Stockholm University

Models of Electoral Competition

Three Essays in Political Economics

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Abstract

This thesis consists of three essays in political economics.

In **"The Swing Voters' Blessing"**, I model elections with quality differences between two ideological candidates. The quality differences are only observable to a limited number of informed voters. I show that if uninformed voters follow an optimal strategy of only making their voting decisions dependent on their ideological position relative to the median voter, the candidate who is preferred by the median voter wins. Furthermore, I show that the existence of boundedly rational uninformed voters who always support the candidate whose policy offer is most attractive increases the welfare of the majority of voters. It forces candidates to announce positions closer to the median voter's bliss point. This is "The Swing Voters' Blessing".

"Lobbying and Elections" contributes to the literature on lobbying. This literature is large, but only a few papers allow for the interaction of post-election lobbying and the voting decision of forward-looking voters. Besley and Coate (2001) use their well-known citizen candidate framework and find that if citizen candidates with sufficiently extreme preferences are available, lobbying has no influence on equilibrium policy. I show that this result does not apply in a more realistic model with ideological parties instead of citizen candidates because the parties cannot adjust their policy positions. In a two-party system, even if forward-looking voters are aware that lobbying will take place, their choice between policies is different when lobbies do and do not exist. However, often the average and/or the median voter are better off with lobbying.

"Lexicographic Voting" reconsiders the division of the literature into models with forward-looking voters and models with backward-looking voters by developing a model that incorporates motives from both literatures. As long as there is no uncertainty about preferences and parties can commit in advance to the ideological dimension of policy, but not to a maximal level of rent extraction, voters can constrain the latter to the same extent as in a purely backward-looking model. At the same time, the policy preferred by the median voter is implemented as in a standard

forward-looking model of political competition. Voters achieve this outcome by following a simple lexicographic voting strategy. They cast their vote in favor of their favorite policy position whenever parties offer different platforms, but make their vote dependent on the incumbent parties' performance whenever they are indifferent. When uncertainty about the position of the median voter is introduced into the model, voters have to accept higher rent payments, but they still retain some control over rent extraction.

Für meine Eltern

Acknowledgments

I had never seriously thought about studying economics until I finished school and began my year of military service. Even then, I only considered economics as a minor field of study to be combined with a history or philosophy major. However, some energetic economics professor at the University of Potsdam changed my mind and I decided to become a "Diplomvolkswirt" after his talk at some information day for potential future students.[1]

Nonetheless, I did not begin my studies in Potsdam but at Humboldt-Universität zu Berlin. Little did I know at that time how much difference the decision to study economics in Berlin and not in Potsdam would make. In Potsdam, I would have had a much more applied and traditional German economics education. I think the difference might very well be comparable to the difference between studying physics or engineering. It seems unlikely that I would have ended up in an American style graduate program if I had begun my studies in Potsdam.

Several years later, I became a graduate student in Stockholm. Here, I found a program with many inspiring teachers and great fellow students. I can mention only a few.

First and foremost, I would like to thank my advisor Torsten Persson for his great support and patience. He read all my research many times and made many useful proposals and suggestions. Last but not least, not only did he teach me how to do research but also how to transform it into readable papers.

I appreciate very much that he is generous with his advice but does not impose his opinion on his students and I enjoyed the freedom I had to pursue my own research. Another great advantage of having Torsten as an advisor is that he has many areas of expertise so that one can always switch to a different field of economics or from theoretical to empirical research.

I still remember when I first heard the name of my future advisor. When I told a fellow student that I was going to write a diploma thesis about "Central Banks from a Public Choice Perspective", he told me that there was a new book by Persson and Tabellini with the title "Political Economics" that I should probably have a look at. I did not since the book was not available in our university library. At that time I did not know that Torsten had begun his career as a macroeconomist and

[1] After consulting the Homepage of the University of Potsdam I am almost sure that the energetic economist was Wilfried Fuhrmann.

that the book contains three chapters on monetary politics that could have been very useful for my thesis. In the end, I had the book ordered for our chair when I worked for a few months as a research assistant at the European Business School in Oestrich-Winkel and knew already that I was going to become a Ph.D student in Stockholm. Probably the book is still at the European Business School and perhaps the fact that I ordered it inspired someone who read it later to work on political economics.

Special thanks belong also to many other researchers at the IIES. David Strömberg always had time for me when I came by his office and provided many valuable insights when I presented my research in seminars. He gave me important advice on how to present my results in "The Swing Voters' Blessing".

Ethan Kaplan read the essay "The Swing Voters' Blessing" extremely carefully and provided countless valuable suggestions on how to improve the paper. Moreover, he was always willing to engage in discussions with graduate students and his presence made the IIES a much more interesting and stimulating place to be.

