau}^P$, after which he switches to setting $\underline{\tau}^P$ for the rest of his incumbency. The low competence politician, on the other hand, signals his type by the tax policy $\tau_*^P(\theta_L^P) = \bar{\tau}^P$, and continues setting $\bar{\tau}^P$ throughout his incumbency.

For such strategies to constitute an equilibrium, the voting rule has to be modified a bit. For the high competence politician to have incentives to reveal his type in the first period by setting a tax rate $\tau_*^P(\theta_H^P) < \underline{\tau}^P$, the first period voting rule has to be the following: $P_1 = 1$ when the electorate observes $\tau_*^P(\theta_H^P) < \underline{\tau}^P$, and $P_1 = \pi < 1$ when the electorate observes a tax rate higher than $\tau_*^P(\theta_H^P)$ but $\bar{\tau}^P$ at the highest. From the second period onwards the voting rule is as defined in section 3.4.

Let us start the proof for this equilibrium by stating the equilibrium

conditions for the two types. For the high competence politician we need the following three conditions. First, the condition that the high type does not have an incentive to mimic the low type and set $\bar{\tau}^P$ is given by

$$\beta r_H^P(\tau_*^P(\theta_H^P)) + \frac{\beta^2}{1-\beta} r_H^P(\underline{\tau}^P) \geq \frac{\beta}{1-\beta\pi} r_H^P(\bar{\tau}^P) \tag{35}$$

Second, to rule out an incentive to set the tax rate to one and take all the tax revenue for himself, it has to hold that

$$\beta r_H^P(\tau_*^P(\theta_H^P)) + \frac{\beta^2}{1-\beta} r_H^P(\underline{\tau}^P) \geq \beta y \tag{36}$$

Third, the condition for the high type not to deviate from his equilibrium strategy from the second period onwards is given by

$$\frac{\beta^2}{1-\beta} r_H^P(\underline{\tau}^P) \geq \frac{\beta^2}{1-\beta\pi} r_H^P(\bar{\tau}^P) \tag{37}$$

Next, the conditions for the low competence politician are the following. First, the condition for the low type not to have an incentive to mimic the high type in the first period is given by

$$\frac{\beta}{1-\beta\pi} r_L^P(\bar{\tau}^P) \geq \beta r_L^P(\tau_*^P(\theta_H^P)) + \frac{\beta^2}{1-\beta\pi} r_L^P(\bar{\tau}^P) \tag{38}$$

To rule out the incentive to set the tax rate to one and take all the tax revenue for himself it has to hold that

$$\frac{\beta}{1-\beta\pi} r_L^P(\bar{\tau}^P) \geq \beta y \tag{39}$$

And finally, the condition for the low competence politician not to deviate from $\bar{\tau}^P$ from the second period onwards is given by

$$\frac{\beta^2}{1-\beta\pi} r_L^P(\bar{\tau}^P) \geq \frac{\beta^2}{1-\beta} r_L^P(\underline{\tau}^P) \tag{40}$$

Now, for the separating equilibrium to exist, we need to solve the signalling policy $\tau_*^P(\theta_H^P) < \underline{\tau}^P$ for the high type, and the re-election probability π such that the above conditions (35) to (40) hold at the

same time. (See Appendix A.4.1 for details for this proof.)

Let us start by solving the signalling policy $\tau_*^P(\theta_H^P)$ from the low type's condition (38). The left-hand side represents his rents if he sets the private rents maximising tax rate $\bar{\tau}^P$ throughout his incumbency. The first term on the right-hand side in (38) represents the first period rents if the low type sets the high type's signalling policy, $\tau_*^P(\theta_H^P)$. Now since $\tau_*^P(\theta_H^P) < \underline{\tau}^P$, and as defined by (25), $\underline{\tau}^P$ represents the lowest tax rate the low type is willing to set each period instead of setting the tax rate to one and taking all the tax revenue for himself. Therefore, if the low type sets a tax rate *below* $\underline{\tau}^P$ in the first period, in the following periods the tax rate has to be *above* $\underline{\tau}^P$ to have the condition (9) to hold for the low type. According to the voting rule, any tax rate above $\underline{\tau}^P$ decreases the re-election probability from certainty to π, and thus after the signalling stage the low type would switch to setting $\bar{\tau}^P$ for the rest of his career. This is the second term on the left-hand side. Solving $\tau_*^P(\theta_H^P)$ from (38) gives

$$\tau_*^P(\theta_H^P) \leq \frac{(1-\beta)\bar{\tau}^P + (1-\pi)\frac{\beta g}{\theta_L^P y}}{1-\beta\pi} \tag{41}$$

Thus, the signalling policy for the high type has to satisfy condition (41) so that the low type has no incentive to try to mimic the high type in the first period.

One candidate for such a signalling policy is the lowest tax rate the low type can set; plugging $r = 0$ into (3) and solving the lowest possible tax rate for the low type gives $\tau^P = \frac{g}{\theta_L^P y}$. This signalling policy $\tau_*^P(\theta^P) = \frac{g}{\theta_L^P y}$ always satisfies condition (41) since

$$\frac{g}{\theta_L^P y} < \frac{(1-\beta)\bar{\tau}^P + (1-\pi)\frac{\beta g}{\theta_L^P y}}{1-\beta\pi} \tag{42}$$

always holds, since $\frac{g}{\theta_L^P y} < \underline{\tau}^P < \bar{\tau}^P$.

Next, let us consider condition (35) for the high competence politician. The first term on the left-hand side represents the rents of the first period signalling policy, and the second term represents the rents after switching to tax policy $\underline{\tau}^P$. Note that signalling takes place only

for one period, because once the competence of the politician is revealed, there is no incentive for him to continue setting the lower tax rate due to how the voting rule is defined in this section. After the first period, he switches to setting $\underline{\tau}^P$ for the rest of his career. The right-hand side represents the rents if the high type deviates from the signalling strategy and sets the private rents maximising tax rate $\bar{\tau}^P$.

Now, let us take the suggested signalling policy $\tau_*^P(\theta^P) = \frac{g}{\theta_L^P y}$, which generates first period rents for the high type as $r_H^P(\tau_*^P(\theta^P)) = \frac{g}{\theta_L^P} - \frac{g}{\theta_H^P}$. Plugging the first period rents into (35), and solving the re-election probability π such that the inequality holds gives

$$\pi \leq \pi^s = \frac{\underline{\tau}^P - (1-\beta)\bar{\tau}^P - \beta\varphi_H^P - (1-\beta)^2}{\beta(\underline{\tau}^P - \ \varphi_H^P - (1-\beta)^2)} \tag{43}$$

where $\varphi_H^P = \frac{g}{\theta_H^P y} < \underline{\tau}^P$. To prevent the high type from deviating from his equilibrium strategy, the re-election probability after the deviation has to be sufficiently low with $\pi \leq \pi^s$.

Now, we have proved that the signalling policy $\tau_*^P(\theta_H^P) = \frac{g}{\theta_L^P y}$ is such that the low type has no incentive to deviate in the first period from his equilibrium strategy given by (38), and that for a sufficiently low re-election probability $\pi \leq \pi^s$ the high type has no incentive to deviate in the first period from his equilibrium strategy given by (35) either.

Next, let us consider the conditions (36) and (39) guaranteeing that neither type has an incentive to set the tax rate to one, and collect all the tax revenue for himself. For the high type, condition (36) holds when

$$\left[\frac{1}{\theta_L^P} - \frac{1}{\theta_H^P}\right] \geq (1-\beta)^2 \cdot \frac{y}{g} \tag{44}$$

For the low type, on the other hand, condition (39) is essentially the same as condition (31) in pooling equilibrium 1, but with the direction of the inequality changed, so that when $\pi > \pi^{p_1}$ the low type is willing to participate in the game. Let us check when $\pi^s > \pi^{p_1}$

$$\frac{\underline{\tau}^P - (1-\beta)\bar{\tau}^P - \beta\varphi_H^P - (1-\beta)^2}{\beta(\underline{\tau}^P - \ \varphi_H^P + (1-\beta)^2))} > \frac{\beta - \bar{\tau}^P + \underline{\tau}^P}{\beta} \tag{45}$$

5.2 Bureaucrat

Similarly for the politician, we consider the existence of both such equilibria the bureaucrats pool to set the same tax rate, and thus their true competence cannot be observed. Then we consider the existence of such separating equilibrium where the types are revealed.

5.2.1 Pooling equilibria

The threshold tax rates when there are two types of bureaucrats can be defined similarly as in the case for the politicians, and are

$$\underline{\tau}^B = \frac{g}{\theta_L^B y} + (1-\beta) \tag{48}$$

$$\bar{\tau}^B = \frac{g}{y^m} \tag{49}$$

Again, $\underline{\tau}^B$ is defined according to the competence of the low competence bureaucrat. Recall that this tax rate is derived from the condition that the bureaucrat does not have an incentive to set the tax rate to one and take all the tax revenue for himself, as given by condition (10) in section 3.4. It is clear that for a positive hiring probability and sufficiently high private sector salary ρ, this tax rate is not binding to either type of the bureaucrat; however, to simplify the analysis and to be able to compare the results with the politician, this lower threshold tax rate is used for the bureaucrat as well when analysing the pooling equilibria.