Philippe Aghion had a similar influence. Whenever he is in Stockholm he has time for every single graduate student at the IIES who wants to present or discuss his or her research. He listened to presentations of all three papers in this thesis and provided valuable insights to all of them. Especially the final version of "Lobbying and Elections" was strongly influenced by his ideas on how the paper should be written.

My beloved girlfriend Rongrong Sun read all of the papers several times and made many valuable comments and suggestions. She had always time for me when I needed her help or her advice. Last but not least, she suggested at least half of the commas you can find in the final manuscript.

Christina Lönnblad helped with editing the final version of this thesis even during her holidays and was always available when there was a question or a problem during my time at the IIES. This thesis would be much less well written without her generous help.

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I would also like to thank all the other administrators at the IIES, the department of economics and Stockholm University in general who have helped to make my time in Stockholm a more pleasant experience. I would like to thank John Hassler for being a very accessible mentor in the second year of my studies. Robert Östling and Masayuki Kudamatsu both gave valuable advice what literature could be relevant for

my research. Jens Josephson, Per Krusell, Michael Neugart and Elena Paltseva all provided important comments on "The Swing Voters' Blessing". James M. Snyder also provided comments on the paper and gave me the opportunity to present it at the MIT Political Economy Breakfast. Karl Wärneryd's course at Stockholm School of Economics inspired me to write "The Swing Voters' Blessing". Without his course I would not have been familiar with the information aggregation approach to elections. Even if the actual model was written much later, the basic idea to combine the Downsian approach to elections with the information aggregation approach was conceived already then. Jörgen Weibull several times gave me the opportunity to discuss my research with him. In addition, he was my favorite teacher (Mathematics 1) in the Stockholm graduate program.

I would like to thank Ruixue Jia for always being willing to listen to my random thoughts. Moreover, she has read most of my papers and provided great help in finishing them. Marta Lachowska was a true friend and very generous with her advice. Without her help I would still not have figured out how BibTeX can be used in combination with Scientific Workplace.[2] Moreover, we produced a fabulous "how to give a job market talk" video together that is available upon request.

Emilia Simeonova, Sergei Koulayev and Pedro Brinca provided great company especially in the last weeks before bringing my thesis to the printer. Heng Chen was my best friend in the first years in Stockholm and I would like to thank him for *henging out* with me before deserting to Zurich. My Italian former office mate Ettore had a great influence on me. I learned how to express myself by using my hands extensively when talking. This will come in handy when I move to Italy.

David von Below provided extremely helpful TeX advice. Without him this thesis would much less reflect my ideas about how the final product should look like. Olle Folke provided many of the templates that were needed for producing a thesis of the required format. I also want to thank all my other fellow graduate students at the IIES, the department of economics and last but not least the Stockholm School of Economics for all the help and friendship they provided.

Moreover, I would like to thank Ruchir Agarwal for making me feel at home when I spent one year of my graduate studies at the economics department of Harvard.

I would also like to mention the IIES espresso machine and thank whoever decided to buy it. As with many great things too often taken for granted, its true value is only appreciated when it does not work.

[2]Even with her help it took about a week and it leads to problems once you have to put your thesis document together. Think twice before you start using it.

I also intended to thank all the people who played football on Wednesdays regularly. However, I came to the conclusion that my fellow players should actually thank me for making them look good in comparison.

Last, but most importantly, I would like to thank my parents for providing me with lots of support over many years.

Stockholm, August 2010

Jan Klingelhöfer

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Chapter 1

Introduction

This thesis consists of three essays in theoretical political economics. All three essays model different aspects of elections in a democracy.

"The Swing Voters' Blessing" deals with the consequences of limited information and limited rationality of voters and come to the surprising, but positive, conclusion that such limitations might actually increase voters' welfare. "Lobbying and Elections" reconsiders the influence of interest groups on policy outcomes taking into account feedback effects on elections. Finally, "Lexicographic Voting" shows the compatibility of prospective and retrospective voting in a model with rent-seeking parties that compete on a spatial policy dimension.

With the exception of the second part of the first essay, I restrict myself to the rational choice approach of modeling elections. Voters as well as policy makers are assumed to maximize their utility and to use all information available to them in an optimal way. The first essay introduces a plausible behavioral assumption about how uninformed voters cast their votes and the results of this approach are contrasted with the rational choice outcome.

Some history of thought Rational choice is (still) part of the standard methodology in almost all of economics and also has a great influence in formal political science. It was used by all early contributors to formal models of elections. The most influential among them were the three economists Kenneth Arrow, Duncan Black and Anthony Downs.[1]

Only later, mathematical models were also established in political science by

[1] It should be mentioned that some first attempts to use formal methods to model group decision making go back much further in history to Condorcet (1785) who developed his famous paradox and the less well-known jury theorem. More about the jury theorem can be found Chapter 2.