The per period rents r_j^B for a bureaucrat of competence j when choosing tax policy τ^B are denoted by $r_j^B(\tau^B)$ and can be written for the two competence levels and the two policy choices as

$$r_H^B(\bar{\tau}^B) = \frac{gy}{y^m} - \frac{g}{\theta_H^B} \tag{50}$$

$$r_H^B(\underline{\tau}^B) = (1-\beta)y + (\frac{g}{\theta_L^B} - \frac{g}{\theta_H^B}) \tag{51}$$

$$r_L^B(\bar{\tau}^B) = \frac{gy}{y^m} - \frac{g}{\theta_L^B} \tag{52}$$

$$r_L^B(\underline{\tau}^B) = (1-\beta)y \tag{53}$$

Separating equilibrium $t = 1$: $\tau_*^P(\theta_H^P) = \frac{g}{\theta_L^P y}$, $\tau_*^P(\theta_L^P) = \bar{\tau}^P$, $P(\tau^P = \tau_*^P(\theta_H^P)) = 1$, $P(\tau^P = \bar{\tau}^P) \leq \pi^s$;$Pr(\theta_H^P \mid \tau_*^B(\theta_H^P))$=1 and $Pr(\theta_L^P \mid \bar{\tau}^B) = 1$
$t \geq 2$: $\tau^P(\theta_H^P) = \underline{\tau}^P$, $\tau^P(\theta_L^P) = \bar{\tau}^P$, $P(\tau^P = \underline{\tau}^P) = 1$, $P(\tau^P = \bar{\tau}^P) \in (\pi^{p_1}, \pi^s]$.

This equilibrium is based on the voting rule given in section 3.4. that the voters reward for setting a lower tax rate, and punish for setting a higher tax rate, with the modification for the first period. Since the signalling policy for the high type politician in this separating equilibrium is strictly lower than the lowest acceptable tax rate for the low competence politician, this raises the problem of moral hazard on the electorate's perspective; if the high competence politician sets a lower tax rate in the first period, after which he switches to setting a higher tax rate for the rest of his incumbency, there is an incentive for the electorate to replace the high type after the first period, since the newly elected incumbent (if high talent) would again set a lower tax rate, and so on. Then this would be an equilibrium only if the share of low type politicians is very high. The voters have no incentive to replace the high type incumbent after the first period if the probability with which the challenger will be a low type is high enough.

On the other hand, if the game was specified so that in the case of being replaced after the first period signalling stage, the newly elected politician of any type would switch to pooling strategy of setting the private rents-maximising tax policy. Then the voters would not have incentives to replace the high competence politician.

Note that this section has proved the existence of one separating equilibrium with the underlying voting rule. Another candidate for a separating equilibrium would be such that each period the high type would set the signalling polic y $\tau_*^P(\theta_H^P) < \underline{\tau}^P$, but this would require changing the voting rule for each period, so that the high type could be induced to set a tax rate below $\underline{\tau}^P$ each period. In this case there would be no risk of the voter's moral hazard.

To conclude, the existence of such a separating equilibrium, where the high competence politician can be induced to set a tax policy that reflects his true talent, is sensitive to the specifications of the game.

5.2 Bureaucrat

Similarly for the politician, we consider the existence of both such equilibria the bureaucrats pool to set the same tax rate, and thus their true competence cannot be observed. Then we consider the existence of such separating equilibrium where the types are revealed.

5.2.1 Pooling equilibria

The threshold tax rates when there are two types of bureaucrats can be defined similarly as in the case for the politicians, and are

$$\underline{\tau}^B = \frac{g}{\theta_L^B y} + (1-\beta) \tag{48}$$

$$\bar{\tau}^B = \frac{g}{y^m} \tag{49}$$

Again, $\underline{\tau}^B$ is again defined according to the competence of the low competence bureaucrat. Recall that this tax rate is derived from the condition that the bureaucrat does not have an incentive to set the tax rate to one and take all the tax revenue for himself, as given by condition (10) in section 3.4. It is clear that for a positive hiring probability and sufficiently high private sector salary ρ, this tax rate is not binding to either type of the bureaucrat; however, to simplify the analysis and to be able to compare the results with the politician, this lower threshold tax rate is used for the bureaucrat as well when analysing the pooling equilibria.

The per period rents r_j^B for a bureaucrat of competence j when choosing tax policy τ^B are denoted by $r_j^B(\tau^B)$ and can be written for the two competence levels and the two policy choices as

$$r_H^B(\bar{\tau}^B) = \frac{gy}{y^m} - \frac{g}{\theta_H^B} \tag{50}$$

$$r_H^B(\underline{\tau}^B) = (1-\beta)y + (\frac{g}{\theta_L^B} - \frac{g}{\theta_H^B}) \tag{51}$$

$$r_L^B(\bar{\tau}^B) = \frac{gy}{y^m} - \frac{g}{\theta_L^B} \tag{52}$$

$$r_L^B(\underline{\tau}^B) = (1-\beta)y \tag{53}$$

Again, the rents for the high competence bureaucrat are higher than for the low competence bureaucrat at either policy choice. Furthermore, note that since according to the definition $\rho > r$, it is the low competence bureaucrat who benefits more of the private sector job, since it always holds that $\rho > r_H^B(\tau^B) > r_L^B(\tau^B)$.

Observing the bureaucrat's policy choice, the private sector makes the hiring decision, according to the hiring rule presented in section 3.4. The equilibrium consists of the bureaucrat's policy choice τ_j^B, the hiring rule P, and the updated beliefs of the competence of the bureaucrat.

Similarly to the case of the politician, I consider two pooling equilibria for the bureaucrat; i) $\underline{\tau}^B$ and ii) $\bar{\tau}^B$. Recall the private sector hiring rule, according to which setting tax policy $\underline{\tau}^B$ results in a private sector job with probability $P = \sigma < 1$. If a bureaucrat sets any tax rate above $\underline{\tau}^B$, the probability of receiving the private sector job is $P = 0$. Thus, the condition when either of these policy choices constitute an equilibrium, the hiring probability σ has to be on such a level that neither type of a bureaucrat has an incentive to deviate from the equilibrium policy.

Pooling 1 for bureaucrat

Let us start with the tax rate $\underline{\tau}^B$. This tax policy results in a private sector job with probability $\sigma < 1$. Either type could set the income tax rate even below $\underline{\tau}^B$, but since it would not increase the probability of receiving the private sector job, there is no incentive for either type to go below $\underline{\tau}^B$.

Recall that the high competence bureaucrat can extract more rents in the public sector job than the low competence bureaucrat, as defined in (50) to (53), and thus it is the low competence bureaucrat that is more motivated by the private sector job. Therefore, to prove that $\underline{\tau}^B$ is an equilibrium strategy for both types, it is sufficient to consider such a hiring probability σ that $\underline{\tau}^B$ is an equilibrium strategy for the high competence bureaucrat. Thus, for the high type it has to hold that

$$\frac{\beta}{1-\beta(1-\sigma)} r_H^B(\underline{\tau}^B) + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \geq \frac{\beta}{1-\beta} r_H^B(\bar{\tau}^B) \quad (54)$$

Where the first term on the left-hand side are his rents in the public office he when sets $\underline{\tau}^B$. The private sector employer will note this, and offer him a job with probability σ with salary ρ which he will receive each period for the rest of his life. This is represented by the second term. On the right-hand side are the high competence bureaucrat's private rents if he extracts the maximum amount of rents each period and never receives the private sector job offer. Solving the hiring probability such that (54) holds, and denoting it by σ^{p_1} gives (see Appendix A.4.2)

$$\sigma \geq \sigma^{p_1} = \frac{(1-\beta)(\bar{\tau}^B - \underline{\tau}^B)}{\beta(\frac{\rho}{y} - \bar{\tau}^B + \varphi_H^B)} \tag{55}$$

Where $\varphi_H^B = \frac{g}{\theta_H^B y}$. When the probability of the private sector job is sufficiently high according to condition (55), the high competence bureaucrat has no incentive to deviate from tax policy $\underline{\tau}^B$. Since the low type cannot have an incentive to deviate either, we have thus proved that the equilibrium strategy for both types is $\underline{\tau}^B$, when $\sigma \geq \sigma^{p_1}$.

The private sector employer cannot identify the competence of the incumbent bureaucrat; his updated beliefs of the true type remain the same as the prior beliefs, and the bureaucrat who sets $\underline{\tau}^B$ will be offered a job with probability σ^{p_1}. If the employer observes any other tax rate than $\underline{\tau}^B$, the incumbent is believed to be of high competence. The pooling equilibrium 1 for the bureaucrat can be summed up as

P1: $\tau^B(\theta_H^B) = \tau^B(\theta_L^B) = \underline{\tau}^B$; $P(\tau^B = \underline{\tau}^B) = \sigma^{p_1}$; $Pr(\theta_H^B \mid \underline{\tau}^B) = q$, $Pr(\theta_L^B \mid \underline{\tau}^B) = 1 - q$, $Pr(\theta_H^B \mid \tau^B \neq \underline{\tau}^B)$=1.

Pooling 2 for bureaucrat

In the second pooling equilibrium both types choose the private rents maximising tax rate $\bar{\tau}^B$. As there are no other restrictions on the bureaucrat behaviour than losing a job opportunity, the private rents maximising tax policy $\bar{\tau}^B$ is an equilibrium strategy, if the private sector employment probability is so low that neither type sees the private sector job worth pursuing for.