William Riker. Riker called his approach "positive political theory" and was one of the first political scientists to use game theory in the modeling of politics (Riker 1962). By now, game-theoretical analysis is well established in political science and contributions to the formal modeling of elections are made by political scientists as well as economists.

A third tradition that has influenced the modeling of collective decision making is the public choice approach developed by Buchanan and Tullock (1962). Often, the term public choice is used to describe all uses of economic tools to study problems that are traditionally in the province of political science.[2] However, there is also a narrower definition of "public choice" which defines it as an alternative approach to standard public finance. In contrast to most of public finance, public choice rejects the assumption of a benevolent dictator as the decision maker. Instead, public choice scholars assume that politicians maximize their own utility.

Arrow's work was concerned with theoretical limitations of collective decision making summarized in his famous impossibility theorem (Arrow 1963) which can be seen as a clarification and generalizations of problems with voting procedures known ever since Condorcet (1785) pointed out his paradox of voting. Black, on the other hand, showed that with some additional assumptions on voters' preferences (single peakedness), the existence of an equilibrium in a voting game could be guaranteed. He developed the median voter theorem in the setting of committee decision making (Black 1948). Subsequently, Downs was the first researcher who applied the median voter theorem to a model of democracy. In a simple spatial model of elections with two parties solely interested in vote maximization, he used Black's median voter theorem to derive policy outcomes in a democracy directly from the preferences of the voters (Downs 1957). With this work, he laid the foundations for most rational choice models of elections.[3]

My essays are closely related to the Downsian approach of modeling electoral competition. They retain several of Downs' original assumptions that have become standard by now, for example the restriction to a world with only two parties.[4]

[2] This broad definition is more or less synonymous with my use of the term "political economics", although the latter might indicate the use of more rigorous methods than implied by the term "public choice".

[3] The one important exception is models where elections aggregate information rather than preferences. The interested reader can find a short introduction to this type of model in "The Swing Voters' Blessing."

[4] Naturally, there are now many models with more than two parties or candidates. Nonetheless, what could be called the core of political economics almost exclusively consists of two-party models. To confirm this, it is sufficient to have a look at the content of a standard textbook such as Persson

Part of the secret of the longevity and influence of Downs' approach is without any question that he managed to cut down his model to the bare essentials so that other researchers could build on his research by adding institutional detail to answer more specific questions.

Existing models combined in novel ways Neither do I try to provide new work-horse models that other researchers would hopefully build on, nor do I put more institutional details into existing work-horse models. What all three of my essays instead have in common is that they combine different existing and well established models in new ways.[5] This provides a check on the consistency of the core models of electoral competition with each other. For example, standard models of rent seeking and political accountability assume voters who cast their ballots according to past performance of the incumbent, while the Downsian approach to electoral competition assumes prospective voting. Text books usually introduce both approaches without much discussion of potential conflicts. In the third essay, I show that combining the two approaches does not necessarily lead to inconsistencies. This result is not trivial because models of accountability usually assume an indifference of the voters with respect to the candidates. Introducing an additional spatial component of policy means that this indifference can no longer be taken as exogenously given.

All three models have in common a standard spatial policy dimension on which voters disagree on what policy should be implemented, just as in Downs (1957). The main difference to Downs is that politicians and parties are not assumed to be (only) office motivated, but either have their own ideology or want to acquire rents for themselves.

The Swing Voters' Blessing In the first essay, "The Swing Voters' Blessing", I add an additional valence dimension to the standard Downsian spatial policy dimension. In other words, the candidates running for election are of different quality. The idea of combining a policy dimension with candidates of different quality and ideology is not new. What is new is that I introduce imperfect information of the electorate. Not all voters can observe the quality of the candidates. Essentially, I am combining a standard spatial model of policy determination in which elections are a way of aggregating voters' preferences with the alternative approach of modeling

and Tabellini (2000). The most important exception is probably citizen candidate models that completely ignore parties (Osborne and Slivinski 1996; Besley and Coate 1997).

[5] I would like to point out that I realized this similarity in approach only after finishing the three essays.

elections as a mean of aggregating information. The standard median voter result does not apply in this combined framework because the difference in the quality of candidates gives the higher quality candidate an opportunity to deviate from the median position and to win the elections nonetheless. Surprisingly, the lack of information by some voters either has no effect on policy (as long as all voters are fully rational) or if some of the voters are boundedly rational and follow the most plausible behavioral strategy even leads to a policy closer to the standard median voter result.

Lobbying and Elections In the second essay, "Lobbying and Elections", I combine a spatial model of elections with a model of post-election lobbying. So far, post-election lobbying and elections were mostly dealt with in different models. However, Besley and Coate (2001) is an important exception. They use their well-known citizen-candidate framework and find that if citizen candidates with sufficiently extreme preferences are available, lobbying has no influence on implemented policy. I show that this result does not apply in a more realistic model with ideological parties instead of citizen candidates because the parties cannot adjust their policy positions. In a two-party system, even if forward-looking voters are aware that lobbying will take place, their choice between policies is different when lobbies do and do not exist. Nonetheless, voters are often better off with lobbying.

In addition to the main result, I provide a discussion clarifying the reasons for the differences in policy outcomes between the approaches in my paper and in Besley and Coate (2001) on the one hand, and models without elections taking place before the lobbying stage, presented for example in Grossman and Helpman (2001), on the other hand. The differences are not only due to the additional election stage, but also to the fact that my model (as well as that of Besley and Coate) is not a model of special interest, but of general interest lobbying.

Lexicographic Voting In the third essay, "Lexicographic Voting", I combine a spatial model of elections with a model of political accountability in the tradition of Barro (1973) and Ferejohn (1986). The combination of prospective and retrospective voting motives could easily be dealt with in a behavioral framework, but I show that they can also be combined within a rational choice framework. This has the advantage that the internal consistency and the discipline that the rational choice approach imposes are not lost.

I show that as long as preferences are knows with certainty and parties can

commit in advance to the ideological dimension of policy, but not to a maximal level of rent extraction, voters can constrain the latter to the same extent as in a purely backward-looking model. At the same time, the policy preferred by the median voter is implemented as in a standard forward-looking model of political competition. Voters achieve this outcome by following a simple lexicographic voting strategy. They cast their vote in favor of their favorite policy position whenever parties offer different platforms, but make their vote dependent on the incumbent parties' performance whenever they are indifferent. When uncertainty about the position of the median voter is introduced into the model, voters have to accept higher rent payments, but they still retain some control over rent extraction.

A surprising pattern in the results Somewhat unexpectedly, in none of my three essays does the combination of different models lead to policies that differ more from Downs' predictions than the underlying work-horse models I use would predict. Either there is no influence on the policy dimension,[6] or the results actually come closer to Downs' predictions for policy.[7] On the whole, this makes for a rather optimistic assessment of the working of democracy and elections. Of course, the standard caveats apply. Even if a model comes to the conclusion that the preferred policy of the median voter will be implemented, we know that this policy is, in general, not welfare maximizing. However, as long as the distribution of voter preferences is not too asymmetric, the preferences of the median voter might provide an acceptable approximation to a welfare maximizing policy.

The purpose of this thesis is certainly not to assess the general desirability of the policy outcomes in a democratic system. Moreover, the assumptions underlying the rational choice approach might somewhat bias the results towards a positive assessment of democracy. At least this seems plausible following the critique of the rational voter assumption by Caplan (2007). However, and somewhat ironically, the one time I deviated from the rational choice framework in this thesis, I actually found that my alternative behavioral assumptions led to higher expected utility for all voters.

The existence of a stable democracy is an assumption and not an outcome in my papers. In all three essays, the rules of the democratic game are taken as given by

[6] This is the case in first part of the first essay and in the main model of the third essay.

[7] This is the case in the second part of the first essay. Moreover, it is also the case in the second essay if it is interpreted as an extension of a standard lobbying model with additional elections and not the other way around.

voters as well as politicians and they maximize their utility within this given framework. Thus, my work cannot contribute anything new to the important question where and under what circumstance democratic electoral systems can develop and be sustained. A partial exception is only chapter 3, which shows that the monetary contributions of interest groups do not necessarily disturb the policy outcome of the democratic process too much.

Some thoughts on formal modeling and rational choice The rational choice approach to politics is not without its critics (Green and Shapiro 1996; Caplan 2007). Formal models, even if they are not (entirely) based on rational choice motives, are often seen with skepticism by more empirically minded researchers, especially in political science. Rational choice models are criticized for their "unrealistic" assumptions. At this time, we also observe a trend in economics in general and political economics in particular to focus more on empirical work that is probably partly driven by this criticism. Given that there is hardly a well established theoretical alternative to rational choice, empirical research seems to be an attractive alternative for many young researchers at the beginning of their careers.

I do believe in the value of empirical research. However, I also think that theoretical research can still contribute novel and valuable insights to economics and political science. Moreover, I learned from Smith and Ricardo about the division of labor and comparative advantage and believes that my own comparative advantage is within the different fields of theoretical research.