Since the low type would benefit more from the private sector job, to prove that $\bar{\tau}^B$ is an equilibrium strategy for both types, it is sufficient to consider such hiring probability that the rents maximising tax rate

$\bar{\tau}^B$ is an equilibrium strategy for the low competence bureacrat. For the low type it has to hold that

$$\frac{\beta}{1-\beta} r_L^B(\bar{\tau}^B) \geq \frac{\beta}{1-(1-\sigma)\beta} r_L^B(\underline{\tau}^B) + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \quad (56)$$

On the left-hand side are the low competence bureaucrat's discounted lifelong rents if he extracts the maximum amount of rents each period by setting $\bar{\tau}^B$ and stays in the public office. On the right-hand side the first term is the low type's rents when sets $\underline{\tau}^B$, after which he receives the private sector job offer with probability σ. Solving the hiring probability from inequality (56), and denoting it by σ^{p2} gives (see Appendix A.4.2)

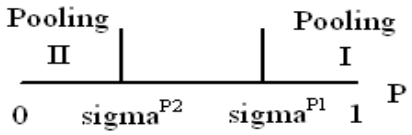
$$\sigma \leq \sigma^{p_2} = \frac{(1-\beta)(\bar{\tau}^B - \underline{\tau}^B)}{\beta(\frac{\rho}{y} - \bar{\tau}^B + \varphi_L^B)} \quad (57)$$

Where $\varphi_L^B = \frac{g}{\theta_L^B y}$. When the probability of being employed in the private sector is sufficiently low according to (57), the low competence bureaucrat has no incentive to deviate from $\bar{\tau}^B$. Since the high type has no incentive to deviate either, we have proved that $\bar{\tau}^B$ is an equilibrium strategy for both types, when $\sigma \leq \sigma^{p2}$.

Again, the employer cannot detect the competence of the bureaucrat, and the updated belief of the type remains unchanged. If the employer observes any other tax rate than $\bar{\tau}^B$ he believes the incumbent to be of low competence. The pooling equilibrium 2 for the bureaucrat can be summed up as
P2: $\tau^B(\theta_H^B) = \tau^B(\theta_L^B) = \bar{\tau}^B$; $P(\tau^B = \bar{\tau}^B) = 0$; $Pr(\theta_H^B \mid \underline{\tau}^B) = q$, $Pr(\theta_L^B \mid \underline{\tau}^B) = 1 - q$, $Pr(\theta_L^B \mid \tau^B \neq \underline{\tau}^B) = 1$.

Let us discuss the two pooling equilibria. In pooling equilibrium 1, both types choose $\underline{\tau}^B$, when the probability of the private sector job is high enough, $\sigma \geq \sigma^{p_1}$. This is represented in area I in figure 2. In pooling equilibrium 2, both types choose the private rents maximising tax policy $\bar{\tau}^B$ and stay in the public sector, when the probability of the private sector job is sufficiently low with $\sigma \leq \sigma^{p2}$. This is represented in area II in figure 2.

Figure 2: Pooling equilibria for bureaucrat



Now, σ^{p_1} denotes the condition for the high type, and σ^{p_2} for the low type to deviate from the minimum tax rate $\underline{\tau}^B$, with $\sigma^{p_1} > \sigma^{p_2}$. This means that the since the low competence bureaucrat would benefit from the private sector job more than the high competence bureaucrat, he is willing to set the minimum tax rate for lower probability of the private sector job than the high competence bureaucrat.

Essentially, the two conditions (55) and (57) tell us about the competitiveness of the private sector vs. the public sector. Similarly to the symmetric information case, this can be noted by looking at the denominators in both conditions (see Appendix A.4.2). First, in (55), the denominator depends on the wage gap between the private sector and what the high competence type can extract at maximum at the public sector. The higher is the competence of the bureaucrat, the smaller this wage gap is, meaning a higher σ^{p_1}. So, if the competence of the bureaucrat is very high, then either the private sector salary has to be very high, or the probability of receiving the private sector job offer has to be very high for him to have incentives to set $\underline{\tau}^B$. If these two are interpreted to represent a highly competitive private sector, then the higher the competence of the bureaucrat, the more competitive the private sector has to be for any type of bureaucrat to set $\underline{\tau}^B$, as given by condition (55). Otherwise he stays in the public sector and employs his high talent to extract more rents for himself.

In (57), on the other hand, the denominator represents the wage gap between the private sector salary and the maximum rents for the low type bureaucrat at the public sector. The lower is the low type's competence, then lower is σ^{p_2}, meaning that only when the private sector is very uncompetitive in comparison to the public sector, either because the private sector salary is not very high, or because the probability of receiving the job is very low, then no type of bureaucrat is

interested in aspiring for the private sector job, but stays at the public office and extracts the maximum amount of rents each period by setting $\bar{\tau}^B$.

5.2.2 Separating equilibrium

Let us consider the existence of an equilibrium, where the two types of bureaucrats play such strategies that their true types are revealed to the private sector employer. Again let us denote the type-specific signalling policy by $\tau_*^B(\theta_j^B)$.

One separating equilibrium where the types are revealed is when the high competence bureaucrat signals his competence by setting a tax rate $\tau_*^B(\theta_H^B)$ that is strictly lower than what the low competence bureaucrat is capable of. This is because the low type would always benefit more of the private sector job than the high type. The high type will be rewarded with the private sector job with probability σ. The low competence type, on the other hand, plays the private rents maximising tax rate $\tau_*^B(\theta_L^B) = \bar{\tau}^B$ throughout his career and stays in the public sector job.

For these strategies to constitute an equilibrium, the hiring rule has to be modified such that upon observing a signalling policy from the high competence bureaucrat, $\tau_*^B(\theta_H^B)$, the bureaucrat will hired into the private sector with probability $P = \sigma$, whereas any tax rate above $\tau_*^B(\theta_H^B)$ will result in never receiving the private sector job offer, $P = 0$.

Let us start the proof for this equilibrium by stating the equilibrium conditions for the two types. First, the high competence bureaucrat does not have an incentive to mimic the low type and set the private rents maximising tax rate $\bar{\tau}^B$, when the following holds

$$\frac{\beta}{1-\beta(1-\sigma)} r_H^B(\tau_*^B(\theta_H^B)) + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \geq \frac{\beta}{1-\beta} r_H^B(\bar{\tau}^B) \tag{58}$$

The low competence bureaucrat, on the other hand, does not have an incentive to mimic the high type and set the high type's signalling

policy $\tau_*^B(\theta_H^B)$, when the following holds

$$\frac{\beta}{1-\beta} r_L^B(\bar{\tau}^B) \geq \frac{\beta}{1-\beta(1-\sigma)} r_L^B(\tau_*^B(\theta_H^B)) + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \tag{59}$$

It is fairly obvious to note that at either of these conditions, we can rule out that either type would have an incentive to set the tax rate to one, and take all the tax revenue for himself; if (58) holds, then holds also that $\frac{\beta}{1-\beta} r_H^B(\bar{\tau}^B) \geq \beta y$, and if (59) holds, then also holds that $\frac{\beta}{1-\beta} r_L^B(\bar{\tau}^B) \geq \beta y$.

Thus, for there to exist a separating equilibrium we need to solve such a signalling policy $\tau_*^B(\theta_H^B)$ and hiring probability σ that conditions (58) and (59) hold at the same time. Let us start with the signalling policy $\tau_*^B(\theta_H^B)$. Recall the condition defining the lowest acceptable tax rate for the bureaucrat given in section 3.4 as

$$\beta y \leq \frac{\beta}{1-\beta(1-P)}(\tau^B y - \frac{g}{\theta_j^B}) + \frac{\beta^2 P}{(1-\beta)(1-\beta(1-P))}\rho$$

It is important to note that this condition is satisfied for either type $j = L, H$ even for zero public office rents, when $P > 0$ and for a high enough private sector salary ρ. Furthermore, since $\rho > r_H^B(\tau^B) > r_L^B(\tau^B)$, it is the low competence bureaucrat who benefits more of the private sector job.

Thus, for a sufficiently high private sector salary, the low type is willing to even tolerate zero rents in the public sector, and therefore for the high competence bureaucrat to be able to distinguish himself from the low type, the high type's signalling policy $\tau_*^B(\theta_H^B)$ has to be *strictly below* any tax rate the low type can set. The lowest possible tax rate for the low competence bureaucrat can be solved by plugging $r = 0$ into (3) and solving the tax rate as $\tau^B = \frac{g}{\theta_L^B y}$.

The signalling policy for the high type thus has to satisfy $\tau_*^B(\theta_H^B) < \frac{g}{\theta_L^B y}$. One candidate for the signalling policy is the lowest possible tax rate for the high competence bureaucrat. Similarly as for the low type, this can be solved by plugging $r = 0$ into (3) and solving the tax rate as $\tau^B = \frac{g}{\theta_H^B y}$.

Since the low type can never set a tax rate this low, the equilibrium condition for the low type (59) is satisfied; the low type sets the private rents maximising tax rate $\tau_*^B(\theta_L^B) = \bar{\tau}^B$ throughout his incumbency.

Now, it is sufficient to consider the equilibrium condition for the high type (58). The first term on the left-hand side in (58) are the public office rents for the high type when he is signalling his competence to the employer by the policy choice $\tau_*^B(\theta_H^B)$. The second term is his private sector salary he enjoys for the rest of this life if he gets the job offer, which takes place with probability σ. On the right-hand side are the high competence bureaucrat's private rents if he mimics the low type and extracts the maximum amount of rents each period and never receives the private sector job offer, $P = 0$. Plugging in the suggested signalling policy $\tau_*^B(\theta_H^B) = \frac{g}{\theta_H^B y}$ and solving the private sector hiring probability σ gives (see Appendix A.4.2)

$$\sigma \geq \sigma^s = \frac{(1-\beta)(\bar{\tau}^B - \varphi_H^B)}{\beta(\frac{\rho}{y} - \bar{\tau}^B + \varphi_H^B)} \tag{60}$$

Thus we have proved that there exists a separating equilibrium for a signalling policy where the high type sets $\tau_*^B(\theta_H^B) = \frac{g}{\theta_H^B y}$ in the public sector and will be hired into the private sector with probability $\sigma \geq \sigma^s$. The low type sets the private rents maximising tax rate throughout his incumbency, $\tau_*^B(\theta_L^B) = \bar{\tau}^B$, and will be never hired into the private sector. The equilibrium can be summed up as
Separating equilibrium: $\tau_*^B(\theta_H^B) = \frac{g}{\theta_H^B y}$ and $\tau_*^B(\theta_L^B) = \bar{\tau}^B$; $P(\tau^B = \tau_*^B(\theta_H^B)) = \sigma^s$, $P(\tau^B = \bar{\tau}^B) = 0$; $Pr(\theta_H^B \mid \tau_*^B)$=1 and $Pr(\theta_L^B \mid \bar{\tau}^B) = 1$.