Empirical research provides an important check on theoretical research. However, especially at times in which empirical research seems to be on a forceful rise, theoretical research also provides an indispensable check on empirical work. To give just one example from my research, consider the second essay, "Lexicographic Voting". Empirical researchers often implicitly assume without further justification that prospective and retrospective voting motives rule each other out. My essay shows this not to be the case, even within the strict limits of the rational choice framework. This is an insight that future empirical research will hopefully consider.

Of course, theoretical and empirical research can often be fruitfully combined. However, combining both in one paper restricts the research essentially to theory that leads to results that can be tested directly with existing data. Besides of such work, I see an important role left for more stylized models in the spirt of my thesis. Stylized models are not easy to test empirically. But this does not mean that they are not valuable. Arrow (1963) is a good example of problems whose existence were not

even considered before they were derived with formal methods. The models of Downs (1957) cannot capture the full richness of democratic elections and policy making, but they help to isolate some essential forces of electoral competition whose existence are hardly doubted even by the greatest sceptics of theoretical research. The results in "The Swing Voters' Blessing" may be easy to grasp intuitively once they are established. However, they are in sharp contrast to the results I expected to find before solving the model. They would be difficult to establish and to communicate without the help of formal analysis.

A further advantage of formal models is that the underlying assumptions are made explicit. This is often not the case in purely verbal argumentation and some empirical work.

Combining existing models as a robustness check on core results of political economics One possible reading of many of my results is to see them as a theoretical robustness test on some of the core models commonly used in theoretical political economics. Does combining existing models lead to contradictions or surprising new results?

In many ways, the models I combine and reexamine seem to pass the robustness test rather well. For example, "The Swing Voters' Blessing" shows that the standard information requirements of the median voter theorem are stronger than necessary to derive the standard results. This becomes clear in the extension of the main model where I show that if voters are neither informed about the quality, nor about the policy positions of the politicians the underlying logic of the model still applies and the lack of information has no consequences as long as all voters are rational. Thus, the results in the literature are more robust to lack of information than what seems to be commonly believed.

Chapter 2

The Swing Voters' Blessing*

1 Introduction

When most political economists model elections, the focus is on aggregating individual preferences. Voters disagree on questions of distribution or ideology and elections are a way of deciding which policies are implemented. This literature goes back to the seminal contributions of Black (1948) and Downs (1957).[1] Here, the problem is that voters want different things and elections decide whose preferences prevail. If candidates can commit to policy platforms, as is often assumed in the literature, elections become a way of aggregating conflicting preferences.

A different approach to modeling voting and elections goes back to the Jury Theorem by the Marquis de Condorcet (1785). The idea is to model elections as an information aggregation device.[2] Voters' interests and preferences are aligned and if all voters were fully informed, they would support the same proposition or candidate. Here, the problem is not that voters want different things, but that limited information creates uncertainty about the consequences of a particular election outcome. Therefore, voters who maximize their expected utility need to understand

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[1] For an overview over this literature, see Persson and Tabellini (2000).

[2] Condorcet himself was more interested in the verdict of a jury in a court. For an overview of the information aggregation approach, see Piketty (1999).

that their vote has an impact on the election results only if both sides obtain exactly half of the votes and their vote is pivotal for the outcome of the elections (Austen-Smith and Banks 1996; Feddersen and Pesendorfer 1996, 1997). Voters who do not consider this when making their voting decision can suffer from what Feddersen and Pesendorfer (1996) call "the swing voter's curse". Whenever such a voter actually decides an election with her vote, it is likely to turn out that her voting decision makes her worse off.

In reality, elections aggregate preferences as well as information. There is little disagreement about the fact that voters and candidates have different preferences, for example about the amount of income redistribution. However, voters also have common interests, for example in having a President who is a good crisis manager. Candidates who are aware of their superior abilities might be tempted to let the electorate "pay" by choosing relatively extreme policy positions close to their own bliss point, knowing that they will beat their opponent nonetheless. Therefore, separate modeling of preference and information aggregation might conceal important insights.

1.1 Outline of the model and the results

This paper combines the information aggregation as well as the preference aggregation aspects of elections. In contrast to a similar attempt by Feddersen and Pesendorfer (1999), I allow policy offers to be freely decided by the candidates. As in the information aggregation literature, there is a dimension on which voters agree when they are fully informed and, as in the preference aggregation literature, there is a policy dimension over which voters disagree. Specifically, I model elections with quality or valence[3] differences between two ideological candidates who can commit to policies before the elections. Incomplete information plays a crucial role because the valence differences are only observed by a limited number of voters. However, given the true quality difference, voters agree on who is the candidate whom they prefer to win the election for a given policy position. Voters may prefer the candidate who is ideologically further away from their ideological bliss point if his quality

[3] In the political science literature, quality differences between politicians are often referred to as valence differences. For an early use of the term "valence" in the literature, see Stokes (1963). I use both terms, valence and quality, interchangeably throughout the text.

advantage over the other candidate is sufficiently large.