Note that $\sigma^s > \sigma^{P_1}$, meaning that since the high competence bureaucrat is sacrificing all his rents in the public sector job to signal his competence to the private sector employer, the probability with which he will be awarded the private sector job has to be higher than in the case where he sets $\underline{\tau}^B$ and gets private rents every period.

5.3 Discussion

In this framework, the policy choice for the incumbent is to set the income tax rate to finance a public good. A high competence policy maker can set the tax rate lower than a low competence policy maker. The policy maker has discretion in setting the tax rate so that he can set a tax rate that is higher than what is needed to finance the public good, and take the rest of the tax revenue as private rents for himself.

While the politician is constrained by his re-election wishes, the bureaucrat aspires for a private sector job. Both the simplified voting rule, and the hiring rule used throughout the paper have been based on the idea that the incumbent of either type is rewarded for a lower tax rate, and punished for setting a higher tax rate. Due to the definition of the voting and hiring rules, the choice of the optimal strategy reduces to either setting the minimum tax rate $\underline{\tau}^i$, or the maximum tax rate $\bar{\tau}^i$.

Let us first consider the utility at each policy choice for voter k with private income y^k are

$$u^k(\bar{\tau}^i) = (1 - \frac{g}{y^m})y^k + g = y^k + (1 - \frac{y^k}{y^m})g \quad (61)$$

$$u^k(\underline{\tau}^i) = (1 - (\frac{g}{\theta_L^i y} + 1 - \beta))y^k + g = \beta y^k + (1 - \frac{y^k}{\theta_j^i y})g \quad (62)$$

First, the upper limit for the tax policy $\bar{\tau}^i$ is always redistributive; all voters whose private income is below the median voter's income $y^k < y^m$, always benefit from the introduction of the income taxation and the public project, whereas voters whose income is higher than the median income $y^k > y^m$, are worse off as a result of the project, as shown in (61). If the position of the median changes, then also changes the share of citizens who are either better or worse off. Tax policy $\underline{\tau}^i$, on the other hand is not as strongly redistributive; it does provide g more to the poorer citizens than the richer citizens, as shown in (62), but it does not depend on the position of the median voter, but on the incumbent competence, so that the higher is the competence of the low type, the higher is the citizen's utility. Thus, it is clear that the citizens would benefit of having a high competence policy maker in office who

could be induced to set a lower tax rate. This paper has considered the conditions when this takes place.

In section 4, the competence of the incumbent is observable. The higher is the competence of the incumbent politician, the lower he can set $\underline{\tau}^P$, but also the higher is the gap in the private rents produced by the two policy choices. Thus the punishment from the deviation from $\underline{\tau}^P$ has to be harder (a lower re-election probability), the higher is the competence of the incumbent. For the bureaucrat, the higher is the competence of the incumbent, the smaller is the gap between the private sector salary, and the public sector rents. Thus the higher is the incumbent's competence, the higher the private sector job probability has to be for him to have incentives to set $\underline{\tau}^B$

In section 5, the competence of the incumbent is no longer observable. Now the lower threshold tax rate for the policy maker $\underline{\tau}^i$ is defined as the lowest acceptable tax rate for the low competence policy maker. The lower is the low type's competence, the higher is $\underline{\tau}^i$, meaning that the high type always benefits more from his public sector job than the low type. When the incumbent is the politician, it is the high competence politician who is less likely to deviate from the lower tax policy $\underline{\tau}^P$. For the bureaucrat, on the other hand, it is the high competence one that is more likely to extract the maximum amount of rents. This reflects the different accountability mechanisms, and the different result they produce.

In any of the equilibria, where policy makers under either regime pool to choose the same tax policy, the citizens cannot infer the true competence of the incumbent, and there is no difference in the voter utility, whether the incumbent is of low or high quality. Therefore, the benefit of having a high competence policy maker is not realised, since the high competence incumbent is using his competence to extract more rents to himself, instead of employing his talent to produce more utility to the citizens.

Therefore, I have considered the existence of such equilibria, where the types play tax policies that reveal their true competence. More specifically, I have considered such equilibria, where the high competence policy maker can be induced to set a tax policy below $\underline{\tau}^i$, which

means a higher utility for the citizens, and less rents for the incumbent.

For the politician, there exists a separating equilibrium where the high competence type signals his competence by setting a tax rate below $\underline{\tau}^P$, however, this signalling stage lasts for only one period. Furthermore, the separating equilibrium presented in this paper is sensitive to the problem of moral hazard on the voter side, and can therefore hold only when the share of high competence politicians is very low.

For the bureaucrat, on the other hand, there exists such a separating equilibrium, where the high competence type can be induced to set a tax policy that is below any tax rate the low competence bureaucrat is capable of for several periods. Since it is always the low type that benefits more of the private sector job, this takes place if the prospect of the private sector job is good enough and/or the private sector salary is high enough. Thus a long-term commitment to a tax rate that reflects the bureaucrat's true competence is possible under bureaucracy. However, since the citizens have no means to get rid of a low type bureaucrat, there is a chance of getting stuck with low competence bureaucrat, who extracts the maximum amount of rents each period.

Even though the career incentives for the two types have been very simplified, we can still relate them to reality. This framework suggests that having a high competence bureaucrat in office results in the highest utility to the citizens, however the risk is that the bureaucrat in office is proven to be of low competence, in which case there is no way for the citizens to get rid of him. On the other hand, it is difficult to provide the politician with sufficient incentives to do their best if the reward of re-election is not motivating enough.

The answer to the question of which of the two regimes is the preferred one, depends on the share of high and low competence policy makers. If the share of high competence policy makers is high, then bureaucracy would be preferred. On the other hand, if the share of high competence policy makers is very low, then the politically elected policy maker would be the preferred institution, since in the case of having a low competence politician in office, the citizens always have the option of replacing the incumbent.

6 CONCLUDING REMARKS

Essentially, this paper has been about delegation. Even though the policy framework analysed has been very simplified, it has addressed an important issue since today not only are citizens delegating authority to politicians, but nation states are delegating authority to supranational organisations, such as the EU. This paper has studied tax policy choices in an infinite setting with two kinds of policy makers with different accountability mechanisms. A politician cares about reelection, whereas a bureaucrat is motivated by a private sector job. I have looked at the behaviour of two types of policy making regimes with two levels of competence. The idea has been to analyse the rent-seeking behaviour of each of these, and the implications on the electorate's utility.

This paper has extended the framework of Persson and Tabellini (2000, ch. 4) by altering the assumptions regarding the timing and the information, and by introducing two policy-making regimes. The role for the decision maker is very simplified; there are no ideological bias or pre-electoral promises he needs to fulfil. Instead, with a predetermined policy goal, the only question is in setting the rule of the game such that taking full advantage of the authority over the public finances is restricted. It is clear from the formulation of the objective functions for the two policy-making regimes that their incentives are very different; while the politician is punished if not acting well enough, the bureaucrat is rewarded for acting well enough.

When considering conditions when the high competence policy makers are induced to reveal their true competence, the results show that the highest utility to the citizens can be achieved under bureaucracy. This takes place when the private sector is very competitive in comparison to the public sector, and the bureaucrat is of high competence. However, since the citizens do not have any direct control over the bureaucrat, the risk is that when bureaucracy is the chosen regime, the citizens may be stuck with a low competence bureaucrat, whose only interest is to extract the maximum amount of private rents for himself. On the other hand, when the elected politician is the chosen regime, the welfare of the citizens is not as high as under the

bureaucracy, but in the case of a low competence politician, the citizens always have the option of voting him out of office. Therefore, the choice of the preferred regime depends on the share of high and low competence policy makers.

A APPENDIX

A.1 Politician's expected utility

With a constant re-election probability across periods, $P_1 = P_2 = \ldots = P$, the politician's expected utility

$$E(v^P(\tau^P)) = \beta r_1 + \sum_{t=2}^{\infty} \prod_{k=2}^{t} \beta^t P_k r_t$$

can be rewritten as

$$E(v^P(\tau^P)) = \beta r + \beta \sum_{t=1}^{\infty} (\beta P)^t r = \beta r + \frac{\beta^2 P}{1-\beta P} r = \frac{\beta}{1-\beta P} r$$

A.2 Bureaucrat's expected utility

With a constant private sector employment probability across periods $P_1 = P_2 = \ldots = P$, the bureaucrat's expected utility

$$E(v^B(\tau^B)) = \beta r_1 + \sum_{t=2}^{\infty} \prod_{k=2}^{t} \beta^t (1-P_k) r_t + \frac{1}{1-\beta} \beta^2 P_2 \rho_2 + \frac{1}{1-\beta} \sum_{t=3}^{\infty} \prod_{k=2}^{t-1} \beta^t P_t (1-P_k) \rho_t$$

can be restated as

$$\begin{aligned} E(v^B(\tau^B)) &= \beta r_1 + \beta \sum_{t=1}^{\infty} \beta^t (1-P)^t r_t + \frac{\beta^2 P}{1-\beta} \rho_2 + \frac{\beta^2}{1-\beta} \sum_{t=1}^{\infty} \beta^t (1-P)^t P \rho_t \\ &= \beta r + \frac{\beta^2 (1-P)}{1-\beta(1-P)} r + \frac{\beta^2 P}{1-\beta} \rho + \frac{\beta^2}{1-\beta} \frac{\beta(1-P)P}{1-\beta(1-P)} \rho \\ &= \frac{\beta}{1-\beta(1-P)} r + \frac{\beta^2 P}{(1-\beta)(1-\beta(1-P))} \rho \end{aligned}$$

A.3 Symmetric information

The lower threshold tax rate is defined as $\underline{\tau}^i = \frac{g}{\theta^i y} + 1 - \beta$, and the upper threshold tax rate as $\bar{\tau}^i = \frac{g}{y^m}$. In the symmetric information case the the private per period rents for a policy maker $r^i(\tau^i)$ at the two tax

rates are

$$\begin{aligned} r^i(\underline{\tau}^i) &= (\frac{g}{\theta^i y} + 1 - \beta)y - \frac{g}{\theta^i} = (1-\beta)y \\ r^i(\bar{\tau}^i) &= \frac{g}{y^m}y - \frac{g}{\theta^i} = \frac{gy}{y^m} - \frac{g}{\theta^i} \end{aligned}$$

A.3.1 Politician

For the politician, $E(v^P(\underline{\tau}^P)) \geq E(v^P(\bar{\tau}^P))$ holds when

$$\begin{aligned} \frac{\beta}{1-\beta} r^P(\underline{\tau}^P) &\geq \frac{\beta}{1-\beta\pi} r^P(\bar{\tau}^P) \\ \beta y &\geq \frac{\beta}{1-\beta\pi}(\frac{gy}{y^m} - \frac{g}{\theta^P}) \\ \pi &\leq \frac{1 - \frac{g}{y^m} + \frac{g}{\theta^P}}{\beta} = \frac{\beta - \frac{g}{y^m} + \frac{g}{\theta^P y} + 1 - \beta}{\beta} \\ \Rightarrow \pi &\leq \frac{\beta - \bar{\tau}^P + \underline{\tau}^P}{\beta} \end{aligned}$$

A.3.2 Bureaucrat

For the bureaucrat, $E(v^B(\underline{\tau}^B)) \geq E(v^B(\bar{\tau}^B))$ holds when

$$\begin{aligned} \frac{\beta}{1-\beta} r^B(\bar{\tau}^B) &\leq \frac{\beta}{1-\beta(1-\sigma)} r^B(\underline{\tau}^B) + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \\ \frac{\beta}{1-\beta}(\frac{gy}{y^m} - \frac{g}{\theta^B}) &\leq \frac{\beta}{1-\beta(1-\sigma)}(1-\beta)y + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \\ \sigma &\geq \frac{(1-\beta)\frac{g}{y^m} - (1-\beta)(\frac{g}{\theta^B y} + 1 - \beta)}{\beta(\frac{\rho}{y} - \frac{g}{y^m} + \frac{g}{\theta^B y})} \\ \Rightarrow \sigma &\geq \frac{(1-\beta)(\bar{\tau}^B - \underline{\tau}^B)}{\beta(\frac{\rho}{y} - \bar{\tau}^B + \varphi^B)} \end{aligned}$$

where $\varphi^B = \frac{g}{\theta^B y} < \underline{\tau}^B$.

A.4 Asymmetric information

In the asymmetric information case the tax rates are $\underline{\tau}^i = \frac{g}{\theta^i_L y} + 1 - \beta$ and $\bar{\tau}^i = \frac{g}{y^m}$, and the associated per period rents for a policy maker of

high (H), or low (L) competence are

$$\begin{aligned} r_H^i(\underline{\tau}^i) &= (\frac{g}{\theta_L^i y}+1-\beta)y-\frac{g}{\theta_H^i}=(1-\beta)y+\frac{g}{\theta_L^i}-\frac{g}{\theta_H^i} \\ r_H^i(\bar{\tau}^i) &= \frac{g}{y^m}y-\frac{g}{\theta_H^i}=\frac{gy}{y^m}-\frac{g}{\theta_H^i} \\ r_L^i(\underline{\tau}^i) &= (\frac{g}{\theta_L^i y}+1-\beta)y-\frac{g}{\theta_L^i}=(1-\beta)y \\ r_L^i(\bar{\tau}^i) &= \frac{g}{y^m}y-\frac{g}{\theta_L^i}=\frac{gy}{y^m}-\frac{g}{\theta_L^i} \end{aligned}$$

A.4.1 Politician

Pooling equilibrium 1: The low competence politician sets $\underline{\tau}^P$ when

$$\begin{aligned} \frac{\beta}{1-\beta}r_L^P(\underline{\tau}^P) &\geq \frac{\beta}{1-\beta\pi}r_L^P(\bar{\tau}^P) \\ \beta y &\geq \frac{\beta}{1-\beta\pi}(\frac{gy}{y^m}-\frac{g}{\theta_L^P}) \\ \pi &\leq \frac{1-\frac{g}{y^m}-\frac{g}{\theta_L^P y}}{\beta}=\frac{\beta-\frac{g}{y^m}+\frac{g}{\theta_L^P y}+1-\beta}{\beta} \\ \Rightarrow \pi^{p_1} &\leq \frac{\beta-\bar{\tau}^P+\underline{\tau}^P}{\beta} \end{aligned}$$

$\pi^{p_1}<1$ for all $\underline{\tau}^P<\bar{\tau}^P$.

Pooling equilibrium 2: The high competence politician sets $\bar{\tau}^P$ when

$$\begin{aligned} \frac{\beta}{1-\beta\pi}r_H^P(\bar{\tau}^P) &\geq \frac{\beta}{1-\beta}r_H^P(\underline{\tau}^P) \\ \frac{\beta}{1-\beta\pi}(\frac{gy}{y^m}-\frac{g}{\theta_H^P}) &\geq \frac{\beta}{1-\beta}((1-\beta)y+\frac{g}{\theta_L^P}-\frac{g}{\theta_H^P}) \\ \pi &\geq \frac{\frac{g}{\theta_L^P y}+1-\beta-(1-\beta)\frac{g}{y^m}-\frac{\beta g}{\theta_H^P y}}{\beta(\frac{g}{\theta_L^P y}+1-\beta-\frac{g}{\theta_H^P})} \\ \Rightarrow \pi^{p_2} &\geq \frac{\underline{\tau}^P-(1-\beta)\bar{\tau}^P-\beta\varphi_H^P}{\beta(\underline{\tau}^P-\varphi_H^P)} \end{aligned}$$

Where $\varphi_H^P=\frac{g}{\theta_L^P y}$. $\pi^{p_2}<1$ for all $\underline{\tau}^P<\bar{\tau}^P$.

Separating equilibrium: Taking the equilibrium condition for the

low competence politician (38) in the main text, and solving $\tau_*^P(\theta^P)$ gives

$$\begin{aligned}
\frac{\beta}{1-\beta\pi} r_L^P(\bar{\tau}^P) &\geq \beta r_L^P(\tau_*^P(\theta_H^P)) + \frac{\beta^2}{1-\beta\pi} r_L^P(\bar{\tau}^P) \\
\frac{\beta}{1-\beta\pi}\left(\frac{gy}{y^m} - \frac{g}{\theta_L^P}\right) &\geq \beta\left(\tau_*^P(\theta_H^P)y - \frac{g}{\theta_L^P}\right) + \frac{\beta^2}{1-\beta\pi}\left(\frac{gy}{y^m} - \frac{g}{\theta_L^P}\right) \\
(1-\beta)\left(\frac{gy}{y^m} - \frac{g}{\theta_L^P}\right) &\geq (1-\beta\pi)\left(\tau_*^P(\theta_H^P)y - \frac{g}{\theta_L^P}\right) \\
\Rightarrow \tau_*^P(\theta_H^P) &\leq \frac{(1-\beta)\frac{g}{y^m} + (1-\pi)\frac{\beta g}{\theta_L^P y}}{1-\beta\pi} = \frac{(1-\beta)\bar{\tau}^P + (1-\pi)\frac{\beta g}{\theta_L^P y}}{1-\beta\pi}
\end{aligned}$$