I show that if uninformed voters follow a simple equilibrium strategy of basing their voting decisions on their own ideological position relative to that of the median voter, the candidate who is preferred by the informed median voter wins. Thus, the uninformed voters effectively ignore the policy platforms of the candidates.

As an example, consider the problem of an uninformed conservative voter deciding between Republican John McCain and Democrat Barack Obama in the 2008 United States presidential elections. Obama's unobserved valence advantage could be so large that the uninformed conservative voter would prefer him if she were fully informed. However, in this case, Obama would not need the conservative voter's support to win the elections because his great appeal to informed voters would ensure his victory even without her vote. The elections are only a close call if McCain has a relatively high valence as compared to Obama. Therefore, the conservative voter knows that she must prefer McCain in case her vote is pivotal.

The uncertainty among uninformed voters makes no difference for the implemented policy as compared to a situation where all voters are fully informed. The candidate with the support of the median voter wins in both cases. Therefore, the candidate with the valence advantage wins. He announces the platform that is as close as possible to his own bliss point without giving the other candidate the opportunity to win the support of the median voter. If the median voter is uninformed, it can be shown that the results for the informed median case provide a good approximation for the uninformed median case, as long as informed voters are located close to the median voter.

The proposed strategy requires the uniformed voters to have a certain amount of sophistication that not every reader might find credible. Therefore, I introduce unsophisticated swing voters into my model to check for the robustness of the results. These uninformed voters do not take into account that their vote makes a difference only if the elections are decided by just one vote. Thus, they vote for the candidate whom they prefer given the unconditional distribution of the valence difference. Because they can only observe the different policy offers by the candidates, their decision is always in favor of the candidate whose policy offer is ideologically closer to their own preferences. They are not only "swing voters" in the sense of Feddersen and Pesendorfer (1996), that is voters who make their voting decision without con-

sidering the fact that their vote only makes a difference when they are pivotal. They are also swing voters in the more common use of the term in the political science literature, that is voters who are likely to switch their support from one party or candidate to a different one. In the terminology introduced by Austen-Smith and Banks (1996), the swing voters in my model vote "sincerely", not "strategically".

It turns out that the majority of voters is better off, in expectation, if such boundedly rational uninformed voters exist. This somewhat surprising result is an application of the second-best principle that introducing an additional distortion into a model may bring the equilibrium closer to the equilibrium without distortion and increase welfare rather than reducing it further (Lipsey and Lancaster 1956). The existing valence differences between candidates "distort" political competition on the policy dimension and lead to results that are different from normal Downsian Competition. The additional distortion of boundedly rational voting brings the results closer to Downsian competition. But just as Downsian competition will not necessarily lead to welfare maximizing results, there is no guarantee that swing voters bring the outcome closer to the utilitarian optimum.

It is illuminating to consider the consequences of swing voters in the Obama versus McCain example mentioned above. An unsophisticated uninformed voter with a bliss point close to, but left of the median voter votes for the centrist McCain if Obama chooses a position far to the left. The existence of such voters forces Obama to stay closer to the median voter than he would otherwise have to in order to win the elections.

Unsophisticated voters make irrational voting decisions, but this turns out to be a blessing and not a curse. They can play a strategy that a rational voter could not commit to because it would not be time-consistent to do so and she would want to deviate after the candidates have chosen their positions. No unsophisticated swing voter has to regret her vote because the candidate with valence advantage wins nonetheless. Her vote could only make her worse off if it were not foreseen by the candidates. But because the candidates know about the existence of swing voters, they adjust their positions. The candidate with the valence advantage wins, but with a more moderate policy position than in the case of full rationality. I call this force of moderation the "swing voters' blessing".

1.2 Related approaches and literature

Feddersen and Pesendorfer (1999) combine motives from the information aggregation with the preference aggregation literature in an attempt at explaining abstentions in a setup where voters' interests are not perfectly aligned. Their main example is a plebiscite over the decision of wether to build a bridge. The main difference as compared to my setup is that the details about the building plans are exogenously given. Feddersen and Pesendorfer also mention the example of different candidates for office, but their framework is ill suited to this application since the policies proposed before elections are not exogenously given. Thus, what is missing to make the model in Feddersen and Pesendorfer an adequate framework for the analysis of elections is a stage of the game in which candidates or parties endogenously decide on policies. With exogenous policy proposals the swing voters' blessing cannot occur.

My model is similar to that in Groseclose (2001) in combining a policy dimension with a candidate quality dimension. However, I focus on uncertainty in the electorate about the quality of the politicians, while Groseclose focuses on uncertainty among candidates about the preferences of the electorate.

In a series of papers by McKelvey and Ordeshook (1985, 1986), uninformed voters use a sequence of opinion polls to infer the truth about candidate positions. However, McKelvey and Ordeshook ignore the strategic aspects of being a pivotal voter that are central to my basic model. Voters simply try to vote for their favorite candidate given their best estimate of the candidates' positions just as is done by the swing voters in the generalization of my model. If the McKelvey and Ordeshook model were formulated as a game, an uninformed voter would have to condition her estimate of the candidates' positions on herself being pivotal. Moreover, the answers to opinion poll questions may be given strategically. McKelvey's and Ordeshook's assumptions could nonetheless be a good description of how boundedly rational voters actually make their voting decision, but there is no discussion of this issue in their papers.

Another paper in the same tradition is Cukierman (1991) whose model is very similar to mine with respect to voters' preferences and information. In contrast to the papers of McKelvey and Ordeshook, voters do not only care about policy, but also about valence. Just as in my approach, some of the voters do not directly observe valence. However, as in the McKelvey and Ordeshook approach, uninformed

voters try to gauge some information from opinion polls and, once more, their voting decisions lack game-theoretic foundations.

An idea related to mine can be found in the recent paper by Bond and Eraslan (2010). These authors endogenize proposals in a Feddersen-Pesendorfer setup. However, they do not model political competition, but rather decision making within a committee as in Feddersen and Pesendorfer (1998), and there is only one offer by an agenda setter, not two offers by competing candidates. Just as in my setup, however, endogenizing positions leads to important differences in the results.

1.3 Structure of the paper

The paper proceeds as follows. In Section 2, the basic model is introduced and discussed. Section 3 allows for some generalizations. In Section 4, swing voters are introduced. The welfare implications of their existence are discussed in Section 5 and Section 6 provides an example with a continuum of voters. The paper ends with a conclusion. A technical appendix contains most of the proofs.

2 The model

Consider a polity with a one-dimensional ideological policy space on the real line $[0, 1]$, two candidates L and R and an odd number n of voters denoted by $i = 1, 2, 3, ...n$. Candidates have quality (also called valence) q_L and q_R, respectively, and a bliss point for implemented policy b_L and b_R, respectively.[4] The candidates' utility is decreasing in the distance of implemented policy to their bliss point and it is given by:

$$U_J(p) = -(p - b_J)^2, \tag{1}$$

with $J = L, R$, and where p is implemented policy.

Just as the candidates, every voter i has a bliss point b_i on the policy space. By assumption, they are all distinct and no two voters have exactly the same preferences. Voters are ordered by their bliss points so that $b_1 < b_2 < b_3$ and so on.[5] Besides

[4] Variables with capital letter subscripts are used to denote characteristics of candidates, while variables with small letter subscripts denote characteristics of voters.

[5] The assumption that no two voters have exactly the same bliss point is a mild one given that

the policy dimension, voters care about the quality of candidates and voter i has the utility function:

$$U_i(b_i, p, q) = -(p - b_i)^2 + q, \tag{2}$$

where $q \in \{q_L, q_R\}$ is the quality of the candidate who wins the elections.[6] Assuming that the (dis)utility from policy does not interact with the quality of the winning candidate as is done here is the most straightforward way of modeling information and preference aggregation in one election. However, the results also hold for more general utility functions where the possible interaction of quality and distance is not ruled out. This is shown in Section 3.3 where generalizations of (1) as well as (2) are discussed.

The median bliss point of the voters is denoted by b_m with $m = \frac{n+1}{2}$. By assumption $b_L \leq b_m \leq b_R$; I thus call candidate L the left and candidate R the right candidate. The difference in quality of the two candidates is denoted by the variable $v = q_R - q_L$, which hence measures the quality advantage of the right candidate. If the left candidate has a quality advantage, v takes a negative value. The values of q_R and q_L are drawn from a continuous distribution function before the candidates announce their position. The cumulative distribution of v is given by the function $G(v)$. By assumption, the corresponding probability density function of $g(v)$ has positive support everywhere on the real line. All players, voters as well as candidates, know the basic structure of the game including the policy preferences of the parties as well as the distribution of the bliss points of the voters.[7]

The sequence of moves is the following: First, nature chooses q_R and q_L. Second, candidates announce the policy platform they propose to be implemented after observing the quality difference v. Third, elections in which every voter casts one vote are held. Some of the voters, the so-called informed voters (their number is n_I), can observe the random variable v and the policy platforms offered by the candidates before they make their voting decision. The so-called uninformed voters (their number is n_U) only observe the policy platforms before they cast their votes. Fourth, the candidate who obtains at least $\frac{n+1}{2}$ of the votes in the elections wins

the probability of two voters having exactly the same position is 0 if all of them are drawn from a continuous distribution function. It considerably simplifies the notation.