The signalling policy $\tau_*^P(\theta^P) = \frac{g}{\theta_L^P y}$ suggested in the main text satisfies this condition since

$$\begin{aligned}
\frac{g}{\theta_L^P y} &< \frac{(1-\beta)\frac{g}{y^m} + (1-\pi)\frac{\beta g}{\theta_L^P y}}{1-\beta\pi} \\
(1-\beta\pi)\frac{g}{\theta_L^P y} &< (1-\beta)\frac{g}{y^m} + (1-\pi)\frac{\beta g}{\theta_L^P y} \\
\frac{g}{\theta_L^P y} &< \frac{g}{y^m} = \bar{\tau}^P
\end{aligned}$$

always holds, since $\frac{g}{\theta_L^P y} < \underline{\tau}^P < \bar{\tau}^P = \frac{g}{y^m}$. The first period rents for the high competence politician of signalling policy $\tau_*^P(\theta_H^P) = \frac{g}{\theta_L^P y}$ are $r_H^P(\tau_*^P(\theta_H^P)) = \frac{g}{\theta_L^P y}y - \frac{g}{\theta_H^P} = \frac{g}{\theta_L^P} - \frac{g}{\theta_H^P}$. Plugging this into the equilibrium condition for the high competence politician, (35) in the main text, and solving π gives

$$\begin{aligned}
\beta r_H^P(\tau_*^P(\theta_H^P)) + \frac{\beta^2}{1-\beta} r_H^P(\underline{\tau}^P) &\geq \frac{\beta}{1-\beta\pi} r_H^P(\bar{\tau}^P) \\
\beta\left(\frac{g}{\theta_L^P y}y - \frac{g}{\theta_H^P}\right) + \frac{\beta^2}{1-\beta}\left((1-\beta)y + \frac{g}{\theta_L^P} - \frac{g}{\theta_H^P}\right) &\geq \frac{\beta}{1-\beta\pi} r\left(\frac{gy}{y^m} - \frac{g}{\theta_H^P}\right) \\
\pi &\leq \frac{\frac{g}{\theta_L^P} - \frac{\beta g}{\theta_H^P} + \beta - \beta^2 - (1-\beta)\frac{g}{y^m}}{\theta_L^P - \frac{g}{\theta_H^P} + \beta - \beta^2} \\
\Rightarrow \pi^s &\leq \frac{\underline{\tau}^P - (1-\beta)\bar{\tau}^P - \beta\varphi_H^P - (1-\beta)^2}{\beta(\underline{\tau}^P - \varphi_H^P - (1-\beta)^2)}
\end{aligned}$$

where $\varphi_H^P = \frac{g}{\theta_H^P y} < \underline{\tau}^P$. $\pi^s < 1$ for all $\underline{\tau}^P < \bar{\tau}^P + (1-\beta)^2$.

Next, the suggested signalling policy $\tau_*^P(\theta_H^P) = \frac{g}{\theta_L^P y}$ satisfies condition (36) for the high competence politician when

$$\begin{aligned} \beta r_H^P(\tau_*^P(\theta_H^P)) + \frac{\beta^2}{1-\beta} r_H^P(\underline{\tau}^P) &\geq \beta y \\ \beta\Big(\frac{g}{\theta_L^P y} - \frac{g}{\theta_H^P}\Big) + \frac{\beta^2}{1-\beta}\Big((1-\beta)y + (\frac{g}{\theta_L^P} - \frac{g}{\theta_H^P})\Big) &\geq \beta y \\ \Rightarrow \Big[\frac{1}{\theta_L^P} - \frac{1}{\theta_H^P}\Big] &\geq (1-\beta)^2 \cdot \frac{y}{g} \end{aligned}$$

Condition (39) for the low type is satisfied, when $\pi^s > \pi^{p_1}$, i.e.

$$\frac{\underline{\tau}^P - (1-\beta)\bar{\tau}^P - \beta\varphi_H^P - (1-\beta)^2}{\beta(\underline{\tau}^P - \ \varphi_H^P + (1-\beta)^2))} > \frac{\beta - \bar{\tau}^P + \underline{\tau}^P}{\beta}$$

which holds when

$$\Big[\frac{1}{\theta_L^P} - \frac{1}{\theta_H^P}\Big] > (1-\beta)\frac{(1-\beta)\frac{y}{y^m} + \frac{\beta}{\theta_L^P} - \frac{1}{\theta_H^P}}{\frac{g}{y^m} - \frac{g}{\theta_L^P y}}$$

Comparing the two conditions, it is easy to see that

$$\begin{aligned} (1-\beta)\frac{(1-\beta)\frac{y}{y^m} + \frac{\beta}{\theta_L^P} - \frac{1}{\theta_H^P}}{\frac{g}{y^m} - \frac{g}{\theta_L^P y}} &> (1-\beta)^2 \cdot \frac{y}{g} \\ \Rightarrow \theta_H^P &> \theta_L^P \end{aligned}$$

To conclude the proof, π^s has to be such that neither type has an incentive to deviate from the second period onwards. For the high type this is given by (37). As discussed in the main text, (37) holds when $\pi^s < \pi^{p_2}$, i.e.

$$\frac{\underline{\tau}^P - (1-\beta)\bar{\tau}^P - \beta\varphi_H^P - (1-\beta)^2}{\beta(\underline{\tau}^P - \ \varphi_H^P - (1-\beta)^2))} < \frac{\underline{\tau}^P - (1-\beta)\bar{\tau}^P - \beta\varphi_H^P}{\beta(\underline{\tau}^P - \ \varphi_H^P)}$$

which holds for $0 < (1-\beta)^3\bar{\tau}^P$. Thus $\pi^s < \pi^{p_2}$ is always satisfied. For the low type, on the other hand, condition (40) holds when $\pi^s > \pi^{p_1}$. The condition when this holds has already been solved above.

A.4.2 Bureaucrat

Pooling equilibrium 1: The high competence bureaucrat sets $\underline{\tau}^B$ when

$$\begin{aligned}
\frac{\beta}{1-\beta} r_H^B(\bar{\tau}^B) &\leq \frac{\beta}{1-\beta(1-\sigma)} r_H^B(\underline{\tau}^B) + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \\
\frac{\beta}{1-\beta}\left(\frac{gy}{y^m} - \frac{g}{\theta_H^B}\right) &\leq \frac{\beta}{1-\beta(1-\sigma)}\left((1-\beta)y + \frac{g}{\theta_L^B} - \frac{g}{\theta_H^B}\right) + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \\
\sigma &\geq \frac{(1-\beta)\frac{g}{y^m} - (1-\beta)\left(\frac{g}{\theta_L^B y} + 1 - \beta\right)}{\beta\left(\frac{\rho}{y} - \frac{g}{y^m} + \frac{g}{\theta_H^B y}\right)} \\
\Rightarrow \sigma^{P_1} &\geq \frac{(1-\beta)(\bar{\tau}^B - \underline{\tau}^B)}{\beta\left(\frac{\rho}{y} - \bar{\tau}^B + \varphi_H^B\right)}
\end{aligned}$$

where $\varphi_H^B = \frac{g}{\theta_H^B y} < \underline{\tau}^B$. The second line shows how the denominator depends on wage gap between the private sector and the maximum rents for the high type. $\sigma^{p_1} < 1$ when $\bar{\tau}^B + \beta(\underline{\tau}^B - \varphi_H^B) < \frac{\beta\rho}{y}$.

Pooling equilibrium 2: The low competence bureaucrat sets $\bar{\tau}^B$when

$$\begin{aligned}
\frac{\beta}{1-\beta} r_L^B(\bar{\tau}^B) &\geq \frac{\beta}{1-(1-\sigma)\beta} r_L^B(\underline{\tau}^B) + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \\
\frac{\beta}{1-\beta}\left(\frac{gy}{y^m} - \frac{g}{\theta_L^B}\right) &\geq \frac{\beta}{1-\beta(1-\sigma)}(1-\beta)y + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \\
\sigma &\leq \frac{(1-\beta)\frac{g}{y^m} - (1-\beta)\left(\frac{g}{\theta_L^B y} + 1 - \beta\right)}{\beta\left(\frac{\rho}{y} - \frac{g}{y^m} + \frac{g}{\theta_L^B y}\right)} \\
\Rightarrow \sigma^{P_2} &\leq \frac{(1-\beta)(\bar{\tau}^B - \underline{\tau}^B)}{\beta\left(\frac{\rho}{y} - \bar{\tau}^B + \varphi_L^B\right)}
\end{aligned}$$

where $\varphi_L^B = \frac{g}{\theta_L^B y}$ and $\varphi_H^B < \varphi_L^B < \underline{\tau}^B$, so that $\sigma^{P_1} > \sigma^{P_2}$. Again, by looking at the second line, we see that condition depends on the wage gap between the private sector and the maximum amount of rents for the low type. $\sigma^{p_2} < 1$ when $\bar{\tau}^B - \underline{\tau}^B + \beta(1-\beta) < \frac{\beta\rho}{y}$

Separating equilibrium: The lowest possible tax rate for the high type $\tau_*^B(\theta_H^B) = \frac{g}{\theta_H^B y}$ as a signalling policy results in zero rents $r_H^B(\tau_*^B(\theta_H^B)) =$

0. Plugging this into (58), for the high type it has to hold

$$\begin{aligned} \frac{\beta}{1-\beta}\left(\frac{gy}{y^m} - \frac{g}{\theta_H^B}\right) &\leq 0 + \frac{\beta^2\sigma}{(1-\beta)(1-\beta(1-\sigma))}\rho \\ \sigma^s &\leq \frac{(1-\beta)(\bar{\tau}^B - \varphi_H^B)}{\beta(\frac{\rho}{y} - \bar{\tau}^B + \varphi_H^B)} \end{aligned}$$

References

Acemoglu, D., Johnson, S. — Robinson, J. A. (2001) The colonial origins or comparative development: an empirical investigation. *The American Economic Review*, vol. 91 (5), 1369–1401.

Acemoglu, D., Johnson, S. — Robinson, J. A. (2002) Reversal of fortune: geography and institutions in the making of the modern world income distribution. *The Quarterly Journal of Economics*, vol. 117 (4), 1231–1294.

Adams, J. (2012) Causes and electoral consequences of party policy shifts in multiparty elections: theoretical results and empirical evidence. *The Annual Review of Political Science*, vol. 15 (x), 401–149.

Aidt, T. S. (2000) Economic voting and information. *Electoral Studies*, vol. 19 (2-3), 349–362.

Alesina, A. (1988) Credibility and policy convergence in a two-party system with rational voters. *The American Economic Review*, vol. 78 (4), 796–805.

Alesina, A. — Tabellini, G. (2007) Bureaucrats or politicians? Part i: a single policy task. *The American Economic Review*, vol. 97 (1), 169–179.

Alesina, A. — Tabellini, G. (2008) Bureaucrats or politicians? Part ii: multiple policy tasks. *Journal of Public Economics*, vol. 92 (3-4), 426–447.