[6] This kind of preferences can be called "one and a half dimensional" (Groseclose 2007).

[7] For the basic model it is sufficient if uninformed voters know the position of the median voter.

and his announced policy platform is implemented. Therefore, $p = p_L$ and $q = q_L$ if candidate L obtains more than half of the votes, and $p = p_R$ and $q = q_R$ if he obtains less than half of the votes.

Abstentions are not allowed. This assumption is made to simplify the notation. It is easily verified that in my model, no voter would ever want to abstain in equilibrium. By assumption, the majority of voters are informed, that is $n_I > n_U$.[8]

In the main part of the paper, the median voter is assumed to be informed. A discussion of the model with an uninformed median voter can be found in Section 3.2. There, it is also shown that the main model is a good approximation of this case for "large" electorates.

For the moment, I assume all voters to be sophisticated in the sense that they are able to understand the Bayesian Nash equilibrium of the voting game and play equilibrium strategies. In Section 4, this assumption is relaxed and boundedly rational voters are introduced into the model.

2.1 Solving the model

I begin my analysis at the last stage of the game and solve the problem of the voters after observing the platforms of the candidates. Then, I solve the problem of the candidates when announcing their policy platforms and show what is the equilibrium policy.

2.2 Informed voters

I consider equilibria where informed voters play the weakly dominating strategy of always voting for the candidate whom they favor.[9] It is possible to determine who is the rightmost informed voter weakly in favor of the candidate with the left policy position. Specifically, the cutoff point is the bliss point b^* that makes a voter indifferent between the two candidates. This point is implicitly defined by (2). Equating the utility of voting for the left candidate and voting for the right

[8] This assumption helps avoid implausible additional equilibria with all uninformed voters voting for one party independently of policy positions. The assumption is not necessary for the existence of the type of equilibrium analyzed below.

[9] Without this restriction, it is possible to have equilibria where everybody votes left or everybody votes right independently of the candidates' policy positions, so that none of the voters is ever pivotal.

candidate gives:

$$\Delta U(b^*, p_L, p_R, q_L, q_R) = U(b^*, p_L, q_L) - U(b^*, p_R, q_R) = -(p_L - b^*)^2 + (p_R - b^*)^2 - v = 0. \tag{3}$$

The cutoff point b^* exists for any v as long as $p_L \neq p_R$ and it is uniquely given by:

$$b^*(p_L, p_R, v) = \frac{p_L + p_R}{2} - \frac{v}{2(p_R - p_L)} \text{ for } p_R \neq p_L. \tag{4}$$

All voters with a bliss point to the left of b^* prefer the candidate with the left position, while all voters with a bliss point to the right of b^* prefer the candidate with the right position.[10] Note that the right candidate could, in principle, be located at the left position (if $p_R < p_L$), although this will never be the case in any plausible equilibrium.[11] The intuition for this formula is straightforward. If $v = 0$, the cutoff point is midway between the policy position of the two candidates. A positive v makes the right candidate more attractive and therefore shifts the cutoff point to the left for given policy positions as long as $p_R > p_L$. However, the marginal effect of valence differences on the position of the cutoff point is decreasing in $p_R - p_L$, i.e. the distance in policy. The further the candidates' policy positions are from each other, the more policy matters relative to valence. The reason is that the disutility of distance from the ideal policy point of a voter is quadratic while utility is linear in valence. In the case of large valence differences, it is possible that the cutoff point is to the left of the left policy position or to the right of the right policy position.

The cutoff point between preferred candidates is the same for informed and uninformed voters. The difference between the two types of voters is that uninformed voters do not know where b^* is located since they do not know the valence difference v. However, for informed voters, the voting decision only depends on b^* and therefore

[10] This can be seen from the derivative of the difference in utility from the left candidate's position and the right candidate's position, with respect to a voter's bliss point:

$$d\frac{\Delta U(b, p_L, p_R)}{db} = -2(p_R - p_L) \quad \begin{matrix} < 0 \text{ if } p_R > p_L \\ > 0 \text{ if } p_R < p_L \end{matrix} .$$

[11] In theory, a candidate who knows that he will lose against the other candidate's bliss point with any policy position could choose a position further away from his own bliss point than the other candidates bliss point in equilibrium. Throughout the text, I will use the short expression "vote for the left (right) position" instead of the slightly more precise but cumbersome "vote for the candidate with the left (right) policy position".

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