Allers, M., de Haan, J. — Sterks, C. (2001) Partisan influence on the local tax burden in the Netherlands. *Public Choice*, vol. 106 (3-4), 351–363.

Alt, J., de Mesquita, E. B. — Rose, S. (2011) Disentangling accountability and competence in elections: evidence from the U.S term limits. *Journal of Politics*, vol. 73 (1), 171–186.

Anesi, V. — de Donder, P. (2011) Secondary issues and party politics: an application to environmental policy. *Social Choice Welfare*, vol. 36 (3-4), 519–546.

Ansolabehere, S., Snyder, J. M., Strauss, A. B. — Ting, M. M. (2005) Voting weights and formateur advantages in the formation of coalition governments. *American Journal of Political Science*, vol. 49 (3), 550–563.

Ansolahebere, S. (2006) Voters, candidates and parties. In *The Oxford Handbook of Political Economy*, eds. B. R. Weingast — D. A. Wittman, Oxford University Press.

Ashwort, S. (2012) Electoral accountability: recent theoretical and empirical work. *Annual Review of Political Science*, vol. 15, 183–201.

Ashwort, S. — Shotts, K. W. (2010) Does informative media commentary reduce politician's incentives to pander. *Journal of Public Economics*, vol. 94 (11-12), 838–847.

Austen-Smith, D. — Banks, J. S. (1996) Information aggregation, rationality and condorcet jury theorem. *The American Political Science Review*, vol. 90 (1), 34–45.

Bandyopadhyay, S., Chatterjee, K. — Sjostrom, T. (2011) Pre-electoral coalitions and post-election bargaining. *Quarterly Journal of Political Science*, vol. 6 (1), 1–53.

Banerjee, A. V., Kumar, S., Pande, R. — Su, F. (2010) Do informed voters make better choices? Experimental evidence from urban India, unpublished manuscript.

Banks, J. S. — Sundaram, R. K. (1998) Optimal retention in agency problems. *Journal of Economic Theory*, vol. 82 (2), 293–323.

Baron, D. P. — Diermeier, D. (2001) Elections, governments, and parliaments in proportional representation systems. *Quarterly Journal of Economics*, vol. 116 (3), 933–967.

Bawn, K. — Rosenbluth, F. (2006) Short versus long coalitions: electoral accountability and the size of the public sector. *American Journal of Political Science*, vol. 50 (2), 251–265.

Bendor, J., Diermeier, D., Siegel, D. A. — Ting, M. M. (2011) *A Behavioral Theory of Elections*. Princeton University Press.

Berganza, J. C. (2000) Two roles for elections: disciplining the incumbent and selecting a competent candidate. *Public Choice*, vol. 105 (1-2), 165–193.

Besley, T. (2006) *Principled Agents. The Political Economy of Good Government*. Oxford University Press.

Besley, T. — Case, A. (2003) Political institutions and policy choices: evidence from the United States. *Journal of Economic Literature*, vol. 41 (1), 7–73.

Besley, T. — Persson, T. (2009) The origins of state capacity: property rights, taxation and politics. *The American Economic Review*, vol. 99 (4), 1218–1244.

Besley, T. — Persson, T. (2010) State capacity, conflict and development. *Econometrica*, vol. 78 (1), 1–34.

Blinder, A. (1997) Is government too political? *Foreign Affairs*, vol. 76 (2), 115–126.

Bordignon, M., Nannicini, T. — Tabellini, G. (2010) Moderating political extremism: single round vs. runoff elections under plurality rule, unpublished manuscript.

Borgne, E. — Lockwood, B. (2006) Do elections always motivate the incumbents? Learning vs. re-election concerns. *Public Choice*, vol. 129 (1-2), 41–60.

Bräuninger, T. (2005) A partisan model of government expenditure. *Public Choice*, vol. 125 (3-4), 409–429.

Brennan, G. — Hamlin, A. (1998) Expressive voting and electoral equilibrium. *Public Choice*, vol. 95 (1-2), 149–175.

Buchanan, J. M. (1989) *Essays on the Political Economy*. University of Hawaii Press.

Buchanan, J. M. (1997) *Post-socialist Political Economy - Selected Essays*. Edward Elgar.

Buchanan, J. M. — Tullock, G. (1962) *The Calculus of Consent. Logical Foundations of Constitutional Democracy.* University of Michigan Press, Ann Arbor. Reprinted with and introduction by Charles K. Rowley in 2004 by Liberty Funds, Indianapolis.

Burden, B. C. (1997) Deterministic and probabilistic voting models. *American Journal of Political Science*, vol. 41 (4), 1150–1169.

Canes-Wrone, B., Herron, M. C. — Shotts, K. W. (2001) Leadership and pandering: a theory of executive policymaking. *American Journal of Political Science*, vol. 45 (3), 532–550.

Caplan, B. (2007) *The Myth of the Rational Voter. Why Democracies Choose Bad Policies*. Princeton University Press.

Caselli, F. — Morelli, M. (2004) Bad politicians. *Journal of Public Economics*, vol. 88 (3-4), 759–782.

Coate, S. — Knight, B. (2011) Government form and public spending: theory and evidence from US municipalities. *American Economic Journal: Economic Policy*, vol. 3 (3), 464–484.

Coughlin, P. J. (1992) *Probabilistic Voting Theory*. Cambridge University Press.

Cusack, T. R. — Fuchs, S. (2002) Ideology, institutions, and public spending, discussion Paper of the Research Area Markets and Political Economy. Wissenschaftszentrum Berlin für Sozialforschung.

Dalton, R. J. (2009) Economics, environmentalism and party alignments: A note on partisan change in advanced industrial democracies. *European Journal of Political Research*, vol. 48 (2), 161–175.

Dewan, T. — Shepsle, K. A. (2011) Political economy models of elections. *Annual Review of Political Science*, vol. 14, 311–330.

Dewatripoint, M., Jewitt, I. — Tirole, J. (1999) The economics of career concerns, part ii: application to missions and accountability of government agencies. *The Review of Economic Studies*, vol. 66 (1), 199–217.

Diermeier, D., Eraslan, H. — Merlo, A. (2002) Coalition governments and comparative constitutional design. *European Economic Review*, vol. 46 (4-5), 893–907.

Diermeier, D., Eraslan, H. — Merlo, A. (2003) A structural model of government formation. *Econometrica*, vol. 71 (1), 27–70.

Diermeier, D., Keane, M. P. — Merlo, A. (2005) A political economy model of congressional careers. *The American Economic Review*, vol. 95 (1), 347–373.

Downs, A. (1957a) *An Economic Theory of Democracy*. HarperCollins.

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

Drazen, A. (2000) *Political Economy in Macroeconomics*. Princeton University Press.

Drinkwater, S. — Jennings, C. (2007) Who are the expressive voters? *Public Choice*, vol. 132 (1-2), 179–189.

Duggan, J. (2006) Candidate objectives and electoral equilibrium. In *The Oxford Handbook of Political Economy*, eds. B. R. Weingast — D. A. Wittman, Oxford University Press.

Duggan, J. — Fey, M. (2005) Electoral competition with policy-motivated candidates. *Games and Economic Behavior*, vol. 51 (2), 490–522.

Feddersen, T. — Pesendorfer, W. (1997) Behavior and information aggregation in elections with private information. *Econometrica*, vol. 65 (5), 1029–1058.

Fiorina, M. P. (1976) The voting decision: instrumental and expressive aspects. *The Journal of Politics*, vol. 38 (2), 390–413.

Fiva, J. H., Folke, O. — Sørensen, R. J. (2013) The power of parties: evidence from close municipal elections in Norway, unpublished manuscript.

Folke, O. (2014) Shades of brown and green: party effects in proportional election systems. *The Scandinavian Journal of Economics*, vol. Forthcoming.

Fox, J. (2007) Government transparency and policy making. *Public Choice*, vol. 131 (1-2), 23–44.

Fox, J. — van Weelden, R. (2012) Costly transparency. *Journal of Public Economics*, vol. 96 (1-2), 142–150.

Freier, R. — Odendahl, C. (2012) Do parties matter - estimating the effct of political power in multi-party systems, DIW Discussion Papers 1205.

Frisell, L. (2009) A theory of self-fulfilling political expectations. *Journal of Public Economics*, vol. 93 (5-6), 715–720.

Galasso, V. — Nunnari, S. (2010) Electoral incentives and economic policy across political regimes, CEPR Discussion Papers No. 7959.

Hibbs, D. A. (1977) Political parties and macroeconomic policy. *The American Political Science Review*, vol. 71 (4), 1467–1487.

Hillman, A. L. (2010) Expressive behaviour in economics and politics. *European Journal of Political Economy*, vol. 26 (4), 403–418.

Holmström, B. (1999) Managerial incentive problems: A dynamic perspective. *The Review of Economic Studies*, vol. 66 (1), 169–182.

Hotelling, H. (1929) Stability in competition. *Economic Journal*, vol. 39 (153), 41–57.

Jean, S. — Jimenez, M. (2011) The unemployment impact of immigration in OECD countries. *European Journal of Political Economy*, vol. 27 (2), 241–256.

Jennings, C. (2011) The good, the bad and the populist: a model of political agency with emotional voters. *European Journal of Political Economy*, vol. 27 (4), 611–624.

Jensen, C. B. — Spoon, J.-J. (2011) Testing the 'party matters' theses. *Political Studies*, vol. 59 (1), 99–115.

Keane, M. P. — Merlo, A. (2010) Money, political ambition and the career decisions of politicians. *The American Economic Journal: Microeconomics*, vol. 2 (3), 186–215.

Kedar, O. (2005) When moderate voters prefer extreme parties: policy balancing in parliamentary elections. *The American Political Science Review*, vol. 99 (2), 185–199.

Kopits, G. (2011) Independent fiscal institutions: developing good practices. *OECD Journal on Budgeting*, vol. 11 (3).

Lassen, D. D. (2005) The effect of information on voter turnout: evidence from a natural experiment. *American Journal of Political Science*, vol. 49 (1), 103–118.

Laver, M. — Budge, I. (1992) *Party Policy and Government Coalitions*. The MacMillan Press.

Lee, D. S., Moretti, E. — Butler, M. J. (2004) Do voters affect or elect policies? Evidence from the U.S. House. *The Quarterly Journal of Economics*, vol. 119 (3), 807–859.

Levy, G. (2004) A model of political parties. *Journal of Economic Theory*, vol. 115 (2), 250–277.

List, J. A. — Sturm, D. M. (2006) How elections matter: theory and evidence from environmental policy. *The Quarterly Journal of Economics*, vol. 21 (4), 1249–1281.

Maskin, E. — Tirole, J. (2004) The politician and the judge: accountability in the government. *The American Economic Review*, vol. 94 (4), 1034–1054.

Matsusaka, J. G. (1995) Explaning voter turnout patters: an information theory. *Public Choice*, vol. 84 (1-2), 91–117.

Mattozzi, A. — Merlo, A. (2008) Political careers or career politicians. *Journal of Public Economics*, vol. 92 (3-4), 597–608.

McMurray, J. M. (2013) Aggregating information by voting: the wisdom of the experts versus the wisdom of the masses. *Review of Economic Studies*, vol. 80 (1), 277–312.

Milesi-Ferretti, G. M., Perotti, R. — Rostagno, M. (2002) Electoral systems and public spending. *The Quarterly Journal of Economics*, vol. 117 (2), 609–657.

Morelli, M. — van Weelden, R. (2013) Ideology anf information in policymaking. *Journal of Theoretical Politics*, vol. 25 (3), 412–436.

Müller, M. (2007) Motivation of politicians and long-term policies. *Public Choice*, vol. 132 (3-4), 273–289.

Neumayer, E. (2003a) Are left-wing party strength and corporatism good for the environment? Evidence from panel analysis of air pollution in oecd countries. *Ecological Economics*, vol. 45 (2), 203–220.

Neumayer, E. (2003b) The environment, left-wing political orientation and ecological economics. a commentary. *Ecological Economics*, vol. 51 (3-4), 167–175.

North, D. C. (1991) Institutions. *Journal of Economic Perspectives*, vol. 5 (1), 97–112.

Osterloh, S. — Debus, M. (2012) Partisan politics in corporate taxation. *European Journal of Political Economy*, vol. 28 (2), 192–207.

Padovano, F. (2013) Are we witnessing a paradigm shift in the analysis of political competition? *Public Choice*, vol. 156 (3-4), 631–651.

Persson, T. — Tabellini, G. (2000) *Political Economics. Explaining Economic Policy*. The MIT Press.

Persson, T. — Tabellini, G. (2003) *The Economic Effects of Constitutions*. The MIT Press.

Persson, T. — Tabellini, G. (2004a) Constitutional rules and fiscal policy outcomes. *The American Economic Review*, vol. 94 (1), 25–45.

Persson, T. — Tabellini, G. (2004b) Constitutions and economic policy. *The Journal of Economic Perspectives*, vol. 18 (1), 75–98.

Piketty, T. (1999) The information-aggregation approach to political institutions. *European Economic Review*, vol. 43, 791–800.

Prat, A. (2005) The wrong kind of transparency. *The American Economic Review*, vol. 95 (3), 862–877.

Riker, W. H. (1982) The two-party system and Duverger's law: an essay in the history of political science. *The American Political Science Review*, vol. 76 (4), 753–766.

Riker, W. H. — Ordershook, P. C. (1968) A theory of calculus of voting. *The American Political Science Review*, vol. 62 (1), 25–42.

Roemer, J. E. (2006) Modeling party competition in general elections. In *The Oxford Handbook of Political Economy*, eds. B. R. Weingast — D. A. Wittman, Oxford University Press.

Roemer, J. E., Lee, W. — van der Straeten, K. (2007) *Racism, Xenophobia, and Distribution. Multi-issue Politics in Advanced Democracies*. Harvard University Press.

Rogoff, K. (1990) Equilibrium political budget cycles. *The American Economic Review*, vol. 80 (1), 21–36.

Schofield, N. (1993) Political competition and multiparty governments. *European Journal of Political Research*, vol. 23 (1), 1–33.

Schuessler, A. A. (2000) Expressive voting. *Rationality and Society*, vol. 12 (1), 87–119.

Smart, M. — Sturm, D. M. (2013) Term limits and electoral accountability. *Journal of Public Economics*, vol. 107, 93–102.

Snyder, J. M., Ting, M. M. — Ansolabehere, S. (2005) Legislative bargaining under weighted voting. *The American Economic Review*, vol. 95 (4), 981–1004.

Stenlund, H., Lane, J.-E. — Bo, B. (1985) Formal and real voting power. *European Journal of Political Economy*, vol. 1 (1), 59–75.

Taylor, J. B. (2011) The cycle of rules and discretion in economic policy. *Foreign affairs*, vol. 7, 55–65.

Tsebelis, G. — Chang, E. C. C. (2004) Veto players and the structure of budgets in advanced industrialized countries. *European Journal of Political Research*, vol. 43 (3), 449–476.

Volkens, A., Lehmann, P., Merz, N., Regel, S. — Werner, A. (2013) *The Manifesto Data Collection. Manifesto Project (MRG/CMP/MARPOR). Version 2013b*. Wissenschaftszentrum Berlin für Sozialforschung (WZB), Berlin, with Lacewell, Onawa Promise / Schultze, Henrike.

Warren, P. L. (2012) Independent auditors, bias and political agency. *Journal of Public Economics*, vol. 96 (1-2), 78–88.

Weingast, B. R. — Wittman, D. A. (2006) The reach of political economy. In *The Oxford Handbook of Political Economy*, eds. B. R. Weingast — D. A. Wittman, Oxford University Press.

Whalley, A. (2010) Elected versus appointed policy makers: evidence from city treasures, NBER Working Paper 15643.

Wittman, D. A. (1973) Parties as utility maximizers. *The American Political Science Review*, vol. 67 (2), 490–498.

Wyplosz, C. (2011) Fiscal discipline: rules rather than institutions. *National Institute Economic Review*, (217), R19–R30.

THE FOLLOWING PUBLICATIONS HAVE BEEN RELEASED SINCE 2014 IN TURKU SCHOOL OF ECONOMICS PUBLICATION SERIES A

A-1:2014 Kirsi-Mari Kallio
”Ketä kiinnostaa tuottaa tutkintoja ja julkaisuja liukuhihnaperiaatteella…?”
– Suoritusmittauksen vaikutukset tulosohjattujen yliopistojen tutkimus- ja opetushenkilökunnan työhön

A-2:2014 Marika Parvinen
Taiteen ja liiketoiminnan välinen jännite ja sen vaikutus organisaation ohjaukseen – Case-tutkimus taiteellisen organisaation kokonaisohjauksesta

A-3:2014 Terhi Tevameri
Matriisirakenteen omaksuminen sairaalaorganisaatioissa – Rakenteeseen päätyminen, organisaatiosuunnittelu ja toimintalogiikan hyväksyminen

A-4:2014 Tomi Solakivi
The connection between supply chain practices and firm performance – Evidence from multiple surveys and financial reporting data

A-5:2014 Salla-Tuulia Siivonen
“Holding all the cards”
The associations between management accounting, strategy and strategic change

A-6:2014 Sirpa Hänti
Markkinointi arvon muodostamisen prosessina ja sen yhteys yrittäjyyden mahdollisuusprosessiin
– Tapaustutkimus kuuden yrityksen alkutaipaleelta

A-7:2014 Kimmo Laakso
Management of major accidents
– Communication challenges and solutions in the preparedness and response phases for both authorities and companies

A-8:2014 Piia Haavisto
Discussion forums
– From idea creation to incremental innovations. Focus on heart-rate monitors

A-9:2014 Sini Jokiniemi
"Once again I gained so much"
– Understanding the value of business-to-business sales interactions from an individual viewpoint

A-10:2014 Xiaoyu Xu
Understanding online game players’ post-adoption behavior: an investigation of social network games in

A-11:2014	Helena Rusanen Resource access and creation in networks for service innovation
A-12:2014	Joni Salminen Startup dilemmas – Strategic problems of early-stage platforms on the Internet
A-13:2014	Juulia Räikkönen Enabling experiences – The role of tour operators and tour leaders in creating and managing package tourism experiences
A-14:2014	Natalie S. Mikhaylov New school ties: Social capital and cultural knowledge creation in multicultural learning environments
A-1:2015	Hanne-Mari Hälinen Understanding the concept of logistics cost in manufacturing
A-2:2015	Arto Ryömä Mielelliset ja keholliset johtajuusprosessit yksilöllisyyttä ja yhteisöllisyyttä kietomassa – Empiirinen tarkastelu jääkiekkojoukkueen kontekstissa
A-3:2015	Kati Suomi Managing brand identity and reputation – A case study from Finnish higher education
A-4:2015	Jenni Jaakkola Essays on the decision-making in representative democracy

All the publications can be ordered from

KY-Dealing Oy
Rehtorinpellonkatu 3
20500 Turku, Finland
Phone +358-2-333 9422
E-mail: info@ky-dealing.fi